HEARING OF THE U.S.-CHINA ECONOMIC AND SECURITY REVIEW COMMISSION (AS RELEASED BY THE USCC); SUBJECT: THE IMPACT OF TRADE WITH CHINA ON NEW YORK STATE AND OPPORTUNITIES FOR ECONOMIC GROWTH COMMISSIONERS: CAROLYN BARTHOLOMEW, CHAIRMAN; LARRY M.WORTZEL, VICE CHAIRMAN; PETER T.R. BROOKES; WILLIAM A. REINSCH; DANIEL BLUMENTHAL; DENNIS C. SHEA; ROBIN CLEVELAND; DANIEL M. SLANE; JEFFREY FIEDLER; PETER VIDENIEKS; PATRICK A. MULLOY; MICHAEL R. WESSEL STAFF: MICHAEL R. DANIS, EXECUTIVE DIRECTOR; KATHLEEN J. MICHELS, ASSOCIATE DIRECTOR INTRODUCTORY REMARKS BY: WILLIAM DESTLER, PRESIDENT OF ROCHESTER INSTITUTE OF TECHNOLOGY; WITNESSES: PANEL I: "THE IMPACT OF TRADE WITH CHINA ON NEW YORK STATE" RON HIRA, ASSOCIATE PROFESSOR OF PUBLIC POLICY, ROCHESTER INSTITUTE OF TECHNOLOGY; JOHN PERROTTI, CEO, GLEASON CORP.; WILLY C. SHIH, PROFESSOR OF MANAGEMENT PRACTICE, HARVARD BUSINESS SCHOOL; PANEL II: "THE IMPACT OF CHINESE COMPETITION ON LOCAL COMPANIES AND COMMUNITIES" JAMES V. BERTOLONE, PRESIDENT, ROCHESTER LABOR COUNCIL (AFL-CIO); WILLIAM A. JOHNSON, JR., FORMER MAYOR OF THE CITY OF ROCHESTER, AND DISTINGUISHED PROFESSOR OF PUBLIC POLICY AND URBAN STUDIES, ROCHESTER INSTITUTE OF TECHNOLOGY; ED KOWALEWSKI, DIRECTOR OF INTERNATIONAL TRADE AND INVESTMENTS, UPSTATE EMPIRE STATE DEVELOPMENT CORPORATION; PANEL III: "GOVERNMENT AND INSTITUTIONAL PERSPECTIVES ON CURRENT OPPORTUNITIES FOR GROWTH IN NEW YORK STATE" PETER ROBINSON, VICE PRESIDENT AND CHIEF OPERATION OFFICER, UNIVERSITY OF ROCHESTER MEDICAL CENTER AND STRONG HEALTH; LINDA DICKERSON HARTSOCK, DIRECTOR, CENTER FOR CLEAN TECH ENTREPRENEURSHIP, THE TECH GARDEN; NICHOLAS ROSTOW, UNIVERSITY COUNSEL AND VICE CHANCELLOR FOR LEGAL AFFAIRS, STATE UNIVERSITY OF NEW YORK;  PAUL VARGOVICH, PRESIDENT, NATIONAL SOLAR TECHNOLOGIES; PANEL IV: "ADVANCED R&D IN SUNRISE INDUSTRIES THAT CAN LEAD TO GROWTH FOR LOCAL COMPANIES" NABIL NASR, DIRECTOR OF THE CENTER FOR INTEGRATED MANUFACTURING STUDIES, ROCHESTER INSTITUTE OF TECHNOLOGY; MARNIE LAVIGNE, DIRECTOR OF BUSINESS DEVELOPMENT, UNIVERSITY OF BUFFALO CENTER FOR ADVANCED BIOMEDICAL AND BIOENGINEERING TECHNOLOGY; EDWARD PATTON, DIRECTOR OF SALES AND MARKETING, ROCHESTER PRECISION OPTICS; CLIVE R. BARONS, VICE PRESIDENT, STRATEGY INTEGRATION, FUJI XEROX OPERATIONS; LOCATION: ROOM 2240, LOUISE M. SLAUGHTER

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HEARING OF THE U.S.-CHINA ECONOMIC AND SECURITY REVIEW COMMISSION (AS RELEASED BY THE USCC) SUBJECT: THE IMPACT OF TRADE WITH CHINA ON NEW YORK STATE AND OPPORTUNITIES FOR ECONOMIC GROWTH COMMISSIONERS: CAROLYN BARTHOLOMEW, CHAIRMAN; LARRY M.WORTZEL, VICE CHAIRMAN; PETER T.R. BROOKES; WILLIAM A. REINSCH; DANIEL BLUMENTHAL; DENNIS C. SHEA; ROBIN CLEVELAND; DANIEL M. SLANE; JEFFREY FIEDLER; PETER VIDENIEKS; PATRICK A. MULLOY; MICHAEL R. WESSEL STAFF: MICHAEL R. DANIS, EXECUTIVE DIRECTOR; KATHLEEN J. MICHELS, ASSOCIATE DIRECTOR INTRODUCTORY REMARKS BY: WILLIAM DESTLER, PRESIDENT OF ROCHESTER INSTITUTE OF TECHNOLOGY WITNESSES: PANEL I: "THE IMPACT OF TRADE WITH CHINA ON NEW YORK STATE" RON HIRA, ASSOCIATE PROFESSOR OF PUBLIC POLICY, ROCHESTER INSTITUTE OF TECHNOLOGY; JOHN PERROTTI, CEO, GLEASON CORP.; WILLY C. SHIH, PROFESSOR OF MANAGEMENT PRACTICE, HARVARD BUSINESS SCHOOL; PANEL II: "THE IMPACT OF CHINESE COMPETITION ON LOCAL COMPANIES AND COMMUNITIES" JAMES V. BERTOLONE, PRESIDENT, ROCHESTER LABOR COUNCIL (AFL-CIO); WILLIAM A. JOHNSON, JR., FORMER MAYOR OF THE CITY OF ROCHESTER, AND DISTINGUISHED PROFESSOR OF PUBLIC POLICY AND URBAN STUDIES, ROCHESTER INSTITUTE OF TECHNOLOGY; ED KOWALEWSKI, DIRECTOR OF INTERNATIONAL TRADE AND INVESTMENTS, UPSTATE EMPIRE STATE DEVELOPMENT CORPORATION; PANEL III: "GOVERNMENT AND INSTITUTIONAL PERSPECTIVES ON CURRENT OPPORTUNITIES FOR GROWTH IN NEW YORK STATE" PETER ROBINSON, VICE PRESIDENT AND CHIEF OPERATION OFFICER, UNIVERSITY OF ROCHESTER MEDICAL CENTER AND STRONG HEALTH; LINDA DICKERSON HARTSOCK, DIRECTOR, CENTER FOR CLEAN TECH ENTREPRENEURSHIP, THE TECH GARDEN; NICHOLAS ROSTOW, UNIVERSITY COUNSEL AND VICE CHANCELLOR FOR LEGAL AFFAIRS, STATE UNIVERSITY OF NEW YORK;  PAUL VARGOVICH, PRESIDENT, NATIONAL SOLAR TECHNOLOGIES; PANEL IV: "ADVANCED R&D IN SUNRISE INDUSTRIES THAT CAN LEAD TO GROWTH FOR LOCAL COMPANIES" NABIL NASR, DIRECTOR OF THE CENTER FOR INTEGRATED MANUFACTURING STUDIES, ROCHESTER INSTITUTE OF TECHNOLOGY; MARNIE LAVIGNE, DIRECTOR OF BUSINESS DEVELOPMENT, UNIVERSITY OF BUFFALO CENTER FOR ADVANCED BIOMEDICAL AND BIOENGINEERING TECHNOLOGY; EDWARD PATTON, DIRECTOR OF SALES AND MARKETING, ROCHESTER PRECISION OPTICS; CLIVE R. BARONS, VICE PRESIDENT, STRATEGY INTEGRATION, FUJI XEROX OPERATIONS LOCATION: ROOM 2240, LOUISE M. SLAUGHTER BUILDING, ROCHESTER INSTITUTE OF TECHNOLOGY, ROCHESTER, NEW YORK TIME: 8:45 A.M. EDT DATE: THURSDAY, JULY 23, 2009

MR. DESTLER: I want to welcome the U.S.-China Economic and Security Review Commission to RIT and thank the Commissioners, especially Patrick Mulloy and Dennis Shea, for the recognition of the importance of upstate New York to the American economy.

I also wanted to recognize Ron Hira, Professor of Public Policy here at RIT, who helped organize today's hearing, as well as our own Professors Bill Johnson and Nabil Nasr who will be testifying before the Commission today.

It is my hope that this event will provide USCC with a better understanding of the impact of ***U.S.***-China policies on upstate businesses and communities and ultimately inform ***Congress*** on possible reforms that might enhance economic development in the region.

Upstate New York has traditionally been a strong economic driver, particularly in the manufacturing sector. We've spawned many nationally recognized international corporations in the manufacturing sector, of course, including Kodak, Bausch & Lomb, and Xerox, right here in Rochester.

But the region and our manufacturing industries, in particular, are facing significant competition from overseas, and this competition needs to be addressed, and ways need to be found to assist businesses in retaining and improving market share and growth.

So a review of how ***U.S.*** economic and trade policies with China impact our ability to compete is a significant step in developing stronger federal policies, to improve the manufacturing environment locally and throughout the nation.

So, again, I would like to thank the USCC for its efforts and wish its Commissioners the best today and in the future as you seek to address and improve American economic and security issues.

Welcome to RIT.

1 CHAIRMAN BARTHOLOMEW: Thank you.

Dr. Destler, thank you very ***much*** for your kind and welcoming remarks.

On behalf of all of the Commissioners and the staff of the Commission, I want to thank you for hosting this hearing at this magnificent facility, and I understand that you ***spent*** many years down in the Washington, D.C. area, so-- DR. DESTLER: I did and emerged unscathed.

[Laughter.] OPENING STATEMENT OF CHAIRMAN CAROLYN BARTHOLOMEW CHAIRMAN BARTHOLOMEW: Good morning, everybody, and welcome to today'***s*** hearing on "The Impact of Trade with China on New York State and Opportunities for Economic Growth." I'm Carolyn Bartholomew, the Chairman of the USCC for the 2009 reporting year. Today'***s*** hearing will be cochaired by Commissioners Patrick Mulloy and Dennis Shea.

For those of you who aren't aware of our organization, we are a bipartisan Congressional Commission composed of 12 members, six of whom are selected by the Majority and Minority Leaders of the Senate and six from the Speaker and the Minority Leader of the House. Commissioners ***serve*** two-year terms.

Congress has given our Commission the responsibility to monitor and investigate the national security implications of bilateral trade and economic relations ***between*** the United States and China.

We fulfill our mandate by conducting hearings and undertaking related research as well as sponsoring independent research.

We also travel to Asia and receive briefings from other ***U.S.*** government agencies and departments. We produce an annual report. We provide recommendations to ***Congress*** for legislative and policy changes.

Today'***s*** hearing is the seventh hearing for the 2009 reporting year, a year in which we have already seen dramatic developments in the ***U.S.***-China trade relationship.

Earlier in the year, we had a hearing on China'***s*** industrial policy which supports and nurtures its domestic strategic industries.

Today'***s*** hearing is on the impact of trade with China on upstate New York and the opportunities for economic growth in the region. Upstate New York, as you all know better than we do, has a great industrial base, and we're looking forward to hearing from our panelists about it.

Once a year, in our hearing cycle, we travel somewhere in the country to see more closely what's going on in local communities, so we're really pleased to be here to talk about what's happening in this area.

Before we proceed with the hearing, we'd like to thank Michelle Seger, Associate Director, for her outstanding service and assistance; James Bober, the Lead Engineer, and Neil Kromer and the engineering staff for their A/V assistance in setting up the hearing room; Will Dube for his outstanding support and 2 assistance; and Janice Emerson, who is the General Manager of the RIT Inn and Conference Center, Rita Farsace and Jennifer Harewood for their support and assistance in arranging for all of our logistics.

The staff here has been wonderful to work with and have contributed immensely to the success of this hearing. So we thank everybody very ***much*** for their cooperation and warm welcome.

I would also like to specifically welcome our panelists and ask that you each speak for no more than seven minutes. This will allow the maximum amount of time for questions and answers.

We'll be breaking at noon for lunch, and we'll be resuming at one o'clock p.m. Also, there will be a public comment period from 4:00 p.m. to 5:00 p.m., this afternoon, and there's a sign-up sheet at the press materials table by the entrance.

With that, I'm going to introduce Commissioner Shea who is one of the cochairs of the hearing.

Thank you, again.

OPENING STATEMENT OF COMMISSIONER DENNIS C. SHEA HEARING COCHAIR HEARING COCHAIR SHEA: Thank you, Chairman Bartholomew, and again thanks for everyone coming here today.

I'd like to take this opportunity to invite all of you to visit our Web site, www.uscc.gov, where you'll find many useful items, including our 2008 Annual Report and various research papers on an array of subjects that might be of interest to those present today.

As the Chairman mentioned, today's hearing looks to highlight not ***only*** the impact of trade with China on central and western New York, but also the tremendous potential available for growth and development in the region.

Companies in upstate New York have access to a very well-educated workforce, a strong world-class university system, including RIT as a member, public and private institutions with great R&D facilities, and a state government-- and we'll be hearing from representatives of the state government--that hopes to assist in revitalizing the industrial base of the region.

Furthermore, established companies with rich R&D traditions in the region can help lay the foundations for job creation in the new industries of the future.

We're looking forward to hearing from all of our experts today about these future opportunities.

The transcript of today's hearing will be published on our Web site, and today's written testimony will also be posted on the Web site.

By the end of November, this coming November, our 2009 Annual Report will appear on the Commission's Web site, as well as in the form of a bound paper copy.

I am very, very confident that today's hearing will provide a wealth of information for that annual effort, and I want to personally thank all of our 3 witnesses for taking the time to not ***only*** be present here today, but also to prepare written testimony, and I know putting pen to paper is very, very time consuming.

So we appreciate you doing that.

I'm going to turn over the hearing to Commissioner Mulloy.

OPENING STATEMENT OF COMMISSIONER PATRICK A. MULLOY HEARING COCHAIR HEARING COCHAIR MULLOY: Thank you.

Perhaps our witnesses would want to come up to the witness table. First panel, Dr. Ron Hira, Mr. John Perrotti, and Dr. Willy Shih. If I'm not pronouncing any of your names correctly, let me know.

I am very pleased to have the opportunity to cochair this hearing with my friend and colleague, Commissioner Dennis Shea. And again, I want to thank Rochester Institute of Technology, and with particular thanks to our friend Ron Hira, who has been very helpful to us in getting this organized.

In March, this Commission held a hearing in Washington, in which we looked at China's policy of promoting pillar and strategic industries, meaning key industries that China believes can provide a high tech, high wage society.

This, in my view, is part of the strategy being used by China to build its comprehensive national power and to help China regain its former status as a great power. China was once a great power in Asia; they want it back, and they've developed a strategy to do it.

I have no quarrel with China doing this as long as it's not done at the expense of our own standard of living and our own economic strength.

Unfortunately, I believe the latter is the case, and we must formulate and adopt policies that protect the legitimate interests of our country and the standard of living of our people.

This does not mean I favor provoking a confrontation with China, but rather I believe we can formulate policies that can help maintain our own high tech manufacturing industries. I hope today's hearing can help us better understand the challenges we face and help us think about what policies we might adopt to stop what I think is a decay in our ability.

Now, one of our witnesses today, Dr. Willy Shih, wrote in a recent important Harvard Business Review article entitled "Restoring American Competitiveness" that, quote: "Decades of outsourcing manufacturing has left ***U.S.*** industry without the means to invent the next generation of high-tech products that are key to rebuilding this economy." That's very important what he's saying here, that this outsourcing has now reached the stage where we can't innovate and be the leaders in the next generation. Somebody else is going to be there.

This Commission will make good use of today's discussion when it formulates its Annual Report to ***Congress***.

4 I thank all of our witnesses for putting the effort in and preparing their statements. I also want to thank Senators Schumer and Gillibrand and Congresswoman Slaughter for their interest and support of this hearing. Each of them has put statements in the record, and they're available at the press table.

Now, let me introduce our first panel. Dr. Ron Hira is the Associate Professor of Public Policy at RIT. Prior to joining the university, he worked as a systems control engineer and a program manager for ten years. Among other places, he was at NIST and the George Mason University.

He coauthored Outsourcing America, which had quite an impact in the policy circles in Washington.

Our second witness is Mr. John Perrotti, the CEO of the Gleason Corporation. He has held a variety of positions at Gleason since joining the company in 1986 so you've been there 23 years.

Prior to joining Gleason, he worked for KPMG, an international public accounting firm, but his testimony is very interesting because he's on the ground and has seen what's happening.

Finally, we have Dr. Willy Shih, Professor of Management Practice at the Harvard Business School in Boston. We're very fortunate to get Dr. Shih because he worked right here at Eastman Kodak from 1997 to 2005, and he is one who sees what's happening in our ability to innovate.

So let me welcome all three of you, and if we could just go from Dr. Hira, Mr. Perrotti, and then Dr. Shih. You'll each have about seven minutes, and then we'll open it up, and each Commissioner will get about five minutes to ask questions.

Thank you very ***much***. Dr. Hira.

PANEL I: THE IMPACT OF TRADE WITH CHINA ON NEW YORK STATE OPENING STATEMENT OF DR. RON HIRA ASSOCIATE PROFESSOR OF PUBLIC POLICY, ROCHESTER INSTITUTE OF TECHNOLOGY, ROCHESTER, NEW YORK DR. HIRA: Thank you. Welcome to Rochester and welcome to RIT. I'd like to thank the Commission and the cochairs of this hearing for inviting me to testify today.

Offshoring is one of the most important economic, technological and national security issues this country faces. Yet, we have had a muted and often misleading public discussion about its causes, its impacts, and the appropriate policy and responses we should adopt.

I've been studying offshoring for the past decade, and I believe that the ***U***.***S***. is charting the wrong policy course that, if left unchanged, will significantly erode America'***s*** economic and technological future.

I'll focus my remarks today on the offshoring of innovation and research and development, areas where the ***U***.***S***. is presumed to hold a commanding lead and 5 areas that are widely viewed as keys to our future success.

The dominant narrative given about offshoring is that as the ***U***.***S***. offshores particular jobs, industrial sectors and tasks, it will be a win-win for both the ***U***.***S***. and the receiving country such as India or China. The argument goes that it is good for the ***U***.***S***. to offshore software programming to India or auto parts manufacturing to China because these jobs and sectors will be replaced by better ones. The United States will simply specialize in the high-tech sectors that create high-skill, high-wage innovation and creative jobs to replace those that are lost.

The narrative and its prescriptions rest on a division of labor hypothesis.

The ***U***.***S***. response to increased offshoring should be to move up the innovation and skill ladder. Policy responses aimed at retaining current jobs or industry are deemed as folly.

The story acknowledges that low-skill, low-wage workers will face increased competition from workers abroad, and some may lose their jobs, but it offers a solution for them, too: they can be easily retrained for higher-skill, higher-wage jobs and end up in a better job. Never mind that the Department of Labor itself just sponsored a study that found retraining efforts are largely ineffective.

Also keep in mind that all of this, this dominant globalization narrative, rests on a key assumption: that the ***U***.***S***. is at ***full*** employment, a condition that no economic prognosticator is predicting any time soon. So let'***s*** leave aside the ***full*** employment assumption for now.

What happens to plausibility of this narrative, this dominant narrative, if in reality the tasks and jobs moving to low-***cost*** countries are the very same high-skill innovation and high-tech jobs in which the ***U***.***S***. is supposed to have an advantage? What if the sectors that are lost are the "better" industries, the ones that we're supposed to specialize in? A variety of indicators show that some high-tech jobs and sectors have already moved to low-***cost*** countries like India and China, and there'***s*** even more evidence that this migration will increase in scale and scope.

Princeton University economist and former Vice Chair of the Fed, Alan Blinder, has estimated the vulnerability of all 838 occupations in the Department of Labor categories and found that nearly all science and engineering occupations are vulnerable to being offshored.

And we know that major corporations are rapidly growing their R&D facilities and workers in low-***cost*** countries like India and China. General Electric provides, I think, a very fascinating case study, particularly given the current CEO'***s*** recent op-eds about globalization. Jack Welch, the former CEO of GE, was an early and significant evangelizer of offshoring. The firm now has four research locations worldwide in New York, Shanghai, Munich and

Bangalore. Bangalore's Jack Welch R&D Center employs 3,000 workers, more than the other three locations combined.

And just this week, Reuters had a feature story about how key components of Microsoft's brand-new search engine product, Bing, which is competing with 6 Google, were produced by its R&D center in India. The article also states that networking giant Cisco Systems already does half of its core--its core--R&D work in India.

Further, large losses of ***U.S.*** manufacturing jobs and the worsening deterioration of the goods trade balance over the past decade are very troubling for American innovation. According to the National Science Foundation, manufacturing industries accounted for a whopping 70 percent of all business R&D performed in the ***U.S.***.

The Department of Labor statistics show that more than 40 percent of engineers in the ***U.S.***--and engineers, I believe, and I'm a bit biased because I'm an engineer myself, are the agents for technological innovation--more than 40 percent work in the manufacturing sector, even though with all workers, it's about nine percent or so. So there's disproportionately a large number of engineers that work in manufacturing.

Recent discussions by some pundits that the ***U.S.*** should jettison manufacturing and will simply succeed by specializing in innovation seem to be unaware of these statistics and the ***fact*** that innovation and manufacturing are inextricably linked. Lose manufacturing and you're going to lose innovation.

Now let me turn to the innovation policy responses that we've seen so far from the government. They have been focused purely on the supply side of innovation, on increasing resource inputs into the innovation system, basically increasing R&D ***spending***, increasing the number of scientists and engineers and improving K through 12 science and math education.

This prescription is bound to fail because it assumes that we have a ***U.S.*** economy moored in 1957 that we essentially haven't changed since Sputnik. It's based on a misunderstanding of how R&D is connected to a company's activities and to the general economy.

The purpose of government subsidies for R&D, which I fully support, is not to create research jobs. We're not all going to be researchers. There's ***only*** about a million R&D jobs in the ***U.S.***. It's about .7 percent of the workforce. The sector is simply too small to be a major job creator.

Instead the purpose of subsidizing R&D ***spending*** is the hope that the ***U.S.*** will capture the downstream benefits: the design, development and production jobs that complement and are complemented by those R&D activities.

Yet, we're at a stage where we're unwilling or unable to even discuss how to design policies to capture those downstream fruits of the R&D.

In my written statement, I've provided a number of, I think, concrete policy recommendations that are, to use the phrase of the day, "shovel ready." I look forward to your questions, and again thank you for the opportunity to be here.

[The statement follows:] 7 Prepared Statement of Dr. Ron Hira Associate Professor of Public Policy, Rochester Institute of Technology, Rochester, New York Introduction I want to thank the commission and Chairmen Shea and Mulloy for inviting me to testify here today.

Offshoring is one the most important economic, technological, and national security issues this country faces. Yet we have had a muted and often misleading public discussion about its causes, impacts and the appropriate policy responses. I have been studying offshoring for the past decade and I believe that the ***U.S.*** is charting the wrong policy course that, if left unchanged, will significantly erode America's economic and technological performance. In this testimony, I will focus on the offshoring of innovation and research and development (R&D), areas where the ***U.S.*** is presumed to hold a commanding lead and are widely viewed as keys to our future success.

The dominant narrative given about offshoring is that as the US offshores particular jobs, industrial sectors, and tasks, it will be a win-win for both the US and the receiving country, say India or China. The argument goes that it is good for the US to offshore software programming to India, or offshore auto parts manufacturing to China, because these jobs and sectors will be replaced by better ones. The United States will simply specialize in high-tech sectors that create high-skill, high-wage innovation and creative jobs to replace those lost.

The narrative and its prescriptions rest on a division-of-labor hypothesis: the ***U.S.*** response to increased offshoring should be to "move up" the innovation and skill ladder. Policy responses aimed at "retaining" current jobs or industries is folly. The story acknowledges that low-skill, low-wage workers will face increased competition from workers abroad and some may lose their jobs, but it offers a solution for them too: they can be easily retrained for higher skill and higher wage jobs, and end up in a better job. Also remember that the narrative rests on the fundamental assumption that the economy is at ***full*** employment, a condition that few prognosticators have on their radar screen.

But what happens to the narrative if in reality the tasks and jobs moving to low-***cost*** countries are in the very same high-skill innovation and high-tech sectors in which the United States is supposed to hold an advantage? What if the sectors that are lost are the "better" industries? A variety of indicators show that some high- tech jobs and sectors have already moved to low-***cost*** countries like India and China, and there is even more evidence that this migration will increase in scale and scope, and its growth could be substantial. Princeton economist Alan Blinder estimated the vulnerability to offshoring of all 838 Department of Labor job categories, and found absolutely no correlation with skill level. This means that many occupations requiring advanced skills are vulnerable to offshoring, including nearly all science and engineering job categories. Getting more education or advanced degrees does not make one immune from the negative effects, job and/or wage loss, from offshoring.

Further, large losses of ***U.S.*** manufacturing jobs and the worsening deterioration of the goods trade balance over the past decade are very troubling for those betting on innovation. According to the National Science Foundation manufacturing industries accounted for a whopping 70% of all business research and development (R&D) performed in the United States in 2007. Also, Department of Labor statistics show that more than 40% of engineers, the agents of technological innovation, work in the manufacturing sector. Recent discussions by some pundits that the ***U.S.*** should jettison manufacturing and will succeed by specializing in innovation defy reality. Innovation and manufacturing are inextricably linked and complementary activities. Now let me turn to some worrying indicators about the offshoring of innovation and R&D, which I have documented in more detail in some of my recent papers.

8 Advanced (High-Technology) Trade Balance The United States is running large and growing trade deficits with China in the "advanced technology products" (ATP) category. Advanced technology products, defined by the Foreign Trade Statistics division of the Census Bureau, captures trade in goods (services are excluded) that require a high amount of R&D to produce. The ATP series was created in the late 1980s specifically to more easily identify the ***U.S.*** trade position in high- technology.

The United States began running a trade deficit in advanced technology products in 2002, and that deficit increased to $38 ***billion*** in 2006. ***Much*** of the deficit can be attributed to the rapidly declining trade position with China, dating to its accession to the World Trade Organization in 2001. Looking at exports and imports separately, China ranks number one for both exports and imports. The US exported more ATP, $24 ***billion***, to China than any other country in 2006, up more than two-fold from $11 ***billion*** and 8th place in 2000. But the remarkable story is the massive fivefold increase in ATP imports from China ***between*** 2000-06 going from $12 ***billion*** and 7th place to $73 ***billion*** and a dominant 1st (***Mexico*** is a distant second at $31 ***billion***), accounting for one-quarter of all US ATP imports.

In the case of India, America ran a slight surplus of $2.6 ***billion*** in 2006, up from $913 million in 2000. Exports to India increased from $1 ***billion*** and a rank of 28th in 2000 to $3 ***billion*** and a rank of 20th in 2006. Many predicted that India would become a large market for US ATP exports, as the offshoring of IT services increased. The prediction was that Indian workers would be buying "Dell computers" and telecommunications equipment from Americans. But it simply hasn't materialized. Information and communications ATP exports to India increased a

mere $470 million ***between*** 2003 and 2007, from $650 million to $1.12 ***billion***, while the Indian offshoring industry exploded. The claim that offshoring is a two-way street ***isn't*** supported by the ***facts***.

Science & Engineering Articles A significant output of research activities, especially academic research, is publishing articles. China'***s*** article output increased more than four-fold ***between*** 1995 and 2005 to 42 thousand, moving it from being ranked 14th to the 5th in just a decade. The 2005 Chinese output still significantly lags the US and EU, each in the low 200 thousand range, but it'***s*** now three- quarters the size of Japan'***s***. India'***s*** output, which was nearly equal to China'***s*** in 1995, has increased at a ***much*** slower rate to 15 thousand. It began 1995 and ended 2005 as the 12th ranked country.

A potentially more significant figure is how China has focused its efforts on particular technical fields. The data above include social as well as natural and physical sciences. China appears to investing in the physical sciences, engineering and mathematics. In engineering and chemistry, China became the second leading publisher of articles, supplanting Japan. And in physics and mathematics it moved into third place behind Japan for physics and third place behind France for mathematics. In the leading edge field of nanotechnology, China is now ranked number two, behind the US, in number of nanotechnology papers.

Human Capital Measures Chinese and Indians are responding to the increased opportunities in science, technology, engineering, and mathematics (STEM) occupations, from offshoring as well as overall growth. In India the response has been mostly in the private sector through a proliferation of private colleges and training academies. In China, the state has played a bigger role in expanding the talent pool at all levels with a dramatic difference especially at the doctorate level.

According to the NSF, India'***s*** engineering doctorate production hardly budged from 1989 to 2003, but China'***s*** production increased nine-fold, surpassing Japan in 1999 and America by 2002 to move to first place.

U.***S***. Multinational Corporation R&D Activities in China & India There is no comprehensive list of R&D investments by ***U***.***S***. multinational corporations and they aren't required to disclose geographic segment activities of R&D in financial filings. Below are some of the R&D activities of leading 9 ***U***.***S***. firms that have been reported in the press or by the companies themselves. Two patterns emerge from the data: the R&D activities and investments in India and China are relatively new and they are growing. Figures in the parentheses show the firm'***s*** R&D ***spending*** ranking (for ***U***.***S***.-based firms ***only***) and its ***spending*** for fiscal year 2007.

General Motors (#1, $8.1bn) India The India Science Lab, one of eight General Motors research labs, is located in Bangalore and was established in 2003. More than 70% of its researchers hold a Ph.D. Also, GM has created collaborative research laboratories with two Indian universities to focus on specific R&D topics. GM has nine such labs with universities, and two of the three outside the ***U***.***S***. are in India.

China In October 2007 General Motors announced it would build a wholly-owned advanced research center in Shanghai to develop hybrid technology and other advanced designs. GM already has a 1,300-employee research center in Shanghai through a joint venture with Shanghai Automotive Industry Corporation.

Pfizer (#2, $8.1bn) India Pfizer has been outsourcing significant drug development services to India. 44 new drugs are under clinical trials involving 143 medical institutions and at least 1,800 patients. The company is now looking to expand into drug research in India through collaborations.

China Pfizer has approximately 200 employees at its Shanghai R&D center, which supports global clinical development. It also uses a number contract research firms for some R&D there. It plans significant expansion of its R&D in China.

Microsoft (#5, $7.1bn) India It employs more than 4,000 workers in India. The Microsoft India Development Center (an R&D center) was established in 1998. It has grown to more than ten-fold since 2003 when it had 120 people. With 1,500+ workers now, it is the largest development center outside the ***U***.***S***.

China The Microsoft China R&D Group is over ten years old and currently employs 1,500 workers. Activities are for both localization and global markets. The Microsoft China R&D Group focuses on the five areas of mobile and embedded technology, web technology products and service, digital entertainment, server and tools, and emerging markets. Microsoft broke ground on a new $280 million R&D campus in Beijing in May 2008. In November 2008 Microsoft announced it is significantly expanding its R&D operations in China by investing an additional $1 ***billion*** over the next three years making it the largest R&D center behind the ***U***.***S***.

Intel (#6, $5.8bn) India Intel began with a sales office in 1988 and established an R&D center in 1998. It now has about 2,500 R&D workers in India and has invested approximately $1.7 ***billion*** in its Indian operations. In 2007, Intel'***s*** Bangalore 10 Development center contributed about half the work towards its "teraflop research chip." In September 2008 Intel unveiled its first microprocessor designed entirely in India, and the first time that 45 nanometer technology was designed outside of the ***U***.***S***. The Xeon 7400 microprocessor are used for high-end servers. In 2005 Intel announced a planned investment of $800 million in India to expand research operations and an additional $250 million to launch a venture capital fund targeted at Indian start-ups.

China Intel is building a $2.5 ***billion*** 300 mm semiconductor fabrication facility in Dalian, China, its first fab in Asia. In April 2008 Intel announced a $500 million Intel Capital China Technology Fund II will be used for investments in wireless broadband, technology, media, telecommunications, and "clean tech." The first fund'***s*** size was $200 million. Examples of Intel'***s*** first China Fund company investments include Neusoft Group, Supcon Group, A8 Music, Chinacache International, Chipsbank Microelectronics, DAC, HiSoft Technology International, Kingsoft, Legend Silicon, Montage Technology, and Palm Commerce.

Why the Current Policy Response to High-Technology Offshoring is Insufficient In response to the offshoring of high-tech jobs and tasks an additional narrative supporting status-quo globalization has been constructed. In this muddled tale, the rise of India and China is seen as both a challenge and a boon. In response to the challenge, American workers and companies and industries that cannot take advantage of offshoring must "run faster and jump higher" or "adjust" by moving to new functions or sectors. The proponents argue that innovation is the panacea, and that more public money should be directed to increase ***U***.***S***. technological capacity.

They offer a simple three-ingredient cocktail: increase R&D ***spending*** (and R&D tax breaks); produce more scientists and engineers; and improve K-12 science and math education.

Their primary focus is on increasing resource inputs into the innovation system. But this policy course is misguided because it is based on a misunderstanding of how R&D is connected to a company'***s*** activities and the economy.

First, the purpose of government subsidies for R&D is not to create research jobs, which number about 1 million in the ***U***.***S***., or less than 0.7% of the workforce (less than the number of jobs lost in the past three months alone). The sector is simply too small to be a major job creator now or in the future. Instead the purpose of subsidizing R&D ***spending*** is the hope that the ***U***.***S***. will capture the downstream benefits - the design, development and production jobs that complement and are complemented by those R&D activities. Second, a number of major structural shifts have occurred in the ***U***.***S***. national innovation system (NIS), the term scholars use to describe the complex system that supports the innovation process. Our policies have not kept up with these significant structural and institutional changes affecting the ***U***.***S***. NIS - its elements, institutions and the links ***between*** them. These changes include shifts in the employment relations and the rise of the globally integrated enterprise; the internationalization of ***U***.***S***. universities; and, the uncertainty of the ***U***.***S***. science and engineering labor market.

U.***S***. High-Technology Employment Relations & Rise of Globally Integrated Enterprises During the past two decades there has been a significant shift in the employment relations ***between U***.***S***. employers and their American scientists and engineers. Corporate decisions are increasingly being made with little regard to how it affects workers. IBM, a leading employer, shows how radically these practices have changed over the past 20 years. As recently as 1992 IBM never laid off an employee, but since 2002 it has policies in place that force its ***U***.***S***. workers to train foreign replacements as a condition of severance and unemployment insurance. These practices have become quite widespread in the American technology sector. An American software engineer I know working at a

major semiconductor company put it this way, "The basic plan where I worked was to hire H-1Bs [foreign workers in the United States on temporary work permits], train them, and use them as a way to outsource and transfer technology to China. I trained my replacement who was here on an H-1B visa from India." When asked if he would tell his story publicly, he demurred saying, "The company I worked for required I sign a several page agreement stating I would not discuss company information. My human resources representative and manager both made it clear that the company has never lost any challenge and has gone out of its way to destroy the lives of the 11 people who have caused issues. They tell everybody this, not just me. They would brag about cases." At the same time that this American engineer was training his foreign replacement, the CEO of his company was publicly complaining to Washington policy makers about a shortage of ***U***.***S***. engineers.

U.***S***. corporate leaders have been explicit about how they now manage their technology human resources. For example, in response to the discussion on offshoring and ***U***.***S***. competitiveness, Craig Barrett, then CEO of Intel Corporation, said that his company can succeed without ever hiring another American. And in an article in Foreign Affairs magazine in 2006, IBM CEO Sam Palmisano gave the eulogy for the multinational corporation (MNC), and introduced us to the globally integrated enterprise (GIE). Palmisano said, "Many parties to the globalization debate mistakenly project into the future a picture of corporations that is unchanged from that of today or yesterday....But businesses are changing in fundamental ways-structurally, operationally, culturally-in response to the imperatives of globalization and new technology." The MNC model, where firms replicated their organization for each country where they sold, is now giving way to the GIE model, where firms geographically separate their production from the markets in which they sell. When discussing his firm'***s*** aggressive moves to shift its share of workers to low-***cost*** countries, Ron Rittenmeyer, CEO of EDS, the largest ***U***.***S***.-based IT services firm, said he "is agnostic specifically about where" EDS locates its workers, choosing the place that reaps the best economic efficiency. By 2008, EDS had 43% of its workforce in low-***cost*** countries, up from virtually zero in 2002.

Firms are significant actors in the innovation process, and changes in their behavior will impact the ***U***.***S***. NIS as well as the distribution of its benefits and ***costs***. For example, advanced tools and technologies created or purchased by firms, will likely diffuse ***much*** more rapidly across ***borders*** (be geographically more leaky), giving domestic technology workers diminished preferred-access advantage. There will also be larger shares of technology workers in low-***cost*** countries, and likely smaller workforces in the United States. This will affect new firm creation in the United States because engineers not ***only*** create new knowledge, but are also an important source of entrepreneurship and start-up firms.

These new arrangements will also make innovations less geographically sticky, raising questions about whether promised payoffs to public investments in R&D will be realized. Global firms will have access to knowledge created in low-***cost*** countries, if they aren't creating it themselves, and will be able to diffuse and exploit that new knowledge in their ***U***.***S***. operations.

Low-***Cost*** Countries Attract R&D Sites Another new phenomenon is competition by low-***cost*** countries for R&D site selection. Defying the product lifecycle pattern of technological investments proposed by development scholar Raymond Vernon in 1966, India and China have successfully attracted R&D and innovation facilities. Vernon argued that newly invented products were initially produced in developed countries and ***only*** after they matured did production move to developing countries.

Any R&D done in developing countries would be limited to localization, customizing the product for the domestic market.

Recent surveys of corporate R&D managers indicate that India and China have become ***much*** more attractive as destinations for R&D investments. A survey by the ***U***.N. Conference on Trade and Development of the top 300 worldwide R&D spenders found that China was the top destination for future R&D expansion, followed by the United States, India, Japan, the ***U***.K., and Russia. A survey of 248 R&D managers of ***U***.***S***. and European MNCs, conducted by Thursby and Thursby for the National Academies' Government University Industry Research Roundtable, found more firms had new or planned facilities, "central to overall R&D strategy," to be located in China than the United States, and a large number are slated for India. The study also found that the managers expected

R&D employment growth in India and China, and more respondents expected ***U***.***S***. R&D employment to decline than those that expected it to increase. In 2007 The Economist magazine surveyed 300 executives about R&D site selection. They asked them to name the best overall location for R&D, excluding their home country.

India was the top choice, followed by the United States and China (Canada followed as a distant fourth). Eight of the 12 top 10 R&D ***spending*** companies have R&D facilities in China or India, (Microsoft, Pfizer, DaimlerChrysler, General Motors, Siemens, Matsushita Electric, IBM, and Johnson & Johnson).

While General Electric ***spends*** less than many other firms on R&D it nevertheless provides an interesting case of a company with the majority of its R&D personnel in low-***cost*** countries. Jack Welch, former CEO of GE, was an early and significant evangelizer of offshoring. The firm has four research locations worldwide, in New York, Shanghai, Munich, and Bangalore. Bangalore'***s*** Jack Welch R&D Center employs 3,000 workers, more than the other three locations combined. In fiscal year 2008, 47% of GE'***s*** revenues came from the United States and 84% from outside of Asia. So, clearly those R&D personnel are creating products for the global and high-***cost*** country markets.

The emerging economies of India and China have leap-frogged certain stages of economic development by attracting private-sector R&D production. This may result in greater competition amongst regions for attracting R&D investments. An important rationale for public sector investments in R&D is that it helps to attract co-located private-sector R&D investments. These public-sector investments, often accompanied by tax and other subsidies, may become less effective at attracting those private investments.

Perhaps the most important effect will be felt on the downstream benefits accruing from public investments in R&D, which are often targeted at economic growth and job creation. The payoff from such investments is not the R&D jobs created by government ***spending*** or subsidies, but rather the expectation that the downstream spillover benefits, in the form of start-up firms and design and development and production facilities, will be geographically sticky.

The ***fact*** that China and India are able to attract R&D indicates they have improved their absorptive capacity for the mid-skill technology jobs in the design, development and production stages.

U.***S***. Universities Begin to Internationalize ***U***.***S***. universities, long seen as providing a central role in the ***U***.***S***. NIS, are beginning to internationalize in new ways. While these institutions have traditionally attracted large numbers of foreign students, particularly at the graduate level in science and engineering fields, they are beginning to take their education to foreign students by building campuses and offering STEM degree programs in other countries. Some, like Cornell, already identify themselves as transnational universities.

Offshoring is giving high-quality foreign students new job opportunities in their home countries making it less desirable to come to the ***U***.***S***. to study. Those opportunities are increasingly with ***U***.***S***.- based MNCs, creating new markets for universities. As a result prominent ***U***.***S***. universities are expanding their global footprints, to tap a more geographically diffuse student pool, especially in India and China. While there are no definitive counts of foreign campuses and programs established by American universities, experts believe that more universities, particularly high-prestige ones, are venturing abroad. And the World Bank estimates that 150 of the 700 foreign degree programs operating in China are American. Cornell, which already operates a medical school in Qatar, sent its president to explore opportunities in India in 2007. And Cornell ***isn't*** alone-many other engineering-intensive colleges, such as Rice, Purdue, Georgia Tech, and Virginia Tech, have made similar exploratory visits. Various programs have already been initiated by major engineering colleges. Carnegie-Mellon offers its technology degrees in India in partnership with a small private college there. Students take most of the courses in India, because it is less expensive, and then they ***spend*** six months in Pittsburgh to complete the Carnegie-Mellon degree.

University internationalization is still in its early stages and is still small in scale, but reports indicate that highprestige ***U***.***S***. universities have serious plans in the works to ramp up their overseas operations.

13 Uncertainty for ***U***.***S***. STEM Workers & Students The emerging opportunities for GIEs to take advantage of high-skilled talent in low-***cost*** countries have introduced career uncertainty for the ***U***.***S***. STEM workforce. Many ***U***.***S***.

STEM workers worry about offshoring's impact on their career prospects. According to the Taulbee survey, conducted by the Computing Research Association, enrollments in bachelors programs in computer science dropped an astounding 50% from 2002 to 2007. Rising risks for job loss in information technology, caused in part by offshoring, was a major factor in students shying away from computer science degrees. Other factors, such as the bursting of the dot-com bubble and record unemployment levels for IT workers, were also important contributors. But even as those factors have been mitigated, enrollments have not come back.

Offshoring concerns have been mostly concentrated on IT occupations, but many other STEM occupations may be at risk. Blinder examined all 838 occupations as defined by the Bureau of Labor Statistics. He estimated that nearly all (35 of 39) STEM occupations are offshorable, many of which he describes as "highly vulnerable." By vulnerable, Blinder is not claiming that all, or even a large share, of jobs in those occupations will actually be lost overseas.

Instead, he claims that those occupations have characteristics that mean they will face significant new wage competition from low- ***cost*** countries. Blinder finds that there is no correlation ***between*** vulnerability and education level; i.e., even occupations that require advanced education and skills are vulnerable.

Workers need to know which jobs will be geographically sticky and which are likely to be offshored. But because offshoring of white- collar jobs is still an incipient phenomenon, there is a great deal of uncertainty about how globalization will affect the level and mix of domestic STEM labor demand. The response of some workers appears to be to play it safe and opt for occupations that are likely to stay. Longer-term impacts on the national innovation system are unknown but likely to be significant.

How Globally Integrated Enterprises Are Responding to Competition We have an excellent case study for how these dynamics will play out in the near future. One of the most important high-technology stories of the past decade has been the remarkably swift rise of the Indian IT services industry, including firms such as Wipro, Infosys, TCS, and Satyam, as well as ***U***.***S***.-based firms such as Cognizant and iGate that use the same business model. There is no need to speculate about whether the Indian firms will eventually take the lead in this sector; they already have become market leaders. By introducing an innovative, disruptive business model, the Indian firms have turned the whole industry upside down in the matter of four short years. ***U***.***S***. IT services firms such as IBM, EDS, CSC, and ACS were caught flat-footed.

Not a single one of those firms would have considered Infosys, Wipro, or TCS as direct competitors as recently as 2003, but now they are chasing them by moving as fast as possible to adopt the Indian business model, which is to move as ***much*** work as possible to lowcost countries. The speed and size of the shift is breathtaking.

The Indian IT outsourcing firms have extensive ***U***.***S***. operations, but they prefer to hire temporary guest workers with H-1B or L-1 visas. The companies train these workers in the United States, then send them home where they can be hired to do the same work at a lower salary. These companies rarely sponsor their H-1B and L-1 workers for ***U***.***S***. legal permanent residence.

The important lesson though is how the ***U***.***S***. IT services firms have responded to the competitive challenge. Instead of investing in their ***U***.***S***. workers with better tools and technologies, the firms chose to imitate the Indian model by outsourcing jobs to low-***cost*** countries. IBM held a historic meeting with Wall Street analysts in Bangalore in June 2006, where the whole IBM executive team pitched their strategy to adopt the Indian offshore-outsourcing business model, including an additional $6-***billion*** investment to expand its Indian operations. IBM's headcount in India has grown from 6,000 in 2003 to 73,000 in 2007 and is projected to be 110,000 by 2010, which will rival the current ***U***.***S***. headcount of 115,000. And IBM is not alone. Accenture passed a historic milestone in August 2007, when its Indian headcount of 35,000, surpassed any of its other country headcounts, including the United States, where it had 30,000 workers. In a 2008 interview, EDS's Rittenmeyer extolled the profitability of shifting tens-of- thousands of the company's workers from the United States to low-***cost*** countries such as India. He said outsourcing is "not just a passing fancy. It is a pretty major change that is going to continue. If you can find high-quality talent at a third of the 14 price, it's not too hard to see why you'd do this." ACS, another IT services firm, recently told Wall Street analysts

that it plans its largest increase in offshoring for 2009, when it will move many of its more complex and higherwage jobs overseas so that nearly 35 percent of its workforce will be in low-***cost*** countries.

What We Should Do Most of the responses to offshoring will be done in the private sector, by firms and individuals, but governments can and should play a more significant role in ensuring that globalization works for the national interest. Given the speed by which offshoring is increasing in scale, scope and moving up the skill ladder, a number of immediate steps should be taken.

A. Establish a Dedicated Standalone FFRDC to Study the Globalization of Innovation Princeton'***s*** Alan Blinder has likened the economic transformation caused by offshoring to be equivalent on scale to the industrial revolution. The stakes are simply too large for the country not to invest in a better understanding of the economic impacts and policy implications of offshoring. Existing institutions cannot provide objective and unconflicted advice and analysis because they all have significant limitations. The scale of the ***problem***, and its growth rate, requires a budget of at least $40 million per year for a new FFRDC dedicated to studying offshoring. Its agenda would be far ranging from advising the agencies on data collection to generating policy alternatives for creating geographically sticky jobs. The FFRDC should be created in a new organization, rather than an existing contractor to ensure that its functions and mission are focused and its resources are not poached by the parent organization.

Many academics, especially those in business schools, have set up research agendas studying ways that make offfshoring more efficient and effective, essentially speeding up the offshoring trend. This is understandable given the operating model of most universities. Faculty respond to incentives and to date there have been no incentives to study offshoring from a ***U***.***S***. national interest perspective. The government is the ***only*** institution that can fill this breach.

B. Create the Environment for Worker Representation in the Policy Process Imagine if a major trade association, such as the Semiconductor Industry Association, was excluded from having any representatives on a federal advisory committee making recommendations on trade and export control policy in the semiconductor industry? It would be unfathomable. But we have precisely this arrangement when it comes to making policies that directly affect the STEM workforce.

1. Government advisory boards, such as the National Science Board, should be required to have members that represent the interests of American STEM workers.

2. Organizations that fall under the FACA rules should ensure that STEM workers are represented on committees that make recommendations on policy issues that affect workers.

C. Collect Additional, Better, and Timelier Data There is a consensus that poor data has severely limited analysis of, and policy as well as private responses to, the globalization of innovation and R&D. To remedy this situation, the National Science Foundation should work with the appropriate agencies (BEA, BLS, and Census) to begin collecting additional and timelier data on the globalization of innovation and R&D. The broad-based effort should include a number of new initiatives.

1. The NSF Statistical Research Service (SRS) should augment existing data on multinational R&D investments to include detailed STEM workforce data. This data will track the STEM workforce for multinational companies in the ***U***.***S***. versus other countries. Details should include occupation, level of education, and experience. These data will be reported on an annual basis and in a timely manner such that the data are from the most recent fiscal year reported by the companies.

2. The NSF SRS should collect detailed information on how ***much*** and what types of R&D and innovation activities are being done overseas.

15 3. The NSF Social, Behavioral, and Economic Sciences (SBE) division will begin a research program identifying the characteristics of jobs that make them more or less vulnerable to offshoring. The program will include a study of estimating the numbers of jobs that have been lost to offshoring.

4. The NSF should make an assessment of the extent of ***U***.***S***. university globalization. It should then track trends in university globalization.

5. NSF SBE will identify the impacts of university globalization on the ***U***.***S***. STEM workforce and students.

NSF SBE will begin a research program identifying and disseminating best practices in university globalization.

6. The NSF should conduct a study to identify the amount and types of ***U***.***S***. government procurement that are being offshored.

7. The BEA should implement recommendations from prior studies, such as the 2006 study by MIT'**s** Industrial Performance Center, to improve its collection of services data, especially trade in services data.

D. Create Better Career Paths for STEM Workers STEM offshoring has created a pessimistic attitude about future career prospects for incumbent workers as well as students. New programs are needed to create better career paths for STEM workers including improved continuing education, a sturdier safety net for displaced workers, improving labor market signals and career information, expanding the pool of potential STEM workers by better utilizing workers without a college degree, and improving rates of successful re-entry into the STEM labor market after voluntary and involuntary absences. No American STEM worker should be forced to train his foreign replacement because of government designed loopholes in ***immigration*** policy.

1. The government should encourage the adoption and use of low- ***cost*** asynchronous on-line education targeted at incumbent STEM workers. The program would coordinate with the appropriate scientific and engineering professional societies. The pilot program will assess the current penetration rates of on-line education for STEM workers and identify ***barriers*** to widespread adoption.

2. Using H-1B fees, the ***U***.***S***. Department of Labor should work with the appropriate scientific and engineering professional societies to create a pilot program for continuous education of STEM workers and to re-train displaced mid-career STEM workers. Unlike prior training programs, these ones should be targeted at jobs that require at least a bachelors degree.

3. The NSF SRS should issue a report on improving the dissemination of STEM labor market signals, and begin reporting these data on a monthly basis. The report will assess the current state of labor market signals, and ways in which they may be distorted.

The focus of the report is how workers and students receive information on the current and future prospects for specific STEM careers. The report will identify the appropriate data from the Department of Labor including data series such as JOLTS, DWS, and BED.

4. The National Academies should form a study panel to identify on-ramps to STEM careers for students who do not go to college. This study will identify how many workers enter STEM careers without formal college degrees. And it will identify the ***barriers*** for additional workers, without college, to enter STEM careers and ways to overcome those ***barriers***.

5. The National Academies should identify effective strategies for STEM workers to more easily re-enter the STEM workforce. STEM workers are more likely to leave the workforce, voluntarily and involuntarily, for extended periods of time.

6. Extend TAA to services workers since many STEM workers work in the services sectors.

7. Fix the broken high-skill ***immigration*** system by encouraging the best and brightest from abroad to stay permanently and reducing our reliance on guestworkers. First, fix permanent residency pathways by increasing the overall quota for high-skill permanent residents. We should move towards a two channel approach in permanent residence, with a new merit point system quota coupled with a reduced reliance on employer based sponsorship. Second, the loopholes in the H-1B and L-1 visa guestworker programs should be closed. These loopholes enable

employers to pay below-market wages and exploit vulnerable guestworkers, harming American and foreign workers alike. These H-1B and L-1 reforms should ensure that employers look for American workers first, pay market wages, and not displace American workers. As part of the broader ***immigration*** reform policies, place the ability to set ***immigration*** quotas in the hands of 16 an independent body that monitors the labor market. This allows the board to adjust the new flow of immigrants to real needs by the US economy. Former Secretary of Labor Ray Marshall has developed proposals on how such a board could be operated.

E. Improve the Competitiveness of the Next Generation of STEM Workers As universities globalize and multinational firms take the latest tools and technologies to STEM workers in low-***cost*** countries, American STEM workers must find new ways to compete. They can compete by finding new opportunities and niches in the types of jobs and tasks that will remain geographically sticky to the United States.

Those opportunities and niches for American STEM workers need to be identified. Entrepreneurship and innovation training have been identified as a comparative advantage, for American STEM workers, have yet to be fully exploited.

1. The National Academies will form a study panel to identify the types of curricula reform that are needed, if any, in response to globalization. The aim is to ensure that US STEM students graduate with the best skills to compete in the world.

2. The National Academies will form a study panel to examine best practices in teaching innovation, creativity and entrepreneurship specifically target to STEM students.

3. The National Science Foundation will encourage study abroad programs for STEM students to improve their ability to work in global teams.

F. Public Procurement Should Favor American Workers Government procurement has been one of the primary areas of outsourcing policy debate, since about forty states have legislation either pending or passed that restricts offshore outsourcing to some degree. Tennessee was the first state to pass this kind of legislation, but it is likely to pass in many more states. An outright ban does not make sense, but instead we should take a pragmatic approach to what should and should not be outsourced overseas. A simple one-size-fits-all approach just does not work.

American taxpayers have a right to know that government expenditures at any level are being used appropriately to boost innovation and help ***U***.***S***. workers. The public sector-federal, state, and local government-is 19 percent of the economy and is an important mechanism that should be used by policymakers. There is a long, strong, and positive link ***between*** government procurement and technological innovation. The federal government funded not ***only*** most of the early research in computers and the Internet but also was a major customer for those technological revolutions. Also, our ***billions*** in defense expenditures have helped to fund technological innovations, such as the Internet, that have commercial applications.

The first step is to do an accounting of the extent of public procurement that is being offshored. Then the government should modify regulations to favor STEM intensive work staying in America.

G. Establish Tax & Trade Policies That Put ***U***.***S***. On Equal Footing In Attracting High-Wage STEM Jobs ***U***.***S***. tax and trade policies currently discourage investments by companies in high-wage STEM jobs. Changes should be made to tax and trade policies to improve America'***s*** ability to recruit and retain R&D and innovation facilities.

1. Investigate "unfair" trade practices such as linking market access to a country with technology transfer, undervalued currencies, and theft of intellectual property.

2. Fix the perverse loopholes that provide firms a tax advantage for keeping profits overseas.

3. Explore more fundamental tax reform where corporate tax rates are scaled by the kinds of jobs they have in the US. It would offer lower rates for companies with high-wage jobs and higher rates for low-wage jobs.

HEARING COCHAIR MULLOY: Thank you, Dr. Hira.

Mr. Perrotti.

17 OPENING STATEMENT OF MR. JOHN PERROTTI CEO, GLEASON CORP., ROCHESTER, NEW YORK MR. PERROTTI: Good morning. Gleason Corporation is headquartered here in Rochester, New York. It was founded in 1865 and is a producer of gear production equipment or what falls into a category called machine tools. Gleason is a global company. We've got about 2,400 employees around the world. We do business in 40 countries. 80 percent of our business in the last few years has been outside of the United States.

The machine tool industry is an interesting industry to study. The machine tool industry is the engine of manufacturing. It's not somebody producing components, but it's the machinery and technology that's used to produce those components.

The United States used to be the world leader in machine tool technology as recently as the 1980s. Today, the United States is barely in the top ten. The world leaders today are Germany, Japan, Switzerland. The Taiwanese and the Chinese are also world leaders. They produce more machine tools than the United States, albeit at a somewhat lower technological level.

So Gleason's competition is primarily German, Japanese. We do compete to some extent with the Chinese in their local market, but make no mistake, the Chinese are gaining technically because part of what technology does is flatten the competitive playing field. Technology becomes an enabler where companies can advance with their own products at a more rapid rate. So we are conscious of our Chinese competitors as we develop our strategies.

China has become the center for manufacturing in the world. It's not a phenomenon unique to the United States in terms of seeing China grow its manufacturing base ***much*** faster than the United States. Last year China consumed 25 percent of the machine tools in the world. So one out of every four machine tools in the world has been purchased by China. That's twice as many as the next country, which was Japan.

I should also mention that the United States historically for many years was the largest consumer of machine tools, and that no longer occurs. I think that's a commentary about the decline of manufacturing in the United States. We can cite that as an outsourcing of jobs, but I think it's a greater reflection of public policy and other priorities in many respects.

China is an important market for Gleason. When one out of every four machine tools in the world is being purchased in China, if you don't have a strategy to compete in China, you don't have a business.

Fortunately, for Gleason, we've been doing business in China since the early 1970s. Gleason was actually the second company after Boeing to sell products into China after the Nixon administration trade talks in the early '70s.

We have over 2,000 machines in China of which 70 percent of those machines came from our factory right here in Rochester, New York. For Gleason Corporation, worldwide, last year, one-third of our orders came from China. For 18 Gleason Corporation in the second quarter, just ended June 30, two-thirds of our machine orders came from China.

As such, Gleason understands that to maintain leading market share in China, it's very difficult to do it from thousands of miles away. You need to have more of a local presence. So, in the past two years, Gleason has opened two small facilities in China, in Suzhou China, southeast China. ***We only*** have about 40 people there in total, but we are starting to manufacture some products in China.

The good news is that's actually creating work here in the United States because many of the components that they're using are still being made here in Rochester, New York. And these are sales we otherwise wouldn't get. These are sales that we would be losing to our other competitors.

What is the Chinese government doing to support or subsidize their industry? It's clear that the Chinese pick certain industries as important.

Countries like Germany, Japan, China, if you were to ask them, machine tools would be in their top ten. In the United States, I'm not sure machine tools honestly make the top 50 in terms of industries people think as vital to the survival of the country.

The incentives that the Chinese offer are not ***much*** different than if you went to New York State Economic Development. They'll offer tax holidays.

They'll offer training grants. There may be low-***cost*** loans. They are encouraging R&D centers to locate there. They do put a higher premium on that. Ten years ago, perhaps just getting simple assembly work was important to them. Today, they are looking to bring in companies with more advanced technology.

The Chinese companies have other advantages. Many of them today are still state-owned. They are going through privatization. Some of our local competitors there at one point were state-owned today are privately owned, so they are going through a privatization process.

But the state-owned companies do have an advantage. Many of them still operate under a model which is volume-driven and profitability ***isn't*** so important.

They have access to capital that in a free market one might not have such access to. They do benefit from lower raw material ***costs***, lower energy ***costs***, many of these through governmental programs and subsidies.

So the overall ***costs*** of doing business, not just labor ***costs***-- but the overall ***costs*** of doing business in China are lower. But we're even seeing those ***costs*** of doing business increasing further in this country.

And why is Gleason in China? Gleason is in China not to make it an export hub, not to chase low labor ***costs***, because for most manufacturers, labor is a relatively low percentage of their product ***costs***. We're in China because one out of every four machine tools in the world is being purchased in China, and if you aren't there, then you are not going to be able to compete in this market. So we're in China to be closer to our customer.

There is no doubt there are companies that have moved operations to China to try to make it an export hub because the reality is there is a lower ***cost*** of doing business there.

19 I see my time is expired, but what I will say in terms of what ***U.S.*** policy needs to focus on, in my judgment, is the things that will create a healthy economy here in the United States are the same things that will help us compete with the Chinese. To blame any of our economic ***problems*** on the Chinese I think would be misguided. It's the things we need to focus on here, starting with talent.

My greatest challenge as CEO of Gleason, and relative to our operations in the United States, is a lack of high-level technical talent. Yes, we need machinists, but even more importantly than that, I need high-level engineers.

Today, to find high-level engineers, I have to hire those from abroad, and then to bring them to the United States, it's quite an exercise to try to get them to come here because of some of the ***immigration*** rules and to keep them here.

That's a serious ***problem***, and it honestly makes a CEO of a multinational company sometimes wonder if it's worth it when you have the option to do it in other places. So talent is at the top of the list.

And beyond that, then, it's the common things you hear about, which I hate to recite, but they're true: the issue of taxes; the issue of regulatory ***costs***; energy; health care; all the things you read about everyday involving companies that have no interaction with China, either China as a competitor or China as a market.

Those are the things that ultimately will enable ***U***.***S***. companies to succeed, to grow, to be able to export, and to create jobs.

[The statement follows:] Prepared Statement of Mr. John Perrotti CEO, Gleason Corp., Rochester, New York My name is John Perrotti. I am President and Chief Executive Officer of Gleason Corporation ("Gleason") which is headquartered in Rochester, New York. Gleason, founded in 1865, is the world'***s*** leading provider of gear production solutions. Our company designs and manufactures advanced machinery and tooling used in producing all types of gears. We have approximately 8,000 customers around the world operating in a variety of industries including automotive, energy, truck, construction, industrial equipment, aerospace, marine and power tools.

Gleason is a global company. We have nine manufacturing plants around the world including three in the United States, our in Europe and three in Asia. Our three factories in Asia include two small facilities recently opened in Suzhou, China to support that rapidly expanding market. Gleason sells to over forty countries each year with 75% to 80% of our total sales outside of the United States. To support our global customer base we have 2,400 employees located in twenty countries throughout the world.

Gleason participates within an industry sector called "machine tools". Machine tools are metalworking machinery that have sophisticated computer-based motion control systems which allow the machine to perform a range of tasks with high productivity and repeatability while achieving high precision levels.

Machine tools represent the "engine" of manufacturing and the advances in machine tool technology have been a vital part of the remarkable strides made in manufacturing productivity in the past decade. The United States as recently as the 1980s was the global leader in this technology and in the production of machine tools, but today with a general decline in manufacturing within our country, the United States is now barely in the top ten producing countries of machine tools. Japan and Germany, who consider machine tools as vital to their long-term economic prosperity, have emerged as the technology leaders. China and Taiwan are also top 20 producers of machine tools, but typically with less technologically advanced products. In the past two years China has consumed 25% of all the machine tools produced in the world. China is purchasing more than two times the amount of machine tools compared to the next highest country. The United States had historically also been the largest global consumer of machine tools. This again highlights a worrisome trend about the state of manufacturing within our country.

With compelling statistics such as China purchasing one out of every four machine tools in the world it becomes apparent that participants within our industry need to actively ***serve*** this market. Fortunately for Gleason, we have a long history in China. My understanding is that Gleason was the second company (after Boeing) to ship product to China in the early 1970s after trade was established under the Nixon administration. Our sales and service branch in China started in 1985 and currently there are more than 2,000 of our machines installed in China. In 2008, Gleason Corporation on a global basis had record high new order levels with approximately one-third of those total orders coming from customers in China.

In the second quarter ended June 30, 2009, China accounted for two- thirds of our new order volume for machines albeit at lower levels than last year due to the global recession.

Today, we have approximately 60 employees located throughout China supporting our sales and service activities. In the past two years, we have started producing machines and the consumable cutting tools used on our machines in Suzhou, China. Today our manufacturing presence in China is on a relatively small scale with about 40 employees and a few million dollars of sales from the products we produce there, but we realize to succeed in the long-term in this large and growing market we need to have an even greater local presence.

One of Gleason'***s*** largest factories is located here in Rochester. This factory makes advanced machinery for the production of bevel gears. This factory similar to our entire company counts China as one of its key markets. More than 70% of the total machines that Gleason has shipped to and installed in China over the past thirty five years were produced in our factory in Rochester.

I cannot state strongly enough that the Chinese market is critical to Gleason'***s*** future growth and survival.

The growth in the Chinese economy has had a direct and significant benefit for Gleason in the past and its importance in the future appears even greater. However, Gleason is not alone in selling its products into the Chinese market. Because of the technical sophistication of our products most of our competitors are European and Japanese. These competitors are very aggressive in selling their products into China and are also establishing local operations to manufacture and support their products. There are Chinese companies manufacturing products similar to ours, but they are generally still perceived to be a level lower in terms of technology. Our local Chinese competitors are a mix of state-owned enterprises and privately owned Chinese companies. Today, our Chinese competitors are primarily ***serving*** their local market and are ***only*** exporting a small percentage of their products. However, each year they advance further in their technological development and no doubt will become global competitors in the not too distant future. These Chinese firms are aggressive and are continuing to invest with the ability to acquire the same advanced components and production equipment we use to manufacture our products. Chinese universities are graduating more than ten times the number of engineers compared to the ***U***.***S***. which will form a strong and technically competent labor base for the future. I see the emergence of China as not totally different from the rise in the manufacturing base in Japan and Korea over the past decades.

Of course, one potential difference is the involvement of the Chinese central government in sponsoring these industries. The Chinese have certain industries which they see as critical to their long-term growth and security. They recognize machine tools as one of these key industries. As such the machine tool companies which are state-owned companies have access to capital which in a true free market would probably not be so readily available. Certain of these companies would not survive based upon their own financial performance.

Universities are subsidized to support research and development of higher level engineers and certain incentives are offered to multinational companies, particularly those bringing advanced technology or R&D 21 centers, to China. Incentives for companies to expand in China are not so different than those generally offered by state governments within the United States, including tax holidays, training grants and low-***cost*** loans. In addition as a result of certain government policies many of the basic expenses of doing business, including health care, energy, acquisition of certain raw materials and regulatory ***costs*** are less in China compared to many other countries. As their currency is not freely traded, many economists estimate it is artificially weaker by some 40% further fueling Chinese manufacturers' ability to export. China also has significantly lower corporate tax rates than the United States, but this unfortunately is not that unusual as most of the industrialized world has lower corporate tax rates compared to our country and our state.

Why did Gleason decide to establish a local manufacturing presence in China? The primary reason being it is now the largest single global market for our products and still growing at a double digit percentage annual rate. Our European, Japanese and Chinese competitors continue to expand their capabilities in ***serving*** this market. Gleason to compete effectively must have a robust local infrastructure in order to provide pricecompetitive products and the required technical support to our customers. Because of the geographic distance and language ***barriers*** in doing business in China the ***only*** way to have significant market share for certain products is to be present in the local market. We manufacture some of the key sub-assemblies for the products we make in China here in Rochester creating incremental business which would otherwise not exist.

Gleason did not begin production in China to capitalize on low labor rates or to make it an export hub for our products. We may export from China in the future but our primary mission is to ***serve*** the large and growing local market. Another objective in expanding in China is to build our technical staff which can bring value to us not ***only*** in China, but on a global basis. With manufacturing becoming a smaller part of the overall ***U***.***S***. economy, one of the unfortunate consequences is the supporting infrastructure including university research, supply chain and availability of technical talent is diminishing within our country. We find ourselves more and more looking abroad for higher level technical talent. Gleason positions itself as the technology leader within our industry so this is an area where can make no compromises. We must have the best and brightest engineers to maintain our market leadership.

So what government policies would Gleason like to see to support our continued success and ability to create jobs here in the United States? First, we cannot afford any form of protectionism, certainly not when our global competitors are under no such restrictions. We cannot let political agendas interfere with free trade.

There are certain minimum expectations we should have of our trading partners, but these expectations need to be aligned with the global community or else we will put American companies at a severe disadvantage which will have far worse consequences than what one was trying to guard against in the first place. I have a personal core philosophy of "starting with the man in the mirror". Blaming China, for example, for the decline in our manufacturing base or job losses is energy largely wasted in my judgment. The majority of the manufacturing jobs lost in our country and state over the past two decades are generally not because the "jobs have been shipped to China" but because the jobs in many instances have been replaced by automated solutions. For example, a battery of five Gleason machines today can do what fifty machines used to do twenty years ago. Today there is typically one person operating the five machines compared to what may have been fifty operators creating the same output in the past. By the way, the Chinese today employ fewer in manufacturing jobs compared to just a few years ago because of the very same automated solutions which they now use in their factories. However, it is clear that building and maintaining a strong manufacturing sector seems to be a more critical priority for many countries, including China, than for the ***U***.***S***.

Have ***U***.***S***. companies shifted some of their manufacturing capacity to China; the answer is clearly "yes". The reasons why will vary by company, but in part it is to support that growing market as is mainly the case with Gleason and in part it is because there is generally a significantly lower ***cost*** of doing business-all around, not just labor ***cost***. For most producers the direct labor ***cost*** is a relatively small component of their overall product ***cost***. It is all the items discussed previously including taxes, regulatory and health care ***costs*** where ***U***.***S***. policy can help manufacturers.

22 In addition to lowering the ***costs*** of doing business, companies need the basic skill sets in their talent pool.

Government needs to focus more intensely on education all the way from basic math and science skills to higher level research. Many of the qualified higher level engineers are from different countries that come here for their advanced education. We should be honored and look at this as a great opportunity to retain this talent to work and contribute to American companies. However, many of these talented young people face severe hurdles to remain in this country and to practice what they have learned here. Even if these uniquely talented individuals were allowed to remain in this country they may choose not to with growing tax burdens and the ***cost*** of living within the ***U***.***S***. In today'***s*** world, people are very mobile and we as a country need to be more competitive to incent people with advanced levels of education to live here. As I stated earlier, finding and developing high level engineering talent in the ***U***.***S***. is one of Gleason'***s*** foremost challenges.

To achieve long-term economic prosperity requires government policies which are not ***only*** pro-trade but recognize this as one of the cornerstones of economic growth and national security. Significant trade imbalances driven by tariff rates, for example, must be rectified over time. However, these decisions again must be guided by economic fairness for global consumers and not clouded by other issues.

The easing of policy restrictions in certain areas including with EXIM Bank which is used to finance product sales to developing countries and export control laws on technologically advanced products to certain endusers should also be considered to put American companies on even footing with foreign competitors.

In summary, doing the right things to help our economy at home in terms of creating a more "business friendly" environment - lower taxes, sensible regulation, improved education, and greater support of research at both the university and private levels-are what will allow American businesses to succeed by exporting more of their products and creating new jobs.

HEARING COCHAIR MULLOY: Thank you, Mr. Perrotti. Very helpful.

Dr. Shih.

OPENING STATEMENT OF DR. WILLY C. SHIH PROFESSOR OF MANANGEMENT PRACTICE, HARVARD BUSINESS SCHOOL, BOSTON, MASSACHUSETTS DR. SHIH: Chairman Bartholomew, Commissioners, Commission staff, thank you very ***much*** for the invitation to speak with you today.

I think you're addressing a very important topic. As was mentioned before, I ***spent*** 18 years in the computer industry. I started my career at IBM in Poughkeepsie, New York. And I came here to Rochester in July 1997 and assumed the position as President of Digital and Applied Imaging, which represented Kodak'**s** nascent efforts in the consumer digital arena.

I was then President of the Display and Components business unit, and simultaneously led Kodak'**s** Intellectual Property strategy until I left the company in February 2005.

I'm pleased to tell you that both my daughters completed their high school education here in Rochester.

Professor Gary Pisano and I recently published an article in the current issue of the Harvard Business Review entitled "Restoring America'**s** Competitiveness." In this article, we argue that as a consequence of not thinking about potential long-term implications of some types of outsourcing as well as 23 faltering investment in research, the ***U***.***S***. has lost or is on the verge of losing its ability to develop and manufacture many high-tech products.

We talk about the idea of an "industrial commons"--the collective R&D, engineering, and manufacturing capabilities in a region that sustain innovation.

Historically, the "commons" refer to the land where animals belonging to people in the community would graze. Commons did not belong to any one farmer, but all farmers were better off for having access to it. We describe an industrial commons in an analogous fashion embodying the R&D know-how, advanced process development and engineering skills, and manufacturing competencies related to specific technologies.

One finds such resources embedded in companies, universities, often even in different intermediate customers and users in the value network. The capabilities in an industrial commons sustain all the companies that access it, and it is the foundation of capabilities upon which other companies can build.

I want to give you some examples. When I came to Kodak, one of the efforts I was to lead was the establishment of a digital camera business. I think everyone in the region certainly remembers that George Eastman built the Eastman Kodak Company on his innovations in roll film. And for a century, Kodak made its profits on film. Cameras were a vehicle, if you will, for the film to be consumed. The company made low-***cost*** cameras for the mass market, but it let the mid and high-end of the camera business shift to Japan in the 1960s and 1970s. It was kind of hard to make money in cameras, but the profits were in film anyways.

Now digital cameras were different. There was no film, but now in a turnabout, the components of the camera became key generators of value.

Consumers wanted zoom lenses, but the industrial cluster, or commons, for lenses was in Japan. Digital cameras used electronic image sensors, a technology invented in the United States that had migrated to Japan with the rest of the consumer electronics industry when Asian companies started to build camcorders.

And, of course, the coolest thing about a digital camera was the ability to view a picture immediately on the little electronic display. That was another technology invented in the United States that had moved to Asia. We talk about the loss of the display industry in the paper as well and the consequences of that.

So there was no commons, or capabilities, in the United States, or specifically in Rochester, to develop and manufacture a product whose technological underpinnings all came from the United States, many of them from Kodak'**s** own research labs, as a look at Kodak'**s** patent portfolio will show.

Did I outsource digital cameras to Asia? Actually we bought a company in Japan that was well-connected to the commons in the greater Nagano region so we could tap into that cluster of resources. That was where we did our

camera design and manufacturing initially. Ultimately, we moved camera manufacturing to China where ***costs*** were lower because if we wanted the American consumer to purchase our products, and the United States is far and away our largest market, we had to be price competitive at retailers like Wal-Mart. Assembly labor ***costs*** were substantially less in China, and the ***cost*** differential would have made us woefully 24 uncompetitive if we had assembled cameras in the United States.

Could we have done manufacturing in Rochester? Actually we tried. We had set up a highly-automated assembly line at the former Elmgrove site on the west side of town, but it was not as flexible as the manufacturing in Asia, nor was the ***cost*** competitive, and almost all of the components would have had to come from Asia in any case because they simply aren't made in the United States.

So what was the lesson there? 30 years ago, manufacturing sophisticated cameras was less important than the manufacture of film. So Kodak and others let the commons wither away. Was it a sensible decision at the time? In isolation, probably. A colleague of mine who was the president of a second-tier Japanese camera company once told me, "In the film era, we camera manufacturers never made money; Kodak made all the money on film." He said that with a residual tone of bitterness as his was one of the companies that never made any money on cameras.

But then a technological shift happened and the decisions made 30 years ago suddenly had irreversible consequences.

I could give you some other examples, but, you know, let me look at the subject of batteries. You know, Kodak was in the battery business, and it wasn't the largest player, but the battery manufacturers in the ***U.S.*** kind of ceded the rechargeable battery business to the Asians because we weren't interested in the consumer electronics business. Now, there'***s*** this little company called BYD in China, who is the second-largest manufacturer of lithium ion batteries.

They also make cars. I was just in China for several weeks, and we used a little taxi company, and one of their taxis was a BYD car so we were riding around in it all the time.

BYD has announced their intention to produce electric cars. Let'***s*** see.

World'***s*** second-largest battery manufacturer and a maker of cars. The Chinese government strategically is using the transition to hybrid and electric vehicles as an opportunity to assert global leadership in the next generation of automobiles unburdened by a gasoline-powered vehicle manufacturing infrastructure.

So why do managers make these seemingly short-sighted decisions to outsource in the first place? More often than not, I would argue it'***s*** not driven by greed, but it'***s*** driven by ***cost*** pressure and the need to be competitive.

If you ***spend*** any time analyzing retail sales, you find American consumers are very ***cost*** conscious; price matters a great deal. And a lot of manufacturing outsourcing is driven by pure labor ***cost*** arbitrage. So once a major player outsources in an industry, everybody else is forced to follow. So short-term decisions, as I've said, about the commons can have a ***much*** longer-term impact.

Just some other thoughts. I think other countries for years have been strategically thinking about industries they want to foster and grow. Taiwan is a good example, which now has the bulk of the semiconductor foundry industry in the world.

China'***s*** 863 program, , so named because it was launched in March of 1986, targets specific industries and competencies that the country wants to do.

25 We comment further in our article, which I'll incorporate by reference, on some of the things that Washington and companies operating in America need to work together to reinvigorate this industrial commons and restore our competitiveness. I think it'***s*** a long-term issue, and my hope is that the Commission will be able to highlight the importance of these issues.

Thank you very ***much***.

[The statement follows:] Prepared Statement of Dr. Willy C. Shih Professor of Management Practice, Harvard Business School, Boston, Massachusetts Co-Chairman Shea, Co-Chairman Mulloy, other panel members, commission staff, and other distinguished guests, good morning, and thank you for the invitation to speak with you this morning. I believe that you are addressing a very important topic, one that has had a significant impact on the region, and America as a whole.

I would like to begin with some background on myself. I began my professional career in the Hudson Valley, at IBM Corporation in Poughkeepsie, in downstate New York. I ***spent*** fourteen years at IBM, followed by another four years at two other computer companies, the Digital Equipment Corporation in Maynard, Massachusetts, followed by Silicon Graphics Computer Systems in Mountain View, California. In July 1997, I came to the Eastman Kodak Company here in Rochester, and several weeks later assumed the position of President of the Digital and Applied Imaging unit, which represented Kodak'**s** nascent efforts in the consumer digital arena. The team that I was privileged to lead there was a great team, and I was with that business until the end of 2003. I then was President of the Display and Components business unit, and simultaneously led Kodak'**s** Intellectual Property strategy until I left the company in February 2005. It was a period of great excitement, and of some real ups and downs. When I worked at Kodak my family and I lived in Pittsford, not far from here, and I am pleased to tell you that both of my daughters completed their high school education here.

I subsequently joined Thomson, a French company, and was based in Princeton, New Jersey but I also had offices in Burbank, California and Paris, France. Thomson, I should mention, owned what remained of the RCA Corporation, the pioneer in recorded music, radio, and of course color television, having received it as part of a famous "trade" with GE.

I joined the faculty at the Harvard Business School in January 2007, where I have been teaching in the second year of the MBA program as well as the Executive Education program. The focus of my research there has been on companies operating in Asia in technology sectors, and I just returned from my seventh trip to Asia this year, where we have major research studies going on in China and Taiwan.

Professor Gary Pisano and I recently published an article in the current issue of the Harvard Business Review entitled, "Restoring America'**s** Competitiveness." In this article, we argue that as a consequence of not thinking about potential long term implications of some types of outsourcing, as well as faltering investment in research, the ***U***.***S***. has lost or is on the verge of losing its ability to develop and manufacture many high-tech products. We talk about the idea of an "industrial commons" - the collective R&D, engineering, and manufacturing capabilities in a region that sustain innovation. Historically, the "commons" referred to the land where animals belonging to people in the community would graze. The commons did not belong to any one farmer, but all farmers were better off for having access to it. We describe an industrial commons in an analogous fashion, embodying the R&D know-how, advanced process development and engineering skills, and manufacturing competences related to specific technologies. One finds such resources embedded in companies, universities, often even the different intermediate customers and users in the value network. The capabilities in an industrial commons sustain all the companies that access it, and it is a foundation of capabilities upon which those companies can build.

26 It was during my years at Kodak, when I made many trips a year to Asia, that I started to think a lot about this topic.

Let me give you some examples that illustrate the often unforeseen long term consequences of letting a commons erode.

When I came to Kodak, one of the efforts I was to lead was the establishment of a digital camera business. I think everyone in this region certainly remembers that George Eastman built the Eastman Kodak Company on his innovations in roll film. And for a century, Kodak made its profits on film - cameras were a "vehicle" for the film to be consumed. The company made low ***cost*** cameras for the mass market, but it let the mid and high end of the

camera business shift to Japan in the 1960s and 1970s. It was very hard to make money in cameras, but the profits were in film anyways.

Digital cameras were different. There was no film, but now in a turnabout, the components of the camera became key generators of value. Consumers wanted zoom lenses, but the industrial cluster, or commons, for lenses was in Japan. Digital cameras used electronic image sensors, a technology invented in the United States that had migrated to Japan with the rest of the consumer electronics industry when Asian companies started to build camcorders. And the coolest thing about a digital camera was the ability to view the picture immediately on a little electronic display.

That was another technology invented in the United States that had moved to Asia. We talk about the loss of the display industry and the consequences in our article as well.

So there was no commons, no capabilities, in the United States, or specifically in Rochester, to develop and manufacture a product whose technological underpinnings all came from the United States, many of them from Kodak'***s*** own Research Labs, as a look at Kodak'***s*** patent portfolio will show.

Did I outsource digital cameras to Asia? Actually, we bought a company in Japan that was well connected to the commons in the greater Nagano region of Japan so that we could tap into that cluster of resources. That was where we did our camera design and manufacturing initially. Ultimately we moved camera manufacturing to China, where ***costs*** were lower. Because if we wanted the American consumer to purchase our products, and the United States was far and away our largest market, we had to be price competitive at retailers like Wal- Mart. Assembly labor ***costs*** were substantially less in China, and the ***cost*** differential would have made us woefully uncompetitive if we had assembled cameras in the United States. We did do ***much*** of our firmware and software in the United States, in Rochester and in Lowell, Massachusetts.

Could we have done manufacturing in Rochester? Actually, we tried. We had set up a highly automated assembly line at the former Elmgrove site. But it was not as flexible as manufacturing in Asia, nor was the ***cost*** competitive.

And almost all of the components would have come from Asia in any case, because they simply were not made in the United States.

Was there a lesson in this? I think so. Thirty years ago, manufacturing sophisticated cameras was less important than the manufacture of film. So Kodak and others let the commons wither away. Was it a sensible decision at the time? In isolation, probably. A colleague of mine who was the president of a second tier Japanese camera company once told me, "In the film era, we camera manufacturers never made money.

Kodak made all the money on film." He said that with a tone of residual bitterness, as his was one of the companies that had never made money on film cameras. But then a technological shift happened, and the decisions made thirty years ago suddenly had irreversible consequences.

Let me give you another example. In my last year at Kodak, I managed what was then called the Display and Components business. Ching Tang, a scientist at Kodak Research Labs, discovered the phenomena know as organic electroluminescence back in the late 1980s. This is the foundation for a technology called OLED, which stands for organic light emitting display. Some of you may have seen Sony'***s*** remarkable OLED television, and I was just talking to an Asian display manufacturer last week who said OLEDs would be the next big thing for them.

But here was the ***problem***. Fashioning a display out of OLED materials required the capability to fabricate large 27 thin film transistor arrays on thin sheets of glass, as is done in the LCD flat panel display industry. LCD flat panel displays were invented in the United States as well, but the capital ***costs*** and the skills for that type of manufacturing left these shores in the 1990s, for Japan, Korea, Taiwan and now China. For a while I considered the possibility of purchasing the manufacturing tools and setting up a line in the United States. But essentially every other such production line in the world was located in Japan, Korea, Taiwan, or China. If a tool went down and one needed a service call in Taiwan or Korea, a technician could come over in maybe 20 minutes. In the United States,

it might take a week. We ended up setting up a joint venture production line in Japan, because you need access to a production line if you want to commercialize this type of technology. ***Much*** of the innovation and the obstacles to commercialization were in the manufacturing process. The commons did not exist in North America, a result of decisions made a decade earlier, by other companies.

Let me look at the subject of batteries. Kodak developed some pretty advanced battery technology too, but was not the ***U***.***S***. market leader. Who would have thought that batteries, rechargeable batteries, would become so important an area? Certainly not the other large ***U***.***S***. based battery manufacturers, who didn't really want to chase the rechargeables market. Most innovation in batteries in recent decades has been driven by the demands of consumer electronics products for portable power in small packages. So when ***U***.***S***. companies largely abandoned the "mature" consumer electronics business, the locus of R&D and manufacturing - not just for the laptops, cell phones, and such but also for the batteries that power them - shifted to Asia. The Chinese company BYD is now the second largest manufacturer of lithium ion batteries in the world. And BYD is also an auto manufacturer. When I was in China over the last few weeks, we used quite extensively a little taxi company with two cars, one of which was a BYD, so we rode around in it quite a bit. It was not a bad little car - it reminded me of where Korea was 10 years ago, and of Japanese cars from the mid 1980s. BYD has announced their intention to produce electric cars, and I believe the Chinese government strategically is using the transition to hybrid and electric vehicles as an opportunity to assert global leadership in the next generation of automobiles, unburdened by a gasoline powered vehicle manufacturing infrastructure.

Why do managers make these seeming short-sighted decisions to outsource in the first place? More often than not, it is not driven by greed, but it is driven by ***cost*** pressure and the need to be competitive. If you ***spend*** any time analyzing retail sales, you find that American consumers are very ***cost*** conscious - price matters a great deal. A lot of manufacturing outsourcing is driven by pure labor ***cost*** arbitrage, the ability to reduce ***costs*** by taking advantage of lower factor ***costs*** in another geography. But when a major player in an industry outsources an activity, cuts funding for long-term research, and gains a short-term ***cost*** advantage, competitive pressure often forces rivals to follow suit. Next potential employment opportunities shrink, experienced people change jobs or move out of the region, and students shy away from entering the field. Eventually, the commons loses the essential critical mass of work, skills, and scientific knowledge and can no longer support providers of upstream and downstream activities, which are, in their turn, forced to move away as well. Short term decisions, which might make sense in their own context, have the longer term potential to impact strategic control points for future technologies.

The ***problem*** I am describing has been years in the making. It is the consequence of what I sometimes call "logical incrementalism," in which individual decisions made with a local context and shorter horizon, seem to make sense.

But taken together, the long term consequences are not what we bargained for.

Having said this, I don't think all outsourcing is bad. The global model of vertical specialization and sequential production that we live in today has brought dramatic improvements in the standard of living to many people, especially here in the United States. And there are many things that are outsourced from the United States that are jobs people here would not, or could not do. We as a country need to look forward, and think carefully and strategically about what we do want to keep, and what do we want to nurture for the future. We need to recognize areas that embody capabilities that will be the underpinnings of important technologies for the future, and we need to recognize that the capacity to undertake advanced process engineering and complex manufacturing is important to continued innovation.

Other countries have for years thought strategically about the industries that they want to foster and grow. I am not 28 speaking just of China. Japan in the 1970s, Taiwan in the 1970s and 1980s, Singapore, Korea, all have exhibited visionary thinking and planned for the long term. One of my good friends and colleagues was one of the fathers of the semiconductor industry in Taiwan. As a government researcher, he was part of the original team that travelled to RCA in New Jersey, to transfer its CMOS process to Taiwan. He then ***spent*** the next thirty years of his life trying to foster the development of the right types of capabilities within local industry. They put a lot of energy and government funding into the growth of a commons, through its Industrial Technology Research Institute, which

he ultimately headed. Today Taiwan has 70% of the world's semiconductor foundry capacity, and they are recognized as world leaders not only in semiconductors, but in LEDs, PC design, and information displays.

China's "863" program framed its long term technology development goals in 1986. Subject areas included information technology, biotechnology and advanced agricultural technology, advanced materials, energy technology, and resource and environmental technology. It targeted specific product categories and know-how that the country needed to develop. This program was not about currency manipulation or trade barriers, it was about what capabilities the country wanted to establish, what strategic industries they wanted to foster. China as well as other nations were only too happy to see the American companies abandon area after area in pursuit of short term profits. Should we fault them for capitalizing on our myopia? So what do we do? I think Washington and companies operating in America need to work together to reinvigorate the industrial commons. A few of the things that we suggest in our article include: Reverse the slide in the funding of basic and applied science. Government funding for basic research has been flat to declining over the last six years, and funding for applied research has dropped sharply. Historically, government programs like the DARPA VLSI program in the early 1980s or National Science Foundation funding of the NSFNet have had led to ground-breaking innovation and growth of entire new industries.

Focus resources on solving "grand challenge problems." Programs like the sequencing of the human genome, big complex problems like climate change, such problems require tremendous resources and coordination. We rally to such challenges in this country. And the benefits in generating new capabilities in universities, companies and the commons are lasting and profound. But that also means that we have to look at the granting process, and move it beyond the safe and incremental to the higher risk, higher return cross discipline challenges that the U.S. is supremely good at tackling.

We suggest that companies need to make capabilities the main pillar of their strategies. Capabilities are the foundation on which innovative products are built. There are some exemplary upstate companies in this regard - Corning and IBM Research.

Companies need to stop blaming Wall Street for short-term behavior. I understand why it happens, the pressure for short term earnings can be huge. But I think this is a matter of choice for executives. Again, to cite Corning, there stock has had its ups and downs. But when you talk to people responsible for the long term strategy of the company, they think about the next 150 years and invest for the long term. And they end up having the stockholders they deserve.

Company managers need to recognize the limits of financial tools. I have worked in a company where every key R&D project was evaluated by a tool called net present value or NPV. I suspect one reason they did this was it relieved top executives of the need to understand the details of the projects, including their longer term strategic implications. The problem with a lot of these tools is that you need data in order to use them. And data is only available on the past, and good data is really only available on the distant past. Informed judgment is a better guide to making such decisions than analytical models loaded with arbitrary assumptions.

We all need to reinvigorate basic and applied research. I've cited Corning and IBM as great New York State examples. Locally the University of Rochester, R.I.T., Kodak's Research Labs, Xerox, U. of R.'s Laser Energetics Lab, there are rich resources and capabilities in the area.

29 There are many things we as a country can do to set ourselves on a better course for the future. The Federal government, and to a lesser extent state governments have long played a role in supporting technological innovation.

As we discuss in our article, programs like DARPA's VLSI Program, the National Science Foundation Network, the sequencing of the human genome - these programs produced tremendous benefits by creating capabilities in universities and companies - and in the commons. And the Albany Nanotech initiative is making the Hudson Valley a key development area in the future of microelectronics and nanotech. The recent groundbreaking of the new GlobalFoundries fab in Luther Forest is a testimony to this, and it complements the ongoing investment by IBM in

microelectronics at East Fishkill. These are all steps that hold great promise for upstate New York, as long as we train people for the new types of jobs that they will create.

I hope we can turn our recognition of the challenges we face into concrete steps that will start to address this ***problem***. ***Only*** by rejuvenating our high-tech sector can we hope to return to the path of sustained growth needed to pay down our enormous deficits and raise our citizens' standard of living.

Thank you very ***much*** for your attention.

Panel I: Discussion, Questions and Answers HEARING COCHAIR MULLOY: Thank you, Doctor. Very important testimony.

Now we'll start the questioning. Commissioner Blumenthal.

COMMISSIONER BLUMENTHAL: Thank you all very ***much***. It was very interesting and useful testimony.

I'm going to throw out a couple comments and questions and have you answer them together. One thing I did not hear ***much*** about is China itself. What you said about the Gleason Corporation, that made a lot of sense to me. China is a huge market, and it'***s*** kind of a good news story for you in many ways. You want to export machine tools to China because it'***s*** a growing economy, and it'***s*** at a certain phase, and it needs these machine tools.

The ***problems*** are back here is what you said--the ***immigration problems***, the need for capturing human talent, and nurturing it and keeping it here in the United States--but it doesn't seem to me that any of you said it'***s*** anything China itself is doing unfairly.

It sounds more like we have some fiscal, ***immigration***, and other types of ***problems***, back here that are hurting us. That'***s*** just one comment I'd want you to respond to.

Dr. Hira, the one thing that I'm puzzled about is this trade in advanced technology surplus. When you look at the World Economic Forum Competitiveness Index, we're still at the way top and China is way behind us, and even with all the ***problems*** that you mentioned, I wonder, what do you mean by advanced technological products? Is there a particular--Dr. Shih pointed out the lithium business--but are there are particular sectors or industries or companies that the Chinese are really developing in terms of competing or are putting out or actually pushing out our top most innovative companies? Do you see that coming down the line? I wanted a little bit more specificity in terms of what we mean by advanced technological 30 products and which companies and which sectors are actually in some trouble.

And then I would just throw out the general comment, going back to the Gleason Corporation'***s*** testimony, which is would you all agree with the statement that attracting the best human talent to the United States and keeping it here is something that we can do ***much*** better than the Chinese, and is that something we should focus on as an answer to some of these ***problems***? So each one of you. Start with Dr. Hira, and go down.

DR. HIRA: Sure. Let me address this issue of whether, what China is doing actively to attract R&D centers. If you talk to people who are in the business, what they'll say, and they don't want to say this on the record very often, what they'll say is that there'***s*** a linkage. If you want to take, if you're a foreign multinational corporation, and you want to take advantage of the low ***cost*** production work, you need to transfer technology; you need to establish an R&D center in China as kind of a quid pro quo.

COMMISSIONER BLUMENTHAL: Is that illegal? Is that wrong? Is that unfair? Is that against obligations? DR. HIRA: I do not know if it'***s*** illegal or not. I think fairness is a normative judgment. It is active policy. As far as everybody I've spoken to, there'***s*** a consensus that this goes on.

COMMISSIONER BLUMENTHAL: So should we be doing that in response? DR. HIRA: I think that we should have active policies to promote R&D centers being established in the ***U.S.***, but I think we need to go beyond that, and that'***s*** part of what I get into in my testimony.

For example, in New York State, we have a major center in nanotechnology and nanoelectronics in Albany. We're subsidizing that in a big way. The R&D.

But what's more important is not to create R&D jobs, but it's the downstream benefits. The design, development and production jobs hopefully will be co-located or, as a taxpayer in New York, that those jobs will stay within New York or at least in the U.S., and I don't think we're talking about those kinds of policies.

We've been instead just talking about the R&D. The R&D is not the end.

It's a means to an end.

COMMISSIONER BLUMENTHAL: Right.

DR. HIRA: And it's only a piece. It's a necessary but not sufficient part of the policy that we need to have, and we're not having that discussion, at least within R&D policy and industrial policy.

COMMISSIONER BLUMENTHAL: My time has gone over so I'd like to just hear some remarks from the rest of you on the immigration and human talent issues.

MR. PERROTTI: Well, let me get to that. The first part of your question I think was essentially talking about is there a level playing field to compete on, and the answer is probably no. But is there a level playing field to compete on with the Japanese, with the Koreans? You know there are all kinds of different barriers that one faces competing in the world in terms of labor markets, regulations, tariffs, 31 and so forth.

Is the Chinese situation perhaps a bit more skewed? Yes. But, again, from my perspective, I try not to so much to focus on that. I really try to focus on what we need to do as a company because I don't think the playing field is so skewed that it's an unwinnable situation.

Relative to the issue of talent, yes, absolutely. As I said in my comments, we need to rebuild a manufacturing infrastructure in this country, and it starts with high-level talent and innovation. That will be the engine that will help us to rebuild the manufacturing infrastructure in this country.

COMMISSIONER BLUMENTHAL: Thank you.

HEARING COCHAIR MULLOY: Dr. Shih, did you want to comment? DR. SHIH: Let me just add that I think what China is doing, as Mr.

Perrotti said, is no different than what Japan, Korea, Taiwan and Singapore, other countries have done. It does have the advantage of what is perceived to be an enormous domestic market.

COMMISSIONER BLUMENTHAL: Right.

DR. SHIH: Which is what helped the United States in the 20th century and the late 19th century. And that's a huge advantage, and selling access to that market essentially is a big difference.

I'd just mention that import substitution is a major drive in China, as it was in Japan and Taiwan earlier and Korea earlier, and there is a strong notion of national champions as well.

As far as particular sectors, one day this country will wake up to what has happened in semiconductors and optoelectronics and communication technology and display technology, a whole host of high- tech areas.

As far as attracting the best talent, one telling observation--I agree with everything that has been said. Certainly after 9/11, for understandable reasons, we have made it much more difficult for people to come to the United States.

COMMISSIONER BLUMENTHAL: Yes.

DR. SHIH: One of my colleagues in Taiwan told me in the 1990s, 95 percent of the top engineering graduates in Taiwan came to the United States.

COMMISSIONER BLUMENTHAL: Right.

DR. SHIH: And he said today zero percent come to the ***U.S.***. 95 percent go to China COMMISSIONER BLUMENTHAL: Thank you.

HEARING COCHAIR MULLOY: Commissioner Shea.

HEARING COCHAIR SHEA: I too want to thank the panelists. I think you've made, each of you have made great presentations. I just want to, again, thank you for that.

I just have a couple of questions. I was hoping--I think Dr. Hira touched upon it briefly--but I was hoping if all the panelists could describe the importance of innovation, research and development being geographically proximate to the manufacturing process? So, in other words, if the manufacturing process is leaving the United States, that impacts the ability to do effective research and 32 development because you need to be close to the production line.

I was wondering if you could just generally talk about that, and if you can give me an example, or maybe you disagree with this proposition? Secondly, this might be for Dr. Shih, but I'd appreciate the other panelists' views. You talk about incrementalism. If you're a CEO of a company and you can outsource a design, outsource production, lower your ***costs***; you have pressures from shareholders; you have pressures from Wall Street analysts to meet projections. How do you tell a CEO not to do that if that is a rational decision? And I think Dr. Shih is saying that it might be rational for that particular moment, but the effect, the cumulative effect of all these rational decisions is negative for the United States? I want to explore that a little bit.

So why don't I start with you, Dr. Hira.

DR. HIRA: Sure. I think that there'***s*** been a couple of trends within R&D management, management of R&D, over the past 30 years or so. One of the big ones is the shorter time cycle, and so companies don't do basic research. You know our imagination of the Watson labs and GE'***s*** research labs, and what not, or Xerox PARC, for example, is an anachronism. It'***s*** not true today.

What they're doing is if a product doesn't look like it'***s*** going to be commercializable within three years or so, they're not doing that research and development. It'***s*** ***much*** more applied research, ***much*** more development. So heavy on the "D," a little bit of "R." And as a result, I think there needs to be a ***much*** tighter link, and I think co- location becomes a bigger issue with the production side of things, and so I think there'***s*** a stronger pull from manufacturing reaching back into the research and development, and I think you see that trend in terms of companies in general.

Regarding your last point, I think it'***s*** a really important one. This is not a blame game; right. The CEOs who are making these decisions are not Benedict Arnold'***s***, as one former presidential candidate tried to label them. They're making rational decisions based on their incentive structure. We have to think about how we recreate those incentives, both through carrots and sticks, through incentives and disincentives, so that their interests are aligned with the country'***s*** interests.

We have to be grown up enough to realize that what'***s*** in the interest of IBM is not necessarily in the interest of the ***U.S.***, but you better believe that IBM'***s*** CEO and their team are going to lobby for things that are in the interest of IBM even if it'***s*** at the expense of the ***U.S.***.

HEARING COCHAIR SHEA: Mr. Perrotti.

MR. PERROTTI: Relative to your first question, yes, having research and development-- ultimately, it needs to be near the manufacturing infrastructure because the two need to go hand-in-hand. Yes, there are advanced tools

today where you can follow the sun and, you know, with the beauty of the Internet and many technologies can do more and more things remote.

But in our world, particularly with complex technologies and products, you really need to have those things in close proximity, which is why it's so important for us to be successful in the United States to have this higher level talent nearby.

33 We can't rely on doing the engineering in Europe or Asia because it's not just about creating technology. It's being able then to commercialize it and the production process related to that.

Relative to CEOs and why they make certain decisions, I think-- HEARING COCHAIR SHEA: Are you publicly traded? MR. PERROTTI: We used to be.

HEARING COCHAIR SHEA: Okay.

MR. PERROTTI: We are privately owned now.

HEARING COCHAIR SHEA: Does that mean easier? MR. PERROTTI: It does.

[Laughter.] MR. PERROTTI: That's a whole another day. I've lived on both sides of that ***fence***, but what has made America great are many things, but one of them is its embracing capitalism, and, yes, capitalism perhaps in some cases has been misapplied, but in general being profit-driven leads to a lot of good things, and we should never try to extinguish that, and with some of the tax burdens people face, one of the reasons people don't want to stay in this country is because of things like taxes and the ***cost*** of living here.

And we have to do something about it. The United States has the secondhighest corporate tax rates of any industrialized country in the world other than Japan. So, in China, tax rates are 23, 25 percent. In Germany, the tax rates are 30 percent. In the ***U***.K., the tax rates are under 30 percent. In the United States, particularly being in New York State, our tax rate is 40 percent.

Now who's going to make decisions to operate in a high-***cost*** environment-- there's no sense going to business school because it teaches you to try to make rational decisions. Who's going to make rational decisions? [Laughter.] HEARING COCHAIR SHEA: Thank you.

Dr. Shih.

DR. SHIH: On your first question about tying innovation R&D close to manufacturing process, I cite an example in my written testimony about trying to go into the OLED business here in New York, and essentially all display manufacturing has moved to Asia.

And the commercialization process involves very close linkage ***between*** R&D, experimentation, process development, and so on. So I think some industries more than others, but, in general, I think it's a vital linkage.

As far as the pressure from the short term, you know, one thing I'd like to add--I agree with my other panelists here--one of the challenges is there's an active market in corporate control.

Okay. And that means if you as a leader, of a publicly traded company particularly, don't make your numbers on a quarter-byquarter basis, you know, somebody else will.

When I was here at Kodak, I mentioned earlier that we used to have a New Year's Eve staff meeting, and I'd usually open it with "the prize for winning is you get to play again." I mean if you made your numbers and you survived the year, 34 then we could do another year.

That was relatively long-term. Most companies operate on a quarter-toquarter basis now, and there's tremendous pressure on that. When you go to Asia, my colleague, who was the father of the Taiwanese semiconductor industry,

recognized that the Taiwanese companies were too short-term focused. So he forced long-term R&D because he said I know you guys are too short-term focused.

They always complained back to him that, you know, you're competing with me.

He said but you're too short-term focused to do this. So I'm going to invest in it, and he invested from the government standpoint.

I think it's a serious ***problem***, the difference in time horizons. In Asia, I was once told, you know, you guys have ***only***--you guys in the ***U.S.***. have ***only*** been around 250 years. That's like a dynasty for us.

[Laughter.] HEARING COCHAIR MULLOY: A dynasty.

HEARING COCHAIR SHEA: Thank you.

HEARING COCHAIR MULLOY: Thank you.

Commissioner Slane.

COMMISSIONER SLANE: Our job is to make recommendations to ***Congress***. And what's troubling me is what do we recommend to ***Congress*** to stop or stem the tide of losing our high-tech industries to offshoring? Dr. Hira.

DR. HIRA: Well, I think there are a lot of lessons from the debates that we had about Japan in the 1980s in particular. A lot of people look back, and I think it's revisionist history, and say, what happened with Japan is okay; we moved on to the Internet and IT, and so what if we lost some sectors to Japan and the like? But I think that's a wrong reading of history. We had a long debate, and I think a very fruitful one, in terms of policy measures that came out of our struggle with competing with Japan.

The Bayh-Dole Act in 1980, the Stevenson-Wydler Act, the Cooperative Research and Development Act, a number of different policy measures were taken within innovation policy to really bolster the ***U.S.***. One of the biggest ones was something called SEMATECH. It wasn't just autos and steel that we were worried about in terms of losing those sectors.

It was also semiconductors, and the CEOs of those semiconductor companies, Intel, in particular, Bob Noyce, made the rounds of Washington to push for subsidies. Essentially, what SEMATECH was, was a $500 million a year--and $500 million actually was a lot more back in the '80s--subsidy to the semiconductor industry. But it wasn't just a subsidy. It was forcing collaboration amongst the companies. You know there's a lot that went into it.

But we did that under the umbrella of national security; right. DARPA, Defense Advanced Research Projects Agency, was the organization that funded SEMATECH.

We haven't had that discussion about national security, about the defense industrial base this time around, and I think that's one of the major voids in the 35 public discussion because, as I mentioned in my testimony, you're sort of dismissed, that, you know, we're just going to move on to the sunrise industries; right? It wasn't that we didn't have that discussion. There were the Atari Democrats--right-- the so-called Atari Democrats back in the '80s. There was a strategy, and there was investment, and there were policies, major policy changes, along the way.

MR. PERROTTI: Well, relative to innovation and preserving high- tech industries in the United States, it starts with labor. It starts with talent. You can go all the way back to the fundamental level of math and science skills within our schools, which is obviously a longer-term proposition, but I'm sure everyone here is aware that the United States doesn't rank favorably with that.

So if we want to be the world's leader in terms of high-tech industries, we first have to focus on some of the very fundamental things that go back to primary education.

Beyond that, we've talked about talent and retaining high-level talent here.

One of the other things I observe traveling the world is that at least in the sectors I interact with is that in foreign countries, not just China, but in all foreign countries--Japan, Korea--there seems to be a tighter relationship in many cases ***between*** universities and the private sector.

Whether that'***s*** because of public policy, what exactly gives rise to that, I don't know, but that is something I think we need to think about, is how we can have universities and the private sector and create incentives there that create an even tighter working relationship because I see that more prevalent in some of the, in other foreign countries.

DR. SHIH: Let me just add on your question about losing high-tech to offshoring. ***Immigration***. I will remind us that we are a nation of immigrants, and we've made it very difficult to attract the best and brightest who I believe would still want to come here if we didn't make it so difficult. So that would be one thing.

Cost of capital, I think that'***s*** a large complicated issue. Craig Barrett, retired chairman of Intel, has testified on numerous occasions that if you look at the tax and location--factor ***costs*** associated with operating a fab in the United States over the ten year life of a fab, it'***s*** typically about $1 ***billion*** more than in other countries.

COMMISSIONER SLANE: To operate it? DR. SHIH: Direct. Direct ***costs*** of ownership. I think the last time he testified on that was probably about three or four years ago. What we're now seeing is even larger incentives, not ***only*** in China, but in other places, where there'***s*** direct subsidies which influence the ***cost*** of capital.

GlobalFoundries' new facility in Luther Forest received a large incentive as well, but, you know, that'***s*** sort of the stakes that is happening. Tax and ***cost*** of capital.

Let me reinforce what my other panelists said about talent and skills. If 36 you are operating a fab in Taiwan --and I've been through many of the fabs there-- they have machine operators who are masters in electrical engineering or industrial engineering. Okay. There'***s*** a level of skill and qualification for some of these jobs, and the universities--in ***fact***, I was just in a debate in Taiwan on this last week, where some of the companies said, you know, you universities need to train our operators a little bit more--okay-- whereas, the universities were saying, no, we need to focus on the long term; you're responsible for training your operators.

But you don't even have that discussion in the United States. Okay. And one of my concerns, and I don't know how to address this, is that, you know, as long as our young people would rather be a sports hero or an entertainment celebrity, as opposed to, you know, a technological leader, that'***s*** very troubling to me. I see that in my two children who are in technology--okay--and are wondering what is their future. My younger daughter is a mechanical engineer. I don't know if I had any influence on that, but anyways-- [Laughter.] DR. SHIH: But it'***s*** troubling. It'***s*** a complicated ***problem***, but I think we can start to address some of those very straightforward things like, you know, taxation and ***cost*** of capital.

HEARING COCHAIR MULLOY: Thank you.

Commissioner Videnieks.

COMMISSIONER VIDENIEKS: Good morning, gentlemen. A couple of quick questions maybe for all three of you, but Mr. Perrotti, you mentioned that a large part of your business, machine tools, is with China. My understanding was, from prior testimony to this Commission, that they are primarily assemblers. I'm not conversant on the topic, but are they wrong? How do machine tools fit into assembly of imported components? MR. PERROTTI: Well, what machine tools are, are basically metalworking machinery. So you're using machine tools to produce parts out of metal.

In Gleason'***s*** case, it'***s*** gears. Gleason machines are specialized. So they're buying Gleason equipment to produce gears. Those gears may be going into transmissions, axles, gear boxes for a variety of industries ranging from automotive to wind turbines, and so forth.

So, yes, the Chinese are doing ***much*** more than just doing light assembly.

The Chinese are doing-- COMMISSIONER VIDENIEKS: We heard that they add anywhere from five to ten percent. Value added by China is like five to ten percent of the final value of the exported item, the manufactured end result. So my question basically is if that's true, that they basically assemble components. I still don't quite understand. Sure, some machine tool use is involved, but ***isn't*** manufacturing done in other countries? MR. PERROTTI: China today is almost as capable in its manufacturing technology as any country in the world, the United States, Germany, Japan. As I mentioned earlier, today technology, it's a great leveler of the playing field. So in the United States there's been millions of manufacturing jobs lost. The reason for 37 that is not so ***much*** outsourcing of jobs as it is technology.

Within our factory here in Gleason, in Rochester, New York, we have a fifth of the jobs we used to have 20 years ago, but our output is 50 percent more.

And you can find those statistics all over, and it's the same thing in China. China today actually has less manufacturing jobs than it had a few years ago because they're buying automated equipment.

So part of when someone is looking at jobs for example, they should not underestimate the impact of technology and automation as probably the major variable in that.

COMMISSIONER VIDENIEKS: So, okay, then basically we are talking about the process? MR. PERROTTI: The manufacturing process.

COMMISSIONER VIDENIEKS: Right.

MR. PERROTTI: Yes.

COMMISSIONER VIDENIEKS: Dr. Shih, in the article which you coauthored, I read it--and I may be wrong--that the article appeared to say that if we solved our trade deficit situation, the ***problems*** with our economy would go away. And half of our trade deficit, or roughly so, is from energy, oil. A part of it is manufacturing, and then maybe it's with the region, not just with one country.

DR. SHIH: What we were intending to say there was that we have a large trade deficit in high-tech products, and we are going to have to manufacture products in the United States to earn our way out of that deficit, but let me add to what Mr. Perrotti said. What he said, and it is true in many high-technology products, that a lot of know-how and capability is embodied in tools.

And you can kind of trace this by, for example, export controls on semiconductor process tools, which has held China back a little bit from Taiwan, you know, so for example they've ***only*** recently started to come on stream with 300 millimeter wafers as opposed to 200 millimeter wafers, and they had to file for export control relief on every individual tool they brought in.

Nonetheless, they got their start by doing a lot of manual assembly and substitution of manual labor for capital intensity, but there are sophisticated manufacturing capabilities in China. You see it in organic chemicals. You see it in a lot of metals. You see it in a lot of high-tech processing. You see it in optoelectronic components.

COMMISSIONER VIDENIEKS: So you're saying it would vary by industry? DR. SHIH: It varies by industry.

COMMISSIONER VIDENIEKS: So a blanket statement like five to ten percent value added would-- DR. SHIH: I would suggest that the way to look at that is that a lot of products that are assembled there have relatively low labor content compared to the component ***costs***. So, for example, a notebook computer doesn't have that ***much*** labor content.

Now, the question you have to ask is how many of the components are now 38 made in China, and the answer to that is more and more because there's a real drive for localization, if you will, and import substitution.

COMMISSIONER VIDENIEKS: Understood. If I could ask Dr. Hira to comment. Sir.

DR. HIRA: Yes. I would just point to the trade data. We're running a very large and increasing trade deficit in advanced technology products. So unless you think the trade data is wrong, I think that speaks for itself.

HEARING COCHAIR MULLOY: Chairman--okay? COMMISSIONER VIDENIEKS: Yes.

HEARING COCHAIR MULLOY: Yes. Chairman Bartholomew.

CHAIRMAN BARTHOLOMEW: Thanks very ***much***, and thank you, gentlemen, for interesting testimony.

A couple of comments on my end first. I can't resist making the comment that the purportedly rational decisions by some of the graduates of this nation'**s** finest business school got us into the economic crisis that we have certainly been experiencing for the past year, which, Dr. Shih, is not to say that people shouldn't go to business school.

But I think our business schools need to start looking a little bit about what they're teaching in those schools.

[Laughter.] CHAIRMAN BARTHOLOMEW: Actually I ***serve*** in a different part of my life on a corporate board with somebody who is involved with a California business school, and I know that they're struggling a little bit with some of these issues.

I was really interested, Mr. Perrotti, in the statement you made that this is not an unwinnable situation, but that also gets to what Dr. Hira was talking about.

My question is also sort of unwinnable or winnable for whom, and how do we align the interests? I don't think anybody expects that CEOs of companies should be--I mean they have to make the decisions that are in the interests of their shareholders, of their business--but we do expect the policymakers in this country to be making decisions that transcend the interests of a particular company, and that'**s** some of what we're trying to explore.

I also think, Dr. Hira, the comment you made about the defense industrial base is a very important piece of all of this. This Commission is supposed to be looking at the nexus of our national security interests and our economic security interests.

Two years ago, we held a hearing in Dearborn, Michigan, and at that hearing, somebody from the Army testified that we no longer have the capability in this country to manufacture triggers for howitzers. Now that also goes, Mr.

Perrotti, directly to the machine tool industry, which is a critical part of our whole manufacturing supply chain.

My question would be, the Chinese government has done an excellent job of identifying sectors in their economy that they want to build some of the basic 39 manufacturing; what kinds of competition are you facing from a domestic machine tool industry in China and what kinds of pressures are you under to share technology that you might have? Nobody here has mentioned intellectual property theft, and similar issues.

I do think that our machine tool industry is really going to be critically important. We can talk about R&D, but we also really have to talk about this. So how do you ***deal with*** those competitive pressures, and what are they as you face the future? MR. PERROTTI: Well, when I first think of competitive pressures, I actually don't think of the Chinese first.

One thing we need to be cognizant of--I think of the Germans, the Japanese, the Koreans because as we develop policy, whether it be trade policy or other policy, security-related policy, if it'**s** not somewhat in lockstep with the rest of the world, and it can try to put greater restrictions on doing business in China, which might not be catastrophic for Gleason if all of the other people we compete with-- the German, the Japanese, the Swiss, the Koreans, and so forth--are in lockstep with those policies.

But when the United States is creating policies and the rest of the world ***isn't*** following those policies, the Chinese are going to still have access to all of the technology because none of this is necessarily proprietary within the United States.

So that is one of the dilemmas. We lose orders today because of certain ***U.S.*** policies that exist where Germans or other competitors aren't under the same restrictions.

Relative to local Chinese companies, they are aggressive. But in some ways, capitalism almost seems more alive in China than it does in the United States, if any of you have been there, you see the entrepreneurial people coming up. Yes, is the central government maybe behind with some puppet strings? Certainly to some extent. How large an influence they're playing in every corner of the economy I guess is debatable, but we have not personally encountered intellectual property theft. We're careful; we're guarded about it.

There are blatant things like violations of patents, patent infringement, and these kinds of things, but there***s*** the things you can't guard against again anywhere in the world, and that***s*** just people reverse engineering, picking up know-how, trade secrets, hiring people who once worked for your company, the same way technology transfers all over the world, and those risks exist in China.

Our antenna is up. We've had to guard against it, but we have not at this point encountered anything that is really that different from what we encounter ***dealing with*** other countries.

CHAIRMAN BARTHOLOMEW: Dr. Hira, Dr. Shih.

DR. SHIH: I would echo. I think the intellectual property area is very interesting, and what we saw in Japan in the '50s and '60s, and we saw in Taiwan in the '70s, and we saw in other areas, is almost like, you know, economies and nations go through an evolutionary stage where eventually intellectual property becomes important enough for their own home industries to protect it.

40 You ***only*** have to look at the mobile phone handset market these days to see that there is a whole segment called the "shanzhai" market, which are knockoff cellphones. It will be one-quarter of the world total mobile phone handsets produced this year, and, you know, so for the major players in mobile phones, it***s*** a big ***problem***. But it***s*** not that different than the evolution of many other countries. The main difference is the size of their domestic market.

CHAIRMAN BARTHOLOMEW: And pace? DR. SHIH: And the pace. Well, everything is going faster these days, yeah.

CHAIRMAN BARTHOLOMEW: Dr. Hira.

DR. HIRA: I'd just make a couple quick comments. One is that my wife teaches in the business school here so I have to be careful.

[Laughter.] DR. HIRA: So we have interesting conversations about these issues. I would say that we have shifted from a stakeholder model. It wasn't always the case that corporate governance was driven in the short run by the quarterly reports and what not. I don't have enough expertise to say what we need to do to sort of change those incentives and create disincentives.

The other point I would make is the comments about talent. The defense industry or the Defense Department, I should say, has played a leading role over the years in subsidizing engineering education. When I graduated from engineering school in the mid-'80s, where you went to work was in the defense sector. And I think it***s*** lost its role in a lot of ways and hasn't played that active a role and could play a ***much*** more active role in encouraging people to go into engineering but also creating opportunities for them when they graduate.

It***s*** not just a matter of convincing people to go into engineering; it***s*** they have to have a job at the end that they want to go into and do interesting work.

In terms of the intellectual property, it***s*** not my area of expertise, but I would just point out if you look at the royalty numbers, even if we solved it--and I think we should do something in terms of IP theft--it wouldn't solve the trade deficit issue.

HEARING COCHAIR MULLOY: Yes. Thank you.

Commissioner Cleveland.

COMMISSIONER CLEVELAND: I actually want to follow up a little bit on that, your comment about the Defense Department, and Dr. Shih, in your article and testimony, you speak to the urgency of the need for investment in basic and applied science and talk about the government's role in the past in making those investments.

If you were the Secretary of Defense or Secretary of Commerce today, how would you structure U.S. government investment in basic and applied science? Would you restructure existing agencies? What agencies would you use? And do you think that the stimulus package that just went through makes any of those investments? DR. SHIH: I think some of the examples we cite and some of the things--I 41 think back to, as Dr. Hira mentioned, like DARPA--had some tremendous successes. The National Science Foundation had some tremendous successes.

One of the things I think is very important is some of these bold initiatives that are a little bit riskier because if you look at the grant process, there's been a bias towards more incremental, incremental problems, as opposed to really tackling some of those big bold initiatives. I think a wonderful example of that was the sequencing of the human genome, which was not that long, but it really created a whole industry in the United States. You see it very much in the Cambridge, Massachusetts area.

So I think it's increased funding in basic research, which underpins a lot of things, as well as the applied-- COMMISSIONER CLEVELAND: When you say "basic," is there a sector or a type of basic science that you think the government should or could invest in, like the Genome Project? DR. SHIH: Well, I think there are a lot of areas. Continuing in the biotech sector, of course. Also, in materials and nanomaterials in particular, which there is already substantial investment. It isn't evident to me that the short-term stimulus money is showing up in any of those areas right now, which is a little unfortunate, but what we need to do is take some of those longer horizon bigger risks.

You know it's interesting that we just came up on the 40th anniversary of the lunar landing.

HEARING COCHAIR MULLOY: Yes.

DR. SHIH: Okay. That's an excellent example of a big risky audacious venture that generated tremendous amount of spillover into the commons and capabilities and drove a lot of those types of needs.

The Chinese are doing some of those things from an infrastructure standpoint. They'll have a much more advanced cable television network than we will here in the United States, for example. So they're doing it in a very applied fashion.

I think for this country, we need to take on some of those big grand challenge problems, and that's a great way of driving kind of the next generation of spillover.

COMMISSIONER CLEVELAND: And who would you suggest lead that effort? Where do you see that innovative, imaginative, and creative energy in terms of the government? DR. SHIH: I'll have to give you a more thoughtful answer on that later.

That's a very important question.

HEARING COCHAIR SHEA: Are you available? [Laughter.] COMMISSIONER CLEVELAND: I'm not talking about individuals.

I'm talking about where you see that kind of-- DR. SHIH: You know, there's a question of will in this country as well, political will. But--you know, desire to make this important--that's why I think 42 the framing of grand challenges tends to attract a lot of people who want to do things like that.

I lived through the '60s with the race to the moon. That was absolutely inspiring for a whole generation of people, and we have that type of ***problem*** in the ***U.S.***, like energy independence, for example.

COMMISSIONER CLEVELAND: Well, yes. Continuing on the government theme, Dr. Hira, you talked in an article that I read about the FFRDC--and I think you said in your testimony as well--you would recommend a free-standing FFRDC.

DR. HIRA: Yes.

COMMISSIONER CLEVELAND: Can you elaborate a little on that--I mean the testimony, unfortunately, being abbreviated, it sounded like you were going to study the ***problem*** rather than what kind of sort of real impact it might have, like the other FFRDCs.

DR. HIRA: Right. Well, I would respectfully disagree to some extent about this, the analogy of the Manhattan Project or the Apollo Project being something that we need to do. We ***spend*** a lot of money on research and development, about $140 ***billion*** a year. I see the issue not so ***much*** as a funding issue as ***much*** as that the world has changed, and the nature of innovation has changed. It'***s*** become a global process, and we're acting as though that never occurred or that hasn't occurred.

And so my proposal in the written testimony is to create an organization that actually studies this in ***much*** more detail. Alan Blinder has argued that offshoring is equivalent to the Industrial Revolution, that the transformation is equivalent to the Industrial Revolution, and we're essentially not doing anything about that.

We're not even studying the issue, and so the FFRDC that I propose would look specifically at the offshoring and globalization of innovation and make recommendations, specific recommendations, on the nature of innovation and where we should be reallocating our resources.

We're really not reallocating that 140 ***billion***. We're not ***spending*** it as smartly as we should be, and it'***s*** fine to have grand challenges, but, hey, we already have that 140 ***billion***. Let'***s*** do that in a ***much*** smarter way. As you know, in government, there'***s*** a lot of inertia. Programs don't get killed, and so on and so forth. We need to rethink that.

And, as I mentioned earlier, even with Japan, we really did rejigger our innovation system during the '80s. I worked at NIST. That was created through the Omnibus Trade Act of 1988, right, from the National Bureau of Standards, and I think it made a lot of good investments, the Manufacturing Extension Partnership, the place I worked, the Advanced Technology Program, and so on and so forth, but it also focused our attention on what was really going on in terms of innovation and how it had changed.

HEARING COCHAIR MULLOY: Thank you.

Dr. Shih, I have cut out a quote, and I put it on my computer, from the Book of Proverbs: "Without a vision, the people will perish." And I thought you 43 just hit it.

The national leaders have to give you a vision; they don't tell you how to do things. And then you set the country free to achieve the goals. I thought President Kennedy did that. He didn't say how we're going to get to the moon; he said we're going to get to the moon, but--okay--and we did it. And it gave a burst of energy and spillover to the commons.

I think the Chinese have the same thing. They were a great society. They fell apart when they came into the contact with the West, and the British went to war and forced them to take opium and all that sort of thing, and they were humiliated.

1949, the Communists came to power; they drove out foreign influences, but they couldn't make their economy grow properly. By '78, they came in, and the new guy, Deng Xiaoping, came in with a vision: we need the foreigners to help us build a high-tech economy. And they had a vision of how to incentivize the foreigners to come in and help

them achieve great power status again, and I think they're being very successful at it, to be honest with you. They have a vision.

My sense now is the United States because we're in an economic crisis, there's a chance now to break out of this old thinking and begin to think anew how important manufacturing and how important balancing your trade account. We've been unbelievable because we can balance our trade account by shipping Treasury bills, IOUs, to other people, and then they get more and more claims on our economy. That's what we've been doing.

Now, Dr. Shih, at the end of your testimony, you say, quote: "***Only*** by rejuvenating our high-tech sector can we hope to return to the path of sustained growth needed to pay down our enormous deficits"--that's the trade deficits, this debt that we're now in-- "and raise our citizens' standard of living." Bingo. That could be a vision. How do we do that? Now, one of the things that Dr. Hira--I brought a quote--I was reading this book by Senator Schumer called Positively American, published in 2007. Senator Schumer hit the same thing you did about the divergence of interests ***between*** the multinational corporations and the national interests.

He says by their very nature--he talks about this divergence. He says: "Today large corporations have ***much*** less interest in this country." And then he goes on to say: "Corporations are not sentimental or patriotic. They are the sum of their capital. They're looking to increase returns for their shareholders. Still, it's undeniable that internationalizing diminishes the overlap ***between*** business interests and national interests." So the vision should be we're in trouble; how do we get these guys to put back on American shirts and get on the team, and how do we incentivize them? In the old days--I think someone talked about--shareholder value was not the ***only*** goal of a corporation. Somehow, over the last 25 years, that changed, and I think it's important for this Commission to come back and understand that a little 44 better, but in my opinion, we need to figure out how to reincentivize this game and get the American corporations playing back on the team.

Dr. Shih, you talk about this, the little incremental decisions that are made, but then you wake up 20 years later, and you're really out of the ball game. So I would ask Dr. Shih, Dr. Hira, and then Mr. Perrotti, if you have any thoughts, how can we reincentivize this game? Dr. Shih.

DR. SHIH: Well, one thing that was mentioned earlier is taxation and ***cost*** of capital. In a lot of high-tech industries, labor is a very small part of the total.

And I believe an awful lot of companies look at comparative ***costs***. Certainly one of the things that has enabled this has been the relatively high ratio of value to transportation ***costs***, which has enabled this kind of global sequential manufacturing model that we see today.

I'm watching with interest the new GlobalFoundries fab going up in Luther Forest, up in upstate New York, which is part of Albany Nanotech. I think that's actually a good example. Now, they received a subsidy which lowered their ***cost*** of capital. Okay, we need to think through our taxation and ***cost*** of capital here because so ***much*** is embodied in the tools, as Mr. Perrotti had said earlier, that that would be a very good first step that will cause rational thinking to put more in the United States, I think. But we're going to have to address that first.

HEARING COCHAIR MULLOY: Dr. Hira.

DR. HIRA: Yes. I would just point to an article by Sam Palmisano, published in Foreign Affairs, back in 2006--he's the CEO of IBM--where he talks about the "globally integrated enterprise." And he's explicitly talking about his incentives and the future of multinational corporations, which he's now calling "globally integrated enterprise." I don't know how you realign these interests. I think it's important, and there's folks that are working on this. But you can't just hope that that happens.

HEARING COCHAIR MULLOY: No.

DR. HIRA: You have to take steps that realize that the current situation is that they're going to make decisions. They're not bad people.

They're making rational decisions, and we need to accommodate and adjust to that.

HEARING COCHAIR MULLOY: Yes.

DR. HIRA: And make our policy choices based on the current system as it is, hoping to change it so that you change those incentive structures and what not to realign things.

HEARING COCHAIR MULLOY: Yes. Mr. Perrotti, do you have anything you want to add? MR. PERROTTI: Well, relative to shareholder value, shareholder value needs to be the number one priority for a company or else the entire model fails.

People won't provide capital. The businesses will disappear in short order.

Perhaps the one refinement to that is long-term creation of shareholder value as opposed to some of the short-term incentives. Technology is wonderful, the Internet and all of these things, but it'**s** almost created an even more shortsighted kind of behavior where people are literally checking things every 45 minute, every hour, and wondering whether they should be acting on it.

So that exists in business, and we even have to think about in government, not that I suggest we have to redo our entire form of government, but even people who have relatively short-term assignments, two years and so forth, people, understandably so, it'**s** hard to take a long-term view of things when you perhaps have an assignment for one year or two years and you're trying to satisfy perhaps a set of short-term goals.

And that is one of the fundamental issues that underlies a lot of the ***problems*** we have in this country, as to how we can keep some of those institutions in place, but have a ***much*** better long-term focus on what we need to do.

HEARING COCHAIR MULLOY: There'**s** been a lot of interest in the Commission in your testimony, so we'll start a second round, but let'**s** each try to say within the five minutes on the second round so that everybody can get their shot.

Commissioner Blumenthal.

COMMISSIONER BLUMENTHAL: I won't take a shot.

[Laughter.] COMMISSIONER BLUMENTHAL: I can't resist one comment, and then I want to ask a question-- CHAIRMAN BARTHOLOMEW: Taking a shot.

COMMISSIONER BLUMENTHAL: --which is--no, well, not at them-- [Laughter.] COMMISSIONER BLUMENTHAL: --which is a lot of the innovations that you alluded to, Sputnik and switch packeting that led to the creation of the Internet. We were in a global security competition with the Soviets, and we were trying to--I think you even alluded to it, Dr. Shih, in your article-- we were trying to solve very specific military ***problems*** that then had spinoffs.

And there'**s** no feel for that--there'**s** no feeling in Washington that I can sense that we're in any kind of security competition with the Chinese. In ***fact***, we're cutting defense budgets. We just cut our most high-tech, most capable stealthy airplane, the F-22, and we've been cutting defense budgets and certainly procurement and investment since the end of the Cold War.

So one place to start would be actually to raise the defense budget, and then the defense industrial base and all kinds of companies would be incentivized to create new things. So I can't resist that comment. And there is no feel in Washington right now that there'**s** any threat from China militarily that I can sense.

Dr. Shih, I'm concerned about your daughter because here we have a mechanical engineer, someone who actually went to engineering, got an engineering degree, and you said that she might not have a future in technology, and so I'm wondering if you can spin that out a little bit? I have a romantic view of what happened in the '90s with Silicon Valley, and a lot of immigrants came and started businesses, and we had this boom, and we became leaders again

in different types of Internet technology and 46 telecommunications technology. So is that not possible anymore? Can your daughter or others like her not go off and start new businesses? Is it really that bleak in terms of the road for people who actually have engineering degrees? DR. SHIH: Well, obviously, I believe this continues to be a land of great opportunity, you know, so--but it goes back to the comment I made earlier about what do we value in this country when we see the sports heroes and the entertainment industry heroes as opposed to, you know, people who excel in technology and science and so on? You have a different feel of that overseas.

I want to come back to your opening comment as well. I don't think we face--this is personal opinion--I don't think we face a defense threat. I think we face an economic security competition now, and maybe there is education that needs to be, that needs to go on, because I've been in hundreds of factories across Asia, and I've been with government leaders, I've been with universities, I've been with CEOs, and I don't think people in this country have any concept of the relative scale of what's happening over there versus what's happening in this country.

Having said that, I think we have some good examples. I think Gleason is a terrific example, and there are some other terrific examples in the U.S., of being able to hold their own in a global market. Okay, we don't make it any easier for them, but there are some terrific examples.

But I think people have no comprehension of what is going on on the other side of the world.

COMMISSIONER BLUMENTHAL: Okay. The other question I had for you is it's very interesting, Amazon Kindle 2. I suppose you think this is not a good model for the United States, but I wonder how much value Amazon took out of that, right? Out of that particular product? DR. SHIH: Amazon will take a substantial value out of that because it is a supporting part of their business model to sell e-books as well. You probably saw that E-Ink, the originator of the electrophoretic bead technology, which came out of MIT, was recently sold to Prime View International, and so Prime View is securing their intellectual property position in that as well.

Kudos to Prime View, you know, in my view, but the challenge and the purpose of that Kindle example was if you wanted to manufacture that in the U.S., you could not do it because the capability is not here anymore.

COMMISSIONER BLUMENTHAL: But again, you think this is not a good model for the next Amazon? This is not a sustainable model even though they take the highest value out of it? DR. SHIH: Well, people say the same thing about Apple and iPhones and iPods.

COMMISSIONER BLUMENTHAL: Yes.

DR. SHIH: And notebooks as well. And what you see in the notebook computer business, outside of Apple, is that those manufacturers move up the value chain as well. Okay. So the next wave you'll see is the rise of the other brands 47 who start to take a lot of that value; right. Acer is now the number two PC manufacturer, having passed Dell. That happened in the last quarter, and they used to manufacture for a lot of other people, and so they're moving up the value chain.

So I just think that's kind of the inevitable progression.

COMMISSIONER BLUMENTHAL: Thank you.

HEARING COCHAIR MULLOY: Commissioner Shea.

HEARING COCHAIR SHEA: I'll be quick. Two questions. We spend $140 billion a year annually on research and development. That's great, but to me, research and development achieves its fullest potential if you commercialize it and create jobs, good-paying jobs for people. How well do we do as a country with commercializing R&D, and are there government policies that you would recommend to assist in commercializing R&D so that we can create jobs here in the United States? And if we have time, we're in Rochester, we're going to talk about this in the next panel, but I would like to get your views on the status of manufacturing in this particular region of New York State and what's your prognosis for the future? Do you want to start, Dr. Hira? No one wants to answer? [Laughter.] HEARING COCHAIR SHEA: It wasn't that tough a question.

DR. HIRA: Yeah. I mean I think there'**s** a perception that we should ***only*** invest in basic research, and we have this debate about corporate welfare and industrial policy and the like, but the reality is that commercialization, that'**s** the end, that'**s** what you want to get, I mean, so doing, inventing it here, getting the nanotech breakthrough in Albany ***isn't*** sufficient, right.

HEARING COCHAIR SHEA: Right.

DR. HIRA: So you have to have those kinds of policies in place, and the reinvented ATP program, now called TIP, is a good program, I think, in terms of getting things towards commercialization, the so- called "Valley of Death." You know the SBIR program, if you talk to venture capitalists, is a very important part of commercialization process and the like, and I'll defer to my business colleagues who probably have a better sense in the real world.

MR. PERROTTI: Well, I can comment briefly on the question about the state of manufacturing here in New York. You know the model right here in Rochester is an interesting one because Rochester for many years had been dominated by a few large employers--Kodak, Xerox, Bausch & Lomb, and those companies. The number of employees in this area working for these companies has shrunk dramatically over the past ten to 20 years.

But the unemployment rate in this area is still below the national average, and the reason is there have been lots of small businesses that have popped up, some of them feeding from people who left those companies, which were technology-based companies; some who have started businesses based upon research from the universities like RIT. So there is a positive model there.

On the other hand, we do need to look at the jobs that have been lost and the reasons why. Fortunately, some have been able to be remade, but, and, of 48 course, New York is a tough environment to do business relative to the ***cost*** of doing business--taxes, regulation, and so forth. And we certainly continue to hope that those things will change because the jobs aren't necessarily being lost to China. Sometimes the job is being lost to South Carolina or Texas or other places, not necessarily going thousands of miles away.

DR. SHIH: Let me just add, reinforce, that a big part of the value-add in the know-how comes in the commercialization of a product, commercialization of the technology. I'd reinforce things like SBIR are actually a good way of helping small companies over that commercialization hump.

I think, you know, as far as manufacturing in the Rochester area, I would agree with that. There'**s** been a tremendous amount of spillover from the shrinking of Kodak and some of the other large players, and that kind of spillover also populates the commons which makes it a good resource for reapplication of some of that know-how.

HEARING COCHAIR SHEA: Thank you.

HEARING COCHAIR MULLOY: Chairman Bartholomew.

CHAIRMAN BARTHOLOMEW: Thanks.

Again, I think this is more of a comment than a question, and it will lead into the next panel. I'm really struck listening to all of you about the challenges that we face, not just in R&D, but the downstream aspects of it. Dr. Hira, you mentioned that particularly.

When we were in North Carolina a couple of years ago, we learned a lot about both the sunset industries there and the sunrise industries and the role of Research Triangle Park, but when you started digging into it, it turned out that many of the jobs that were being created were not jobs that were being created that the people who had lost their jobs were appropriate for.

It was not simply about retraining. It was a completely different kind of thing, and again I go back to machine tools and the importance of our manufacturing base when we look at the workforce in this country, the people who built this country, and how do we take these issues that we're talking about, high level R&D issues, and relate it back down to what do we do to make sure that the people in this country who are not engineers, don't want to be

engineers, perhaps are not capable of being engineers, but go down a different path? And that's the bulk of people in this country who built this country. So any insights that you all have about how we connect that to what do we do about strengthening our communities, strengthening our families in this country, and strengthening our workforce? MR. PERROTTI: I guess the G-20, or whatever they call themselves now, is going to hold their next meeting in Pittsburgh, and I saw an interview with their mayor, and they were asking him how Pittsburgh remade itself, you know, from the steel city into what they are today, and they asked what are the leading industries there, and he said health care.

HEARING COCHAIR MULLOY: Yes.

MR. PERROTTI: Which is positive, but every city, the leading industry 49 can't be health care. Guess what it is in Rochester now? It's health care. The largest employers are health care.

At some point you need somebody else working in some other industry, and it goes back again to, I hate to suggest it's a long- term journey or long journey, but it is. It goes all the way back to putting a reemphasis on manufacturing, what we teach in our schools, what we teach in our universities, to make manufacturing again a priority, to make the manufacturing technology, not just somebody taking something off a machine, but the underlying technology, a priority and to rebuild that.

The distinct disadvantage we have in the machine tool industry is there are very few universities that have a focus or curriculum on that in the United States, where in Germany it's held in high esteem, for example, and the Chinese are doing the same exact thing. And it has to start at the very top in terms of our business leaders, in terms of our government officials, in terms of trying to put an emphasis back on that.

CHAIRMAN BARTHOLOMEW: Dr. Hira.

DR. HIRA: I would just take a step back and say that I view students and even universities as rational actors. They will create programs where there are opportunities. Students will go into fields where they perceive opportunities, and we saw this during the 1990s when computer science enrollments mushroomed, maybe not enough to keep up with the demand in terms of the workforce, but I think we have to be cautious about pushing supply and think about demand, and to tie this into a practical policy recommendation, we have to look at public procurement.

We're ***spending*** a lot of money in stimulus dollars. We're also ***spending*** a lot as a government, and government ***spending*** is 20 percent of the economy, of GDP, and it will continue to increase, it looks like, for the foreseeable future. We have to favor domestic content. People will call that protectionism, but I see that as an investment. You can do R&D cheaper in India so should we direct the NSF to do research grants away from RIT and to the IITs in India? Does that make sense? The reason that you're ***spending*** that money is because there are spillover benefits from it, and we should rethink our procurement policies in that light. I'm not saying that every pencil that's bought should be bought from "Buy American," but, boy, there's a wide spectrum ***between*** research and pencils. IT services is a big one. Right. We should be looking at whether we should offshore or not-- public procurement.

CHAIRMAN BARTHOLOMEW: Thank you.

Dr. Shih, anything to add? DR. SHIH: Well, I would ***only*** add that one thing I learned in business is that ***problems*** that are a long time in the making are a long time in solving. So we won't see, you know, a simple solution that we can implement over the short term.

I have a lot of reservations about starting a trade war with something like Buy America. I understand what Dr. Hira is saying, but I think it's important for 50 people in this country to understand, as other countries, business leaders in other countries, understand the nature of trade balance and dependence on other countries for key components.

There's presently a big debate in Taiwan about whether the government should rescue their memory industry. Okay. And I went and interviewed a couple of the ministers there, and they said, well, because Taiwan has 90

percent of the PC industry from a design standpoint, and they don't want to be dependent on other people for--specifically, Korea--for DRAMs.

Okay. Now, the DRAM debate happened in the '80s and the '90s, and it was a huge debate, but I cite that example as a difference in mentality--right. You find in China a sensitivity towards dependence on external sources for things that could get them in trouble. You see them buying a lot of resources right now and trying to secure resources for that very reason; right.

It'***s*** not I'm trying to control it; I'm trying--they're trying not to be held hostage by other parts of the world. Okay. We're held hostage. We just don't know it.

HEARING COCHAIR MULLOY: Yes.

CHAIRMAN BARTHOLOMEW: I think we do.

HEARING COCHAIR MULLOY: Thank you.

Commissioner Slane.

COMMISSIONER SLANE: Dr. Hira, you referred to SEMATECH and the R&D subsidy they received from DARPA. What often happens, it seems to me, is that the R&D gets commercialized; then ***U***.***S***. companies wind up turning it over to Chinese state-owned enterprises. ***Isn't*** this self- defeating and shouldn't we try to prevent this? DR. HIRA: Well, I think that that question dovetails with what I was talking about, is the downstream fruits. We don't subsidize R&D for the sake of creating research jobs. We do it because the hope is there will be localized geographic spillover benefit, that the design, development and production jobs will be created, at least the first round of those, will be created in the ***U***.***S***.

You're not asking the blue collar worker to subsidize and pay taxes to subsidize research jobs at universities. The hope is that the country as a whole will benefit, and I don't think we're paying attention to that because I think the nature of firms has radically shifted. Firm behavior has changed, for better and worse.

And we're not thinking about the ***fact*** that these downstream benefits, these downstream fruits, are ***much*** more geographically leaky than they were in the past, and we need to think about how do we capture those downstream benefits? It goes back to why companies don't ***spend*** on basic research because they don't believe that they'll appropriate, they'll capture those downstream benefits unless they can put a patent on it, unless they can get intellectual property out of it. It goes into the commons arguments.

The ***problem*** is these benefits that we traditionally expect will occur and be around Albany I think are being commercialized overseas, and most of those 51 benefits will leak out which calls into question, you know, why we're ***spending*** $140 ***billion*** on R&D and not thinking about what the outcomes will be out of that.

COMMISSIONER SLANE: Other comments? MR. PERROTTI: Well the premise that people are turning technology over to state-owned enterprises, I don't think a rational CEO would do that to a stateowned enterprise or anyone else.

Technology is very fluid, more so today than ever, and it will be even more so in the future. So people will have the ability to reverse engineer and understand things faster than they have in the past, and we have to accept that as just a ***fact*** of life, that technology is more portable than ever.

But obviously today a CEO has every incentive in the world to try to protect that technology as best they can.

DR. SHIH: I would argue that some of the reasons we have the perception that technology flows in the state-owned enterprises is exactly the argument we make about not having the infrastructure in this country to manufacture some of those things. You know there are an awful lot of things that if you want to manufacture them, you can't do it in this country, you have to go overseas, and that'***s*** how, that kind of encourages the flow.

Going back to the Albany example, and Albany Nanotech, I do agree that know-how created there flows outward through tools. When you talk to IBM people, their argument will be this field moves so quickly that, you know, it's all in the nature of having some temporal advantage for some number of years.

Having it first, you milk a lot of the profits early on, and then everything commoditizes.

So I'm hopeful on Albany because I think outside of Intel, that's really the large, the sole large, you know, semiconductor manufacturing cluster remaining in the U.S. There's still some around Austin, Texas, but it's, you know, it's a global game that we're playing. Technology flows very quickly; you need to have a temporal advantage. And then you need to work on higher parts of the value chain to convert that advantage into products where you can make some profit.

HEARING COCHAIR MULLOY: Thank you.

I just want to finish up by noting that the transcript of this hearing, you'll get chances to correct your English, and then we put all that up on our-- COMMISSIONER BLUMENTHAL: Not that you need to.

[Laughter.] HEARING COCHAIR MULLOY: We put that all up on our Web site so that people can access this, and this has been a very important hearing.

Dr. Shih, you mentioned when you go to Asia and you go into these places and what you see. I first went to China in '81 so I have some perspective of what's happened here.

Chairman Bartholomew always says when we go into these places, I come out and I say, man, it's over; I mean it's over because you see how rapidly they're moving up the technology chain.

I'd like to comment on one last thing. Dr. Shih, in your testimony, on page 52 five, you talk about other countries have for years thought strategically about the industries they want to foster and grow, and you mention China's 863 program which they adopted in 1986, and they said these are the areas we want to dominate or at least we want to be very, very competitive in.

Part of our ***problem*** is any time you talk about these kinds of things, people say, jeez, we don't want to get in the business of picking winners and losers. And I think we have to get over that and begin to talk about what is happening in this country and why manufacturing is so important.

There's a debate beginning in Washington on this. You guys have been invaluable witnesses before this Commission. We can't think you enough, and I think I speak for all the Commission to say thanks for your presentation and taking time to be with us.

MR. PERROTTI: Thank you.

HEARING COCHAIR MULLOY: We'll recess for ten minutes and then come back.

[Whereupon, a short recess was taken.] PANEL II: THE IMPACT OF CHINESE COMPETITION ON LOCAL COMPANIESAND COMMUNITIES HEARING COCHAIR SHEA: Will our two witnesses please come up, Mr.

Kowalewski and Mr. Bertolone? Are they here? Good morning. Our third witness, Mayor Johnson, is running a bit late so we will just start, once Mr. Bertolone gets seated, with our two witnesses.

Come on up. Good morning.

MR. BERTOLONE: Good morning.

HEARING COCHAIR SHEA: We're going to begin our second panel, "The Impact of Chinese Competition on Local Companies and Communities," and again I want to thank the witnesses for taking the time to be here today and to prepare some written testimony for the Commission.

We have as our first witness Mr. James Bertolone, who is the President of the Rochester Labor Council (AFL-CIO), and he's also the President of the local here of the American Postal Workers Union. Thank you for coming.

We also have on the panel Mr. Ed Kowalewski, who is the Director of International Trade and Investments for the Upstate Empire State Development Corporation, based in Buffalo.

In addition to his 11 years of government experience, Mr. Kowalewski has over 20 years of international business experience in the private sector, and as I said earlier, we're waiting to hear from former mayor--waiting to receive former Mayor William Johnson, who is on his way to the hearing but running a bit late.

So when he comes, we will bring him on to the panel.

So why don't we begin with Mr. Bertolone.

OPENING STATEMENT OF MR. JAMES V. BERTOLONE 53 PRESIDENT, ROCHESTER LABOR COUNCIL (AFL-CIO), ROCHESTER, NEW YORK MR. BERTOLONE: Let me start by thanking the Commission for having me here today and receiving this testimony.

I am familiar with some of your work, and I want to recognize and thank you for your recommendations in the past that have included, but are not limited to, defining China's currency manipulation as a violation of WTO rules, to be considered a prohibited subsidy; recommending that ***Congress*** petition to investigate Chinese workers' rights violations in order to make the case before the WTO that the suppression of labor rights is an unfair trade practice; and recommending trade remedies authorized by the WTO be used against China to enforce antidumping and countervailing duty penalties, as well as to protect our economy from the extensive subsidies for companies in China.

I'm also thinking--and I know you touched on it earlier--that some of your recommendations are very important when it comes to ***U.S.***. technology and the effect of that technology moving to China on our national defense industries.

First, in a general overall view, and you have my testimony so I won't read it word for word, but I think working people and Americans in this country were sold a bill of goods that the deindustrialization of America was inevitable and it was necessary, and that it was a good thing. And this process began obviously long before we established permanent trade relations with China, but since we have, it has gotten ***much***, ***much*** worse.

Just a decade ago, nearly 30 percent of our gross domestic product came from the manufacturing sector. Today it's less than 12 percent, and most of the stuff I'm using is statistics at the end of 2007. It doesn't take into account any further effects of the great recession that we're in now.

In 2007, manufacturing still employed 14 million Americans which created eight million additional jobs, and again, as touched on by Professor Hira, when you're talking about jobs of the future and future technologies, robotics, laser, computer science, photonics--and this is one of the biggest areas in the country on photonics with Bausch & Lomb, Kodak and Xerox--biomedical advances, American manufacturers are the leading purchasers of new technology in our economy, and the nearly 80 percent of all patents, come from the manufacturing sector.

At the end of 2007, manufacturing still contributed $***1.2*** trillion to our economy, and for every 100 steel or auto jobs, for example, it creates somewhere ***between*** 400 and 500 jobs, where in retail every 100 jobs creates somewhere around 94 jobs.

I also--and labor has done some work with Professor Hira--I want to recognize his book Outsourcing America. Over the years, particularly since NAFTA, whether it's labor or business, we've heard a lot of platitudes on trade based on ideology, whether it's from the right or the left, and his is one of the original works, I think, that actually attempts to document the evidence of what has happened as these trade laws have expanded, and by his own admission with 54 me, it's an initial work, and there needs to be further study of the actual effects of these trade policies as we go forward.

The American people were not told when we got permanent trade relations with China and these trade policies, that it meant their jobs were going to be outsourced. Historically, trade and outsourcing were two different things, and these trade agreements have been used to outsource in a race to the bottom with few safety and environmental regulations, and that is a big ***problem***.

I understand the gentleman'***s*** testimony from IBM, and the technology, but representing American workers for 35 years, we have failed to see any benefit when the executives and the stockholders at IBM do well if they're not providing jobs to Americans. It'***s*** no skin off our back whether they do well or not if they are not part of the American economy providing good jobs.

When NAFTA was first passed, President Clinton said we might lose some labor-intensive jobs in clothing, shoes or toys, but high-tech jobs with the exporting of computers and electronic parts would increase. Yet, in 2007, we had a $68 ***billion*** trade deficit in advanced technology products with China, which represents 25 percent of our trade deficit.

Now this was all expected to change when China joined the WTO in 2001 with the WTO rules on illegal subsidies, illegal dumping, currency manipulation, et cetera, and yet from 2001 to 2008, we've lost another 2.3 million manufacturing jobs to China. If you add the labor rights' abuses against international standards, which artificially contribute to the low ***cost*** of Chinese goods, that Chinese companies are allowed to pay as little as 15 cents to 50 cents an hour, depressing consumer demand in their own country, and that forces reliance on an export economy.

American multinationals doing business in China have all kinds of roadblocks from the Chinese government to get access to the Chinese market and end up, the majority of their business ends up being for export, as opposed to the promise of getting into the Chinese market and creating American jobs.

Cost of the environmental and safety standards. 80 percent of the products recalled by the Consumer Product Safety Commission in the past year involved Chinese products--17 million toys with the excessive lead, poison pet food and toothpaste, tainted and contaminated seafood.

One of the saddest things to me in the statistics, and I brought new copies of my testimony with some of these graphs documented in there, is that our number one export now in America by far--number two is non-electric machinery, $1.1 ***billion*** a year--number one, 17.4 ***billion*** surplus, is in scrap and waste.

And New York State is behind California and Texas. After them, we lost the largest number of jobs to trade. We are third, 127,000 jobs since 2001, and in New York State, manufacturing was the third-largest contributor to GDP, about $61 ***billion*** a year.

Rochester, which is my hometown, has been devastated by the loss of manufacturing jobs. Kodak moved whole divisions to China. They employ less than 7,500 workers here. Kodak employed over 60,000 in 1980.

55 To be fair, Kodak has downsized its worldwide workforce. It'***s*** now I believe under 25,000.

Auto jobs have been lost and offshored due to ***much*** of the unfair cheating in China. The old Delco, later to become ITT Automotive, then Valeo Automotive, is gone, 4,000 jobs with it. Just 15 years ago.

Delphi, 3,500 jobs, down to 800 now and struggling. Hickey Freeman has lost a number of jobs and has been in danger of closing in the past year due to subsidized dumping of Chinese suits.

Our business community, again, particularly groups like the Chamber of Commerce and IMF, have said it'***s*** okay. We're going to transition from a manufacturing economy, labor-intensive stuff will go offshore, and we will pick up the jobs in the service economy.

Nationwide service economy jobs pay on average $8,100 less. In Rochester, some of those averages are as ***much*** as $20,000 less from an average of $60,000 in manufacturing to ***between*** 30 and 40,000 in the service industries. That is devastating to an economy where there seems to be a consensus among economists that 70 percent of our

economy is based on consumer ***spending***, and even prior to the last decade and a half, post-World War II, consumer ***spending*** was anywhere ***between*** 61 and 65 percent of our economy.

Part of the service economy increase in jobs has been in government. We are now losing government jobs which is further devastating the economy. We are in the process of laying off 200 teachers in Rochester. Other positions are not being filled by attrition, and we know that there will be further layoffs with the ***problems*** on Wall Street and the further erosion of our tax base.

We do have economic development funding, industrial development agencies, Empire and Enterprise zones, tax subsidies, but they are just not sufficient to stop the bleeding in this area.

We also have had a big battle ***between*** labor and business on IDA reform, which has been stalled for a year. Business, though our free marketeers have no ***problem*** taking tax subsidies as part of the free market equation, do not want to have to pay the area median wage as part of taking that money, which is a little over $15 an hour, about $30,000 a year in ***full*** time work. That is one of the big ***problems***.

The city of Rochester now, the average household income is under $30,000 a year. 45 percent of our children grow up in poverty, and the attendant crime and educational ***problems*** that come with that has devastated our city in the last two decades, and I'm sure my old friend, Mayor Johnson, can really speak to those issues of what'***s*** happened to our economy in the city of Rochester in the last two decades.

HEARING COCHAIR SHEA: Mr. Bertolone.

MR. BERTOLONE: Yes.

HEARING COCHAIR SHEA: We're limiting statements to seven minutes.

MR. BERTOLONE: I'm sorry. I'll just finish up with the statement that again, when we were sold these trade agreements and these trade policies, and 56 from the business world told it'***s*** okay, it'***s*** evolutionary, our position is they don't get to decide for the rest of us in an economy.

Tom Friedman, the IMF, they do not get to decide for the citizens in a democracy that Flint and Akron and Rochester and Newark and Buffalo that our cities can be devastated and destroyed because they believe--the masters of the universe--that this is the new global economy.

So, with that, I'll finish.

[The statement follows:] Prepared Statement of Mr. James V. Bertolone President, Rochester Labor Council (AFL-CIO), Rochester, New York Let me begin with the biggest impact on our economy due to trade with China, the deindustrialization of America and the myth that this is inevitable and necessary. Though in some areas this process began long before permanent trade relations with China were established by legislation, the record of the last ten years in different manufacturing sectors and our trade deficit with China leads one to the undeniable conclusion that deindustrialization and attendant reduction in the manufacturing over the last decade has greatly increased to the detriment of the United States and New York State. There are those representing the corporate sector, from the Chamber of Commerce to the International Monetary Fund that have continued to put forth the view that deindustrialization and the loss of manufacturing in the United States is inevitable in a globalized market economy and not detrimental to our economy due to the expansion of the service economy. The statistics refute this view beyond any doubt. Just a decade ago manufacturing was about 30% of US Gross Domestic Product or GDP, today it is less than 12%. From 2000 to 2007 another 3 ***1/2*** million jobs were lost in US manufacturing. Yet as of 2007 US manufacturing still employed 14 million Americans and creates 8 million additional jobs in other sectors. When it comes to the jobs of the future, whether in robotics, lasers, computer sciences, photonics or bio medical advances, American manufacturers are the leading buyers of new technology in the United States. In ***fact***, American manufacturers are responsible for two thirds of research and development investment in the US and nearly 80% of all patents filed come from the manufacturing sector. Though the great recession has reduced these

numbers, at the end of 2007 manufacturing contributed $***1.2*** trillion dollars to America'***s*** economy while every 100 steel or auto jobs create ***between*** 400 to 500 new jobs in the rest of the economy. Contrast this with the retail economy where every 100 jobs generates about 94 new jobs elsewhere.

I would like to take a moment to commend RIT Professor Ron Hira for his work in the areas of concern before the commission, particularly his book "Outsourcing America". His research and documentation has furthered our knowledge of the actual effect of Global trade and ***problems*** with our policies involving China. Particularly disturbing are his findings that Research and Development tend to follow manufacturing off shore. R&D jobs, important in themselves, develop the new products, processes, innovations and technologies that shape the future and create the jobs of the future. This trend is especially disturbing for the future of domestic manufacturing, jobs and our economy.

Allow me to give a brief overview of Labor'***s*** ***problems*** with Trade with China under current conditions in light of the Commission'***s*** mandate to assess the nature of the transfer of United States production to the People'***s*** Republic of China. For one thing the American people were not told that new global trade rules meant outsourcing their jobs for slave wages with few safety or environmental regulations . American companies selling America products to American workers with cheap foreign labor was never part of the bargain. Outsourcing jobs, in a race to the bottom, is not trade, but that is what happened. President Clinton said we might lose some labor intensive jobs in clothing, shoes, or toys, but high tech jobs with the exporting of computers and electronic parts would increase. In 2007 we had a $68 ***billion*** dollar deficit in advanced technology products with China, 25% of the total US-China Trade deficit.

57 The ***fact*** is China'***s*** cheating trade practices has ***cost*** Americans millions of jobs. This was expected to change when China joined the WTO in 2001 with WTO rules on illegal subsidies, illegal dumping, and currency manipulation expected to reduce this ***problem***, but in ***fact*** it has gotten worse with 2.3 million lost US jobs to China from 2001- 2008. Add to this Labor Rights abuses against international standards, which artificially contribute to the low ***cost*** of Chinese goods. Millions of child workers and forced labor are used to make products for export to the United States. Independent Labor Unions are forbidden and such attempts result in firing, imprisonment or worse. The Chinese allow companies to pay as little as 15 cents to 50 cents a hour, depressing consumer demand thus forcing reliance on an export economy. ***Costs*** of production are also depressed due to low safety and environmental standards. As one example 80% of the products recalled by the Consumer Product Safety Commission in the past year involve Chinese products, from 17 million toys with lead, to poison pet food and toothpaste, to tainted and contaminated seafood.

I think the public at large would be alarmed to know that in 2007 the United States ran a manufacturing trade balance surplus in ***only*** two areas. Number two, a little over $1.1 ***billion*** dollars a year was in non-electric machinery. Number one, by a large margin, over a $17.4 ***billion*** dollar surplus, was in scrap and waste.

To apply this to the Local area, since 2001 New York State has lost the third highest number of jobs to China, after California and Texas, 127,000 jobs. Manufacturing is the third largest contributor to NY'***s*** Gross State Product, about $61 ***billion*** per year. Rochester has been devastated by the loss of manufacturing jobs. Kodak has moved whole divisions to China, employing less than 7500 workers here.Kodak employed over 60,000 in 1980 in Rochester. To be fair, Kodak'***s*** world wide employment is now less than 25,000. Bausch and Lomb has moved jobs to China. Auto jobs have been lost or offshored due to this unfair cheating by China, 4000 jobs at the old Delco, later ITT, then Valeo, a couple thousand more at Delphi. Hickey Freeman has lost a number of jobs and been in danger of closing in the past year due to dumping of subsidized Chinese suits. On average the jobs created in service industries, health care and government pay $8100 less per year nationwide. However, these jobs have not been of sufficient quanity or wage quality to make up for the losses in the manufacturing sector. Additionally we now have significant job losses in the government sector which will not ***only*** decrease jobs but further depress average wages. State government has grants for companies, economic development funding and IDA and Empire or Enterprise zones for tax subsidies, but for the most part they haven't been sufficient to stop the bleeding. Since these tax subsidies do not require family sustaining wages, they will not rebuild an economy based on consumer ***spending***. Interestingly, anti dumping laws and countervailing duty laws (AD-CVD) on subsidies have been around

for over a century and are part of WTO rules, and they go hand and hand. These regulations have the support of most trade partners, expect many American CEO'**s** who say when we advocate for enforcement we are being anti - trade protectionists.

In ***fact*** these executives are the anti- trade protectionists whose motivation is the same greed that caused business lobbyists to get politicians to pass Smoot-Hawley tariffs in the 1920'**s**. These subsidies that favor home industries in China have hindered and denied access to the Chinese Market for foreign companies manufacturing in China so that most of what they make in China is for export. In less than a decade, over $27 ***billion*** dollars in government subsides in energy to China'***s*** steel industry has moved them to the number one producer and exporter of steel, producing more steel than the next three countries together, Japan, US and Russia.

As our own NY Nobel Laureate in economics, Joseph Stiglitz writes, all countries have the ability to levy tariffs to balance trade and protect jobs, all do with a VAT, value added tax on imports, except the US. However, the majority of countries do not have the money to subsidize their own industries to compete with massive subsidies that China gives to their industries. Such subsidies are the epitome of protectionist unfair trade.

Though I agree with the recommendations I've seen from this commission on dumping, subsides, currency manipulation, and labor and environmental standards, the ***problem*** is they are recommendations, recommendations to ***Congress*** to recommend to the President or the Treasury, that they recommend to the WTO that the trade regulations be enforced. The Bush Administration showed no interest in enforcement and sometimes neither did the WTO. Regulations are useless if not enforced. ***Congress*** must pass laws requiring corrections in WTO rules and enforcement of existing rules or pull out. The Constitution charges our government to promote the general welfare, not some tribunal that is not accountable to the electorate. Economists still agree that when America sneezes the rest of the world catches cold. China needs our consumer market, especially in a country where workers are low waged 58 and not free,supressing internal consumer demand. Yet there are still plenty of Big Business types and economists from the IMF, the Chicago School, the "my head is flat" Tom Freedman people who say this is "OK", natural, evolutionary, that 100 manufacturing jobs lost in Rochester is "OK" because 100 customer service call center jobs replaced them in Tuscan. In a democracy they don't get to decide that it is "OK" our children have no family sustaining jobs after school, its not "OK" that 45% of Rochester children live in poverty and that poverty is crumbling our city and contributing to a culture of crime and fatalism. In a Democracy they don't get to decide for the rest of us that its "OK" to sacrifice and destroy once thriving communities like Rochester, and Flint and Detroit, and Buffalo, and Syracuse and Akron and Newark. We need trade laws and rules with cheaters in the Global Community, like China, that are required to trade by the rules as our Constitution says, and promote the general welfare.

HEARING COCHAIR SHEA: Thank you very ***much***. As Mr. Bertolone noted, Mayor Johnson is now with us. Mayor Johnson is a Professor here at Rochester Institute of Technology, and he was Mayor of Rochester from 1993 to 2005. In 1999, Governing Magazine named Mr. Johnson as one of its "Top Ten Public Officials in America." Maybe we can go to Mayor Johnson now and then finish up with you, Mr.

Kowalewski.

MR. JOHNSON: Thank you very ***much***.

HEARING COCHAIR SHEA: Again, if we could limit the remarks to seven minutes, please.

OPENING STATEMENT OF MR. WILLIAM A. JOHNSON, JR.

FORMER MAYOR OF THE CITY OF ROCHESTER AND DISTINGUISHED PROFESSOR OF PUBLIC POLICY AND URBAN STUDIES, ROCHESTER INSTITUTE OF TECHNOLOGY, ROCHESTER, NEW YORK MR. JOHNSON: Yes, thank you, Commissioner Shea and Commissioner Mulloy and other members of the Commission. Thank you for this opportunity and this invitation, and I apologize for my delay.

But without any explanation, let me get right into what I wanted to say here. As you know, I spoke with each of you and with members of your staff as you were doing your ascertainment for this hearing, and I indicated that I probably would not have ***much*** to add about the notion of outplacing and outsourcing of jobs to China, but you also expressed concern about what had happened to the upstate economy and the reasons for that.

And, therefore, I've really confined my analysis to looking at the kind of dislocations and disinvestments that have occurred in what we refer to as the Rust Belt economy in the last 60 years.

And true, as I bring quite a bit of experience, even the telling of it makes me shudder that I'm as old as I am now, but I ***spent*** 42 years now in the field since graduating, and I've lived in two Rust Belt communities. I lived and worked in Flint, Michigan for several years, and then I moved here to Rochester where I have actually now lived for 36 years.

During that time, a lot of things have occurred which ***only*** in hindsight and 59 retrospect are we able to get our hands around. At the time I lived in Flint, Flint was one of the leading automotive capitals of the world. During that period in the late '60s and the early '70s, every Buick automobile that was built in America was built and assembled in Flint, Michigan.

At one point, earlier, every Chevrolet automobile that was built in America was built and assembled in Flint, Michigan. Flint is the birthplace of General Motors as well as the birthplace of the United Autoworkers, and has had a long and storied history, and yet we know from popular culture and from reading press accounts that Flint is on the precipice of demise. It is one of those cities that has lost a significant portion of its population from its peak of over 196,000 people in 1960 to current times where it'***s*** now about to slip below 100,000 residents.

And as someone who keeps in contact with friends and colleagues, former friends and colleagues, in Flint, I can tell you that there is no end to the misery.

What does it mean when a city that depended upon one employer for over 80,000 jobs is now down to less than ten percent of that number, fewer than 8,000 jobs, and that number keeps going down.

When I moved to Rochester in the early 1970s, it was as though I was moving to nirvana. I was moving to a place which seemed to be immune to all of these economic dislocations. It was even then cities like Buffalo, Syracuse, Utica, Jamestown, Binghamton, were beginning to show fraying signs, but Rochester was that glowing light, that gem, in a sea of despair.

And, in 1980, as my friend Jim Bertolone has already indicated, Kodak employed in Monroe County alone, over 60,000 people. It has now shed 90 percent of its jobs in the intervening years.

I would say to you that I think this tsunami of economic dislocation which hit places like upstate New York, which has been documented in numerous studies, which I refer to in my paper, this happened long before outsourcing of jobs to China and Japan and ***Mexico*** and other places.

In ***fact***, you have to research it to really document it. People have forgotten that the first outsourcing of jobs from places like Schenectady and Rochester and Syracuse went to the Sun Belt. I was born and raised in a sleepy town called Lynchburg, Virginia in the 1940s and '50s, and I remember when General Electric opened up a facility, a brand new facility, in Lynchburg, which had transformational powers on that city which was caught in the grips and the throes of racial segregation.

General Electric from the north came into that city, creating several hundred new jobs, and opened--in ***fact***, a few thousand new jobs--and opened up tremendous economic opportunity for the residents of that city, but if you track it, and you can find the history, and it'***s*** very hard because these companies do not tell you when they leave Schenectady where they go, but they left the north and they went to the south and the west, and they went there in search of cheap labor, lax labor regulations, and lower ***costs***.

So we are now just caught in the second wave of this ongoing movement.

And I cite what happens as a mayor when you're ***dealing with*** a city. I cite that 60 when I came to office in 1994, there were still rather, relatively abundant resources that were available, and we were able to ***deal with*** a lot of the ***problems*** that were overwhelming our communities like abandoned neighborhoods, loss of services, jobs, improving public safety, improving schools, providing after-school activities. There were still resources that were available for us to pour into these community needs.

But when you step back, and after I left office--when I left office, and I would want the record to reflect that I left office on my own accord.

I was not ushered out of office by disgruntled voters. I retired from office. At the time of my retirement, in 2005, and coming here to RIT, I've had an opportunity now to look back over that period, and when you look back, you say, wow, look at all this investment that we made; look at all these physical changes where I can take you to see.

I just took some visitors from Korea around the city of Rochester last week who came here to look at some things, and I could point to things that occurred, new improvements that were made, and yet this city still is on the downslide.

Let me cite two quick statistics to try to illustrate my point. First, the notion of concentrated poverty. In 1950, there was one census tract in this region with poverty rates of over 40 percent. That'***s*** the definition of concentrated poverty. By 2000, that number had increased to 20. There are 20 census tracts in the greater Rochester metropolitan area that have poverty rates of over 40 percent.

Each and every one of those poverty tracts is concentrated and found within the corporate limits of the city of Rochester, which is ***only*** 35 square miles of a 615 mile, square mile county.

The rest of that county, the rest of the 615 square miles, are absolutely free of this level of bone-crunching poverty. And I would submit to that you it doesn't matter how often or how innovative and creative you are, these are factors that are very, very difficult to overcome.

Let me cite another one. We talk often about Kodak'***s*** job loss. Let me cite another statistic for you. In 1983, Kodak was the second- largest taxpayer in the city of Rochester and its property valuations accounted for nearly 12 percent of the city'***s*** total taxes.

This last year, 2008, which is the last year for which we have records, it'***s*** now down to 1.95 percent. In Kodak'***s*** shrinkage and downsizing, not ***only*** have we lost jobs and we've lost middle-class standards for thousands and thousands of families who depended on those jobs generation after generation, we've seen communities that are devastated.

The community just south of Kodak Park, which is known as Maplewood, one of the most beautiful and historic neighborhoods in this city, has been the recent scene of some of the most vicious crimes that we have ever seen. A mother was stomped to death by a mob just less than a mile south of Kodak Park. And we've seen that neighborhood transformed from being largely owner-occupied to now being investor owned with renters predominating the population.

We've seen the loss of philanthropy. Kodak was a great corporate citizen, 61 and it spread its largess around this community. That philanthropy has all but disappeared. We've seen greatly decreased volunteerism--Kodak encouraged the 60,000 workers to be active partners, and not ***only*** did its leaders go out and take part in the civic affairs of this community, but the average person on the line went out and did things like coach Little League baseball, volunteer for neighborhood groups, be actively and intimately involved in the affairs of community.

All of that has dissipated, and now Kodak has shrunk its physical footprint by more than a third. Kodak Park, which was the largest manufacturing complex in all of New York State, is now a shadow of itself. Not ***only*** have buildings been torn down, which accounts for that shrinkage of tax base, but buildings have been empty, and in its place they now have become realtors and landlords. They opened up their facilities for new companies to come in. That would

be a wonderful thing if we were in a growing community, if our population base was expanding, but what is happening is that people are being seduced and attracted to leave their current space and go to this historic site called Kodak Park, where all of the amenities and the histories are there.

So they are essentially just moving chairs on the Titanic, moving people out of one building into Kodak space, and so we have a tremendous ***problem*** of vacant and abandoned properties in this community.

Let me close by saying this. This is not news. I didn't come here today with any headlines or any news. This has been known to the policymakers and the officials of this state for the last 40 years, and their response to it can ***only*** be called feeble, feckless, ineffective. And aside from offering a few tax incentives and abatements, there is no concrete urban policy that you can find in the state of New York.

This has been suggested in a number of places. Two years ago the Brookings Institution put out this report that you may be aware of called "Restoring Prosperity: The State Role in Revitalizing America'***s*** Older Industrial Cities," which calls for policy changes at the state level, and because of our unexpected shift in governance from Governor Spitzer to Governor Patterson, this has gotten lost in the process.

A year later, a commission that Governor Spitzer appointed, which reported to Governor Patterson--I happen to have been a member of that commission--issued a roadmap for change: "21st Century Local Governments." And there have been other studies from people like Professor Rolf Pendall down at Cornell on behalf of Brookings. It talks about how we can change the upstate economy. It is not from a lack of knowledge that we have not found a way out of this mess.

It'***s*** from a lack of will, and I don't know how to begin to get that point across, particularly, and I say this without any attempt to demean anybody who is in public office because I myself ***served*** in that position, but with the people who are currently entrusted with the public interest, these people have not shown the vision, the courage, and the fortuity to bring us out of the mire that we are in.

So I would come here today to say to you it'***s*** great that we're looking at the role of China as to what has happened there, but we ought to look at how ***much*** of 62 this has been self-inflicted, and how we can recover from our own doing.

Thank you very ***much***.

[The statement follows:] Prepared Statement of Mr. William A. Johnson, Jr.

Former Mayor of the City of Rochester and Distinguished Professor of Public Policy and Urban Studies, Rochester Institute of Technology, Rochester, New York To the co-chairs of this public hearing, Patrick A. Mulloy and Dennis C. Shea, I thank you for the invitation to speak at this hearing. At the outset, I should indicate that my presentation will take a somewhat different direction than the other speakers, focusing on more generalized conditions of urban decline rather than on the specific conditions of globalization and trade. This is done with the prior knowledge and consent of the co-chairs and commission staff, based on our preliminary discussions at the time this hearing was being planned.

I have no empirical studies to cite, or original research to report. I am still in a data gathering and assessment phase of my research on declining cities. I am able to share a narrative with this panel today based on more than forty years of experience as an urban policy maker and practitioner. Hopefully these subjective field observations will be helpful in your on-going deliberations about the patterns of urban decline that are so pervasive in certain regions of this nation.

Let me briefly describe my professional background, which will illuminate the perspective that my testimony will take. I have been on R.I.T'***s*** faculty since January 1, 2006, and I hold a joint appointment in the departments of Science, Technology and Society/Public Policy; and Urban and Community Studies. My courses focus on urban policy and planning, with a particular concern about the contemporary relevance of local governance structures,

past and present performance of community economic development initiatives, and the process for engaging citizens in reform and accountability efforts for local governments. I came to this appointment immediately after retiring as Mayor of Rochester.

Since completing graduate school forty-two (42) years ago, I have been engaged in a diverse array of urban governance and community development activities. For twenty-one (21) years I ***served*** as the chief executive officer of one of Rochester'**s** leading human service and planning organizations, the Urban League; for two (2) years as the deputy director of the Urban League in Flint, Michigan; for twelve years (12) as the elected Mayor and chief administrative officer of New York'**s** third largest city; and for seven (7) years as a political science and urban policy professor in Flint and Rochester.

During this period I have worked in two "rust-belt" cities, one each in the Northeast and Midwest, which have undergone unrelenting transformation and decline. The 1950 census reflected the peak populations for many communities in these regions, with marked declines occurring in subsequent decades. ***Between*** 1950 and 2000, Rochester registered a 34% population loss, from 332,488 to 219.773. If current projections for this decade are confirmed by the 2010 census, Rochester will have around 200,000 people, the lowest level since 1910. [Note: All population data cited throughout this paper is taken from various Census reports, unless otherwise indicated.] Flint, the birthplace of both General Motors and the United Auto Workers, experienced a 1094% population increase ***between*** 1900 and 1930, from 13,103 to 156,492, most of which can be attributed to the rapid expansion of the automotive industry. At one point, every Chevrolet and Buick automobile was built in a Flint factory. This growth was so phenomenal that when most other northeastern and Midwestern cities were experiencing a population decline ***between*** 1950 and 1960, Flint registered a 20.5% increase, from 163,143 to 196,940. Rochester [- 4.2%], Buffalo [-8.16%], Pittsburgh [-10.7%], Cleveland [-4.2%], Detroit [-9.7%] and St. Louis [-12.46%] were moving in the opposite direction.

63 ***Between*** 1970 and 2000, Flint has lost 35.5% of its population, down to 124,943. Like Rochester, its population has continued in free fall during the past eight years, where estimates project an almost 9.5% loss of its residents.

Both cities have suffered huge losses in jobs in their leading industries. The photographic giant, Eastman Kodak, has eliminated nearly 90% of its 60,000 jobs in the Rochester area since the early 1980'**s**. The General Motors companies that employed more than 80,000 people in the Flint area as late as 1978 have also shed 90 % of their workforce. This is a shock to the community'**s** central nervous system that is impossible to absorb.

It is customary to look to conventional and very obvious explanations when seeking reasons to explain this level of decline. Factors like disinvestment, deindustrialization, globalization and technology improvements are often identified as causal factors. However my experience and research have revealed that other factors, sometimes overlooked and sometimes deliberately minimized, can often play a crucial role in destabilizing communities. It is my belief that one such overlooked factor played a contributory role in the early stages of Flint'**s** decline, which was made irrevocably worse by General Motor'**s** massive downsizing two decades later.

Let me indicate at the outset of this particular anecdote that I have discussed this theory with several of my former Flint academic and political colleagues, to first ascertain if any empirical studies were conducted, and to validate my recall of the ***facts***. While the factual recall was verified, I could find no evidence of hard research into the matter. I even raised this subject when I was twice invited to lecture in Flint a few years ago, but my presentations did not generate any follow up. Nor have I had the time or resources to ***spend*** in any follow up research of my own.

My connection to Flint began in September 1967 when I relocated from Washington DC to teach, two months after the major riot in Detroit and a couple of lesser skirmishes in Flint. In January 1968, it became one of the first cities to install a Black mayor. There was in place at the time the commission-manager form of government, where the Mayor was elected by his fellow commissioners as the presiding officer for official meetings and ceremonial events.

Floyd J. McCree, a beloved community leader and commission member, won this designation, but he resigned shortly afterwards in protest when the commission voted down an historic open-housing ordinance that was designed to overturn housing segregation patterns in the city. The mayor'**s** resignation sent shock waves

throughout the entire community, but McCree would not budge from his decision unless the commission reversed itself, which occurred after ***much*** emotional public discourse over the period of a few weeks.

Until that time, the majority of Flint'**s** Black population was confined to intolerable living conditions in the northeast quadrant, in the vicinity of many of GM'**s** manufacturing facilities. The imaginary dividing line was Detroit Street (later renamed Martin Luther King Boulevard); few Blacks lived west of Detroit Street and few whites lived on the eastern side. Yet, after open housing this changed. Once a few Black families began to move, racial fears began to escalate. Some realtors were suspected of engaging in "blockbusting" tactics, which the Urban League and the NAACP, along with the white religious community, worked hard to overcome. News media accounts of increasing crime overtaking formerly peaceful white neighborhoods and of persons selling their homes for below-market prices were standard fare. White flight and Black pride abounded in an atmosphere of hysteria and fear. This was not Flint'**s** "finest hours", which might account for why so many people are still trying to push these memories out of mind without reflecting on what this situation did to disrupt the overall sustainability of the community.

Within a couple of decades, Flint was transformed from a majority-white to a majority-Black city. By 2000, over 53% of the population was African-American. Today, Flint has one of the highest rates of abandoned and vacant properties of any city in America, and it is one of the pioneers of a land banking program that could place it on the road to recovery and re-population [Land Bank Institute].

While little or no empirical data beyond old newspaper accounts exist from this era, there is one indisputable ***fact***. In 1970, the census registered 3,623 fewer city residents, a meager 1.8% loss. (Rochester and Buffalo lost 7% and 13.1%, respectively, during the same period.) Given that Flint'**s** factories were still employing record numbers, and the impact of the 1973 OPEC "oil embargo" had not taken effect, it is entirely reasonable to conclude that ***much***, if 64 not all of this population decline, can be attributed to "white flight" to the surrounding suburbs. One other factor can be noted: a majority of Genesee County'**s** population lived outside of the city, as registered in the 1970 census. In 1970, 56.6% of the county'**s** 445,589 residents lived outside of the city, compared to 47.4% in 1960. [Genesee County Parks, page 5]. While these trends matched the march to suburbanization that began ***full*** bore after World War II, a case can be made that the Flint Open Housing ordinance helped to stimulate some of that movement.

Even with the benefit of four decades of hindsight, it is not entirely clear that Flint could have avoided its current state of decline if the open-housing program had been better planned and implemented. Communities that followed a less controversial path have experienced similar levels of destabilization. And Flint'**s** open housing law was not the ***only*** example of well-designed initiatives that wrought unintended consequences. The Open Housing Ordinance was not conceived as a way to drive white residents out of town, or to render whole neighborhoods as unlivable. But that was the practical effects of the legislation, and it unintentionally placed the city on a downward spiral from which it has been slow to recover. Flint'**s** residential tax base has been devastated in recent years by the massive depletion of its housing stock. The 2000 ***U***.***S***. Census estimated that 12 per cent of the city'**s** housing stock was vacant or abandoned, amounting to over 5,000 units. [Land Policy Institute, p.7] Whole blocks of houses, and sometimes entire neighborhoods, look as though they have been attacked by a neutron bomb. There is little evidence that state and local officials could come up with a credible strategy to ***deal with*** the ***problem*** until a few years ago, when massive property abandonment in cities like Detroit and Flint forced the Michigan legislature to revamp its outmoded tax foreclosure laws, giving local officials a quicker and cleaner path to taking possession of properties that were in foreclosure. The Genesee County Treasurer, Dan Kildee, created a Land Bank program that has allowed the county to address this ***problem*** in a creative way. [Swope, 2008; Streitfeld, 2009].

The point of this story is that it illustrates the flaws of well- intended urban policies, as well as the opportunities for change that can be derived from them. That is the perspective I want to address in the remainder of this testimony.

This hearing is seeking answers to six questions. I will confine my attention to questions 5 and 6, as outlined in your invitation letter: 5) "What has the state government done to respond to the economic decline in central and western NY? What kinds of state policies are being implemented to stop the outsourcing or to attract new investment in the region? 6) "What impact did this decline have on the job base and the tax bases of communities in central and

western NY? What kinds of jobs have replaced the jobs that have been lost?" There is no question that the urban communities of upstate New York have experienced tremendous dislocation during the past sixty years.

The title, "The Empire State" reflected its status as the nation's largest and most prosperous state. Every major city in the state, from New York City downstate to Buffalo-Niagara Falls upstate were home to corporations that shaped the nation and the world through the ***much*** of the 20th century. Companies like Bethlehem Steel and General Motors in Buffalo, Dow and DuPont in Niagara Falls, Kodak, Xerox and Bausch & Lomb in Rochester, Carrier, Crouse-Hinds and General Electric in Syracuse, IBM in Poughkeepsie and Binghamton, and General Electric in Schenectady were leaders in their fields and generated substantial economic prosperity for the citizens of their communities. Today, these companies and their home cities are mere shadows of their former selves. Most of these corporate giants have either relocated or downsized considerably.

David Rusk, a noted urban policy expert who has ***spent much*** time advocating for structural change in New York state, has charted the demographic decline of the Upstate region. ***Between*** 1950 and 2000, each of the major population centers experienced substantial losses: Albany [-29%]; Binghamton [-41%]; Buffalo [-50%], Elmira [-38%]; Jamestown [- 27%]; Niagara Falls [-39%]; Rochester [-34%]; Schenectady [-33%]; Syracuse [-33%]; Utica [-40%]; and Troy [- 32%]. [Rusk, 2005].

65 These numbers are even more startling when compared to downstate. While New York City grew by a meager 1.5% during this period, Westchester County grew by 48%, Nassau County by 98% and Suffolk County by 414% [Rusk}.

This upstate decline has been the subject of ***much*** analysis, both in the media and among academics. One of the most recent studies was conducted by Professor Rolf Pendall of Cornell University for The Brookings Institution. It studied population data from 1990 through 2002. He concluded that if the Upstate Region, home to nearly 7 million people, was a separate state, its growth rate of 1.1% would have outpaced ***only*** West Virginia and North Dakota.

He found that out-migration during the period greatly exceeded in-migration, and that the elder population grew disproportionately; there were 14% aged 65 and older, compared to 12.1% nationally. One additional finding that also illustrates the changing jobs picture in Upstate was the increase in the prison population: 28.3% of all new Upstate residents were prisoners. The state has significantly increased the number of prison facilities in the wake of its severe Rockefeller Drug Law enforcement during the past 25 years. [Pendall] The results of this unrelenting and pervasive Upstate depopulation has been absolutely depressing: eroding tax bases, concentrated poverty, distressed neighborhoods ***full*** of abandoned residences and businesses, and declining political power. Communities like Rochester have gone from prosperous to precarious in the face of this turnaround.

In my opinion, many of these forces of disinvestment and dislocations preceded the global redistribution of jobs and technology. It is clear that the fortunes of Upstate, like the remaining regions in the so-called "rust-belt" economies of the north- east and mid-west, began to unravel in the 1950's when factories in Schenectady, Niagara Falls and other communities began to relocate to the "sun-belt". My hometown of Lynchburg, Virginia received one of those plants which were relocated by General Electric and another by Babcock and Wilcox, which transformed it from a sleepy town to a growing metropolis. Lynchburg's population increased 36.8% from 1950 through 2000. Meanwhile Schenectady, which had once housed 44,000 GE employees before that number was reduced to 4,000, suffered its previously noted 33% decline.

Thus, my contention is that if we focus on the impact of trade with China on Upstate New York, then the analysis will be extremely incomplete.

During my three terms as Mayor, from 1994 through 2005, the city was faced with an array of challenges: increasing and concentrated poverty accompanied by spiraling rates of violence, declining public school student performance, decaying neighborhoods being overwhelmed by vacant and abandoned housing, declining stature as the hub of the region, and difficulties in generating sufficient new economic activity that would help to mitigate many of these ***problems***.

One example of this malaise was the unrelenting spread of poverty, in the city proper. One piece of data that my staff produced was used repeatedly to frame the dialogue for action. In 1950, there was one census tract in the entire city with a poverty level higher than 40%. A poverty rate of 40% or more is the accepted definition of "concentrated poverty" in the ***U***.***S***. By 2000, there were twenty (20) poverty tracts with 40% or more of concentrated poverty, located within the 36 square miles of Rochester. Within the remaining 614 square miles of Monroe County, there were "zero" concentrated poverty tracts.

I have defined the five phases of urban decline as: deindustrialization, disinvestment, deterioration, despair and divorce. While the first three are obvious, let me elaborate on the last two phases. When city residents are faced with a situation where many of the good jobs are beyond their reach, when they do not have ready access to services that most of us take for granted - like quality food markets, medical facilities, pharmacies, gasoline stations, safe recreation facilities for their children, and restaurants to enjoy a leisurely meal-they feel neglected and diminished by being forced to live a "second class" existence. These feelings of despair lead to dysfunctional behaviors that further undermine the viability of these neighborhoods, as William Julius Wilson and others have so assiduously studied. In the face of these conditions, efforts to bring about sustainable change are often overwhelmed.

66 Divorce best describes the disillusionment that most non-city residents manifest at these conditions. Ray Suarez captured this mood perfectly a decade ago in his best-selling book, "The Old Neighborhood". He interviewed scores of people who had migrated from working class and middle income neighborhoods in Chicago, Cleveland, Los Angeles, Miami, New York, Philadelphia, St. Louis and Washington, DC. When those people returned to their old neighborhoods, they were appalled with the conditions that greeted them: rundown and abandoned housing; sacred institutions and community gathering places like churches, schools and social clubs that had fallen into disuse or unconventional uses; and men hanging out on street corners and not taking care of their families. They felt, almost universally, that the residents who had followed them had squandered a precious inheritance. They were unwilling or unable to rationalize such abstract theories as concentrated poverty or disinvestment, and how these things, along with a ferocious out-migration of people like themselves, could have conspired to create the most unimaginable "unintended consequences". All that mattered to them was that their precious old neighborhoods, which had been the source of so many precious memories, were irretrievably lost [Suarez].

During my tenure we were blessed with ***much*** creativity, institutional support and significant financial resources. We were able to inspire neighborhood residents to join in an effective partnership with City Hall to plan for the future.

We built new houses, brought new services into neighborhoods, increased resources to our school, created new partnerships with police and residents that led to reduced crime and violence. Despite all of this energy and investment, it was not enough. The city could not escape the downward spiral, because there were just too many forces beyond our control.

The plight of the Eastman Kodak Company and other key employers illustrates this point. I have attached a chart that I have prepared for one of my courses that illustrate the changes that occurred in the local employment market ***between*** 1981 and 2007. In 1981, Kodak was the top employer with 59,582 workers. As you can see, the top 15 companies during that period employed nearly 127,000 people. Eight of those employers were manufacturers. By 2007, Kodak had dropped to 12,500 employees and ranked third on the list. The top fifteen companies employed 82, 673, which was 45,000 fewer people than in 1981. ***Only*** three of them were manufacturers. The top employer is now the University of Rochester/ Strong Health and the grocery company, Wegman'***s***, rank second. No one pretends that the quality of jobs and pay at these two outstanding companies compares with Kodak'***s*** halcyon days. From news accounts, it is clear that the same trends exist in cities like Buffalo, Syracuse and Binghamton, where local universities have replaced manufacturers as the leading employer.

One further example will illustrate the significance of Kodak'***s*** decline. In 1983, Kodak accounted for 11.36% of the property tax valuation in the city. By 2008, they accounted for ***only*** 1.95%. This data can be found on the annual Assessment Rolls of the City of Rochester.

When a company like Kodak shrinks its presence in its hometown, there are significant side effects: the loss of jobs leads to a decline in the quality of life for the families who were dependent on that income.

Many people are unable to maintain their middle class lifestyles, and neighborhoods suffer as these families either move on or cut back.

Kodak was recognized for its civic leadership. Not ***only*** were its top managers involved in a host of important community initiatives, but it encouraged its workforce to also be good citizens through volunteerism and generous financial support. Kodak'***s*** philanthropic activities supported a host of worthwhile community endeavors.

In addition to ***much*** of this activity being greatly diminished, Kodak has greatly downsized its physical presence.

Many buildings on its Kodak Park manufacturing campus have been vacated or demolished. Its Elmgrove Plant, located in the Town of Gates, was closed and sold a decade ago. This 5 million square facility provided significant tax revenue to the town, by some estimates accounting for 40% of its tax base. ***Much*** of that facility is currently underutilized or vacant, and is now in the hands of its second owner after Kodak'***s*** departure. At Kodak Park, an increasing amount of space is being leased to outside businesses. One can ***only*** surmise the amount of vacant space that is being created in other parts of the community, as companies take advantage of attractive space and attractive rates at a location with such a storied history.

So far, there have been few state or federal programs that have been able to reverse these trends of disinvestment in 67 the Upstate region. At the time of his election, Governor Eliot Spitzer proposed a set of strategies that would be targeted specifically at the Upstate Region. Due to his unexpected and premature departure from office, these strategies have mostly been re-oriented towards a "one state" strategy by his successor, Governor Patterson. Aside from the standard package of tax incentives, Albany has been unable to craft a meaningful and sustainable recovery program for this region.

In 2007, The Brookings Institution issued a set of recommendations in its report, "Restoring Prosperity: The State Role in Revitalizing America'***s*** Older Industrial Cities." New York was a primary target of these recommendations, which called for targeted investments in city schools, neighborhoods and job creation venture. Unfortunately, the transition from Spitzer to Patterson caused this activity to be deferred, and it has never gotten back on tract.

[Brookings] A state commission on which I ***served*** gave Governor Patterson a road map for the reform of local governments, which have become cumbersome and antiquated. These recommendations, under the title "21st Century Local Government", have set practically dormant because the Governor'***s*** attention has been largely devoted to the state'***s*** escalating fiscal crisis. {LGEC] Recommendations from reports prepared by David Rusk and Rolf Pendall are also still viable. President Obama has begun to set up a new Office of Urban Affairs at the White House, but its rollout has been delayed by attention to the economy and other high priority issues.

There is no shortage of recommendations on curing the ills of the Upstate economy. The lack of knowledge is not the ***problem*** as ***much*** as the lack of will. A lot of people will have to reconsider their opinion about the important roles that urban communities play in this new economy, including people who have "divorced" themselves from the situation. Hopefully the stage is being set for a path of reconciliation and recovery.

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Ray Suarez, The Old Neighborhood. New York, The Free Press, 2009 68 Top Employers in Monroe County in 1981, 2000 and 2007 Ranked by ***Full***-Time Employees 1981 2000 2007 Kodak 59,582 Kodak 24,600 ***U*** of R 17802 Xerox 14,918 Xerox 14150 Wegman'***s*** 13,642 ***U*** of R 9,500 ***U*** of T 11,800 Kodak 12,500 GM 9,242 ViaHealth 5,759 Xerox 7,670 Sybron 4,795 Wegman'***s*** 5,395 ViaHealth 6,878 Gleason 4,600 Delphi 3,200 Unity Health 4,879 Wegman'***s*** 4,419 Frontier 2,878 Excellus 3,614 B & L 4,000 Unity Health 2,475 RIT 3,256 RG&E 2,785 B & L 2,300 Paychex 2,866 Mobil Chem. 2,700 RIT 2,291 YMCA 2,358 GRS 2,666 RG&E 1,943 Sutherland 1,800 RIT 2,413 Excellus 1,450 B & L 1,700 Roch. Tel 2,238 Paychex 1,360 FLH 1,651 Star Markets 1,980 Chase Bank 1,280 Thomson Hth 1,066 Lincoln Bank 1,847 EDS 1,250 St. Ann'***s*** 989 127,685 82,191 82,673 8 Manufacturers 4 Manufacturers 3 Manufacturers 2 Colleges 2 Colleges 2 Colleges 2 Utilities 2 Utilities O Utilities 2 Grocers 1 Grocer 1 Grocer 1 Bank 1 Bank 0 Bank 3 Health Care 6 Health Care 2 Services 2 Services 1 Human Service Sources: Democrat and Chronicle (1981); Rochester Business Journal (2000, 2007) Prepared by William A. Johnson, Jr., (c) March 2009 69 HEARING COCHAIR SHEA: Thank you very ***much***, Mr. Mayor.

Our next witness is a representative of the New York State government so he'***s*** a bit on the hot seat here, I guess.

[Laughter.] MR. JOHNSON: Present company excluded.

[Laughter.] MR. KOWALEWSKI: Everybody needs a break.

HEARING COCHAIR SHEA: At least he came last, right. Mr.

Kowalewski.

OPENING STATEMENT OF MR. ED KOWALEWSKI DIRECTOR OF INTERNATIONAL TRADE AND INVESTMENTS, UPSTATE EMPIRE STATE DEVELOPMENT CORPORATION, BUFFALO, NEW YORK MR. KOWALEWSKI: On behalf of Governor David Patterson and Empire State Development'***s*** Chairman, Dennis Mullen, let me begin by again thanking the Commission and its consideration for having this hearing and listening to testimony here in upstate New York and also for selecting Rochester. It'***s*** a great location, and I'm glad you were able to make the trip.

Rather than read my written testimony, I thought what I'd try to do is just make a couple of key remarks and a couple of key points, and then I'm sure you'd like to get into the question and answer session.

Let me start by saying that international trade is a key component to New York State'***s*** prosperity. Export sales currently contribute as ***much*** as $70 ***billion*** to New York State'***s*** economy, and again as a representative of state government, particularly tasked with trade promotion, the performance of New York State business in the marketplace is among our greatest concerns, and I ***spend*** about 50 percent of my time working and asking questions directly with New York State companies.

The position that I have allows me the opportunity to meet with companies on a daily basis. So I'm able to hear firsthand about their business challenges and also hear about their business successes as well.

There is hardly a firm in New York State that has not been touched or impacted by Chinese- made products. I will say that those come in two flavors.

Many of those Chinese-made products are made in China by ***U***.***S***. corporations, and in many ways, companies in upstate New York that are in the manufacturing and service sectors are competing against China on two levels. They're competing against the ***U***.***S***. corporation products that have their sources in China, and they're also competing against increasingly sophisticated Chinese companies and Chinesemade products as well.

So the competition has a couple of different faces to it. I will, however, also comment that with the rapid expansion of low-***cost*** capacity in China, New York State manufacturers continue to experience competitive pressures from other locations as well.

70 South Korea, Southeast Asia, ***Mexico***, and even South American countries by almost any measure are developing export-oriented economies and exportoriented industry sectors that New York State manufacturers and service providers have to ***deal with*** in a daily basis.

And I guess I'd be somewhat remiss if I didn't also include India as being a competitor in the area of software and business services. Certainly, China'***s*** excess industrial capacity and ***cost*** advantage have dramatically lowered the price for manufactured goods sold around the world.

New York firms have had to react to those lower prices, and they've had to do so in many ways by rethinking how it is that they perform business. In many cases, New York firms have jettisoned low value and low-priced products, hoping to move up the food chain. I can say the record ***isn't*** quite clear in terms of success, but many companies do report to me that they've been able to move up the food chain with enhanced or innovative products that now make them competitive in domestic markets and international markets as well.

We're certainly not naive in our understanding of the market dynamics in the two-way trade ***between*** New York and China. Low-***cost*** components produced in China represent a means of ***cost*** cutting for New York manufacturers, in some cases, positively impacting supply chain efficiencies and allowing them to create some profit that in some cases wasn't there before.

I will report to the Commission that this is a key point for New York manufacturers as they continue to be under price assault by many low ***cost*** manufacturing locations. For many firms, this sort of substituting of low-***cost*** components from other parts of the world is their secret to survival.

I know the Commission was also interested in investment, in investment attraction, and I will say briefly that China certainly because of its current economic situation and its rapidly expanding production base does represent an area of interest for New York State and New York State communities.

We would certainly welcome that kind of investment, particularly as it allows us the ability to create jobs and create levels of prosperity. As an agency, I will say that we are particularly interested in those high-tech industries. We're looking at Chinese biotech. We're looking at Chinese solar. We're looking at green technologies, and I will say that, and my written remarks certainly allude to that, that New York has some levels of Chinese investment already.

We certainly would be interested in trying to attract more. Rather than chase all of the industries that China has, we are keenly interested in the hightech, the value-added industries, and as part of our effort to both support New York State industries, but also to support our endeavor to attract investment to New York State, we've recently opened three offices in China.

They provide services to our companies, help provide market information, develop agent distributor relationships and do general ***problem***-solving on behalf of New York State companies. They're also tasked with being on the lookout for investment cases.

More recently, we've started to see an uptick in the potential for Chinese 71 investment, and it'***s*** certainly our agency'***s*** goal and mission to try to attract investment from wherever we can get it in the world to develop levels of prosperity here in upstate New York.

Let me simply conclude, the good news that I hear from New York State companies is that they are increasingly finding some success in the China market.

We're reporting almost $3 ***billion*** in export sales, and the challenge that many companies have frankly is to take products and to increase their level of attention to the innovative process. As they continue to innovate within their

firms and create newer products, those products are increasingly being absorbed not ***only*** in China but in other parts of the world, as well.

[The statement follows:] Prepared Statement of Mr. Ed Kowalewski Director of International Trade and Investments, Upstate Empire State Development Corporation, Buffalo, New York Let me begin by thanking the Commissions' consideration of an upstate New York location for a field hearing and for selecting Rochester as hearing location. I am aware and attentive of the commissions' mandate to assess the key dynamics of the US- China relationship and report back to ***Congress*** and I am pleased to provide testimony in support of your mandate.

International trade is a key component to New York State prosperity. Exports sales contribute as ***much*** as seventy ***billions*** of dollars to New York'***s*** economy. As a representative of a state government agency charged with assisting firms in entering or expanding into international markets, China is particularly important to New York. China is a buyer as well as a seller. Global trade, along with the free movement of capital, is at the heart of today'***s*** international and New York'***s*** economy. What makes global trade different today and quite likely into the future is the unprecedented speed and depth of change: firms reorganizing and extending their enterprises, establishing of global supply chains, instantaneous communications and a new competitive dynamic where every part of the global economy is effectively in competition with every other part.

The Commission indicated a particular interest in gathering information and better understanding the impact of Chinese competition on local companies and communities. There is hardly a firm in New York that has not been touched or impacted by Chinese made products. China is the world '***s*** new industrial powerhouse. It is also a large and rapidly growing market for raw materials, industrial goods, capital equipment, consumer products and technical services. As such, it remains a market of significant interest for many New York manufacturers and service providers.

China'***s*** exports have grown dramatically over the last three decades. China is now a leading manufacturer, not ***only*** of textiles and consumer products, but of increasingly sophisticated electronic equipment, software, and other technologies as well. It is competing not merely on basis of low ***costs*** but increasingly on the basis of high-end value-added products, as well as ***costs***, using some of the world '***s*** best technologies and drawing from a pool of highly skilled talent and it competing against NY firms.

Faced with the rapid expansion of low-***cost*** production capacity in China, New York manufacturers continue to experience competitive pressures. Throughout the past decade, they have also seen the emergence and development of large export-oriented industry sectors in Southeast Asia and South Korea, ***Mexico***, and South America. Now India is a competitor, particularly in the fields of software and business services. China while a being fierce business competitor is not the ***only*** low ***cost*** competitor affecting New York business.

China'***s*** excess industrial capacity and ***cost*** advantage have dramatically lowered the price of manufactured goods 72 being sold around the world. NY firms have had to react to lower priced goods. For a number of NY firms, the reaction was to jettison low ***cost***/low value products for products with higher value added and producing higher profits margins. In many other cases the response from firms was to innovate a newer and better product.

China, in addition be being a competitor, is a source of dynamic market growth for NY firms having the appropriate products. Business interest by NY firms in Chinese markets and the demand for state trade assistance in China has resulted in our agency opening of three trade offices in China. Our agency continues to improve access to markets in China on behalf of NY firms. With some satisfaction I do report to the commission that many New York firms are finding success in markets in China. Almost three ***billion*** dollars of export sales have been reported in 2008.

As analysts of two way trade ***between*** the US and China we are not naïve in our understanding of the market dynamics. For some New York manufacturers, low ***cost*** components produced in China represent a means of cutting product ***costs***, improving supply chain efficiencies, buoying profits upwards, and lowering prices for customers. This is a key point as NY manufacturers continue to be under price assault by many low ***cost*** manufacturing locations. For many firms, this is their secret to survival.

We are always concerned that in addition to following their customers to overseas locations, NY firms consider pulling up the flag and leaving the state completely. This is not just an international phenomenon or just a Chinese challenge, as we are under constant pressure by other US states to keep firms in New York. We to the best of our ability activity seek our those firms to work to retain them in the state.

Where competitive situations exists ***between*** location in and out of New York and there is the potential that a firm might leave, we do attempt to offer incentive to keep the target firm in the state. These incentives have produced investment opportunities for China. One ***only*** needs to tour a Chinese industrial park and read the list of American firms that have established operations in the that park to appreciate the return on that incentive offered.

We are aware of incentives offered by various levels of Chinese government to NY firms to have them consider a relocation of high technology activities (including R & D) to China. We share a joint desire to develop economic prosperity through industries and products of the future. Chinese incentive offered range from tax exemptions on machinery, rapid depreciation of equipment and subsidies on real estate and leases. NY firms are increasingly offered; a housing resettlement subsidy for key business officials; preferential rental of apartment (owned by government) for key technical personnel (typically 70% of market price) and salary subsidies in the range of RMB1000-3000 /month for key company officials.

New York State fiercely competes for investments from manufacturers and other businesses that can choose from any number of other attractive investment locations. China'***s*** rising financial status makes it an interesting candidate as a potential investor in NYS. China'***s*** outward investment comes partly from a national policy, not just from Chinese companies seeking profits overseas.

During the late 1990s and early 2000s, China'***s*** Ministry of Foreign Trade and Economic Cooperation selected some thirty to fifty top Chinese companies to take the lead in overseas investment. As they looked to invest overseas, these national champions enjoy more advantaged by benefits that helped them compete, including low-interest funding from Chinese banks, many of which are controlled by the government. While China has a cheap, effective manufacturing base at home, and has few globally recognized brands this situation is rapidly changing. Chinese firm'***s*** are now making overseas investments in everything from footwear, garments, electronics, and appliances.

This increase can be tied to Chinese companies wanting to secure the complimentary assets that they need to become internationally competitive. We are also cognizant that in many industry sectors the domestic US market (and in turn NY markets) are key driver for investment considerations.

As an Economic Development agency, we are hopeful that the level of Chinese investment in New York will increase. We can already account for Chinese investment in the forms of real estate and other financial industry investments. We activity seek and have received inquiries from potential (Chinese) investors in many industry sectors but we are particularly interested by potential investment in knowledge based industries such as solar energy, biotech and pharmaceuticals. A key agency task remains to identify, track and engage potential Chinese investment to secure that investment and create jobs in New York.

73 While NY competes and collaborates across global economic and industry arenas, we must not forget that the most important competition is being fought in the arena of ideas, learning, and delivering new kinds and levels of value to the marketplace. NY'***s*** strategy for success has been articulated by the executive and invested in by the legislature.

Increased funding in education, and the establishment of Centers of Excellence lay the ground work for innovation in key industries. Innovation generates the productivity that economists estimate has accounted for large portions of ***U***.***S***. GDP growth over the past 50 years. Innovation gives rise to new industries and markets; fuels wealth creation and profits; and, generates high-value, higher-paying jobs. In a world in which many nations have embraced market economies and can compete on traditional ***cost*** and quality terms, it is innovation - the ability to create new value - that will confer a competitive edge in to New York and New York'***s*** firms in the 21st century.

I conclude my remarks and would be happy to respond to questions.

Panel II: Discussion, Questions and Answers HEARING COCHAIR SHEA: Thank you very ***much***. Again, we appreciate your taking the time to be with us today.

I guess since I have the gavel, I'll ask the first question. This is for you, Mr. Kowalewski. You mentioned that you were trying to seek Chinese investment I guess in New York State generally from their high tech and value-added companies.

What specifically is New York'**s** plan to develop, improve manufacturing, and improve the economy of Rochester and the surrounding area? Do you have a plan? MR. KOWALEWSKI: I think the quick answer is that we don't have a plan specifically for China. What we've been doing, frankly, is rallying resources and rallying marketing information across upstate. We've had the privilege of working with local public-private organizations in Buffalo, like the Buffalo Niagara Enterprise.

Here, in Rochester, the Greater Rochester Enterprise and various other upstate locations have these groups focused in on trying to retain jobs, create jobs, and market those communities as destinations for foreign investment. Working with them, we've been able to create tailored marketing brochures. We've been able to focus and identify which communities have stronger industry clusters in industries that would attract the appropriate kinds of investment.

And the state has an ongoing program that we've initiated recently of collecting as many foreign trade councils and trade officers of the foreign consulates that are in New York State, literally bring them to upstate, and then show them, walk them through the communities.

HEARING COCHAIR SHEA: Correct me if I'm wrong. It'**s** my understanding that Albany is becoming a center for nanotechnology. There'**s** a focus in Buffalo on life sciences. Is there a similar focus in Rochester on a specific industry or cluster of industries? MR. KOWALEWSKI: There are centers of excellence across all of New York State, and there is a center of excellence actually located in Canandaigua.

COMMISSIONER BLUMENTHAL: Optoelectronics.

74 MR. KOWALEWSKI: --focusing on optoelectronics, yes. All of them--and there were a few more that will be, that are still be to be opened-- are going through growing pains. You have to establish your credibility in terms of the local community and being able to assist local businesses, and then you also have to advertise your attributes to attract international attention.

Again, one of the sort of key marketing pieces, and sometimes I think we do make short shrift of the requirement to market locations' attributes and capabilities, and do it in a way that will attract international attention and on the pull through international investment.

HEARING COCHAIR SHEA: Mayor Johnson or Mr. Bertolone, do you have anything to respond? MR. JOHNSON: Well, I want to be fair to the state. It'**s** not, again, through a lack of effort. It'**s**, and even though the results are meager, I think the ***problem*** is that we have really not been able to develop a clear strategy and a targeted strategy. When Governor Spitzer came to office, and I've often said this, and many of us rue the day that we drove Governor Spitzer out of office because he at least came to office with some preparation, some focus.

He ***spent*** eight years getting to know this state, and he came with a sort of a bifurcated strategy: he indicated that he would essentially deploy the resources, the economic development resources, targeted to upstate, and to create a downstate focus as well. We are a two-region state, and our downstate region is far more prosperous now than the upstate is. The situation was just reversed 50 years ago when the upstate economy essentially was the net contributor to the New York State economy.

I think Governor Spitzer brought a sensitivity and an understanding, and he was in the process of developing a set of concrete strategies that never had an opportunity to play themselves out.

The second point is that there are so many places of despair. In my paper, on page eight, I think it is, and you don't need to find it. You can read it. I cite the number of cities -- there are at least 12 cities in upstate New York -- that have lost ***between*** 25 and 50 percent of their net population over the last 50 years.

Every one of these cities is out to compete for restoration and revitalization.

So we latch on to any opportunity, and oftentimes we're fighting among ourselves, and we are bidding against ourselves. We are offering the best of deals.

And we have never been able to quite resolve the ***fact*** that a new set of jobs, if they are in Batavia, for example, they can benefit both Buffalo and Rochester.

You know, we don't want them to go to Batavia; we want them to come to Rochester; we certainly don't want them to go to Buffalo. We've got find a way to really address that.

The third thing is that we have meager resources. During my time, we actually successfully attracted one company from Taiwan to locate a branch operation in one of our industrial parks in the northeast side of Rochester. It supplies parts to Delphi, and they needed to be, and we persuaded them that they should be, close to their customer so they came.

75 Let me tell you, they didn't have to expend a lot of effort in order to get here. I mean we wrapped this deal in as ***much*** red ribbon as we could in order to attract them. We had an empty industrial park. We had money. We had the state and the county working with us. And yet today that company--I have a chart on the back of my paper that lists the 15 largest employers in Monroe County from '81 up to 2007--you will not find Macauto on that list. It probably employs less than 50 people.

Our view was that at the time if we could get one, there were a whole host of others that would follow, and I would say to you that if it were just Rochester trying to dig itself out of the hole, I think the state would be in a better position to help, but the ***fact*** is that there are so many communities that are in that same hole trying to dig themselves out, it makes it difficult for them to decide where to target their resources.

HEARING COCHAIR SHEA: Thank you.

MR. BERTOLONE: I would say two things. One of the things in the debates we've had here with the local business alliance leading up to these trade groups is that Rochester would benefit. Unlike Syracuse and Buffalo, which was more blue collar, Rochester industrial base was more high tech, and more white collar--computers, photonics, biomedical, and the rest.

Interesting thing, I write a monthly labor column for the Rochester Business Journal, and I ran across a column I wrote at the beginning of 2005. In the year 2004--and Rochester because of Kodak and this high tech always had a positive trade balance--we exported more from Rochester than we imported.

Rochester exported more goods than Buffalo and Syracuse combined, and yet we lost more jobs that year than Buffalo and Syracuse combined. That is how serious the ***problem*** is with trade with China. So it is insidious. Mr. Kowalewski mentioned Dennis Mullen who I know.

HEARING COCHAIR SHEA: A Rochester resident, right? MR. BERTOLONE: Yes. Before he went with the state, he was with Greater Rochester Enterprise to bring business in here, and I know, I was on the plane last week to New York with Dennis, and I know--and I thanked him because I know it'**s** through GRE, he worked over a year, over a year, to bring an Italian company in here, Barilla, to Avon, I think, for about 120 jobs, decent jobs, but just the effort expended and the community resources, like Bill Johnson, who said to get the company from Taiwan, to bring one company here, and 100 plus jobs in the current economic situation is very, very difficult with what we're facing.

HEARING COCHAIR SHEA: Thank you.

Chairman Bartholomew.

CHAIRMAN BARTHOLOMEW: Thank you very ***much***.

One of the very interesting things for us is to be able to go out and talk to people about what'***s*** going on in their communities. In the early 1990s, the machinists put out a report called "Jobs on the Wing" that was one of the first real forward-looking analyses. It focused on the aerospace industry, of course, but it was essentially talking about how many of the jobs that were already shifting to 76 China for the production of airplanes and a lot of, of course, having to do with Boeing.

But the point of it was that these opportunities that are created by expanding the trade also have ***costs*** because, as Boeing was doing more and more business with China, more and more jobs were going to be shifted over to China.

So I'm particularly interested in your comment, Mr. Kowalewski, about Chinese investment, that Chinese companies want to secure the complementary assets that go along with their investments in the United States, and I wondered if any or all of you could comment on whether you're concerned that Chinese investments in cutting edge industries here in New York would result in the transfer of know-how and technology that ultimately hollows out these sunrise industries before they even have a chance to be created? MR. BERTOLONE: Well, there are a couple of things. I'm also on the board of the AFL-CIO'***s*** Workforce Development Institute for New York State. It does quite a bit of training grants, and one of our coalition partners is the Apollo Alliance in green technology.

The words "corporate welfare" were mentioned earlier, and labor has no ***problem*** with that under certain conditions. Taxpayers are entitled to certain conditions. One of the things we've invested with in the Apollo Alliance is putting steelworkers back to work in Buffalo in a plant that was closed making solar panels. Good investment. Good investment of tax dollars. Good jobs brought back.

I had been arguing and arguing when we were in this project that there must be guarantees in the contract. It does not help us that we do this, and two years later the company is successful and says you know what, we can increase our profits ten percent by going to ***Mexico*** and close the factory after taking our tax dollars.

Semiconductors were mentioned earlier on technology. That'***s*** a perfect example. In the '80s, under the Reagan administration, wave of the future. We got to be heavily invested in semiconductors. We need protective tariffs, and the government did that to protect that industry. As soon as that industry got its global competitive footing and was entrenched in the global market, they began outsourcing jobs.

I heard a little bit about education. One of the graphs that I have attached here will show that in the last seven or eight years, the majority of wages and jobs that have been outsourced are those with college degrees plus, not labor intensive toys and shoes and clothes, college degrees plus.

We are now seeing these technical--as Professor Hira talked about-- research and development. We are now seeing ***billions*** of dollars of wages in hightech jobs, and this very college, and it'***s*** a trend nationwide, in the last four or five years, you will see the number of computer science majors are way down.

Kids have changed their majors because the unemployment rate in computer science is at ten year highs in the last two or three--this is before the recession-- the unemployment rate.

77 Sometimes this is left out of the media because what goes on-- you train your replacement. Under our labor laws, professional white collar managerial workers are not allowed to unionize under the National Labor Relations Act.

Conditions of their separation agreements, if they want to keep health care for a year, get severance pay and the rest, is they got to keep their mouth shut as they sign a contract.

And you mentioned guest workers. There'***s*** no shortage of engineers and computer scientists in this country. These H-2 guest worker visas are being used to bring immigrants over here, sometimes educated at the same universities,

have the people who are losing their jobs train them, and then they go back to India and do a $70,000 for 12 to 15,000 a year.

Now, India really ***isn't*** the ***problem*** and won't be the ***problem*** in the future that China is because India is the world***s*** largest democracy, and what we've seen in the last five or six years is the rate of inflation over there.

We are seeing the wage scale increase with double-digit inflation and consumer demand developing in India, unlike there***s*** a death of consumer demand in China outside the 300 million people on the east coast--their industrial sector--because wages are so low.

But this is a continual ***problem***. Tax subsidies, whether it***s*** industrial development agencies, where we give our tax money to promise to create jobs, there has to be some claw backs. If the taxpayers of New York help you establish a solar panel company, you can't move it to China and throw everybody out of work when you use taxpayer money.

I give you an example that people are screaming about that I represent right now. If we own 60 percent of a bank, why are they still paying obscene salaries and giving themselves bonuses? And why are we going to pay interest on those TARP loans that will keep our grandchildren--there has to be something in return, some guarantees for our tax money.

HEARING COCHAIR SHEA: Mr. Kowalewski, would you like to respond? MR. KOWALEWSKI: The aviation industry is one that I ***spent*** a fair amount of time on for personal reasons, having ***spent*** time working in the defense electronics industry. Still, as airplanes take off from various airports, I wonder about all of the components and the companies that I knew that contributed to make that aircraft fly.

New York doesn't have a Boeing. We don't have a final assembly. What we do have are companies, and I'll say the larger concentration is in the western part of the state and Long Island, but not exclusively there, that work in the aviation industries. Companies like Moog in Buffalo, ***billion*** dollar companies that make large components that go into aircraft, landing gear, wing actuators, and supply to all of the prime contractors and companies like Boeing and Bombardier and Airbus and those sorts of companies.

The smattering of companies that do constitute the aviation cluster in New York make subsystems and are tier two or tier three suppliers, an important contributor. They typically are tied to airframes and specific programs. When Boeing decides to create a new Dreamliner, companies around--aircraft companies 78 around the nation and certainly in New York clamor to be responsive to the needs of Boeing and Airbus.

We do recognize that the aviation industry has certainly changed. Gone are the days when the entire aircraft that Boeing built was produced in Seattle. Many components come from all over the world-- Japan, Italy, China--and again our companies attempt to the best of their ability to compete to keep an innovative edge and to be able to be suppliers to those industries.

As long as Boeing is making airplanes, as long as Airbus is making airplanes, our companies, and frankly in a very fierce fashion, seek those job and do the best they can to be responsive to those new aircraft in designs.

Are we concerned that the Chinese may be looking for key technologies and want to transfer those to China? Let me put on a different hat for just a second.

In addition to my position with the state of New York, I'm a faculty member at the State University of New York working on international business courses, and I take groups of students to China to study Chinese businesses, and we visit all kinds of businesses while we're there.

Our observations, and certainly my personal observations, having been in China, are those key technologies, frankly, are there. I don't see many sort of key technologies that we have in New York State that don't have a place in China already.

And again, my observation is if there were technologies that we attempted to protect here, European manufacturers slide in and provide European machines, European technology, and make those key technologies available indirectly.

HEARING COCHAIR SHEA: Thank you.

Commissioner Mulloy.

HEARING COCHAIR MULLOY: Thank you.

Mr. Mayor, thank you for your testimony about what happens to communities when they lose their industrial base. I think you talk about on page eight of your testimony, deindustrialization, disinvestment, deterioration, despair, divorce. A lot of bad things happen.

And here'**s** my understanding. What we have to understand is that this happened to China. China had a great civilization, and the West hit them, and they fell apart, and they didn't like it, and they sat down and put a game plan together.

We're in a globalization game. They have a game plan and we don't, and you can see, and it'**s** not just China. As Dr. Shih points out in his testimony, on page five, he says I'm not speaking just of China. Japan, Taiwan, Singapore, Korea, they've all exhibited visionary thinking, and they plan for the long term, and we haven't.

And the results are becoming increasingly clear. It'**s** been ***masked*** because there'**s** a lot of propaganda that goes on in Washington, and that'**s** why we like to do these field hearings, to find out about the benefits of all this. Well, there'**s** a small group in our society are benefiting pretty well, the shareholders and the Wall Street guys and other people.

But I think the vast bulk of the people are not doing that way. So if we can 79 set some goals, and that would be one.

I read a wonderful article by Warren Buffett in Fortune magazine in October 2003. Warren Buffett is concerned about this, and he said in that article by running these massive trade deficits year after year, you're sending dollars out which are claims on your economy. We're not sending goods out. We're getting the goods, but we're sending the dollars out which are claims on our economy, and then the foreigners are beginning to buy up our economy.

And he said we're undermining and we're outsourcing our economy ownership. We're not moving toward an ownership society. We're moving toward a sharecropper economy. That'**s** what he said.

Now, then he says why don't we set a goal of balancing our trade? Let'**s** balance our trade. What do you think of setting a goal like that--let'**s** balance our trade in five years? You set the goal, and then you figure out how you have to do it. There may be a lot of things you have to do, but if you set the goal, then we could stop just talking. President Kennedy, he set a goal: get to the moon in so many years. And we found a way.

If we set some goals, what do you think of that idea? And let me hear from Mayor Johnson, Mr. Bertolone, and then Mr. Kowalewski.

MR. JOHNSON: Well, Mr. Mulloy, I find what you say absolutely powerful and potent, but I have to reflect on all the years that I've ***spent*** trying to achieve just very minor objectives and finding that they kind of dissipate, and I don't think it has anything to do with my skills or my talent. I think it'**s** the environment in which we operate.

Now, this is probably not going to come out right. It'**s** probably not going to sound the way I intend it so I ask you to forgive me in the beginning. When you talked about the ***fact*** that China got its lunch handed to it and it regrouped and it recovered, I think that perhaps the reason it was able to do that was that it didn't have to ***deal with*** the niceties of democracy. It didn't have to ***deal with*** all of the various opinions that people had to ***deal with***, all of the--it had a way to impose its will on that society.

I'm not calling for that in this country, but I think if we don't recognize the ***fact*** that we have this kind of representative democracy where everybody not ***only*** is entitled to think but actually now has an opportunity through our media to express their views, think of themselves as being expert as the next person.

If you watch what'***s*** going on in the halls of government--I don't want to dump on it, but I know it very well, and I watch it in its dysfunctionality--it is very hard to achieve any consensus about anything. The political agenda is what prevails.

So how do we transform our own national psyche to get to a point where we recognize that we're in such a state of crisis that we have to change the status quo? There'***s*** a book out that I'm reading. It'***s*** called "The Tyranny of Dead Ideas: Letting Go of the Old Ways of Thinking to Unleash a new Prosperity." There are certain things that we just need to give up on. We just need to say, hey, they don't work anymore; we need to stop embracing them, and we need to find new 80 paradigms.

So I think that for me at this point in my life, struggling not to be pushed off of the side of the stage but to still try to figure out before I leave this earth how to get some of these ***problems*** solved, I think it requires a frontal lobotomy.

We need to change the way not ***only*** we think, but we need to change the way we act.

And I'm not seeing that even in the face of this crisis-the New York State Senate, a metaphor for dysfunctionality, just went through a whole month of doing absolutely nothing, playing around and determining who was going to get the opportunity to dispense the perks. That'***s*** all this was all about. That was what all this fighting was about, not about governance, not about reform. Who'***s*** in charge of the kitty bank, and who'***s*** going to get a chance to disburse it? And the citizens of this state--there was a poll that just came out early this week saying that citizens of this state were just damn angry at their public officials, but the ***fact*** of the matter is they don't get a chance to express that anger until 14 months from now.

I can almost guarantee you based on past experience that in the next 14 months, that anger will have absolutely dissipated and the record of returning incumbents to the New York State legislature will remain intact.

We got to do something up here. That'***s*** what it'***s*** going to take, not down here.

HEARING COCHAIR SHEA: Do you have a quick comment? MR. BERTOLONE: Yes. Because this really goes beyond the ***problem*** with China, but Commissioner Mulloy, when you talk about planning, it is something that, compared to other countries, that it seems in our states and localities has been absent my entire life.

To Bill Johnson'***s*** credit, and sometimes I think I was the ***only*** one who supported it, he ran on metro government. You know in a county of less than 750,000 people, we have dozens and dozens and dozens of taxing authorities. We have 18 different school districts with different standards. We have a federal infrastructure project that has been on the drawing board for--what--almost a decade on main street in Rochester.

We have the money from the federal government, and we're going to lose it because we can't get the county government and the city government to agree on the final plan even though it'***s*** been going on for ten years.

Metro--he talked about urban sprawl, so ***much*** of it dictated by the racism of even in the north of the '50s and the '60s that has helped destroy our city, put economic pressure on our infrastructure, and raised taxes, and there is education to be done for Americans who don't want to pay taxes but all want their own local governments, their own local legislatures, their own local school districts.

So we need planning. I have been having this debate within labor, whether it'***s*** trade with China, whether it'***s*** labor'***s*** top two agenda items, universal health care and Employee Free Choice Act, and that is my debate within labor is that our number one priority should be the public funding of all election campaigns.

81 And I'll be bipartisan here. On the health care thing, we have on the Finance Committee in the Senate, Senator Chuck Grassley, talking about socialized medicine, who has brought socialized agriculture, ***billions*** of dollars to it.

You want to talk about subsidies and dumping in Iowa. And on the other hand, we have the Democrat Max Baucus, who according to NBC reports has gotten so many millions of dollars from the for-profit health care industry, that it comes to $1,500 a day for everyday he's been in ***Congress***, and that's over 30 years.

That's what we have and the shenanigans that Bill talked about in the Senate. We have a building on this campus named after billionaire Tom Golisano who put millions of dollars into changing the State Senate to Democrats, and when they passed the budget that raised his taxes, he then promised millions of dollars to two Democrats to switch to Republican. I mean does my vote count for anything here or what? And that's what is going on. I have read--and I'm not a lawyer so I don't have all the legal nuances down on the Supreme Court decision on free speech and campaign finance.

HEARING COCHAIR SHEA: Buckley versus Valeo. We're going to have to move on to the next witness.

MR. BERTOLONE: Well, just let me say my position is bribery is not free speech. In a lot of countries, what's going on, this would be felonies.

HEARING COCHAIR SHEA: Okay. Thank you.

Commissioner Blumenthal.

COMMISSIONER BLUMENTHAL: Yes. Thank you all for your testimony, and Mr. Bertolone-- MR. BERTOLONE: Yes.

COMMISSIONER BLUMENTHAL: --yes, very compelling. I definitely feel for the people so hard hit by the economic downturn. I wonder, some of these statistics are interesting, given testimony we heard beforehand, and I saw that you got these statistics from the Bureau of Labor and Statistics, but how do we know that these jobs were lost to China rather than some of the other factors people brought up, such productivity and technological gains or high taxes or number of other factors? The other question is there are a lot of puzzles here, because on the one hand, we want to be competitive and attract investment, and I would suppose that just take the auto industry, for example, there were some bad management decisions and high health care ***costs*** and so forth in the Big Three, but then workers down in Toyota plants in the south or Kia plants are benefiting, I would guess, and like their jobs.

It's not that we don't have an auto industry; it's that there was also some bad management. But it seems to me we would want to encourage those kinds of investments from foreigners into the country, as well, because they do create good jobs.

So I also wonder, and this is for all of you, why is it so hard to attract investment in New York? Is it harder than in other states? Is it the tax rates? 82 What is it? Why was it so hard to attract one Taiwanese business into Rochester, and meanwhile you have some of these other foreign countries thriving in the United States and creating jobs here? So those are two questions. If there's time, Mr. Bertolone, I'd like to hear your comments also about labor abuses in China because that's not just immoral, but also an unfair trade practice, and I would like to hear a little more about that as well. But I don't want to go over the time.

MR. BERTOLONE: If you'd like for me to start. I think we know that technology has gotten rid of a lot of jobs, but most of the China statistics are from 2001 to 2007. So there is less of--it's easier to measure what advances in technology eliminated jobs. In my own business in the Postal Service, 80 percent of our mail has been worked by photonics, bar codes, computer bar codes, not by reading addresses. It's all automated.

We have machines that work 40,000 pieces of mail an hour. We've had those machines so they've been upgraded since the late '70s. So I believe, as measured by whether it's the Alliance for American Manufacturing, the Bureau of Labor Statistics, the Economic Policy Institute, some of this has been factored out.

People have a conception that our auto plants, for example, are blue collar, and some of the most advanced manufacturing technology that you can find today, lasers and robotics and all the rest, are in our auto manufacturing plants, and that technology has been in place for years.

There are some other issues here. I mentioned universal health care.

Again, the way Toyota and all the rest, you got to talk about legacy ***costs***, where the health care they provide because in their home country, they have universal health care, there'***s*** a difference of anywhere ***between*** 1,100 and $1,400 a vehicle.

Georgia lost an auto plant--Toyota--to Canada because they have universal health care. So, and as Bill Johnson mentioned, this has been going on for years where New York lost jobs to the Sun Belt states. Now, in the last ten years, we have seen some of the largest job losses--the Carolinas and Georgia are now in the top ten of job losses to China because they went there to get lower ***costs***, and now they're leaving the Sun Belt states to get lower ***costs*** in ***Mexico*** and China.

So there are other issues besides that. But I think when it comes to protectionism, most countries buy--what this Commission work has done, and they're in the WTO rules about antidumping laws and subsidies, but yet we see American businessmen--labor points out the subsidies; we're protectionists.

Joseph Stiglitz, one of New York'***s*** Nobel Laureates, has done a good paper on this that, you know, everyone likes to bring up Smoot- Hawley. We've had thousands of tariffs. That'***s*** the most extreme, and it was sold by the businessmen, not by labor, in the '20s. But tariffs, fair tariffs, can balance bilaterally trade, and all countries can afford to do that.

Two-thirds of the countries in the world cannot afford to heavily subsidize their industries. China heavily subsidized the steel industry, 28 ***billion*** approximately, just energy ***costs*** and the steel industry, since 2001. Developing nations can't compete with that. They went from number four to number one, and 83 they now produce more steel than the ***U***.***S***., Japan, and Russia combined, the next three, because of the subsidies.

The environmental standards. It ***costs*** China half of what it ***costs*** us for every ton of steel to meet environmental standards because their standards are ***much*** lower. You mentioned the lower labor ***costs***.

COMMISSIONER BLUMENTHAL: Labor abuses.

MR. BERTOLONE: Labor abuses. Prior, when global, when this started after NAFTA in the '90s, and Professor Hira did some research on this, the majority of foreign investment from the United States multinationals was going into democracies or countries we considered on the road to democracy.

Since 2001, that has changed. The majority, overwhelming majority, of American multinational capital investment is going into totalitarian states.

If workers are not free, that is--you know, in the second half of the 20th century, the check on corporate power was the labor movement, whether through the legislative side in Social Security and minimum wage and all. As labor'***s*** density and power has declined from the macro/micro economic policies in the last 50 years, there has been no real check on corporate power.

I do not know of a society in the world, whether it'***s*** a country of the left like Castro and Cuba or a dictatorship of the right, like Saddam Hussein, or theocracy like Iran, if they don't have a free democratic labor movement, the people do not have freedom.

If the people do not have freedom, they are not free to improve their conditions, their wages, their safety standards. Why would Chinese workers care about exposing 20 million of our kids to excessive leads when they're working 12 hours a day with that lead without safety ***masks*** and breathing it in and all the rest? So, you know, these issues.

Investing in totalitarian regimes, to me, that is what our legislative--the corporation is an amoral being, in business to make a profit. It is up to us to regulate it, and again as a history major, I think it was 1932, FDR said that if you want to sustain capitalism, you must restrain it, and he was called a traitor to his class, and he said I welcome their hatred. Well, some of our politicians need to welcome the hatred and rein some of the excesses in.

MR. JOHNSON: May I? HEARING COCHAIR SHEA: Yes, Mr. Mayor.

MR. JOHNSON: I want to leave with this one--if you leave here with nothing else, I want you to understand, most elected officials, mayors, and legislators, county executives, whatever, don't sit around discussing policy. They are, we are like emergency medical technicians. When a ***problem*** hits our desk, we try to figure out the quickest and the surest way of ***dealing with*** it.

And let me tell you that there'***s*** no greater crisis in any of our communities than the loss of jobs. I have the sheet--I attached it here--that shows you that this economy lost just 45,000 jobs from 1981 to 2007 from its 15 largest employers.

That number is ***much***, ***much*** greater.

And without a job, I can't persuade kids to stay in school to get a good 84 education because they say for what purpose? And without a job, I can't get those young men off the street corners who are not ***only*** standing there idle but who might, in ***fact***, engage in some kind of criminal behavior. Without a job, it'***s*** very hard to keep people in their homes and to keep those neighborhoods stable.

So, you know, ***much*** of Kodak'***s*** job decline occurred while I was in office.

I didn't get a call from [former CEOs] George Fisher or Dan Carp to say, oh, by the way, Mr. Mayor, we're about to eliminate some jobs; what can you do to help us? Well, let me tell you what, if they had called, I'd have been breaking my back trying to figure out how to keep them from reducing those number of jobs.

And when it happens, there are companies that have come to me, and they say, Mr. Mayor, we're going to have to leave town unless you can figure out a way to keep us here, and we scrambled around, and we put together packages. I can take you to places and show you, large and small, where this has happened.

What it does is that in the pursuit of that goal, in order to maintain a stable community, we continuously deplete our resources. Our tax bases are shrinking automatically, and we are forced to use resources that we literally do not have because we understand doing nothing is not an option.

And so going back to Mr. Mulloy'***s*** question, it behooves us to find a way, you know, to stop talking about this. It behooves us to find a way to finally get down to the bottom line, you know, and I appreciate, if you take anything out of here that you can pass on, President Obama is going to staff up an office, a White House Office on Urban Affairs. He is coming to office committed to being a president who will not ignore cities and metropolitan areas, but who will, in ***fact***, try to find a way to help regenerate them.

And it'***s*** going to take more than five or ten people sitting in a White House office going out having hearings in the field. We have to find a new way of doing business, but the bottom line is this, an d I'm not opposed to Chinese investment--I don't think anything comes good of it, but I'm telling you if they come here, you know, I wanted to make Macauto to come here, not to occupy vacant space, but to grow, to expand, to create jobs for people who live in one of the poorest neighborhoods in the city. That has not happened. They are not paying us back the investment that we made in them.

So we got to stop this endless pursuit, this endless chase for the rainbow, the gold pot at the end of the rainbow. We got to find a way to get that gold pot and to make it pay off for our community. I know that sounds like a political speech. I'm not a politician. And I tell you what it sounds like-- HEARING COCHAIR SHEA: You're a professor.

MR. JOHNSON: --a frustrated man, a man who ***spent*** 40 years of his life trying to make sea change happen, working with people like Jim Bertolone, trying to see things happen, and it would be tremendously disastrous for me if the last conscious thought I have before I leave this earth is that things are no better now than the day that you started out.

HEARING COCHAIR SHEA: Well, hopefully, you won't leave this earth for quite some time, and things will improve in the interim.

85 But we have one last question. Commissioner Slane.

COMMISSIONER SLANE: Thank you.

Mayor, I want to assure you that we have met the enemy, and it is not the Chinese and it is not American companies; it is us. And my feeling is that unless we have a national industrial policy to ***deal with*** these issues, we will continue to lose our high-tech industries, and there is very little that the states or the cities will be able to do to stop it.

HEARING COCHAIR SHEA: On that note, again, I want to thank you, Commissioner Slane. I want to thank everyone, the witnesses, for being here.

We're going to adjourn until one o'clock. Thank you.

[Whereupon, at 12:10 p.m., the hearing recessed, to reconvene at 1:05 p.m., this same day.] PANEL III: GOVERNMENT AND INSTITUTIONAL PERSPECTIVE ON CURRENT OPPORTUNITIES FOR GROWTH IN NEW YORK STATE HEARING COCHAIR SHEA: Good afternoon. We will begin our third panel, which is entitled "Government and Institutional Perspectives on Current Opportunities for Growth in New York State." I want to thank each of the four witnesses. It'**s** a little tight there at the table. I apologize for that, but thank you for participating.

I would remind you, if you could, if you could keep your oral remarks to about seven minutes maximum. We ask a lot of questions in this group.

I'd like to introduce our four panelists. The first panelist is Mr. Peter Robinson. He'**s** the Vice President and Chief Operating Officer of the University of Rochester Medical Center and Strong Health here in Rochester.

He assumed his current role as Vice President and Chief Operating Officer in 1997, if I'm correct.

Also joining us is Ms. Linda Dickerson Hartsock, who is the Director of the Center for CleanTech Entrepreneurship, a New York State Energy and Research Development Authority funded initiative-- that'**s** NYSERDA; right--that helps entrepreneurs and early-stage clean tech companies.

We're also privileged to be joined by Mr. Nicholas Rostow, who is the University Counsel and Vice Chancellor for Legal Affairs of the State University of New York, based in Albany, New York.

As the University Counsel and Vice Chancellor, Mr. Rostow is the legal advisor to SUNY, and before joining the university, he ***served*** for four years as General Counsel and Senior Policy Advisor to the ***U.S.***. Permanent Representative to the United Nations.

Our fourth panelist is Mr. Paul Vargovich. Mr. Vargovich is President of National Solar Technologies based in Depew, New York.

In 1997, Mr. Vargovich established NST, a division of National Manufacturing and Distribution, a company he founded and still owns. NST started in the renewable energy business as a manufacturer, developer, and integrator of 86 solar and wind power systems and commercial solar-powered lighting systems.

Did I get all that right? MR. VARGOVICH: Yes, sir.

HEARING COCHAIR SHEA: Okay. Great. So why don't we begin with Mr. Robinson.

OPENING STATEMENT OF MR. PETER ROBINSON VICE PRESIDENT AND CHIEF OPERATION OFFICER, UNIVERSITY OF ROCHESTER MEDICAL CENTER AND STRONG HEALTH, ROCHESTER, NEW YORK MR.

ROBINSON: Well, thank you very ***much***. Commissioners, Chairperson, others, thank you very ***much*** for allowing us this opportunity to testify.

My comments will be principally focused on the perspective the University of Rochester has to bring, and I will really just refer in passing to my written comments, but I think it'**s** good to begin by focusing a little bit on the ***fact*** that the upstate region, Rochester being typical of that, has seen fairly significant effects from globalization and the shift of the manufacturing sector from our upstate communities and cities. That'**s** typified here in Rochester by what you see as significant transitions in the size of the high-tech manufacturing base in places like Kodak and Xerox, where more and more of that work has shifted overseas.

And in this kind of an environment, we believe research institutions like the University of Rochester have a very critical role to play in terms of helping to shape the region'**s** economic future.

And part of that is, of course, that we have a very significant footprint both in terms of employment and spillover economic activity that'**s** driven by the University'**s** activities, but the principal role that the University can play, we believe, in contributing to the local economy and, therefore, linking it to the areas that you look at, is a driver of the knowledge-based commercial sectors that are driven by the cutting-edge research that comes out of institutions like the University of Rochester.

And we believe that very strong and meaningful partnerships ***between*** institutions like the University of Rochester and similar institutions in China can propel local growth and innovation.

There are a couple reasons for that. Higher education, we believe, is one of the economic pillars of the entire region. The greater Rochester area has 19 colleges and universities. We have more than 90,000 students enrolled and grant about 15,000 degrees annually.

The University itself at slightly under 20,000 ***full*** time equivalent employees is the region'**s** largest employer, and in ***fact*** the fifth largest private sector employer in the state, accounting for aggregate employment of 28,000 people with an impact of about 43,000 jobs, or about 8.7 percent of the labor force in the greater Rochester area.

87 So, in addition to all of that, focusing specifically on university-based research, we believe the potential here for that research to ***serve*** as a catalyst for technological innovation, which can be harnessed for local economic growth, is critically important, but let me just skip a little bit to how those activities can tie to important interactions as we build relationships, particularly with countries such as China, that are also aggressively investing in science and education.

We believe in the coming years that many of the efforts that we've set in motion to create these kinds of partnerships internationally will provide benefits both for our institution and for the local region.

First, a few statistics that we think would be helpful. The University has one of the largest concentrations of foreign students in the country, 16 percent, and we rank 22nd in ***U***.***S***. universities in the percentage of foreign-born students.

The largest number of those students comes from the People'**s** Republic of China, and during the most recent academic year, we had over 500 undergraduate and graduate students at the University of Rochester from China, which is about a quarter of our entire foreign student population. There are an additional 115 from Taiwan, so it'**s** an even higher percentage if you incorporate both Chinas.

We also have a growing number of scientific connections with Chinese institutions. We currently have 144 scholars from China and Taiwan at the University in categories ranging from ***full*** and part-time visiting professors and instructors all the way through to research associates, and some of our faculty members hold appointments at Chinese institutions, and collaborations are growing. I will cite a few specifically.

The University and the Medical Center have been actively building formal partnerships with Chinese institutions and recently signed an agreement with two leading Chinese medical schools: Zhejiang University School of Medicine in southeast China and Shanghai Jiao- Tong University School of Medicine.

The partnerships consist of graduate student and faculty exchanges, and those are producing emerging collaborative research programs in the areas of cardiology, microbiology and infectious diseases, and biomedical genetics.

In addition, we are working on a third partnership with Fudan University in Shanghai which we believe is one of the top two or three medical schools in the country. We expect that these partnerships are going to grow and evolve into meaningful scientific exchanges in the coming years.

The benefits of those relationships for Rochester specifically are they do expose our faculty to international funding opportunities because the Chinese government itself has actually begun to expend more in terms of research funding.

The data that we generate from these collaborations is used to enhance research projects and leverage funding at home, and it also provides access to populations that will enable us to more effectively and rapidly move our biomedical research programs into clinical settings for clinical trials and further development.

I'd like to also point to a couple of companies that are specifically spinning out of university technologies that have direct links to China. Koning, Inc., which 88 was created in 2002, is a medical imaging technology company. It has developed Cone Beam Computed Tomography, a new way of applying CT technologies to breast imaging. And that technology is moving through the FDA process and is pending approval.

The company'**s** founders are linked to Chinese investors, and part of that investment strategy is going to include the deployment of these technologies into clinical settings in China.

The interesting thing about the evolution of medical screening and breast screening in China is that they've actually lagged significantly in terms of the opportunities for breast cancer screening in the Chinese population. So the introduction of the kind of baseline mammography technology that exists here ***isn't*** broadly distributed in China.

So the effect here will be, we hope, that this technology will, in ***fact***, jump over the current technology and be introduced as the first baseline for widespread use of breast cancer screening in China.

Another technology also developed at the University which precisely monitors data from electrocardiograms to determine if an individual is at risk for adverse cardiac events is also being developed into a technology for personal cardiac safety devices, and there is similarly Chinese investment in that and plans for commercial deployment in China, as well.

The one issue that I do want to get to during questions and answers is the issue of H-1 visas and the restrictions that that is placing on the ability to effectively promote the exchanges that we have established.

[The statement follows:] Prepared Statement of Mr. Peter Robinson Vice President and Chief Operation Officer, University of Rochester Medical Center and Strong Health, Rochester, New York Chairwomen Bartholomew, members of the commission: Thank you for allowing me this opportunity to submit testimony on behalf of the University of Rochester. I would also like to thank you for calling this hearing on this important topic.

Rochester, like its sister cities in Upstate New York, and many other areas of the country, are feeling the growing effects of globalization. Direct competition for jobs with low-wage workers, coupled with increased investment by foreign competitors, advances in modern communication and other technologies, has lead to a fundamental shift in manufacturing jobs to other areas of the country and overseas. What was once a significant building block of our area economy is now leading to layoffs and general economic decline as Rochester companies, like Kodak and Xerox, continue to shed jobs.

In this environment, research institutions such as the University of Rochester have a critical role to play in terms of helping shape the region's economic future. The University of Rochester has a significant and growing "footprint" in terms of employment and spillover economic activity. But perhaps the most important economic function that the University can ***serve*** is to fuel growth in knowledge based commercial sectors through cutting edge research. And we believe that strong and meaningful partnerships with institutions in places such as China will propel growth and innovation.

89 Higher education is one of the economic pillars of the region which is home to 19 colleges and universities.

Collectively, these institutions enroll more than 90,000 students and grant more than 15,000 degrees annually.

With19,441 FTE employees, the University of Rochester is the region's largest employer and the 5th largest private sector employer in the state. According to a report by the Center for Governmental Research in 2008, the University of Rochester generates aggregate employment for an estimated 28,000 to 43,000 people (8.7% of the labor force in the Rochester Metropolitan Statistical Area).

In addition to this direct economic impact, university-based research holds the potential to ***serve*** as a catalyst for technological innovation which can be harnessed for local commercial growth. Over the last 5 years, the University has received more than $1.8 ***billion*** in research funding and is home to many leading research programs in the fields of engineering, optics, medicine, and alternative energy. These resources, combined with talented scientific faculty and state- of-the-art facilities, have led to a significant growth in new discoveries and the University's intellectual property portfolio. We also ***serve*** as an important research and development partner for many local companies, such as Kodak, Bausch and Lomb, and Carestream.

We believe that a critical contributor to future research growth will be the relationships that we build with institutions, particularly in countries such as China that are aggressively investing in science and education. In the coming years, we anticipate many of the efforts that we have recently set in motion to flourish and have significant benefits for the University and the region.

The University of Rochester has one of the largest concentrations (16%) of foreign students in the nation - in 2007, the University ranked 22nd among ***U***.***S***. universities in the percentage of foreign born students. The largest number of foreign students is from the People's Republic of China. During the 2008-2009 academic year, there were 505 undergrad and graduate students at the University of Rochester from China - more than a quarter of our entire foreign student population. The University also had an additional 115 students from Taiwan. Most of these students are concentrated in the fields of engineering, medicine, and business administration.

The University also has substantial and growing scientific connections with Chinese institutions. Currently, there are 144 "scholars" from China and Taiwan at the University of Rochester, a category which includes ***full***/parttime/ visiting professors and instructors, post-doctoral fellows, and research assistants/associates, and technical associates. Some of our faculty members also hold appointments at Chinese institutions and collaboration ***between*** Rochester faculty and their Chinese counterparts are growing as witnessed by joint scientific publications, collaboration on individual research projects, and inter-institutional scholarly visits.

The University of Rochester Medical Center has also been actively building formal partnerships with Chinese institutions and has recently signed an agreement with two leading Chinese medical schools - Zhejiang University School of Medicine (southeast China) and Shanghai Jiao-Tong University School of Medicine. These partnerships consist of graduate student and faculty exchanges and emerging collaborative research programs in the areas of cardiology, microbiology/infectious disease, and biomedical genetics. The Medical Center is exploring additional partnerships, including one with Fudan University in Shanghai, home to one of the top medical schools in China.

We anticipate that these partnerships will grow and evolve into meaningful scientific collaborations in the coming years and expand into other areas of medicine.

These partnerships have significant benefits for Rochester. They expose our researchers to international funding opportunities; the Chinese government has significantly expanded research funding over the last several years. In many instances, data from these collaborations can then be used to enhance research projects and leverage funding at home. It also gives our scientists access to large and diverse populations for clinical research, this is particularly important when studying rare and emerging diseases. And finally, China has a large population of highly trained researchers who can help fill out University labs.

Many of the technologies that emerge from our labs ***serve*** as the foundation for new business ventures that remain in 90 Rochester and contribute to the growing number of high tech companies.

There are more than 35 companies in the region that are based on University of Rochester technologies and, in some instances, Chinese markets and resources hold the key for their future growth.

Koning, Inc. was created in 2002 to commercialize a new medical imaging technology developed at the University - called Cone Beam Computed Tomography - for breast cancer screening. The technology is pending approval by the FDA. The company'***s*** founders are in discussions with Chinese investors, have scouted out potential manufacturing facilities in China, and have entered discussions with the Chinese health officials about using the technology in Chinese clinics once it has been approved - a potentially vast market for this technology.

Another University of Rochester start-up company, iCardiac Technologies, is developing technologies that can precisely monitor data from electrocardiograms to determine whether an individual is at risk for an adverse cardiac event such as a heart attack. The company is in discussions with a number of potential Chinese partners regarding the manufacture of personal cardiac safety devices.

The University of Rochester has many other interactions with Chinese institutions and the Chinese people on a scientific and cultural level. For example, our faculty members have participated in efforts organized by the National Science Foundation to strengthen scientific ties ***between*** our two countries and the University of Rochester'***s*** Eastman School of Music recently concluded a 12-day tour of four Chinese conservatories that included concerts, lectures given by Eastman faculty, and informal meetings ***between*** Eastman and Chinese students..

One of the potential ***barriers*** to the continued growth in our interaction with foreign institutions and students that must urgently be addressed is ***U***.***S***. ***immigration*** policies. ***U***.***S***. colleges and universities use the H1-B visa to recruit exceptional researchers, faculty, scholars, and other talented personnel from around the world.

The program grants ***only*** 65,000 visas per year - the same amount provided when it was first established in 1990, plus an additional 20,000 visas for those holding an advanced degree from a ***U***.***S***. university. This is an arbitrary limit that does not reflect the reality of today'***s*** global economic environment and increasingly works against our nation'***s*** competitiveness. It is common that the ***U***.***S***. Citizenship and ***Immigration*** Services (USCIS) will announce that they will meet their allotment of H-1B visas on the very first day applications were accepted - clearly demonstrating the great demand for this program. Allowing foreign competitors to benefit from the best minds the world has to offer - many of whom have been educated right here in the United States -- threatens America'***s*** innovation leadership and competitiveness.

When ***Congress*** and the Administration consider ***immigration*** reform, we should identify ways to strengthen ***U***.***S***. higher education and our global leadership by encouraging more international students and scholars to come to study and work here. This includes, where appropriate, providing them with a clear path to employment and permanent residency.

In addition, greater promotion of international academic and cultural exchanges will also facilitate international students and scholars better understanding the ***U***.***S***. and its citizens. These exchanges would lead to long-term, sustainable relationships and collaborations that can lead to new knowledge, economic development and greater security.

Again, thank you for allowing me this opportunity to submit my testimony for the record and thank you for your efforts to help us understand and adapt to the economic changes brought about by globalization and trade with China.

HEARING COCHAIR SHEA: Thank you very ***much***, Mr. Robinson.

Ms. Hartsock.

91 OPENING STATEMENT OF MS. LINDA DICKERSON HARTSOCK DIRECTOR, CENTER FOR CLEAN TECH ENTREPRENEURSHIP, THE TECH GARDEN, SYRACUSE, NEW YORK MS. HARTSOCK: Thank you and welcome to upstate New York, and thank you for extending the invitation to me to be part of this hearing.

As Commissioner Shea mentioned, I am the Director of the Center for CleanTech Entrepreneurship, but I'm also here today representing the Syracuse Center of Excellence in Environmental and Energy Systems who is our strategic partner.

The Center for CleanTech Entrepreneurship is actually a new initiative supported by NYSERDA. It'**s** located at the Technology Garden in Syracuse, New York. We are focused statewide on developing emerging businesses and commercializing technologies in sectors of renewable and clean energy, alternative fuels, grid and system integration, clean transportation and energy efficient construction technologies.

The CleanTech Center offers support for entrepreneurs and early stage companies through incubation, acceleration, and retention. Our collaborators include angel and venture investors, financial institutions, and other lenders, leading New York State colleges and universities, service providers, utilities, industry associations, economic development organizations, and government agencies who work with us to provide technical and financial assistance to foster this clean tech business development.

And, in addition, we connect clean tech companies with national, state and global resource providers for the acceleration of staged growth.

The Syracuse Center of Excellence in Environmental and Energy Systems uses a collaboration to demonstrate new technologies, commercialize innovations, create jobs, and improve human health and productivity, security and sustainability in urban and built environments.

The CoE works in three core areas: indoor air quality; clean and renewable energy; and water resources, helping foster innovation through research, demonstration, and commercialization.

CoE has played a critical role growing the reputation of upstate New York as an incubator for green technologies. In recognition of the CoE'**s** work at the global scale, the CoE is the host location for the International Healthy Buildings 2009 Conference that will be in upstate in September, an event that'***s*** ***only*** held once every three years--has previously been in Stockholm, Budapest, Milan, Helsinki, and most recently Singapore.

There'**s** a large contingent of academic researchers and companies coming from China who will be engaged in this venue to showcase New York State R&D and innovation to these global leaders in the field of indoor air quality and healthy built environments, and we see it as an opportunity for exchange at the academicto- business level and the business-to-business level with the delegation, not just 92 from China, but the 1,500 or so people we're expecting from around the world.

The event will also coincide with the completion of the Syracuse CoE Headquarters, which is a world-class research building where innovations will be deployed and demonstrated by international teams of academic researchers and industry partners, and which is a test bed itself for innovation in environmental and energy systems. It'**s** a 55,000 square foot LEED Platinum building with lab and office space for joint international research in some of these areas of innovation.

There are more than 300 formal collaborators that are part of both the Syracuse Center of Excellence and the Clean Tech Center Alliance, and through those partnerships, we're uniquely positioned at the nexus of innovation stemming from leading research universities from around the world, small businesses, venture investment deal flow, and corporate innovation from across New York State, the northeast and the nation.

So if there's a message we want you to take away it is that while we're focusing on dangers, we also want to focus on opportunity, and to leave you with the message that upstate New York is a region that is ripe with innovation. Right now there's about $2 billion in annual R&D activity underway at research institutions in central upstate. The region that I am from has the highest concentration of undergraduate and graduate students in the nation: 138,000 students. And equally important, it's a region that's truly a national model for collaboration.

Across upstate, when we focus on opportunities for growth, I think we're all on the same page when it comes to sectors that hold promise across the broad clean tech sector.

Clean tech, as we know, is a major driver in our national economic transformation plan, with opportunities for investments to retrofit buildings, construct smart energy grids, develop new technologies for energy storage, and expand production of wind, solar and advanced biofuels. Much of this research is being done collaboratively at upstate institutions with international partners.

Just to give you a few examples: work that's going on in advanced microelectronics and flexible solar technologies at Binghamton University; work in wind energy and advanced materials at Clarkson; work in sensor and advanced computer applications and software engineering with applications for the Smart Grid at Syracuse University; work in fuel cells and battery technology at Cornell University, which was recently selected as one of our new national DoD Energy Frontier Research Centers; work in advanced biomass and alternative energy feedstocks being done across the SUNY system but particularly by SUNY ESF, a recognized global leader in this area; and work in advanced biofuels at Morrisville State College, another SUNY institution, which is working with China in areas related to liquid biofuels, particularly advanced research in new areas such as algae.

So the list could go on, but I want to convey to you the message that Upstate New York can truly play a role in the development of the new energy economy-- a sector that has the potential for both economic and security 93 implications, and this message should provide a window of optimism for what is ahead.

But that is only if there is a true public policy infrastructure plan that provides regulatory policy and incentives to really jumpstart at a large national scale the kind of innovation and effort that put a man on the moon 40 years ago this week.

Given our R&D legacy and our unique asset base, Upstate New York can become a test bed with international partners for developing, validating and commercializing technologies that can help the energy industry make the transformation that is needed to save energy, reduce costs, increase reliability, and enhance transparency, which is ultimate economic security.

So, thank you, and we look forward to working with you.

HEARING COCHAIR SHEA: I'm very impressed. You just finished right at the seven minute point.

[Laughter.] HEARING COCHAIR SHEA: Mr. Rostow.

OPENING STATEMENT OF MR. NICHOLAS ROSTOW UNIVERSITY COUNSEL AND VICE CHANCELLOR FOR LEGAL AFFAIRS, STATE UNIVERSITY OF NEW YORK, ALBANY, NEW YORK MR. ROSTOW: Thank you.

I'm honored to appear before the Commission on behalf of the State University of New York. The U.S.-China relationship is of importance to all Americans. It has many facets and dimensions. Interdependence is one important reality. It has not always meant smooth sailing however.

My remarks reflect the perspective of a large system of public higher education, a system that is intimately connected with the present and future wellbeing of New York State, and whose ambitions on behalf of all New Yorkers recognize the realities of globalization and seek to take advantage of them.

I will begin with a few general points about education and economic and social well-being in this country and then summarize the SUNY relationships with China and where they might lead in the future.

In the discussion period, I should be happy to address such issues as changes in the visa system and other measures taken since after 9/11.

First, it ought to be axiomatic that among the few essential functions of government, including the federal government, none is more important--there may be some that are equally important--than support for education at all levels. An educated citizenry has been the backbone of American democracy and society for more than 200 years. One can ***only*** imagine what this country would look like without one. And public education has been at the core of that backbone.

A few New York statistics give an idea of one aspect of the impact of public higher education. The SUNY College at New Paltz is the third-largest 94 employer in Ulster County after the school district and the county government itself.

The University of Buffalo is the second-largest employer in western New York after the federal government. Its economic impact is measured in ***billions*** of dollars and will ***only*** grow in the future.

Aggregating SUNY'***s*** multiple western campuses makes the State University the largest employer in western New York and probably in central New York as well.

Second, American prosperity since World War II has owed ***much***-- many multiples of the investment itself--to the federal government'***s*** investment research at American universities and the national laboratories.

These investments enabled the United States to sustain economic leadership long after the rest of the world had recovered from World War II, and without such investment, the United States would be a poorer and weaker place in every sense of these words.

Every region of the country wants its own Silicon Valley or Route 128-- visible economic benefits of investment in education and research. SUNY centers of excellence such as its nanotechnology center in Albany have involved partnerships ***between*** industry and university researchers with positive results in terms of employment and innovation. The model is replicated throughout SUNY through incubators and other educational-industry partnerships, particularly in life sciences and bioengineering.

Financing for start-ups is the hardest form of financing to find. The present economic situation obviously does not help.

Third, the evolution of the global economy has made the ***U***.***S***. economy an intellectual industrial complex by force of necessity. To sustain it requires investment in education. Investment is not simply a question of money although money certainly is important. It also means investing in people: reaching out and drawing into the educational systems and opportunities those people who feel excluded or once included become turned off.

In short, the country cuts its nose off to spite its face if it doesn't invest in education and research.

Let me turn now to SUNY'***s*** China relationship. It has a number of dimensions. It developed from the ground up, spawned by campuses such as the University of Buffalo, which launched its partnerships with individual Chinese universities in 1980. Today, 15 SUNY campuses have exchange and other programs with individual Chinese institutions of higher learning.

The SUNY System relationship with China is of newer vintage. China sees SUNY as a whole and a large whole at that. It is up to the State University to take advantage of that ***fact*** for the benefit of students and faculty at 64 campuses by establishing and maintaining relationships with the central government.

The most recent SUNY initiative with China has led to broad and deep relations with the Chinese government in support of educational collaboration. In response to the massive earthquake in Sichuan, in May 2008, SUNY'***s*** trustees 95 offered to help 150 affected Chinese college students continue their studies at SUNY for a year.

Education is what we do, and we thought it was a real way we could help these young people whose lives had been turned upside down. We could help them not to lose a year and give them skills they could use in the recovery effort when they returned home. The SUNY-China 150 initiative, as it became known, enjoyed the support of the highest levels of the Chinese and American governments and provincial and state and local governments here. Without that support, the initiative could not have been a success.

The 150 students arrived in New York in mid-August 2008 and returned to China at the end of May 2009. They were housed at 22 SUNY campuses from Buffalo to Stony Brook, from Plattsburg to Alfred.

They majored in different fields--a lot in science and business. They all learned leadership skills.

They lived, studied and played among students from all over New York and from many other countries, and they made memorable contributions to their campuses and campus communities, introducing teachers, staff, friends and students to a new culture and a new way of viewing the world.

They also absorbed a lot about New York and America, and, of course, they had a front row seat as Americans picked a new president and made history doing so. They visibly grew in ways no one could have predicted. Shy and scared when they arrived, they departed confident young adults.

The benefits to the students were made clear to all who met them. They also enriched SUNY. All campuses reported that this initiative challenged their international programs to step up in new and unforeseen ways and that they all met the tests. All campuses reported that the students and faculty and community learned from their Chinese guests and came away from the experience with a new appreciation of the diverse world we inhabit, and all reported that our regular students developed and grew as a result of interacting with the Chinese students.

SUNY takes from that experience and from the many exchange programs with individual Chinese universities our campuses have developed over many years, as it has from being open to students from all over the world. Buffalo alone has students from 138 countries. Internationalizing our education system is a good thing. Not ***only*** does it flow logically from New York'***s*** own diversity and history as a gateway to America, but also it so visibly enriches the quality of the education we provide and the research we do.

The Chinese government has made available ten scholarships a year for three years to SUNY students to study in China and has offered a study tour during next year'***s*** semester break to 200 SUNY students.

SUNY believes that there is ***only*** upside to internationalizing education with China and the world and that it can ***only*** enrich us as a society.

Thank you.

[The statement follows:] 96 Prepared Statement of Mr. Nicholas Rostow University Counsel and Vice Chancellor for Legal Affairs, State University of New York, Albany, New York I am honored to appear before the Commission on behalf of the State University of New York.

The ***U***.***S***.-China relationship is of importance to all Americans. It has many facets and dimensions. Interdependence is one important reality. Interdependence has not always meant smooth sailing.

My remarks will reflect the perspective of a large system of public higher education, a system that is intimately connected with the present and future well-being of New York State and whose ambitions on behalf of all New Yorkers recognize the realities of globalization and seek to take advantage of them.

I shall begin with a few general points about education and economic and social well-being in this country and then summarize the SUNY relationships with China and where they might lead in the future. In the discussion period, I should be happy to address such issues as changes in the visa system and other measures taken after 9/11.

First, it ought to be axiomatic that among the few essential functions of government, including the Federal government, none is more important - there may be some that are equally important - than support for education at all levels. An educated citizenry has been the backbone of American democracy and society for more than 200 years. One can ***only*** imagine what this country would look like without one. Public education has been at the core of that backbone.

A few New York statistics give an idea of one aspect of the impact of public higher education. The SUNY College at New Paltz is the third largest employer in Ulster County after the school district and the county government itself.

The University at Buffalo is the second largest employer in Western New York after the Federal Government. Its economic impact is measured in ***billions*** of dollars and will ***only*** grow in the future. Aggregating SUNY'***s*** multiple western campuses makes the State University the largest employer in Western New York and probably in Central New York as well.

Second, American prosperity since World War II has owed ***much*** - many multiples of the investment itself - to the Federal Government'***s*** investment in research at American universities and the National Laboratories. These investments enabled the United States to sustain economic leadership long after the rest of the world had recovered from World War II. Without such investment, the United States would be a poorer and weaker place in every sense of those words.

Every region of the country wants its own Silicon Valley or Route 128 - visible economic benefits of investment in education and research. SUNY'***s*** centers of excellence, such as its nano-technology center in Albany, have involved partnerships ***between*** industry and university researchers with positive results in terms of employment and innovation. The model is replicated throughout SUNY, through incubators and other educational-industry partnerships, particular in life sciences and bioengineering. Financing for start-ups is the hardest form of financing to find. The present economic situation obviously does not help.

Third, the evolution of the global economy has made the ***U***.***S***. economy an "intellectual-industrial complex" by force of necessity. To sustain it requires investment in education. Investment is not simply a question of money, although money certainly is important. It also means investing in people: reaching out and drawing in to educational systems and opportunities those people who feel excluded or once included become turned off.

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SUNY believes that there is ***only*** upside to internationalizing education, with China and with the world. It can ***only*** enrich us as a society.

HEARING COCHAIR SHEA: Thank you very ***much***, Mr. Rostow.

Mr. Vargovich.

OPENING STATEMENT OF MR. PAUL VARGOVICH PRESIDENT, NATIONAL SOLAR TECHNOLOGIES, DEPEW, NEW YORK 98 MR. VARGOVICH: Good afternoon and thank you for asking me to testify.

I just want to say I'm not an expert on ***U***.***S***.-Chinese relations. I don't have a list of statistics to throw at you. All I have is over 25 years as a small businessman in manufacturing.

Over the course of time, I've run across different venues where I had to make the decision dollarwise/timewise on what we were going to do, and what I did do is invest into technology that I purchased from Ontario Hydro Technologies in the solar and wind business. And in looking at that and the way that I am associated with manufacturing, I've always liked to be self-supportive. So when we looked at the ***costing*** of what we're building, one of the biggest ***costs*** were solar panels.

So I looked at manufacturing our own line of solar panels. We started out looking at the equipment ***costing*** to go manual all the way up to ***full*** automatic.

We evaluated all of those numbers on the equipment, and then justified them.

And now we looked at your supplies. When I looked at the supplies, my supplies were coming in the main course from China. So now when I started putting my ***costing*** together, and trying to say, well, where am I going to buy--I

can't buy it in the ***U***.***S***. I have to go to China for it. So then the ***costing*** that I had there, based on the ***fact*** that they control that market, I decided I didn't want to do it.

The profit margin was at a point where you had to go fairly large to do it, and with a minimal amount of what you might call rug-tugging under your feet, they could knock you out of business with it. So I decided not to do that.

That was a business development that didn't happen right from the get-go.

It wasn't something that went away. It was something that didn't happen because I looked at some of the realities of it.

When you get into--I'm going to get a little bit more into it in a little bit-- but the funding that I see, I built my business all the way through this without funding from the government. Funding came out of my pocket. Loans and whatever I could. I tried to get funding, but when I did, I found there were different avenues that people take to accomplish that. A lot of it was if you knew somebody, and in talking with NYSERDA, they will say oh, no, it can't be that way. Well, I've proven it is.

I did use some pull that I had at one time, and I did get a NYSERDA grant for improving some of the electronics that we were building. It was $250,000 grant. I took it, started looking at what I had to do to accomplish the end-product, and the ***costing*** that I came up with versus what was available basically from China, I couldn't compete.

So I took that money that I had received in the grant and gave it back.

Because as a small businessman, I'm not in the research and development business; I'm in the production business. Colleges, universities, and R&D companies want that. They have to have that research and development money because that'***s*** how they survive. I survive in my business by producing, and if I can't produce a product at a ***cost*** that I can make a profit, I'm out of business.

99 And I'm a small guy. I'm not making hundreds of millions of dollars.

We're talking under $10 million. So everything that we do, I have to look at, do the numbers and make a decision on it.

Okay. A lot of the funding that I see in the proposals sent to me, is for research and development. I see very little if any for the end product. In talking to NYSERDA on one of my endeavors, I asked-why they had 1.5 percent residual that you had to pay them back after you started production and sales on your product? Where do you come up with 1.5 percent? And they told me that'***s*** their return on investment.

So, to me, that'***s*** saying all the millions of dollars, and you have your NYSERDAs, you have your federal government, that are putting money into research and development; what is the return on the investment? Is it going just to more research and development? And where is the product going? Is it going to China or is it just laying dormant? And an experience that I had is that most of the time it remains dormant. It gets to a point where there'***s*** a product that could go to market, but that'***s*** where it ends.

Research and development ends when you have the product, and then from there, it has to go to somebody like in my business to produce it. So if I'm going to produce it, now I have to market it, and in order to market it, it ***costs*** more to market that product than it did to do the research and development.

So why not take, instead of putting everything into research and development, why not take that and put it into--some of it--into the production and marketing of the end products that are coming out of this research and development? And to go back, that'***s*** how I ended up with the solar products from Ontario Hydro Technologies. I paid nowhere near what they had invested in it. Nowhere near. So I picked it up for pennies on the dollar because they weren't going to be able to do anything with it. And then I took it and have been making a profit with it.

When you look at the R&D, I also looked at, when we had this grant, one of the things I looked at was where the components were coming from. They were coming from China. You cannot buy it here in the United States--electronic components. It's basically made in China, so when you start looking at what you have to do, you have a competitor in China. I have a competitor in China that I have to buy my supplies from. I don't have any choice. And then they basically control my market through--they're my vendor, my supplier for those parts.

So let's see what I have. You talk about regarding the New York State taxation. You know, no matter where you go, there's taxes. You're not going to get away from--you're not going to have a free situation with taxes, but I've been approached by several other states. At least four times a year, I get a very serious conversation with other states that are offering me incentives to come to Virginia, come to Michigan, because of the renewable energy business that I have.

And I look at that, and just over the telephone or a couple of letters, the 100 incentives that they're offering me are very "enticive." You know, it's just that rate. At this point, you may ask, why don't you move? And when I look at it, I have roots here. I have my family, and I have business associates that I'm not ready to leave. If I was 35 years old and I had this business, like my son who is going to eventually take it over, you might see something.

So my answer to that is if you're offering incentives to new companies to move into upstate New York, why not work with the companies that are already here and give them, offer them the same incentives? What I look at is with a manufacturing facility, whether it's a large one or a small one, they want to see a building. It's a cash cow for the local governments and county governments for taxation.

It's not jobs. Jobs are the secondary issue with them.

If you look at IDAs and all the deals that they've made with different companies in keeping the amount of employment to a certain level, it is hardly ever is reached. The counties and the states complain about the IDAs because they're given tax breaks, but it's in the long-term, and they're expecting the counties and the states will have that cash cow coming in. And it's ruined a lot of businesses because--especially big business--you take, in Buffalo, New York, they had Bethlehem Steel plant there. That plant paid more in taxes than all the other Bethlehem Steel facilities in the country because it was a cash cow for the city.

It just drives business down. So what I say is why not support the businesses that are here? When you get into the research and development, work with the companies that are here. If you take renewable energy, there are probably just a handful of manufacturers in New York State that actually manufacture, that are manufacturing a product.

Why not take those companies, put them all together, and let them meet.

There is no such thing as competition. Everybody has their own specialties. Have them meet. Put some money into marketing for those companies and just market it to the government, to start. The federal government--we do a lot of work with the military. We built streetlights, and we put them in Baghdad and all over the country, and the world, but there's other things that we don't do.

The most expensive thing is trying to get the market, trying to go out and market my business to a larger scale.

[The statement follows:] Prepared Statement of Mr. Paul Vargovich President, National Solar Technologies, Depew, New York Just to provide some additional background I am a small manufacturing business owner in Buffalo, NY. I have built my business from a two car garage in 1980 to a facility that is 34,000 square feet employing 20 personnel. I own two companies, National Manufacturing & Distribution, Inc. (NM&D) which designs, develops, and manufactures electrical and electronic components and ***serves*** the electrical utility and large industries. National Solar Technologies (NST) is a renewable energy business, which manufactures, develops, integrates solar and wind power systems and commercial solar powered lighting systems with customers around the world.

101 I do not claim to be an expert in ***U***.***S***. - China relations, but I do have over 25 years experience in the manufacturing industry. ***Only*** recently have I been involved with importation of products from China to integrate into our solar product line. This was due to the ***fact*** that the availability of ***U***.***S***. made similar products were either not available or not as competitive.

Funding provided by the State is focused on Research & Development (R&D) and is useful to R&D companies, colleges and universities. The perfect end result of an R&D project is a completed product. My experience as a small business is the high ***cost*** of developing a product for the market place. We have been involved in enhancing the R&D of Ontario Hydro Technologies (OHT) solar products from the acquisition of their technology, which created National Solar Technologies. OHT ***spent*** millions of dollars developing this product, and we ***spent*** an additional million to enhance the existing capability. It is not just the expertise and expense required to develop a technology. Once the product is created the more time consuming and expensive step is marketing your finished product.

NST was the recipient of a State Grant from the New York State Energy Research and Development Agency (NYSERDA) to develop an inverter control allowing for a larger power output utilizing solar panels. After researching the ***cost*** associated with designing, producing, and marketing this product we could not compete with a less expensive, similar capability produced by China. After this realization I declined the NYSERDA grant. In my opinion I would recommend government funding be focused on not ***only*** R&D activities but also helping to market the final product. The inability to compete with Chinese manufacturing will hinder New York State (NYS) competitiveness in developing and manufacturing finished R&D products in the United States versus China. Many of the required R&D components are ***only*** manufactured in China, from electronics to machinery. This is like a competitor supplying you with essential parts. This provides the Chinese with control of the marketplace and ***cost*** of equipment. As a small business I cannot afford to invest in projects that could eventually be terminated or unaffordable due to competitor control. I would recommend that if a NYS company wishes to develop a capability with China, NYS government should not fund this endeavor.

Regarding NYS taxation, I have been contacted by State agencies, outside of New York, and offered lucrative incentives to relocate my business. I have chosen to stay in this region due to family ties and business associations.

I would recommend that the incentives to entice other companies to come to NYS, including tax breaks, should apply to existing businesses especially during the current economic decline. Lower taxes and streamlining regulation will make NYS a more hospitable place to do business.

In summary, I believe that NYS government has the ability to make a difference by helping to create jobs in the region by supporting small businesses through additional tax breaks, funding R&D projects with companies planning on manufacturing the product in the US, as well as aiding in marketing the final designed and developed technology. These efforts will aid in increasing New York State'***s*** competitiveness in myriad industries.

Panel III: Discussion, Questions and Answers HEARING COCHAIR SHEA: Thank you very ***much***, Mr. Vargovich. We appreciate the comments and the participation of all the witnesses.

I guess I'll start with the first question. It'***s*** my understanding that the Obama administration, through the stimulus package, has clearly made the development of clean technology a national priority. Do we agree on that? The Chinese have an enormous environmental ***problem***. They are making, I think it'***s*** fair to say, a concerted effort to clean up their environment with a focus on developing their own indigenous renewable energy industry; is that fair to say? It'***s*** also my understanding that the New York State government has made 102 creating a clean energy sector in this region of New York State a priority; is that fair to say? How is it going? I mean is this going to happen? What are the challenges to getting that done? How does Rochester, this area, Syracuse, this area, become a global leader in clean tech? How do we get there? Are we anywhere near that? MR. ROBINSON: Well, I think we have a little bit of a concern regarding the directions the Department of Energy is taking in the sectors that they're selecting for support and those that they're deselecting. The greater Rochester area, for example, has had significant investments both in fuel cell technology and in the use of hydrogen as an alternative fuel.

And in both of those instances, it does appear as though the policies in the Department of Energy are deemphasizing that, at least as we see it outlined in the budget proposals that are coming out of the administration. And so places like the General Motors Fuel Cell Development Center here in the greater Rochester area have started to shed a few jobs, and we have a concern that more might be on the way out if that kind of funding support is--if those indications actually turn out to be reality.

I don't know if you want to add to that.

MS. HARTSOCK: I'd be glad to jump in. First of all, I think New York has received a very generous share of the stimulus package, particularly in areas related to weatherization, and the expectation is that this will jumpstart and really lift the labor market when it comes to jobs in installation, energy management, construction.

I think our concern is, again, we want to see on the national level a fullscale commitment to the development of a true innovation economy so that we're not just creating jobs at that one end of the spectrum, but we see a continuum, and so that we have the ability to capitalize on the research coming out of these institutions who are truly working collaboratively.

The reason that Cornell was able to capture a National Energy Frontier Center DoE grant was that it put together a consortium that involved RPI, Cornell, as well as industry partners. So I think there'***s*** a tremendous potential.

New York State has a very ambitious goal of "45 by 15," -- deriving 45 percent of its energy through a combination of renewable resources and conservation measures by the year 2015. Again, to achieve this, clearly there'***s*** more that has to be done by way of regulatory and policy reform.

If you look at why countries like Spain and Germany are so ***much*** further ahead of us, it has to do with tariff structure and things that I think we're still debating-- MR. ROSTOW: Nuclear power.

MS. HARTSOCK: Exactly. And the Chinese government-- if we look at them as a model for government innovation, what they're doing to build energy research parks, what they're doing to develop national smart grid systems, are, I think, lessons that we could take a page from here, both in New York State and nationally. So I think the more we interact, listen, learn, and adopt best practices 103 both ways, I think the better for all parties.

HEARING COCHAIR SHEA: Mr. Vargovich, did you want to add something? MR. VARGOVICH: Well, just one question-- HEARING COCHAIR SHEA: It sounds like you have the state government as a potential customer. Maybe we can hook you up.

[Laughter.] MR. VARGOVICH: Well, one of the things that I look at is doing research and development doesn't really enter into my production as a manufacturer.

HEARING COCHAIR SHEA: You need marketing money.

MR. VARGOVICH: I need--well, we need projects. The stimulus money, we do work with the government, federal government, military, right across the board, but they're waiting for the stimulus money. That'***s*** the new reason that they're waiting. Before they didn't have any money; now they're waiting for stimulus money.

But just to take the technology, there'***s*** so ***much*** technology that'***s*** out there right now that can be utilized into products. Instead of throwing all the money into research and development, which you still had to do that to keep the universities afloat, but if you could--it'***s*** true.

HEARING COCHAIR SHEA: Right. Well, hopefully, they commercialize some of that technology.

MR. VARGOVICH: But they don't. You don't see that. A great percentage of it is not. A great percentage of it is not. And I've seen it. Ontario Hydro Technologies is the NASA of Canada. Okay. Smaller, but it'***s*** the same scenario.

And there are projects that were completed, that, if you want to buy it, they'll give it to you. They just want a royalty from it because they're finished with it.

What we need in this country and this state are projects, projects that can be manufactured. You're not going to gain manufacturing jobs by doing more research and development. You're going to gain manufacturing jobs by doing some work, doing the finished product in the--put the solar arrays, put the wind turbines up, and do that, and put incentives to--higher incentives for people to purchase it.

Make it, market it. Make it more user knowledgeable.

HEARING COCHAIR SHEA: If I just may follow up, you know, we heard this morning some testimony about the notion of a commons, an industrial commons, where you have clusters of companies and researchers around an industry. People want to come together, be geographically proximate to each other in order to share information. Is that your vision for New York State to-- when I think of Syracuse or Rochester, I'm thinking green. Is that the vision? MS. HARTSOCK: That is the vision. In ***fact***, yesterday, I finished writing material for a DoE Smart Grid Demonstration Grant that is due on August 6-- a collaborative project involving multiple players across upstate New York in a smart grid enterprise with National Grid as the utility.

So, yes, again, I think it is our vision.

MR. ROBINSON: I think for a variety of reasons. I think it'**s** certainly the 104 exchange of knowledge, but it'**s** also the establishment of critical masses for career development for people. People are going to stay in a community if they have an opportunity to kind of move.

If the number of installations around a particular discipline are very limited, their next career move is likely to be out of the community, and so those critical masses actually also create more stability for the population, more opportunities for local growth, which we think is very important as well.

HEARING COCHAIR SHEA: Thank you.

Commissioner Mulloy.

HEARING COCHAIR MULLOY: Thank you, Mr. Chairman.

I was reading an article in the New York Times by Keith Bradsher, "Drawing Critics: China Seeks to Dominate in Renewable Energy." China has built the world'**s** largest solar panel manufacturing industry by exporting over 90 percent of its output to United States and Europe.

But when China authorized its first solar power plant this year, it required that at least 80 percent of the equipment be made in China. When the Chinese government took bids this spring for 25 large contracts to supply wind turbines, every contract was won by one of seven domestic Chinese companies. All six multinationals that submitted bids were disqualified on various technical grounds.

The vision, as I see it, is America is now going to become the green industry capital of the world. We're going to make solar. We're going to make wind, but I never understand. We're already running a trade deficit in green technologies. There'**s** a new study put up by the New America Foundation just two weeks ago showing we are running a larger and larger deficit in so-called green technologies.

What I don't understand is why do we think that the same forces that drove Kodak, Xerox, Corning, a lot of these companies to outshore/offshore, to do all that, why do we think these forces will be any different when we pump all this money into R&D to develop these ideas and then we start making the stuff? Why do we think that the forces that drove won't drive this stuff to be outsourced as well? Mr. Robinson, and we can go right across.

MR. ROBINSON: Frankly I think it is a concern, and I think that the kinds of trade ***barriers*** that we're concerned about are going in two directions. And I think that we certainly need to be advancing on trade policies that are

balanced and fair on both sides. So there's no question that, absent that, we will continue to find restrictions in our ability to sell what we make rather than have our technology exploited and having manufacturing take place elsewhere.

HEARING COCHAIR MULLOY: Terrific response.

MS. HARTSOCK: First of all, I don't think we're investing that ***much*** in R&D. I really don't. I think if you look at, again, at the national level, what we're investing in R&D in early stage funding to commercialize these technologies pales with the level of government subsidy that's happening in other areas.

So I would argue that it is about innovation. I had the opportunity to work 105 in economic development before I took this job in communities that were the home of the Smith-Corona typewriter, who in the 1980s had the opportunity to make a strategic decision: am I going to continue to manufacture typewriters or am I going to take on this new concept called laptop computers, personal computers? Their decision: No, I don't think that's a technology that's going anywhere.

[Laughter.] MS. HARTSOCK: We all know the end of that story, don't we, as we shut down a plant in Cortland, New York that employed close to 10,000 people. So I would argue that it's about investing in R&D and doing it at sufficient scale and scope with financial support to commercialize some of these entrepreneurs and early stage companies to get them to production. It's the entire continuum.

And I would say that it also needs to be supported by government policies that relate to procurement.

From my career in economic development, we worked with some of the largest solar manufacturers and wind manufacturers in the country, and globally, who were looking at New York vis-a-vis other states for investment. It was not state incentives that made the decision where they would site those. It was not who put the biggest pile of money on the table. It was who could provide procurement and purchase commitments to buy 80 megawatts of power from these producers, and that is just as important in terms of developing the market for renewables in the United States. It's why you see other countries, not just China, ahead of us in that regard.

MR. ROSTOW: I think what your question goes to is the nature of China's behavior in the international trade area, and to what extent its practices violate treaties, and so on, to what extent they can be hailed before the World Trade Organization. It is an obligation of the federal government to make sure that the playing field is as even as can be.

Candidly, New York State needs to face a few realities. The most fundamental reality, I think, is that the population of the state today is the same as it was 30 years ago, and that the ***only*** areas of growth have been the New York City metropolitan area, Long Island and the Hudson Valley, and that the taxation and regulatory structure here is not exactly a positive incentive for companies to start up.

I have a colleague who says it is legal malpractice to incorporate a corporation in the state of New York. As long as that's the case, you're going to see it pretty hard to attract new business to the state.

HEARING COCHAIR MULLOY: Mr. Vargovich.

MR. VARGOVICH: Corporate America is not concerned with employment.

Their concern is the bottom line, and there's a reason for it, because it's allowed that way. All right. When you can take a GE, large corporation, they can set a plant up over in China to reduce their manufacturing ***costs*** here, eliminate, virtually eliminating it here, it ***costs*** them nothing if they make money.

Why would they think any other way? There's no reason for them to think any other way but to do that. So there has to be something that changes that playing field so that if they produce, take what they're doing here over to China or 106 India, ***Mexico***, that there has to be a ***cost*** for that, and it has to be a ***cost*** that's associated, they have to think twice before they really want do that.

I've read some things where companies have found that it's not that advantageous to be in China, more of a smaller company than a larger one, but the larger companies have to do it. Even if somebody did care in the upper management, well, what about all these people that we're not going to employ anymore, they have to do it for their bottom line.

So unless you can do something that evens that off ***between*** the two, it's going to continue.

HEARING COCHAIR MULLOY: I'll just make one comment. You agree, then, with the testimony earlier that there's developed a divergence ***between*** the national interests and the corporate interests of some of these multinationals? MR. VARGOVICH: Right.

HEARING COCHAIR MULLOY: Thank you.

HEARING COCHAIR SHEA: Okay. Thank you.

Commissioner Blumenthal.

COMMISSIONER BLUMENTHAL: Yes. Thank you very ***much***.

I have two questions. One is for Mr. Vargovich and one is for Mr. Rostow.

In your testimony, Mr. Vargovich, you talked about the competitors; you're buying parts from your competitors in China. But are you finding Chinese companies in this particular business, renewable energy, developing, integrating solar and wind power systems, are they competing with you in China? Are they competing with you here in the United States? MR. VARGOVICH: They have competed with me on, we did a lot of work, we manufacture solar-powered streetlights that we were putting into Baghdad with the ***U***.***S***. military, the Department of Defense. And before we were called upon to do that, they had purchased Chinese lights directly from China.

COMMISSIONER BLUMENTHAL: To put into Baghdad.

MR. VARGOVICH: Right. Put into Baghdad. They had some of our prototypes in other areas; we make a top-shelf piece of equipment. The ones that they were getting from China, they rejected them, they didn't work, they had this ***problem***, so eventually what they did is they took all the Chinese out and installed ours. They can get in there because of ***costs***.

COMMISSIONER BLUMENTHAL: Right.

MR. VARGOVICH: We've had that same situation in Africa.

COMMISSIONER BLUMENTHAL: Right.

MR. VARGOVICH: We've had it in other parts of the world the same way.

COMMISSIONER BLUMENTHAL: But not the same quality? MR. VARGOVICH: Not the same quality.

COMMISSIONER BLUMENTHAL: They can't compete with you on quality. Do you see them moving up to a place where they can compete with you on quality? MR. VARGOVICH: Well, anybody can--you know, if you can-- COMMISSIONER BLUMENTHAL: Have you seen that? 107 MR. VARGOVICH: You know, but it's, we're small. We're not making a dent in the Chinese economy, you know, where they're going to say let's see if we can take National Solar Technologies off the screen, but it's something that I've been at trade shows where I hear the Chinese come over and start taking snapshots.

COMMISSIONER BLUMENTHAL: Yes.

MR. VARGOVICH: Go ahead. You know.

COMMISSIONER BLUMENTHAL: Right.

MR. VARGOVICH: But that's the mentality that I get from it anyway.

COMMISSIONER BLUMENTHAL: Right.

MR. VARGOVICH: You know, you might look at other statistics and see something else.

COMMISSIONER BLUMENTHAL: Yes.

MR. VARGOVICH: When I'm directly involved and I directly see something and, you know, the solar panels, we buy the solar panels from China now. I get a cargo carrier ***full***.

COMMISSIONER BLUMENTHAL: Yes.

MR. VARGOVICH: Ship them over on a boat because I can't buy them here for what I have to do to be competitive.

COMMISSIONER BLUMENTHAL: Yes. Thanks.

Dr. Rostow, can you tell us a little bit more about this nanotech initiative at Albany? We've heard a lot of different testimony today basically concluding that R&D is not enough for a variety of reasons. If it's just an R&D product, but is not commercialized and doesn't get help getting commercialized, it could be a waste of taxpayer money.

Can you talk about that aspect of the project and where you see it? Are you helping these nanotech R&D projects get commercialized? Would you like to see more of that? What's the plan? MR. ROSTOW: Well, first of all, I would encourage the Commission or Commission staff to reach out to Dr. Alain Kaloyeros, who is the President of the College of Nanoscale Engineering at SUNY Albany, and who is--the whole development of nanotechnology and the public-private partnership at Albany is his, was his idea. He conceived of it, and he got the state government to invest heavily in the idea and he brought in IBM, Tokyo Electronics, SEMATECH, to be partners in what is a very successful effort at marrying companies, university research, teaching, and the production of new products in the nano area.

I am no expert in this. But over the last five to seven years, the state of New York invested very heavily in this vision, which involved creating a research park, if you will, with vast clean rooms, with, as I said, leading engineering companies in the high-tech area to come and work with SUNY researchers and to build, create an incentive to build a whole new college that didn't exist and to make it stand out as the number one in its field.

COMMISSIONER BLUMENTHAL: So the vision included the companies to commercialize it from the beginning.

MR. ROSTOW: Right. And the result has been the accretion of several 108 thousand jobs. The last number that sticks in my head is 3,000 in the last five years, but a lot of research, development and production of products. So it's been an enormously successful effort that has given a real spring in the step to the Albany area and the whole notion of public-private partnerships of this sort.

HEARING COCHAIR SHEA: Thank you.

Chairman Bartholomew.

CHAIRMAN BARTHOLOMEW: Thanks very ***much***, and thank you to all of our witnesses.

Dr. Rostow, I'll note in your bio that you were the Staff Director at the Senate Intelligence Committee for awhile. I shortly after that was on the staff of the House Intelligence Committee. So we don't often see people out and about who have been doing that work.

A question, for those of you who haven't followed this Commission, you'll be a little surprised that I'm actually going to reemphasize a point that Commissioner Mulloy made, but I think this Keith Bradsher article is amazing, and the

fact that when China authorized its first solar power plant, it required that at least 80 percent of the equipment be made in China, and then when they took bids for 25 large contracts to supply wind turbines, every contract was won by one of seven domestic companies.

MR. ROSTOW: I'm shocked to hear this.

[Laughter.] CHAIRMAN BARTHOLOMEW: Well, I was going to ask does anybody here think that that'***s*** coincidental? No. I guess my next question is why is it that people can sort of cavalierly say, well, that'***s*** the way the Chinese government does business, and yet if anybody dares to mention domestic content for ***U***.***S***. production, people get apoplectic? MR. ROSTOW: To state the question is to answer it. I've ***spent*** a lot of my career in the federal government. I have observed that getting the ***U***.***S***. government to link aid to foreign government to the behavior of that government has always been a contentious issue. Somehow it'***s*** impure to do this, to say, you know, you want our assistance, then vote the way we want you to vote at the ***U***.N., for example.

We have trouble behaving like the Chinese. The Chinese do not have trouble behaving like the Chinese.

CHAIRMAN BARTHOLOMEW: Yes. There'***s*** really so ***much*** at stake here in the sense that as we have seen the decline of our traditional economy, and people are trying to figure out how we move forward as an economically vibrant country, renewable energy is supposed to be a growth industry for us, but it looks like we've fallen behind before we've even gotten started. I know we talk about R&D and we talk about tax rates and we talk about all of these things.

One of the reasons we decided to come to Rochester was that we wanted to look at sunset industries and sunrise industries and figure out are we already losing the competition before we even get in the game? Ms. Hartsock.

109 MS. HARTSOCK: I don't think we are. I think what'***s*** happening is happening under the radar screen because there are not large-scale production facilities, but there are just a number of these smaller enterprises. We commissioned the Battelle Institute to do a study on our 14 county region of central upstate New York to look within NAICS codes identified as energy environmental system and determine how many companies are there and how many jobs are there, and what'***s*** that growth been over the last eight to ten years.

Their research indicated there are 419 firms, a little over 10,000 jobs. The growth rate in that industry is 50 percent higher than other comparable sectors, but I think we're just at the threshold of developing this industry here. But I think you're absolutely right in asking are we the tortoise or the hare in the race? And again, you know, that comes down to regulatory policy, incentives, and developing the market, and issues like government strategy related to procurement.

CHAIRMAN BARTHOLOMEW: That'***s*** an important one right there. Mr.

Robinson, anything to add? MR. ROBINSON: Well, I would say two things. One, it relates to the example I cited of this company that'***s*** going to, we hope, introduce and leap-frog technologies by getting a new base in that'***s*** at a higher tech state than where we are because in many instances, China'***s*** evolution has been so rapid that they leap over certain stages in technology development.

And what that actually does is put our start-up companies, I think, at a disadvantage, and the point that you made earlier is critically important. There is so ***much***, and maybe even Mr. Vargovich'***s*** comments about, you know, a lot of research doesn't go anywhere. Well, the reality is that it is true that there is a lot of research that'***s*** commercializable that doesn't. The private sector in the United States does not pay ***much*** attention to the earliest stages of company development.

And some states that have made investments in these early stage companies are starting to show some progress, places like Pennsylvania where they've got the Ben Franklin Fund and things like that.

MS. HARTSOCK: Exactly.

MR. ROBINSON: New York, and I'm sure we're not alone, leaves that gap to the three FFFs: friends, fools and families, and you don't really end up with a structured approach to supporting the development of early stage technology companies. Unless you're in a market where all of the investors live, like in Silicon Valley, or in Boston, you will find that there is very little in the way of early stage technology company development.

I think that is inherently where our competitive advantage is with China and with other emerging technologies.

COMMISSIONER BLUMENTHAL: It's where? I missed the last part.

Where is the competitive advantage? MR. ROBINSON: In our early stage technology companies that can't get off the ground. And so I would strongly urge for there to be, where public investment needs to go is where the private sector is not going. I don't think we need to get into where the private sector is being successful. It is not going into 110 that earliest stage. And we need some mechanisms to actually have more failures.

We are so risk averse in terms of investing in early-stage companies that we do not, because we don't tolerate failure well, but in the early stage technology company development, what you really need to do is have a high enough failure rate that you've gotten enough of the universe in play that the winners can emerge.

CHAIRMAN BARTHOLOMEW: Right. Just one comment, and then we'll turn it over, but I want to tie all of this into some of what our panelists talked about this morning.

I don't think we can walk away from the ***fact*** that not ***only***, Mr.

Vargovich, do you now have to import from China the components or whatever the pieces are of these solar panels that you're manufacturing, but because of this policy that Keith Bradsher talks about here, you're not going to be able to export your product to China because it's not made in China, and so there is this R&D level up here that's talking about, but there's also this manufacturing.

We're not going to get out of our trade deficit ***problem*** unless we can export more products. We can't export what's supposed to be a major sector for us if the Chinese government is going to continue to do whatever it is doing, ***barriers*** or the choices that it's making. So it's like we're being hit twice.

MR. ROSTOW: If I may, I'd like to second what Mr. Robinson said. I think it's not true that in Boston, they finance start-ups any more easily than in New York.

MR. ROBINSON: By reputation perhaps.

MR. ROSTOW: But when I worked on economic development in Massachusetts, MIT used to claim that they generated 70 percent of the economic activity in Massachusetts, and this was graduates going from the garage to Route 128.

But if we could have a fund that would support innovation and accept the ***fact*** that there would be failure, that would be an enormous step forward.

I think if we could change our policy on nuclear energy--I mean with all respect to wind and solar and everything else, if we want to be independent of foreign oil, or oil, period, nuclear energy is the way to do it. The French did it.

You know, other countries have done it. It's not rocket science. And if I can understand it, it certainly is not rocket science.

HEARING COCHAIR SHEA: Anybody else want to add a comment? MS. HARTSOCK: Well, both of my colleagues are right. There is no silver bullet when it comes to technology. It's the entire technology platform we need to be developing, but the critical gap at the federal and state level is that Valley of Death when it comes to the incubation and acceleration of these new technologies.

That's what I was talking about when I said at the national level, we need to focus on an innovation agenda at the same scale and scope at which we did 40 years ago in the space race.

The Governor has just commissioned a Small Business Innovation Task Force. He just announced $100 million State Innovation Fund as a ten percent match for institutions, companies, organizations applying for federal stimulus dollars, which hopefully will leverage up a ***billion*** dollars in activity.

111 But we still, we just don't have the solution. We don't have it at the federal or the state level, and if there's one thing I think all of us could agree to, it's that's the critical gap in terms of taking that vision and making it a reality and really fully recognizing and realizing the promise that academic institutions, not just in Upstate New York, but across this country, have to offer.

HEARING COCHAIR SHEA: Thank you.

Commissioner Slane.

HEARING COCHAIR MULLOY: Mr. Vargovich, did you want to comment? HEARING COCHAIR SHEA: Oh, sure, I'm sorry.

MR. VARGOVICH: I just wanted to make a comment on asking a question about selling back to China or ***dealing with*** China. I'm not concerned with--I don't want--I'm not even concerned with selling to China.

The renewable energy business right now just from what we potentially have in the United States--all right--just the United States is enough to make a million businesses like mine. You know, there's, maybe not a million, but they can have big business right here. You don't have to go to China. You don't have to do that.

You're competing with them with a product, but as an innovator and business and manufacturing, there's always a way around everything that's done. If I have to compete with China, fine. If I have to buy a solar panel from them, but my other products, whatever I can do, I'll do it right here, and then I can sell it right here.

There's more business, ***dealing with*** the United States government, states and local governments around the country, that have sustained many, many, many businesses. You know, it's not a--renewable energy if you're looking at that as an industry, is really small right now-- right. It's really small. You're not going to see a General Motors type of renewable energy company popping up.

It's all going to be the smaller companies, the hundred, 200, 20, maybe 20 employees like my business, but you're going to see that, and that can grow. But you have to have the projects that we can go after.

HEARING COCHAIR SHEA: Thank you.

Commissioner Slane.

COMMISSIONER SLANE: As we all know, innovation is what drives our economy, and yet less than four percent of American college students choose engineering as a profession. Does anybody have any ideas on how we can reverse that and incentivize or encourage these kids to go into engineering? Start with Mr. Robinson.

MR. ROBINSON: Well, I think I'd almost validate your point.

Engineering in the hard sciences has perhaps been a little less attractive, in terms of the best and the brightest. They go into medicine; they go into business and finance. And we actually find that, I mentioned that the percentage of our students who are foreign- born or are coming over through some international vehicle to enroll, and if you take a look at our graduate programs in the biomedical sciences, 112 the Ph.D. programs, they're overwhelmingly populated by people from international sources, not just China.

And so it remains a significant concern for us. We do aggressively compete for ***U***.***S***. graduates, I'm thinking medical school now, and we are actually seeing a little bit of a turning of that tide recently as employment opportunities are

shifting. Obviously, with this downturn, and finance maybe not being as attractive a discipline as it was before, we'll begin to see some shifts, but I echo your concern, and we have to do more to promote those career opportunities well before people select their colleges.

So that's going to have to be working through secondary education and the introduction of STEM-related programs in the educational system across the country at the secondary and middle-school level.

MS. HARTSOCK: I can only give you the "mom" answer. So I have three sons: a mechanical engineer; an aerospace engineer; and a 12- year-old who's sitting around the corner on a laptop who wants to be a chemical engineer-- COMMISSIONER SLANE: You're doing something right.

MS. HARTSOCK: I think the answer is at K to 12 -- making it fun. I mean I encouraged my kids to blow up things in the kitchen when they were little, and now one who was part of the team that blew up the wayward spy satellite a year ago in February as part of the Lockheed Martin-U.S. Navy mission. So I think it is engaging kids at an early age to give them a vision of not just a career path but a life that can really make a difference.

COMMISSIONER SLANE: Yes, let me just add, I was involved with a large public university, and the largest profit center at the university was the law school, and these kids borrow $150,000 a year, and come out of law school, and for most of them, there are no jobs. And for the life of me, I can't understand why they, many of them certainly would qualify to go to select a degree in engineering.

Doctor, do you have any-- MR. ROSTOW: I think this is a concern for everybody in the education, certainly in the education business.

At SUNY, we've engaged in a pretty systematic effort to redesign basic courses to make them more interesting for students, recognizing that an awful lot of decisions about what career path or study path a student takes depends so much on the classroom experience: is it a good one or bad? And where you have in basic science courses or basic history courses--it doesn't matter what field--huge numbers of students that don't finish a course because they're just totally turned off by it, that is something we're addressing through course redesign with very great success, using computers and interactive devices so that the student is more engaged, and this is something that's essential at the lower level and essential for us because we are engaged in the training of teachers on a very large scale. So it's a very important subject for SUNY.

HEARING COCHAIR SHEA: Well, I would say to Commissioner Slane, it probably started with Perry Mason and then Boston Legal and LA Law. Popular culture made being a lawyer a sexy thing to do.

113 COMMISSIONER SLANE: Right, I agree.

HEARING COCHAIR SHEA: You don't see television shows about engineers; do you? Or, you know, chemistry-- MR. ROBINSON: Well, Apollo 13.

[Laughter.] MR. VARGOVICH: Can I make a comment? HEARING COCHAIR SHEA: Yes, please.

MR. VARGOVICH: When you're looking at engineering, you have to look at where are the jobs? Okay. And the jobs are in--what-- manufacturing and production. So generally when somebody goes and takes a career course, it's usually on some sort of advice from somebody else. So if your father, your uncle, or next door neighbor was an engineer at Chevy or Ford, and everything is going great, he's going to say, boy, you have to go for engineering; you're going to have a terrific job, a terrific career. I can get you into Chevy or Ford or General Electric, whatever it is.

But when those jobs start going away, what's he going to tell them? COMMISSIONER SLANE: Switch careers.

MR. VARGOVICH: Go to law school.

COMMISSIONER SLANE: Right, yes.

[Laughter.] HEARING COCHAIR SHEA: Okay. This will be our last question. Thank you.

Commissioner Videnieks.

COMMISSIONER VIDENIEKS: Good afternoon, everybody. With most taxpayer-financed R&D, the acquisition instruments give the government unlimited rights to give to whomever the information generated under the grant or contract.

But these grants and contracts don't require that the government proactively disseminate this information.

Would it be helpful and less restrictive in making a make or buy decision that there were a bank of information of R&D results readily available to even small businessmen? That'**s** my question. Should something like that be, should the regulations, the acquisition regulations, be changed to require that the taxpayerfinanced institutions or supported-institutions that they proactively disseminate R&D data and create a database for this? Am I coming across? MR. ROBINSON: First of all, I think you're, at least in terms of research funding, which is where the intellectual property comes from, ***much*** of it federally funded through NIH, NSF, DoE, and other federal agencies is subject to Bayh- Dole, and the Bayh-Dole Act, in addition to attempting to accelerate the commercialization of technology by providing the research institution with the IP rights and the ability to license it, I think that'**s** been demonstrated to actually be ***much*** more-- COMMISSIONER VIDENIEKS: No licensing would be required if the government has unlimited rights to disseminate. They have it.

114 MR. ROBINSON: The information, actually the publication of research information is required, so that information is out there. Could it be organized better so that it'**s** accessible-- COMMISSIONER VIDENIEKS: Without a fee. In other words, gratis access to the information generated? MR. ROBINSON: In other words, that there--well, I mean that taking that out of the IP realm and just making it available first-come/first-***serve***? Is that kind of what-- COMMISSIONER VIDENIEKS: When the government finances R&D, awards a contract or a grant-- MR. ROBINSON: Right.

COMMISSIONER VIDENIEKS: --it'**s** got a data rights clause in it, and it usually gives unlimited rights to the government to do-- MR. ROBINSON: Right.

COMMISSIONER VIDENIEKS: --whatever it pleases with data first generated under the contract or grant.

MR. ROBINSON: Right.

MS. HARTSOCK: I always refer IP questions to legal counsel.

[Laughter.] MR. ROSTOW: Well, I could duck this by saying that the State University IP world is handled through the Research Foundation of the State University of New York, which is a separate entity.

[Laughter.] CHAIRMAN BARTHOLOMEW: Which you used to work for.

MR. ROSTOW: True, I worked briefly there. [Laughter.] MR. ROSTOW: Let me just say this is not a subject for a flip answer because there'**s** all kinds of research that'**s** done with federal dollars. Some of it is more readily amenable to products being available to the world. Some of the results of research are far less amenable to this.

COMMISSIONER VIDENIEKS: Do taxpayer-financed research results get to China? MR. ROSTOW: Absolutely. That'**s** not desirable, but that'**s** what one would have to guard against. There'**s** an awful lot of sensitive technology that is or knowledge that'**s** generated through federal research which is not just the stuff that has revolutionized the game of tennis.

MR. ROBINSON: Right. Having China be-- COMMISSIONER VIDENIEKS: Not intended. Sir, do you want to comment maybe? MR. VARGOVICH: Yes, I do. That'**s** a great idea, and there is information that would be great to be able to pick and choose what you wanted, but a lot of it, what I see is a lot of the money being ***spent*** on the

research and development of products that are looked at first as to the probability of them being a viable product and being manufactured if we are, in ***fact***, looking to produce production jobs in the United States.

115 All right. Did I lose you? COMMISSIONER VIDENIEKS: To reduce production jobs? MR. VARGOVICH: Yeah, if your idea of doing an R&D project is to take a product, end up with a product at the end that will be used here in the United States to, is manufactured, will produce jobs, then that'**s** one story.

I think what should be done is with that money, if it'**s** going to end up in China, then that company that was given that money to do their R&D work should have to pay it back or let China pay for the R&D.

COMMISSIONER VIDENIEKS: Or, but my point basically is this, if the government in its acquisition documents required that whoever the contractor is or a grantee is, that they be required to distribute to industry organizations the results of the research and development, if applicable, to industry groups-- MR. VARGOVICH: Sure.

COMMISSIONER VIDENIEKS: --wouldn't that be something to include as a requirement in the future government contracts at some point? MR. VARGOVICH: Sure.

COMMISSIONER VIDENIEKS: Would it be helpful? MR. VARGOVICH: And I also think that there should be some input from industrial, from industry itself on what it'**s** actually looking for in the marketplace rather than the pie in the sky.

HEARING COCHAIR SHEA: Mr. Robinson, did you have something to add? I'll give you the last word.

MR. ROBINSON: Well, I was just saying that I think the dissemination of information and control of intellectual property are not necessarily the same thing.

And the dissemination of information takes place.

Could it be organized in a way that was more accessible is a reasonable question to ask, and I think that'**s** true.

I think turning upside down the system of intellectual property protection right now is actually going to further erode our ability to be competitive because it really is our competitive edge. So I would view information dissemination and protection of property as two separate-- COMMISSIONER VIDENIEKS: Is it not one and the same subject if one takes government money to do the work? One doesn't have to take it.

MR. ROBINSON: Okay.

COMMISSIONER VIDENIEKS: There'**s** a price.

HEARING COCHAIR SHEA: Well, thank you very ***much*** to all four of you for being here today and for your participation, and you made a real contribution to our efforts.

We will reconvene at 2:35 for our last panel. Thank you.

[Whereupon, a short recess was taken.] PANEL IV: ADVANCED R&D IN SUNRISE INDUSTRIES THAT CAN LEAD TO GROWTH FOR LOCAL COMPANIES HEARING COCHAIR MULLOY: We're going to start our final panel, and 116 then we will have an open mic after this. I thank each of you for being here. Like the wedding feast at Cana, maybe we've saved the best till last.

Our first witness, Dr. Nabil Nasr, is the Director for the Center for Integrated Manufacturing Studies right here at the Rochester Institute of Technology.

Dr. Nasr just flew in red-eye from California so he could be here with us today, and we can't thank you enough for making that effort. He'**s** the Assistant Provost for Academic Affairs, and he'**s** the Director of the Golisano Institute for Sustainability here at RIT.

Dr. Marnie LaVigne is the Director of Business Development at the University of Buffalo at the Center for Advanced Biomedical and Bioengineering Technology, and she's an ***editorial*** board member for the Biotechnology Healthcare and Disease Management. Thank you for making the effort to be here.

Mr. Edward Patton is the Director of Sales and Marketing for Rochester Precision Optics.

MR. PATTON: Correct.

HEARING COCHAIR MULLOY: Mr. Patton joined Rochester Precision Optics in 2007. He was previously with LightPath Technologies. And this is one of the sunrise industries that we hope New York State will help us understand that.

Finally, Mr. Barons, thank you for being here.

Mr. Barons is the Vice President for Strategy Integration for Fuji Xerox Operations. In his role, he's responsible for developing business strategies for optimizing Xerox's investment in Fuji Xerox with a special emphasis on product development, logistics and distribution.

But Mr. Barons, you've also had a lot of time out in Asia, I understand-- MR. BARONS: I have not lived there, but I've traveled.

HEARING COCHAIR MULLOY: You've traveled, though.

MR. BARONS: Yes.

HEARING COCHAIR MULLOY: Yes, yes. So thank you very ***much***, and we'll start with Dr. Nasr.

OPENING STATEMENT OF DR. NABIL NASR DIRECTOR OF THE CENTER FOR INTEGRATED MANUFACTURING STUDIES, ROCHESTER INSTITUTE OF TECHNOLOGY, ROCHESTER, NEW YORK DR. NASR: Good afternoon. First I would like to thank the Commission for giving me the opportunity to speak to you about this very important subject.

Before I start, just a few words about CIMS. Actually this is the CIMS building that you're in today. The Center for Integrated Manufacturing Studies, or CIMS, at RIT was established in 1992 with the mission to increase the competitiveness of manufacturers through technology development and technology transfer.

CIMS represents a dynamic collaboration of in-house technical experts as 117 well as academic, industry and government collaborators. Our facility houses five research centers and an outreach program.

It's been well documented that New York State is still undergoing considerable job losses in the manufacturing sector, which is a point of interest to this Commission.

A multi-year study conducted by CIMS to analyze the manufacturing sectors, the manufacturing clusters, in this region was concluded last year. The title of the study was "The Development of a Roadmap for the Revitalization of Upstate New York Manufacturing." The goal of the Roadmap study was primarily to gain a clear understanding of the state of health of clusters in the region, and to understand what action can be taken to address some of the challenges as well as the revitalization of our manufacturing economy, the manufacturing sector, here in upstate.

This work -- conducted by CIMS in collaboration with many of our clusters and cluster leadership here in the region, and with many of our industrial partners -- helped identify several needed initiatives that could positively impact New York State's economy.

These initiatives are focused on expanding existing clusters into new areas such as smart product technology integration and sustainable mobility technology development in areas such as fuel cells. We have many fuel cell R&D facilities here for GM and Delphi and others in the area, as well as suppliers. Other initiatives focus on

enhancing industry resources and collaboration, including enhancing partnership ***between*** the university and industry, which is critical to leveraging university resources to advance innovation and technology development.

I will cover some of the recommendations that we included in the study very briefly. I'll start by discussing the potential for new clusters or the new business opportunities that were identified as opportunities for existing clusters in upstate New York.

The first one is green jobs. The latest statistics I've seen note that growth in green jobs is double what we typically see in the traditional manufacturing areas: 9.1 percent growth in this area versus 3.7 overall job market growth. There are plenty of opportunities here and we do have several incubators focusing primarily on clean technology.

We have one incubator here at the university that was in partnership with one of the state agencies, NYSERDA, and it has great potential for expanding job growth in this region.

The other area is alternative fuels. Even though we are in a recession, we see significant growth in this area versus other traditional job opportunities.

In the fuel cell area, as I mentioned, we have significant infrastructure and capabilities here in upstate, and it'***s*** a challenging time because some of these activities are led by GM and Delphi. Some of these activities, like Delphi'***s***, for example, are in an advanced phase and ready for production in 2011. However, with the challenges we see in the automotive industry today, may be in question.

118 The green IT area is another cluster we have identified Many organizations are looking at their IT infrastructure equipment for computing and data centers, as well as printers and so on, with an eye toward lowering the footprint of the eco-IT area for their organizations. This has opened the opportunity for innovation ranging from equipment, to services, to building equipment, and so on.

Another area -- and I know one of our other speakers will be talking about it -- is bio-informatics; so I will not say ***much*** about this, but it'***s*** a great opportunity for growth for firms in this region.

Another area we identified, based on the existing infrastructure and the resources here in upstate, is remanufacturing and recycling. There is significant growth in this area based on many voluntary take- back programs.

Smart products also is an area that we identified with many regional strengths in this area.

I'm going to briefly mention some of the initiatives we identified, that really target what the federal government or New York State can do to help our clusters here to increase job growth and to address some of the challenges that we see in the manufacturing area.

The strategic alignment of resources is one key area. We identified significant resources that exist in upstate New York. We have a notably welleducated labor force in this region. We also have significant infrastructure in this region. The alignment of these resources was identified as one of the major challenges we face.

Promoting New York State exports was also another area that we identified as a major area for growth that can help many of our firms.

Global market expansion tools can provide many small and medium- size companies with the ability to understand how they can take their product to export market and thus grow their business Research related to how the state or the federal government can assist our industry is intended to help companies identify where the opportunities are and help guide them to gain entry into some of these markets and identify what'***s*** needed. For example, today we see major certification requirements for many countries; in many economies, there are significant equal labels requirements.

Those requirements can be ***barriers*** for many medium and small-size companies trying to enter into that market, because it requires a sizable investment for the companies just to understand how they can meet the requirements.

Lastly, I would like to stress the ***fact*** that we have significant infrastructure in the region, and the university system that exists here in upstate New York offers tremendous resources for industry.

However, our studies found that 70 percent of regional manufacturers said that basically they have no collaboration with the university system although they do have significant overlap in terms of technology with many of the existing programs at the universities.

Manufacturers also indicated that they would like to work with the universities. Some of the things that they reported were frustration over 119 intellectual property restrictions, conflicts, contracting process, and slow responsiveness of many research organizations due to some of the rules and regulations we have to comply with as well.

Having said that, I think New York State does have the significant resources that I mentioned earlier, and we also have some bright examples of advanced technology centers that are doing significant work with the clusters in their areas.

So it is definitely an area where we believe major improvement can happen, and that would allow us to leverage all the university resources and capabilities to assist job growth in the region. This is not just a ***problem*** in New York State; it is a ***problem*** we see nationwide.

SUNY and other universities in New York State are operating a number of research centers and R&D facilities in areas such as Buffalo, Syracuse, Rochester, Binghamton. These college- and university-based research centers have remarkable potential to provide assistance to companies and clusters where they have the expertise.

I apologize. I didn't look at the system here.

HEARING COCHAIR MULLOY: The time. I didn't mean to interrupt you, but if you want to finish up, then we'll go on.

DR. NASR: Yes. I will conclude that I think we see these centers as a tremendous opportunity for growth for our industries, by providing the mechanism to allow companies to work collaboratively with universities.

[The statement follows:] Prepared Statement of Dr. Nabil Nasr Director of the Center for Integrated Manufacturing Studies, Rochester Institute of Technology, Rochester, New York Thank you for this opportunity to submit testimony to the US-China Economic & Security Review Commission. I am Nabil Nasr, Director of the Center for Integrated Manufacturing Studies and The Golisano Institute for Sustainability, both located here on the campus of Rochester Institute of Technology.

The Center for Integrated Manufacturing Studies, or CIMS, was established in 1992 with a mission to increase the competitiveness of manufacturers through technology development and transfer. CIMS represents a dynamic collaboration of in-house technical experts, as well as academic, industry and government resources. CIMS' facility houses multiple research centers focused in specific technologies and industry sectors. These centers include: the National Center for Remanufacturing and Resource Recovery (NC3R), Systems Modernization and Sustainment Center (SMS), Center for Sustainable Mobility, Center for Sustainable Production (CSP), and New York State Pollution Prevention Institute (NYSP2I).

Each of these centers embodies programs that contain both focused research efforts and an active industry outreach.

The success of these programs resulted in CIMS becoming a recipient of the ***U.S.*** Department of Commerce's Economic Development Administration's (EDA) Excellence in University Led Strategies award for 2009. The EDA award recognizes innovative economic development projects or strategies of national significance and showcases best practices achieving outstanding results.

It has been well documented that New York State is still undergoing significant job loss in the manufacturing sector, 120 which is a point of interest for this commission. A multiyear research project entitled the Development of a Roadmap for the Revitalization of Upstate New York Manufacturing was conducted by CIMS to gain a clear understanding of the health of our manufacturing clusters in the region and identify what can be done to revitalize our manufacturing base. This work at CIMS has identified several needed initiatives that could positively impact the New York State Economy. These initiatives are focused on expanding existing clusters into new areas such as: smart products technology integration, and sustainable mobility technology development in areas such as fuel cells.

Other initiatives are focused on enhancing industry resources and collaboration including enhancing partnership ***between*** universities and industry, which is critical to leverage university resources to advance innovations and technology development. I will cover some of these recommendations as follows.

Let me start by discussing which industries have the potential to spearhead future economic growth of New York State. Based on my experience, there are several emerging high-potential industry sectors that could help fuel business growth in our state. They include: • Green Jobs: The Pew Charitable Trusts finds that ***U.S.***. "green jobs" grew 9.1 percent ***between*** 1998 and 2007, versus 3.7 percent for the overall job market. According to this report, green jobs represent over half the size of employment in the traditional energy sector and it'**s** gaining.

• Alternative Fuels: Despite the recession, the ***U.S.***. bio-fuel industry grew by 34 percent last year, adding an additional 240,000 new jobs. With the push toward energy independence, this industry should continue to expand.

• Fuel Cells: Lux Research predicts that global commercial sales of fuel cells will reach $1.8 ***billion*** in 2012. This growth will be driven primarily by applications in residential heat/power systems and distributed generation.

• Green IT: The Gartner group surveyed 620 organizations worldwide whether they were cutting ***spending*** to improve the energy efficiency of their IT systems. The results showed that for most businesses, green IT remains a priority. Forty-plus percent of survey respondents expected to ***spend*** more than 15 percent of their IT budgets on energy efficiency projects.

• Bio-Informatics: Bioinformatics is the application of information technology to the field of molecular biology.

RNCOS, a market research organization, predicts that biometric product lines, software, and other applications will achieve an annual market growth rate of 15.8 percent by 2010.

• Remanufacturing and recycling: The remanufacturing industry is reinventing itself in response to the "green products" movement and many remanufacturers are growing. The ***U.S.***. remanufacturing industry generates $65 ***billion*** in sales, with the automotive sector contributing $37 ***billion*** of that total.

• Smart Products: Smart products and production systems offer a great opportunity for NYS businesses.

Smart products leverage intelligent systems, embedded sensors, and connectivity to provide customers with advanced utility throughout the life cycle. Likewise, smart production systems use information age technologies to optimize performance and quality while reducing environmental impacts and resource consumption. The value-add from smart products and systems applies to both large firms and small to midsize manufacturing companies.

The New York State government has a significant role in promoting sunrise industries. Sunrise industries are highrisk/ high-potential enterprises that often require additional support from government to succeed in the global marketplace. Our study of Upstate'**s** industrial base found that the State government could aid high-potential manufacturers to compete globally by adopting these strategies: • Strategic Alignment of Resources. Provide long-term support and planning assistance for clusters impacted by manufacturing transformation; and, link statewide planning with federal strategies, including support for regional companies in areas of national importance and assistance in seeking federal investments.

• Promote NYS exports by reforming policies surrounding exportation of New York centric products, and promote better linkage of company marketing and expansion efforts with cluster organizations and state resources.

121 • Global Market Expansion Tools: Create incentives for export-based manufacturing initiatives, and expand support to global market expansion programs.

• Research & Report Out On Global Markets: Perform periodic reviews of potential trade policy and global initiative impacts on NYS industry clusters and proactively communicate results to impacted clusters. Also, support efforts on behalf of NYS companies regarding global trade policy fairness.

Another key component in promoting future growth is the university system in New York State. There are tremendous resources available through our region's college and university system -- both public and private -- to assist manufacturers in advancing innovation through the development of advanced technology industries that are geographically near to the university. Unfortunately several challenges inhibit strong linkages ***between*** New York universities and area companies. CIMS' study found that 70 percent of regional manufacturers do not currently partner with universities, although over half of them would be interested in collaboration. At the root of this situation is a cultural divide ***between*** the for-profit business and non-profit research worlds. Companies said they were frustrated with the intellectual property restrictions, complex contracting processes, and slow responsiveness of many research organizations.

To improve linkages ***between*** the private sector and the universities, the State should reform intellectual property policies to encourage and facilitate more technology development and transfer. The State should also strategically link both universities and Centers of Excellence to specific industry clusters that stand the best chance of benefitting from this collaboration.

Despite these challenges, NYS has many bright examples of successful collaboration ***between*** advanced technology centers at NYS universities and industries. The work being done here at RIT-CIMS is a good example of encouraging the growth of advanced technology industries.

SUNY and other universities in New York State are operating a number of research centers and advanced R&D facilities in the region. They include Albany, Buffalo, Syracuse, Binghamton, and Rochester. These college and university-based research centers have remarkable potential for providing assistance to industry. Today, many centers are focused on transferring technology and research to companies in a wide variety of fields. However, many NYS industries and companies have not been able to take ***full*** advantage of these resources, and linkages ***between*** centers and industry have not been strong according to our industry survey. To leverage the resources contained within the region's research centers and advanced R&D facilities, the State should take an active role in connecting its Centers of Excellence to those industry clusters that could gain the most advantage from this form of partnership.

New York State is not alone in its desire to foster high-growth and sunrise industries. Many people know that China has created a number of successful industrial parks. I am often asked if this strategy should be emulated in upstate New York. It is true that the Chinese have a strong commitment to large, broad-focus industrial parks to ***serve*** as business attractor. Many have paid back their investments handsomely, but some have failed, which has proven very costly. Let's keep in mind that China-style industrial parks require massive long-term investments in planning, development, and infrastructure. I am not sure emulating this model is right for New York State. We in New York should leverage the strengths of Upstate. I suggest that the State support carefully selected and vetted high-potential business industry clusters. This would focus State funding on the best opportunities for sustainable business and jobs growth.

This concludes my testimony, and again I would like to thank the commission for the opportunity to testify today.

HEARING COCHAIR MULLOY: Thank you.

DR. NASR: I thank you again for the opportunity.

HEARING COCHAIR MULLOY: Thank you, Dr. Nasr.

Dr. LaVigne, your testimony, when you talk about BioBay, suggests you've been over there and you've seen what's happening in China.

DR. LaVIGNE: Yes, I wish I had been over there. Actually, we had visitors in Buffalo.

122 HEARING COCHAIR MULLOY: Oh, you had visitors.

DR. LaVIGNE: Yes.

HEARING COCHAIR MULLOY: Okay. Go ahead.

OPENING STATEMENT OF DR. MARNIE LAVIGNE DIRECTOR OF BUSINESS DEVELOPMENT, UNIVERSITY OF BUFFALO CENTER FOR ADVANCED BIOMEDICAL AND BIOENGINEERING TECHNOLOGY, BUFFALO, NEW YORK DR. LaVIGNE: Very good. Thank you so ***much*** for the opportunity to address the Commission today.

As you heard, I'm Director of Business Development for what is called the University of Buffalo CAT program, which is one of 15 programs across the state supported by one of our economic development agencies known as NYSTAR.

I actually have an added advantage that we did actually see the wisdom of pooling a couple of our programs so I too am part of a Center of Excellence, of the CoE. As you heard referenced in Syracuse, we are the Center of Excellence for the Buffalo region which specializes in bioinformatics and life sciences.

With that role, I too bring a background that is fairly eclectic. I was a scientist, a ***U*** of R grad actually, from many, many years ***spent*** there prior to receiving my doctorate in clinical psychology, but actually went from scientist to entrepreneur, did two start-up companies, took them public, and then actually moved into economic development arena, and now I'm going a lot of workforce development. So kind of running across the spectrum.

Hopefully, I bring a perspective that is informed by experience as well as studying of the region.

The programs that I mentioned actually all reside in the Buffalo Life Sciences Complex which we are most proud of. It was spawned through a $200 million public-private sponsorship, ***much*** like the Albany Nanotech Center, which you heard of, but at a ***much***, ***much*** smaller scale, to be sure.

We do have three institutions that are key in that collaborative, and that's University of Buffalo, Roswell Park Cancer Institute, as well as Hauptmann- Woodward Medical Research Institute. These are our region's premier research institutions, and, in ***fact***, they've had an incredibly rich history of discovery.

For example, the most widely used test for prostate cancer detection, the PSA test, was actually invented at Roswell Park. Avonex, a widely used drug for multiple sclerosis treatment, was invented in Buffalo, New York, as well. The pacemaker, you may not know, was invented in Buffalo, but the business we actually obtained there and set up is in Greatbatch, which really is more of a battery technology, and Medtronic went on to go into the ***billion*** dollar market cap range.

In ***fact***, we're very proud of our history. There are great examples that show that, in ***fact***, all the R&D that we've talked about here can yield great products and services in addition to wonderful kinds of ways to improve our health 123 and quality of life.

Unfortunately, for our region and all of New York State, has not one of those inventions, and many, many more I could list for you, yielded any private sector jobs in the state. In other words, the companies that took those to market did not do that here.

This has taught us some really good lessons, and hopefully we're learning from those lessons, and I think that it's useful to share here today.

The key lessons that I just want to summarize briefly, as I work into a little bit more detail, but I think they ring true with so ***much*** of what you've heard here today. The key lessons for us are, first and foremost, is that we need to assemble the ***full*** complement of strategically-aligned resources--you've heard that phrase before-- versus operating through our multiple silos and traditional programs.

Secondly, we need to invest in operational elements for business development versus strictly investing in capital expenditures like buildings and equipment.

To build a high-tech economy in industries like life sciences, renewable energies and advanced manufacturing, we do know that it requires a unique and strategically combined gathering of technology innovation, capital and workforce.

The process of growing high-tech industry revenues and jobs is, in ***fact***, dependent upon a robust pipeline that facilitates innovation development and movement from the point of discovery and invention to the actual marketplace, as you've heard again prior to my discussing this.

This process is dependent on both capital and talent. So investments in our Center of Excellence in Buffalo Life Sciences Complex, again, we are most grateful for them. They were primarily for capital expenditures. So these have gone far indeed to improve our infrastructure and hard assets, just as you've seen in Albany and as you're seeing in Syracuse, but, in ***fact***, we know that we need to do more than this.

Recently, we are seeing new federal and state initiatives also adding more dollars to the research and development pipeline, and, in ***fact***, this is very exciting because we know we can invent more when we have those resources for our research programs.

But what of the other resources needed to develop the high-tech economy, especially in regions like upstate New York where it'**s** not happening naturally despite the extensive research funding? This concern actually holds true for all of New York State. As you know, we have one of the highest research expenditures in the country. In ***fact***, we're second just to California, but, in ***fact***, if you look at the typical resource needed to turn this R&D into commercial products, which is often in the form of venture capital, we actually ***only*** receive four percent of the venture capital invested nationally, whereas, California receives 47 percent of that venture capital.

We're well aware that we're not where we need to be. We all hear about Silicon Valley and Boston'**s** high-tech corridor, but what about the rest of the country? 124 To mention--Pat, I'm turning to our results--we have seen great results, but it has been with great effort trying to pool resources that are not aligned and are not well funded. So our results for our region are that the life sciences has, in ***fact***, grown and retained jobs to the tune of 5,000 jobs in the private sector and in our academic institutions.

We're pleased with that number. We have spawned over 40 new life sciences companies since we got into this initiative in about 2001. We're showing typically 20-to-one return on the kind of investment we're making in our early stage Valley of Death company opportunities. So we're pleased about that, and we've actually grown our total base of life sciences companies to over 140 with 6,000 private sector employees. We know private sector is where it'**s** all at.

For us, this has been terrific, but we also look at states like North Carolina, who have made significant long-term investments, ***much*** more significant than we have here. We look at China with bioBay, and yes, we had visitors come from bioBay, two business development folks, with a cadre sitting behind them back in China that was nothing I could even imagine.

The bioBay exercise is one we absolutely must learn from. We need to aggregate. It doesn't always have to be geographically in the same space, but there is no question that we need to create those virtual relationships, and that amounts to people. We must have people together, and we must have people who do the work like the work I do, and those are typically the dollars we do not see.

The dollars are for buildings, they are for equipment, but they are generally not for the operations including the talent who has business experience in this industry, and also for the capital investment in the young companies and those that are trying to grow rapidly.

With so ***much*** our federal government can do to catalyze our new economy, I think that that strategic investment is key.

A couple quick items as far as where I think we need to make the investments is: We have to absolutely incentivize and fund projects but make sure that it'**s** clear where the private sector win is. As you well know, many projects don't delineate that carefully.

We have to increase the technology commercialization funding beyond capital expenses, as you heard me say.

We need to develop programs that involve multi-year sustained funding.

In addition, we need to create investment capital programs that actually incentivize our private sector to jump in hand-in-hand with government.

Pennsylvania, Ben Franklin Fund, perfect example.

We need to deploy our funding initiatives through both community- based and university-based programs. I think we've learned that this does work. We're just not funding it at the right level.

In addition, I would add that we have to bring industry-savvy talent into economic development, workforce development and to research arenas. I am an anomaly in my world. Most people have not had the kind of experience I have had, 125 and when you give people money who are used to ***spending*** it on research programs or traditional economic development, it'**s** hard to expect them to know how to treat it differently. So I think we have to really innovate in our people that we're bringing to the table.

And to a point that came up earlier, we do have to address regulatory and trade issues, and I have to tell you I am no expert in it, but the federal government can't be shy about doing what'**s** right for this country.

So I would just urge you to take those ideas back, and I certainly would be happy to discuss those in more depth with you.

Thank you.

[The statement follows:] Prepared Statement of Dr. Marnie LaVigne Director of Business Development, University of Buffalo Center for Advanced Biomedical and Bioengineering Technology, Buffalo, New York Thank you for the opportunity to submit testimony to the US-China Economic & Security Review Commission. I am Marnie LaVigne, Director of Business Development for two New York State-funded, university- based economic development programs at the University at Buffalo (UB): one is the NYS Center of Excellence in Bioinformatics & Life Sciences, and the other, which is also housed at the Center of Excellence, is the UB Center for Advanced Biomedical and Bioengineering Technology, known as the UB CAT, which is funded by the New York State Foundation for Science, Technology and Innovation.

These programs reside in the Buffalo Life Sciences Complex spawned through a $200M public-private partnership involving both state and federal funding that includes the University at Buffalo, Roswell Park Cancer Institute and Hauptman-Woodward Medical Research Institute. These are our region'**s** premier research organizations that have a rich history of yielding substantial inventions and discoveries. One example of our local inventions is the most widely used test for prostate cancer called the PSA test. Another is the drug beta interferon, which ultimately became Avonex, the medication used to treat multiple sclerosis and that launched the biotech company, Biogen. In our largest life sciences sector, medical devices, the pacemaker was invented in Buffalo and became a major product offering of Medtronic.

These are terrific examples showing how research investments and institutional groundwork can lead to improvements in health and quality of life, while spawning new businesses to create high-tech industry and jobs.

Unfortunately for our region and all of NYS, the businesses that brought these inventions to market and created new jobs were not in NYS. This taught us that we in our region are missing something to build our high-tech economy.

The entire United States should learn from these lessons as well, as we seek to compete in a global economy, particularly in high-tech sectors. Two key lessons are first and foremost that we need to assemble the ***full*** complement of strategically aligned resources vs. operating through multiple silos and second, that we need to invest in operational elements for business growth vs. strictly capital infrastructure.

To build a high-tech economy in industries like life sciences, renewable energy, and advanced manufacturing, requires a combination of a) technology innovation, b) capital or funding, and c) workforce. The process of growing high-tech industry, revenues, and jobs is dependent upon a robust pipeline that facilitates innovation development and movement from the point of discovery and invention to the marketplace, through a process dependent upon both capital and workforce.

Investments in our Center of Excellence and Buffalo Life Sciences Complex are going far to improve our infrastructure and hard assets, such as cutting edge equipment, to be able to drive technology innovation. In addition, 126 new federal and state initiatives funding research are yielding more grants for research programs. This means we can keep inventing more. But what of the other resources needed to develop the high-tech economy, especially in regions like Upstate New York where it is not happening naturally despite the extensive research funding? In ***fact***, we need to coordinate the ***full*** set of resources to move these inventions from the lab to the marketplace.

Let'***s*** call these business development and technology commercialization resources. Unfortunately, the publicprivate funding that created our Center of Excellence did not provide any such operational resources initially. We were left having to gather what programs already existed to fulfill our mission of economic development side-byside with translational research.

This story rings true across New York State. As you may know, New York is among the top states in this country when it comes to its higher education system comprising dozens of institutions turning out research talent, conducting innovative research, and finding new discoveries. At the same time, we have one of the poorest records of translating this world class research and development into investments, new products, businesses, and jobs in our State. In ***fact***, if you look at venture capital funding new business in the US, in 2007, New York State ***only*** captured 4% of those dollars vs. California, which captured 47% of the venture capital investments. Furthermore, without a thriving economy to offer employment and business development opportunities, we continue to lose the best and the brightest and fail to attract new high-tech industry constituents to our State. This same story might be said not just about NYS relative to other states in the US, but about the US relative to other countries around the globe. We all hear about Silicon Valley and Boston'***s*** high-tech corridor, but what about the rest of the country? The good news for our region is that we have made progress by coordinating literally dozens of organizations, combining university- based resources and traditional economic development programs, each of which has very small pots of dollars. Through these collaborative efforts our region has managed to launch over 40 new life sciences companies since 2002 and create or retain over 5000 jobs in this sector ***between*** industry and academic settings. Our work with dozens of life sciences firms over the past several years yielded over a 40:1 return on investment last year alone. The CAT program has shown a 20:1 return on investment across all regions and technology sectors in New York State since the new millennium, but it still ***only*** receives the same level of annual funding since it was launched in 1983, despite its success.

I understand that the goal of economic development programs is to grow the private sector jobs as the highest priority. Even with very limited public resources fueling the effort, I am pleased to say that our region now has approximately 140 life sciences firms and over 6000 private sector employees in these companies. However, given

the economic crisis we are in today, particularly in an already depressed region, we need to accelerate our efforts at building the life sciences and other new economy industries. Better coordination of state and federal initiatives can go far toward this goal.

As you have heard thus far, the Buffalo Niagara region has a broad life sciences industry ranging from medical devices to diagnostics, pharmaceuticals, biomedical informatics, and research and development products and services. A central part of my job is to connect industry and academia in order to move technologies from the research lab to the marketplace. A small group of us ***spend*** each day leveraging our university research and development assets with three targets in mind: 1) helping start new companies based on these technologies, 2) growing existing companies by helping them add new products and markets, and 3) attracting companies who want to locate where they can be in this hotbed of new technology development.

Where the efforts are struggling most is in strategically coordinating technology commercialization and business development resources and sufficiently funding such activities. Some states, like North Carolina, have made a significant, long term commitment to growing its biotechnology sector. At an international level, countries such as China have seen the wisdom of applying significant and sustained resources toward this end through the kind of science and industrial park environment embodied in bioBAY, for instance.

BioBAY comprises a city-sized campus outside of Shanghai with more building and equipment than we in Buffalo 127 Niagara can imagine, plus all the people power to drive ever-expanding numbers of institutions and companies to engage with them. Yet, in our world here, this facilitating resource bringing partners to the table, known as business development, is typically embodied in a very small number of individuals spread among fragmented organizations with disconnected agendas and minimal high-tech industry familiarity or experience. Whereas at bioBAY, there is an entire business development department comprising dozens of high level individuals working toward the same comprehensive set of goals.

Fortunately, private industry in the US and throughout the world already understands the critical nature of business development and related functions, such as marketing, and they are learning new ways of doing business in the global economy. Similarly, our government- supported initiatives must adapt to the new landscape of governmentacademia- industry partnerships. This adaptation requires people resources - a different kind of resource than has resided traditionally in our economic development, workforce development and academic research settings.

Furthermore, this is an investment in people vs. strictly buildings and other infrastructure.

Similarly, the supply chain in high-tech industries like life sciences requires a virtual network of organizations that are global, where even research and development alone may need to be done in multiple locations, not to mention manufacturing, marketing and distribution on a global basis. Our life sciences companies have to embrace globalization to be successful, while being savvy about how to create a win-win arrangement across international boundaries. Again, this is where business development plays a significant role and publicly-funded resources can assist our growing companies. China clearly understands this new model of doing business, where in the US we still expect traditional economic development, such as one-shot trade missions, to be the answer.

In addition to people resources who respond to this new business climate, bioBAY has capital to support companies in talent acquisition and other growth activities via grants, loans and equity-based programs. One could argue that China'***s*** government infrastructure supports the organization of these resources in ways not possible in the United States. At the same time, as I mentioned previously, our private sector in the US has decided on its own where to put its investments in new business, as in 2007, where again, 47% of venture capital funding went to California, 12% to Massachusetts, 5% to Texas, 4% to New York with even smaller percentages to the rest of the country. We can assist in driving more of these dollars to whole array of innovation hubs throughout the US where there are strategically- located private-public partnership initiatives. The Buffalo Niagara Medical Campus and its Life Sciences Complex is just such a location, where a combination of business development talent and investment capital for companies, supported at least in part with public dollars, would accelerate high-tech industry growth.

Although our Center of Excellence is not formally defined as an incubator, we have a dozen private sector firms who clearly are benefiting from the critical mass of translational research, start-up company activity and support resources offered on the Buffalo Niagara Medical Campus. Similarly, incubators in our region set up through private and public funding should be brought into the fold through publicly-supported programs that promote science and industrial park networks.

Despite these clear opportunities to catalyze growth of high-tech businesses, our federal government is still mired in trying to grant even the smallest support for our new economy. For example, recently our federal government was considering increasing its Small Business Innovation Research (SBIR) grants from 2.5% to 3.5% of the national research funding set aside, yet one of our budding life sciences entrepreneurs was just told that his funding will not be forthcoming as this meager increase in SBIR funding was not passed. Conversely, it seems incongruous when we contemplate the highly touted economic development through the Recovery Act ***only*** to realize that pouring huge amounts of stimulus dollars into our existing silos for research, economic development and workforce development ***only*** ***serves*** to increase our ***spending*** with little promise of tangible, sustained results due to the lack of coordinated, strategic investment.

In ***fact***, in our region, what might be called a fire hose of recovery act dollars has caused a suspension of strategic investment, ***only*** to yield a feeding frenzy on behalf of individual agenda items and a need for agencies to ***spend*** out the funds at a record pace. Once the stimulus dollars are gone, we are back to reduced budgets to try to support shelved high-tech strategic initiatives, where any exist at all. By way of example, in Buffalo Niagara state workforce 128 development funding has supported life sciences and advanced manufacturing programs for the past two years of $500,000 per year. The stimulus initiative is yielding literally millions of additional dollars to be ***spent*** in less than 24 months, which requires a practical approach of having to direct the funds into existing programs, very few of which address building high-tech industry talent.

The preferential focus of stimulus funding for green technology jobs and industry to the detriment other high-tech development opportunities critical to regions like ours who have attempted to foster these sectors is even more perplexing. Buffalo Niagara, like so many other regions, does not have programming in place that is linked with existing or projected job opportunities in the green technology sector. To date, there has been little analysis and strategic planning in our region to develop a coordinated approach to grow the energy and green tech sectors other than through traditional business attraction strategies, with neglect of growing existing companies and launching new businesses by capitalizing on technological advances in our institutions and industry.

The solution to gaining ground in building our new economy is to stay focused on our target high-tech sectors, such as life sciences in our region. With this focus, the task is to create a pipeline of translational research, technology commercialization and economic development initiatives that combine the most successful elements of traditional economic and workforce development programs with university-based technology development and commercialization programs. More specifically, our state and federal government needs to be the catalyst to engage the private sector in this partnership effort via programs designed to: • Incentivize and fund projects, including translational research and technology commercialization, that involve multi-organizational coordination where clear-cut economic impact in the private sector is delineated; private sector involvement in such projects must be a requirement at the application phase.

• Increase technology commercialization funding to include more than just capital expenses; including funding for operations that mirror best practices in industry engaged in a global, high-tech, multi-organizational, interdisciplinary environment is a good model to follow.

• Develop programs that involve multi-year funding for research and industry growth, leveraging industry and science parks where appropriate, that require participation of state-level programs working in combination with federal support.

• Create investment capital programs that engage both the angel investor and venture capitalist in supporting the launch of our new economy beyond the few currently active areas such as Silicon Valley and Boston.

• Deploy funding initiatives through a combination of community- and university-based economic development programs that engage a new type of industry-savvy talent than traditionally seen in these settings.

The new economy in our region and in so many areas throughout the US is in its infancy, and like an infant, it cannot be starved or fed sporadically in its early days and expected to thrive down the road. The promise of a robust high-tech economy deserves the proper kind of upbringing catalyzed by strategically-aligned public investments that break down the existing silos and engage the private sector in ways that are anything but business as usual.

HEARING COCHAIR MULLOY: Thank you, Dr. LaVigne.

Mr. Patton, thank you for being here.

OPENING STATEMENT OF MR. EDWARD PATTON DIRECTOR OF SALES AND MARKETING, ROCHESTER PRECISION OPTICS, WEST HENRIETTA, NEW YORK 129 MR. PATTON: Thanks. I actually am speaking on behalf of not ***only*** my thoughts and my experiences in the photonics industry, 30 years, past business, 90 percent of the jobs moved to China, but also my colleagues within the photonics cluster here in New York.

Just a little bit on optics itself. Optics have a pervasive impact on our daily lives, but the impact is rarely noticeable because the products of optical technology are ironically often invisible and because we accommodate so swiftly to modern technology.

Today, we pay little attention to the infrared remote control, LCD TVs, laser printers, as we do to the mirrors that have been with us since antiquity.

Besides the products we use daily, optics is an enabling technology. If it weren't for progress in UV optics and UV lasers, Moore'**s** Law and the dramatic exponential growth could not have happened.

Optics also provides superiority in the defense world--night vision systems, long-range surveillance, missile guidance and aversion systems. One ***only*** needs to glance at a modern weapon system in the hands of our soldiers. It has a thermal imaging sight, it has night vision, laser designators, and a plethora of optical devices to protect our soldiers and provide superiority over the enemy of today.

In the Rochester area, across the country, there are several regions that have a strong base in the photonics or optics industry, and upstate New York is among the most prominent.

The domestic optics industry began in Rochester as early as 1880 when Bausch & Lomb and Eastman Kodak began manufacturing camera lenses. Industry growth increased so that by the early 1900s, Rochester became home to over ten of the largest camera and optics manufacturers in the world.

By the mid-20th century, Kodak'**s** "Hawkeye" facility was the largest optics facility in the world. Today, the majority of those jobs are in Asia.

There are over 60 leading optical and photonic companies in Rochester alone, along with 18 outstanding colleges and universities. This includes RIT, University of Rochester'**s** Institute of Optics, which is a multimillion dollar research engine based at the University of Rochester.

Since its creation, the Institute of Optics has granted more than 2,500 degrees in the field of optics, approximately half of all the degrees awarded in optics in the United States.

As I speak today, there are over 200 executives of the New York photonics cluster getting together for a golf fundraising activity which last year raised $16,000 for the Children'**s** Hospital at Strong Memorial. The New York photonics cluster is the largest and most active photonics cluster in the country, and it is a vital resource to the economic growth for our local, state and federal governments.

We wish the Commission had held its hearing in Rochester this past May when over 1,700 representatives from every company and every country concerned with optical fabrication traveled to Rochester. Optifab is an optical fabrication conference that is held here every other year.

130 The New York photonics cluster has been competing with governments that pour many millions of dollars into promoting their optics, photonics and imaging industries. We have been competing on a shoestring budget of less than $250,000 per year, two-thirds of it provided by industry. This year the New York State Senate eliminated the state's contribution to our efforts.

New York photonics is also part of the Emerging Industry Alliance of New York State. The Emerging Industry Alliance authored the legislation for Qualified Emerging Technology Credit, a tax credit for sunrise industries in the New York State.

The role of state government is to help the industry promote the industry.

There is no way the state government could get better results for the same dollar than by supporting the Emerging Industry Alliance, as they have for the past 15 years, until 2010 when the funding was cut.

How will this funding affect our promotional activities? For example, at Photonics West in San Francisco, the largest annual conference in our industry, China, Germany, France, and Canada will be promoting their photonics industries in gigantic footprint pavilions that are fully funded by their governments.

Germany's pavilion, for example, will be two stories and over 4,000 square feet. New York State, which competes with those nations by promoting New York as a vital center for this global industry, has chosen not to contribute to the New York Pavilion in 2010. Simply put, we cannot compete without New York's participation.

Another question that was asked of us prior to convening of this panel was how can New York support the development of advanced technology industries that are geographically proximate to the universities? Simply put, this already happens. What is missing is seed money. Every year panels are convened upon the promise that universities need to get more and more research dollars, and that this will result in economic development. ***Full*** time lobbyists are employed to convince politicians that this is the future of economic development.

As an industry group, we have no ***problem*** with academics getting research dollars, but it needs to be acknowledged that successful companies know how to innovate. Perhaps some of the research dollars should be provided to companies in the form of vouchers to find research partners among the New York State's universities.

More R&D dollars need to be invested in companies, not just universities, along with providing incentives and tax credits for more commercial R&D to provide seed dollars to support early-stage emerging companies.

You know just another thing I heard a little bit earlier today, you know, talking about the IP and IP migrating out of the ***U***.***S***., and you know, the same thing, I think we talked about in New York. You know there's a lot of IP developed here and where does it go? It leaves the state and leaves the country.

You asked about incubators. I've got a fairly good example of an incubator that worked. It was academic, industry, and government working together in the 131 Rochester optics industry. It was called the Center for Optics Manufacturing, COM.

In 1999, the University of Rochester, Harvey Pollicove from Eastman Kodak, and the American Precision Optics Manufacturers Association, along with a $4.8 million contract from the ***U***.***S***. Army Materiel Command, created a collaboration to develop advanced optical technology and equipment for ***U***.***S***. optical manufacturers.

COM was chartered with meeting the needs of a faltering ***U***.***S***. optics manufacturing industry that was losing ground to overseas manufacturers. Though the funding for this collaboration was relatively small, the development that sprang from it was great and impacted each one of us each day of our lives.

The MRF, or Magneto Rheological Finishing, technology developed through QED and COM, is used by all of the world's top manufacturers of UV, ultraviolet, optics for semiconductor lithography systems. These systems enable the semiconductor industry to achieve the decreasingly smaller and smaller line widths leading to the evolution of faster computers and everything digital around us today.

Unfortunately, at this point, the funding for COM has been eliminated and that entity no longer exists as an incubator for optics manufacturing.

HEARING COCHAIR MULLOY: Mr. Patton, we're going to have to finish up, but you have some very good recommendations in your testimony. Why don't you mention a few of those and then we'll move on? MR. PATTON: The five recommendations that we felt were really important: Craft a national vision-- HEARING COCHAIR MULLOY: Craft a vision.

MR. PATTON: Craft a vision, really from the national point. I think it was said earlier on one of the panels, do we want to pick the winners? Maybe we need to pick the winners. We haven't done that in the ***U***.***S***., but maybe we need to.

Create incentives for keeping IP developed in the ***U***.***S***. to stay in the ***U***.***S***.

Dr. Eugene Arthurs, the CEO of SPIE, who presented to the Commission earlier in the spring, he stated--in testimony, he said: We need to select key manufacturing technologies and do what is needed to have world-leading plants in the ***U***.***S***. The decades of work in the Department of Energy laboratories should lead to solar energy manufacturing here and not the installation and maintenance of imported panels and the outflow of incentive dollars to support jobs elsewhere.

We also recommend that the federal and state funds continue to support the incubators, university and private sector research and the photonics clusters.

We recommend that the government and New York State invest more in this industry by providing expanded SBIR programs, low-***cost*** loans and/or grants to help private industry grow and compete globally.

And finally, we strongly recommend that the federal government include a true "Buy American Act" clause in the government's contracts that are awarded to 132 optical components and electro-optical assembly manufacturers.

[The statement follows:] Prepared Statement of Mr. Edward Patton Director of Sales and Marketing, Rochester Precision Optics, West Henrietta, New York Thank you to the commission for this opportunity to share some views from our local optics community. We believe that the Federal Government could be better aligned with industry and our state and local governments to put our tax dollars to more effective use and make sure that critical technology and jobs related to the photonics industry remain on shore. This is not ***only*** an economic issue, but a matter of National Security.

The 20th Century was the century of the electron and now the 21st century is the century of the photon.

Exactly what comprises the optoelectronics or photonics industry? According to a paper written by the Committee on Optical Science and Engineering, National Research Council in 1998, it is "the field of science and engineering encompassing the physical phenomena and technologies associated with the generation, transmission, manipulation, detection, and utilization of light. Optics have a pervasive impact on our daily lives, but that impact is rarely noticeable because the products of optical technology are, ironically, often invisible and because we accommodate so swiftly to modern technology. Today we pay little attention to the infrared remote control, LCD TV's and laser printers as to the mirrors that have been with us since antiquity." Besides the products we use daily, optics are an enabling technology. If it weren't for the progress in UV lasers and optics, Moore's Law and the dramatic exponential growth of the digital chip could not have happened. According to Washington DC based OIDA (Optoelectronics Industry Development Association) the global optoelectronics industry in 2008 was $356 ***billion***. It seems the ***U***.***S***. should be doing everything we can to strengthen this industry and generate and retain jobs.

Optics is a critical technology that must remain strong in the US In 1996 the National Science Foundation and other US agencies asked the Japanese Technology Evaluation Center (JTEC) to assess the current state of optoelectronics research, development, and manufacturing in Japan compared to that in the United States. It found that while optoelectronics is regarded as important in the United States, this field has not achieved anywhere near the visibility and significance that it has in Japan. The panel regarded this as a significant long- term ***problem*** for the United States as it struggles to maintain its worldwide leadership in electronics technologies for the future. The panel concluded that in this respect, the Japanese have a ***much*** clearer understanding of the crucial role that optoelectronics technology plays in the development of future electronic and communication systems.

In the 20th century, large corporate research facilities such as Bell Labs, 3M and Eastman Kodak Company fueled the creativity and research that birthed enabling technologies for government and commercial applications.

Innovations such as solid state, integrated circuitry and MEMS devices gave rise to an endless supply of products that find application in all areas of defense, medical, industrial, and commercial products. Yet now in the 21st century these corporate resources have mostly disappeared as companies focus more on short term profit and less on long term goals. Executives under pressure to increase the company'***s*** stock value are constantly faced with decisions of balancing the short and long term needs of the company, and it seems there are few enticements to support research and development efforts. This is where federal and state agencies can play a ***much*** more prominent role.

The ***U***.***S***. should not rely on corporate America to unilaterally develop long range goals and policies that compete with foreign governments. As long as businesses emphasize a short term focus on profits, it is clear that a long term vision must be crafted and implemented by the US government. We are not talking about government bailouts and intervention in the free market economy that ***serve*** as short term fixes to address the symptom rather than the source 133 of the ***problem***. We are suggesting that the government do more to incentivize business to invest in our future for the security of our country and the security of our families and their children. Government policy needs to focus on promoting and protecting technological advancements in our nation.

Technological superiority in the global optics industry is critical to the defense and security of our nation as well as being a key enabler of existing and emerging commercial applications. Optics provide Defense with superior advantage through night vision systems, long range surveillance, and missile guidance and aversion systems. One ***only*** needs to glance at a modern weapon system in the hands of our soldiers. It has thermal imaging sights, night vision, laser designators, and a plethora of optical devices that protect our soldiers and provide superiority over the enemy of today.

Rochester is the epicenter of the optics community, both in academia and manufacturing Across the country there are several regions that have a strong base in the photonics or optics industry, and upstate New York is among the most prominent. The domestic optics industry began in Rochester as early as 1880 when Bausch and Lomb and the Eastman Kodak Company began making camera lenses. Industry growth increased so that by the early 1900'***s*** Rochester became home to over ten of the largest camera and optics companies in the world. By the mid 20th century, Kodak'***s*** "Hawkeye" facility was the largest optics facility in the world. Today the majority of those jobs are in Asia.

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As I speak today, there are over 200 executives of New York Photonics Cluster (PIANY) getting together for a golf fundraising event which raised over $16,000 dollars last year for the Children'***s*** Hospital at Strong Memorial. The New York Photonics Cluster is the largest and most active Photonics cluster in the country and is a vital resource to economic growth for our local, state and federal governments.

We wish that The Commission held its hearings in Rochester this past May, when over 1,700 representatives from every company and every country concerned with optical fabrication traveled to Rochester, NY for an optical fabrication conference that is held here every other year: Optifab.

New York Photonics, our industry cluster, has been competing with governments that pour many millions of dollars into promoting their Optics, Photonics and Imaging industries. We have been competing on a shoestring budget of less than $250K per year, two thirds of it provided by industry. This year, The New York State Senate eliminated the State'**s** contribution to our efforts.

New York Photonics is also part of The Emerging Industry Alliance of New York State. The Emerging Industry Alliance authored the legislation for the Qualified Emerging Technology Credit, a tax credit for the sunrise industries in New York State.

The role of the State Government is to help the industry promote the industry. There is no way that New York State could get better results for the same dollar than by supporting the Emerging Industry Alliance as they have for 15 years -- until 2010 when funding was cut.

How will this funding cut affect our promotion efforts? For example: at Photonics West, the largest annual conference in our industry, China, Germany, France, and Canada will be promoting their OPI industries in gigantic footprint pavilions that are fully funded by their governments. Germany'**s** pavilion, for example, will be two- stories and over 4,000 square feet. New York State, which competes with those nations by promoting New York as a vital center for this global industry, has chosen not to contribute to the New York Pavilion in 2010. Simply put, we 134 cannot compete without New York'**s** participation.

Another question that was asked of us prior to the convening of this panel was "how can New York support the development of advanced technology industries that are geographically proximate to the university?" Simply put: this already happens. What is missing is seed money. Every year panels are convened upon the premise that universities need to get more and more research dollars and that this will result in economic development. ***Full*** time lobbyists are employed to convince politicians that this is the future of economic development. As an industry group we have no ***problem*** with academics getting research dollars, but it needs to be acknowledged that successful companies know how to innovate.

Perhaps some of the research dollars should be provided to companies in the form of vouchers to find research partners from among New York'**s** universities. More R&D dollars need to be invested in companies, not just universities along with providing incentives and tax credits for more commercial R&D and provide seed dollars to support early-stage emerging companies.

Additionally New York State needs to be paying attention to how the I.P. paid for with New York dollars is licensed/transferred, and where the products created from that I.P. are then manufactured. New York State has funded research enabling new products that are now being manufactured in other countries. Surely this is counter to the goals of New York'**s** investment in sunrise technologies.

Incubators - Rochester industry/academia and government support A good example of academia, industry and government working together in the Rochester optics industry is COM (Center for Optics Manufacturing). In 1999 The University of Rochester, Harvey Pollicove from Eastman Kodak, and the American Precision Optics Manufacturers Association with a $4.8million contract from the US Army Material Command created a collaboration to develop advanced optical technology and equipment for US optical manufacturers. COM was chartered with meeting the needs of a faltering US optics manufacturing industry that was losing ground to overseas manufacturers and in decline for a decade. Two companies which are world known and compete globally were born from this collaboration. QED based in Rochester developed a technology known as MRF (Magneto Rheological Finishing) which is used to produce the world'**s** most accurate optical surfaces and Optipro Systems, which is synonymous with world-leading computer controlled machine tools and equipment for deterministic fabrication of precision optics. Though the funding for this collaboration was relatively small the development that sprang from it was great and impacted every one of us every day of our lives. The MRF technology developed through QED and

COM is used by all of the world's top manufactures of UV (ultraviolet) optics for semiconductor lithography systems. These systems enabled the semiconductor industry to achieve decreasingly smaller and smaller line widths leading to the evolution of faster computers and everything digital around us today. Unfortunately, at this point, the funding for COM has been eliminated and that entity no longer exists as an incubator for optics manufacturing.

Conclusions: 1. Craft a National Vision The United States must craft a clearly defined, long-term vision for the direction of research and more importantly put more emphasis on development.

2. Create Incentives for keeping IP developed in the US to stay in the US As Dr. Eugene Arthurs (CEO, SPIE) stated in testimony to this commission, "We need to select key manufacturing technologies and do what is needed to have world leading "plants" in the U.S. The decades of work in the DOE laboratories should lead to solar energy manufacturing here and not the installation and maintenance of imported panels and the outflow of incentive dollars to support jobs elsewhere".

3. We recommend that Federal and State funds continue to support the Incubators, University and Private Sector Research and the Photonic clusters.

135 4. We recommend that the Federal Government and NYS invest more in this industry by providing expanded SBIR programs, low-cost loans and/or grants/ to help private industry grow and compete globally.

5. We strongly recommend that the Federal Government include a true "Buy American Act" clause in the government contracts that they are awarding for optical components and electro-optical assemblies.

Within the last couple of months the US Army made 2 contract awards for AN/PVS-14, Night Vision Goggle optical subassemblies that totaled over $4.1M. The two companies that received these contracts are simply procuring the optics from offshore sources in Singapore and Japan. It is shameful that our tax dollars continue to be used to create jobs in foreign countries, especially during these difficult economic times.

US policymakers need to do a better job of providing government agencies and industry with direction and the funding that is necessary to foster innovation and keep critical technologies and jobs within the borders of the United States.

Thank you.

HEARING COCHAIR MULLOY: Thank you. I want to let you know that Commissioner Shea--that NPR is doing a radio show on this hearing-- their local affiliate--so he's down there doing that. He didn't mean to be impolite to this group.

MR. PATTON: No problem. I didn't know.

[Laughter.] HEARING COCHAIR MULLOY: Mr. Barons.

OPENING STATEMENT OF MR. CLIVE R. BARONS VICE PRESIDENT, STRATEGY INTEGRATION, FUJI XEROX OPERATIONS, WEBSTER, NEW YORK MR. BARONS: Thank you, members of the Commission, for allowing me the opportunity to testify today on the challenges to our country and this region from the perspective of Xerox Corporation.

Actually I've been with Xerox for 37 years, which is 60 percent of my life and 50 percent of Xerox's life, in two different countries.

I will give you some background on Xerox first. Our 2008 revenue was $16.8 billion. Now, that actually excludes a large amount of revenue which isn't counted because Asia-Pacific is managed by a minority joint venture, Fuji Xerox, where we own 25 percent equity. So the revenue is not consolidated.

So essentially we're $25 ***billion*** company, which is head-to-head with two other major players in the industry, one Japanese and one ***U***.***S***. company, with two letters. And all our major competition is either ***U***.***S***. or Japanese-based, a few smaller European players, and some emerging Korean players. We have no direct competitors in our industry from China.

Xerox'***s*** main interest in China at the moment is, in ***fact***, the source of low- 136 ***cost*** components. We have been very successful with that and saved in times up to 40 percent of the product ***cost*** by moving components over to China.

Those are often the lower technology type of components, but we do see a significant long-term threat from China, and there'***s*** an old adage in outsourcing in that first you move the low-tech, simple jobs; secondly, you move the supply base to be with the assembly jobs; then, you begin to move the technology; and then you've lost the business.

So although we don't have any direct competitors at the moment from China, it'***s*** always possible, they could eventually move into that. As I think Japan took on the ***U***.***S***., and Europe and Korea is now taking on Japan, China may come next.

Locally, Xerox has a long proud history in upstate New York. It'***s*** been our headquarters from the operational side, although our headquarters from corporate governance was in Stamford, Connecticut, Norwalk now. 65 percent of our R&D resources are based in Monroe County. We employ 7,000 people. We ***spend*** $6 ***billion*** a year locally in wages and salaries and with taxes and with local suppliers.

Our core global operations are also based here: research, technology, product development, still some manufacturing, and global procurement operations.

We also have the North American sales, services and marketing organizations--and a lot has been said today on the environmental side--and our environmental health and safety group is based in Webster, New York here.

We believe we're a good member of the local community from an educational, social and service perspective. We contribute both in money and time.

For example, United Way: we contribute $2 million annually, and half of that is from the company and half of that is by private employee donations. And we've given $2 million to RIT in funding, $1.8 million to MCC, $1 million to University of Rochester, and to many other educational establishments.

The reason we do this is because we depend on local universities for welleducated and technically advanced workforce, and in talking to Mr. Patton just before we came on, I learned he was from Florida, and what we learned some time ago is that because of the unusual weather conditions in Rochester-- [Laughter.] MR. BARONS: --if we hire graduates straight out of Arizona or Florida, they don't always stay once they get through a winter.

We're a technology-led company. I believe there'***s*** three sources of wealth creation: physical resource; natural resource; and intellectual property. We're an intellectual property company, and half the 609 patents we were awarded last year originated in Monroe County.

So we need to sustain this innovation engine, and we find links with the local communities like RIT very, very helpful in doing that. And it'***s*** not just at the university and college levels. We also have our employees volunteer their time at the school levels.

137 At the high school level, we support the FIRST program and National Geographic competitions. At middle school, there'***s*** a sort of a smaller version of that called FIRST LEGO, which gives school children in middle school an early exposure to engineering, and in elementary schools, we have the Xerox Science Consultant program, which has been running since 1968. I think we've had 700 students we've trained in that program.

Let me turn from our local community to a global business perspective. As I said, last year, we were $16.8 ***billion*** revenue. We announced our results this morning for the second quarter; our revenue was $3.7 ***billion***, down 18 percent year over year. Fortunately, our net income was about four percent better than expected so last time I looked the stock was up 50 cents. That'***s*** good news.

HEARING COCHAIR MULLOY: 50 cents? MR. BARONS: But we are seeing the impact of the recession: GDP fell the fourth quarter over the third quarter. ***U***.***S***. and Europe, our largest two markets, were down six percent. Japan, Korea, Taiwan, Australia, where we indirectly support that through Fuji Xerox, was down double digits. Russia, for example, was up one percent, but that compares to 7.7 percent growth in the prior quarter.

So we have had some tough decisions to make on jobs, salaries, benefits, even some educational sponsorships. But we have maintained our commitment to engineering because we believe the future growth of Xerox will be a function of our R&D investments.

Some of those investments are overseas, and a lot of commentators and economists have criticized ***U***.***S***. companies for moving offshore and claim they ***cost U***.***S***. jobs. But as Thomas Friedman said, "The World is Flat." We must utilize the best vendor base in the world to compete with our competitors. If they're going there and bringing in lower product ***costs***, so must we.

Again, sourcing in China does have some risks. One of our major sources of revenue and income is toner sales, the black powder that goes on the paper, and we see an attack on that core business through counterfeit, ***much*** of that emanating in China. So one of the things we look for is a marked improvement in the respect for intellectual property, particularly in China and Southeast Asia.

And that risk will increase as China moves from its current state of development forward. When I went to China first about ten or 12 years ago, onethird, I could see one-third of all the high rise cranes in the world outside my hotel window. China has developed from a low- ***cost*** simple assembly to a fairly competent electronics and component manufacturing entity, if it continues on that growth path, there will be lots more competition other than just toner.

I'm going to then switch quickly to another major aspect, trade, which we need to look at. We've been a truly global company. 45 to 50 years ago, Joe Wilson went over and formed Rank Xerox to cover Europe and Fuji Xerox to cover Asia-Pacific. So we fully understand the opportunity for growth overseas, and we really are supportive of trade initiatives.

We would like to see the Trade Promotion Act/Fast Track renewed. We would like to see the FTAs implemented and new FTAs developed and conclude the 138 Doha Round.

So, in summary, Xerox is an innovation-based company. In 2006, we were awarded the National Medal of Technology for recognition of 50 years' worth of innovation in our industry. I think America'***s***, upstate New York, and Xerox'***s*** opportunities are all aligned. We need to stay internationally engaged and competitive. We need a strong education system working with industry to help us with that, and we need to stay focused on innovation.

So our need from government, from the Administration, both national and locally, is fourfold: We need continuous improvement in education, especially in technology of the information and communications industry, and that must be measured in relative global standards.

And as someone who has just put three kids through New York schools, affordable would go well on that.

[Laughter.] MR. BARONS: We need protection from IP infringement, most of which for Xerox is created here, upstate New York.

We want relief on taxes, employee benefits, which are spiraling out of control, to help the ***U***.***S***. operations be more globally competitive.

And, as I said before, we need to implement the Free Trade Agreements and Doha Round.

And, as Ursala Burns, our CEO, effective first of July, invoked David Kearns, a former CEO, who is a resident of Rochester, the 20- year old statement, which is today as true as it was then, if not more so in the global economy. He said: "We're in a race with no finish line." So the survival of the fittest and the smartest is what we need to do.

Thank you.

[The statement follows:] Prepared Statement of Mr. Clive R. Barons Vice President, Strategy Integration, Fuji Xerox Operations, Webster, New York 139 Statement of Clive Barons Xerox Corporation Before the ***U.S.***-CHINA ECONOMIC AND SECURITY REVIEW COMMISSION July 23rd, 2009 Mr. Chairman, members of the Commission, thank you for the opportunity to testify today and to discuss the major challenges our country and this region face from the perspective of Xerox.

While Xerox Corporation does not sell products or services directly in China - we access the Chinese market through a minority joint-venture (Fuji Xerox) - we do have a keen interest in the development of China as a market opportunity and a viable source of ***cost*** competitive components. However, we are also conscious of some longer term competitive threats from Chinese based companies in the advanced technology field.

This is particularly relevant to Xerox which has a long and proud history in Upstate New York with 65% of our global R&D resources located in Monroe County.

Xerox in Rochester.

Connecting with our Community.

Let me begin with some background on Xerox'***s*** commitment to the region. Since our very beginning, Xerox has invested in the greater Rochester community through jobs, real estate, conducting business with local vendors, and volunteer and philanthropic support. Home to the largest population of Xerox people, Rochester is closely connected to how Xerox operates around the globe. Xerox employs around 7,000 people in the Rochester area, representing over 20% of all Xerox employees in the ***U.S.***. In Greater Rochester, Xerox annually ***spends***: • Over $800 million in payroll • $4.5 million in property taxes • Over $500 million with local suppliers Additionally, over the last five years, we have invested close to $100 million in new facilities and upgrades, including a state-of-the-art Chemical Toner factory.

Our Monroe County operations are core to our global business and include: • Product manufacturing assembly • Toner manufacturing • Product technology and software development • Global Procurement 140 • The Xerox Research Center in Webster and the headquarters of the Xerox Innovation Group • Gil Hatch Center for Customer Innovation • North American sales, services, and marketing • Our Corporate Environmental Health and Safety organization A local voice on issues that matter Twenty-six senior executives ***serve*** on 40 area boards, including the University of Rochester, Monroe Community College, Rochester Institute of Technology, the Urban League, Greater Rochester Enterprise Foundation, YMCA, Rochester Business Alliance, Strong National Museum of Play, Garth Fagan Dance, and many more.

Giving back Over the past 10 years, Xerox has invested over $25 million in Rochester-area educational, cultural, and community organizations and thousands of employee hours. Major investments include: • The Xerox Foundation provides $1 million each year to the United Way.

Xerox employees and retirees donate an additional $950,000. 1,600 Xerox employees participate in the annual United Way Day of Caring.

• $2 million grant to Rochester Institute of Technology for the Golisano Center on Sustainability.

• More than 75 Rochester residents and students have received education assistance through Xerox'***s*** Technical Minority Scholarship Program.

• $1.8 million grant to Monroe Community College for scholarships and campus improvements.

• $1 million grant to the University of Rochester for the Wilmot Cancer Center, in addition to $100,000 a year for the David T. Kearns Center on Diversity and $300,000 a year for undergraduate research programs.

• Since Xerox started its Social Service Leave program in 1972, 98 Rochesterbased employees have taken paid leave to work ***full*** time for local community organizations such as Foodlink, Gilda'**s** Club, LDA Life and Learning Services, and the Rochester Fire Department.

Nurturing the next generation of Xerox innovators Xerox depends heavily on local universities and colleges to provide a well educated and technologically advanced workforce. We are a technology company that is fueled by innovation. 55% of patents filed by Xerox originate from our Upstate New York R&D employees. These employees are at the center of our R&D. Sustaining this base from local educational establishments is good for the community and good for Xerox.

Xerox supports a number of educational programs in the Rochester community through direct funding and the gift of our people'**s** volunteer time. Some examples include: 141 Xerox Science Consultant Program The Xerox Science Consultant Program (XSCP), which began way back in 1968, is one of the longest running business/education partnerships in the country. Xerox researchers, engineers, and scientists teach real-life science lessons to elementary school students, working in partnership with local school districts. The program also includes a competition that culminates in an event where the winners present their inventions -with market research, pricing plans, packaging, etc - to Xerox employees who then vote on the inventions and inventors with the most potential.

Annually, 80 Xerox science consultants teach 1,700 students from 24 schools.

70,000 students have participated since the program began 40 years ago.

FIRST Robotics and LEGO League The FIRST (For Inspiration and Recognition of Science and Technology) robotics program pairs Xerox engineers with teams of high school students to build robots that compete in regional and global competitions. A founding sponsor of FIRST, Xerox provides funding and volunteer support for four Rochester teams as well as the Finger Lakes Regional FIRST competition held annually at RIT.

More than 700 Rochester-area students have participated on Xerox FIRST teams in the last 15 years.

The FIRST LEGO League program gives middle school students early exposure to engineering. Xerox sponsors four Lego League teams in Rochester.

Where We Are Today As you know, the world'**s** economy basically fell off a cliff last Fall. The 4th qtr GDP numbers from around the world are almost unprecedented in our lifetimes: • United States, our largest market was down 6.2% • EU our second largest market fell 6% • Japan, Korea, Taiwan and Australia were all down by double digits • Russia was up 1.1% -- but this was down from 7% growth rate in 3rd quarter There hasn't been any place to hide. Like many companies, Xerox has had to make some tough decisions on jobs, salaries and benefits. But we have maintained our commitment to innovation during these tough times.

But what is going to follow? GE CEO, Jeff Immelt recently said "The basic engine of global growth for a long period of time -- maybe 25 years -- has been the ***U***.***S***. consumer," ...

Now, the ***U***.***S***. consumer is finally going to have to save. As consumers around the world get more conservative, we think that overall economic growth -- not just for a year or two but even post the recession -- may be slower," Xerox thinks we will see investment- led growth, rather than consumer-led growth. As a country, we are going to make investments in broadband deployment, in health IT, in rebuilding our infrastructure. The auto companies must invest in new kinds of cars, 142 GE wants to bring new energy sources onto the grid. We have plenty of needs - no shortage of needed investments - so the next period could be very good for our economy, but it is going to be different from what we've come to expect. Growth will be slower; there will be some very difficult transitions, and slower income growth.

If we're moving towards an investment-led economy, we better make sure we make the investment in an education system that will provide the engineers, scientists and mathematicians to support that type of economy both nationally and regionally.

Immelt also gave an indication of next steps: "An American renewal must be built on technology. We must make a serious national commitment to improve our manufacturing infrastructure and increase exports. We need to dispel the myth that American consumer ***spending*** can lead our recovery.

Instead, we need to draw on 230 years of ingenuity to renew the country'**s** dedication to innovation, new technologies and productivity ... Renewing American competitiveness will not be accomplished through protectionism, but by rebuilding American technology, manufacturing and exports. To get back to making great things, we should clearly strive for a manufacturing workforce that is growing." America must continue to engage with the rest of the world if we are going to prosper. The global economy is a reality, and the current downturn ***isn't*** going to change that basic ***fact***. According to the Treasury department, 57 million American workers are employed by firms that engage in international trade. Despite domestic political pressures, the case for expanding trade is even stronger during these hard times. Trade ***barriers*** slow commerce: removing ***barriers*** increases the flow of commerce. At a time of a severe global downturn, governments need to work together to get commerce flowing. Our exports exceed $1.5 trillion per year - a 69% increase in ten years. We want that number to go up, not down - and that ***only*** happens with international engagement and negotiating away ***barriers*** to trade.

Although the ***U***.***S***. economy has slowed over the last two years, international trade has been an essential driver of what GDP growth we have experienced. Economists from the Federal Reserve calculate that without trade, GDP would have declined during 2008. Trade is essential to the growth of not just the high-tech industry, but the ***U***.***S***. and global economy as a whole.

Over the last two decades, the global average applied tariff has fallen from 25 percent in 1987, to nine percent in 2007.

Meanwhile the volume of world trade has increased more than fivefold over the same period, from $2.5 trillion in 1987 to $14.0 trillion in 2007. Trade has also steadily risen as a percentage of GDP, growing its role as an important component of economic growth, from 38 percent in 1980 to 54 percent in 2005. Continuing to reduce ***barriers*** to trade and investment will be important to sustained and future economic growth.

900,000 ***U***.***S***. jobs in 2007 were supported by high-tech exports. In addition, many ***U***.***S***. tech jobs are dependent on multinationals headquartered in the ***U***.***S***. 67 percent of ***U***.***S***. high-tech manufacturing jobs, and 80 percent of ***U***.***S***. telecommunications and internet services jobs were generated by ***U***.***S***. based multinationals in 2006. These companies' investment and expansion abroad sustains job creation at home.

143 The Global Competition What make Xerox'**s** contributions and commitments to the Rochester area possible are our successes in the global marketplace. Xerox, like most ***U***.***S***. corporations has increasingly adopted global investment, marketing and sourcing strategies. According a recent study by the Business Roundtable, over the past 40 years, exports by ***U***.***S***. corporations have doubled as a share of the size of the total economy, and the share of worldwide profits of ***U***.***S***. corporations attributable to foreign earnings has nearly tripled. Among the largest corporations, the share of worldwide profits attributable to foreign earnings is even greater. In 2005, of ***U***.***S***. companies in the Standard & Poor'**s** 500 reporting foreign earnings, more than 40 percent of worldwide income was earned outside the United States.

Until early 2007, ***U***.***S***. trade has been expanding and, with it, ***U***.***S***. employment. An economic study conducted for the Business Roundtable found that more than 31 million ***U***.***S***. jobs depended on trade in 2004. The analysis was the first estimate of the number of ***U***.***S***. jobs, both nationally that depend on ***U***.***S***. exports and imports of both goods and services. The key findings of the study were: • Total net ***U***.***S***. jobs dependent on ***U***.***S***. trade exceeded 31 million. Nearly one in every five ***U***.***S***. jobs was linked to exports and imports of goods and services.

• Contrary to popular belief, the net impact of trade on the number of ***U***.***S***. manufacturing jobs has been positive.

• Every ***U***.***S***. state had realized net employment gains directly attributable to trade.

• As ***U***.***S***. trade -- both exports and imports -- has grown over the past decade, caused in part by trade liberalizing international agreements, so has the number of ***U***.***S***. jobs tied to trade.

In 1992, a year prior to the implementation of a long string of multilateral and bilateral trade liberalizing agreements, net total trade-related employment in the United States amounted to approximately 14 million jobs, one in ten ***U***.***S***. workers. By 2004 the comparable trade-related employment estimate had more than doubled, representing nearly one in five ***U***.***S***. workers.

U.***S***. enterprises are sometimes criticized for making foreign investments on the grounds that such investments come at the expense of the American economy and jobs. However as Tom Friedman said, "The World is Flat".

Thus, as our competitors utilize the global opportunities - such as China, India and SE Asia -- to improve their ***cost*** structures, so must Xerox. We must do so to remain a key player in our industry and thereby sustain employment in US. Xerox'***s*** sales in China are through our minority-owned joint-venture, Fuji Xerox, so our main use of China is for component sourcing to support products designed and manufactured in Upstate New York. This ability to utilize the best vendor base, anywhere in the world, assists our overall competitiveness.

144 However, there are downsides. We do see a significant attack on our core business, especially on our post-sale toner business, through counterfeit products many of which have their origins in China. Thus, Xerox would like to see a marked improvement in respect for Intellectual Property from this region as China'***s*** development and manufacturing infrastructure continues to become more sophisticated, especially in the area of advanced R&D related to the information and communications industry.

Vast Growth Opportunities As one of the first, truly global companies, Xerox understands how foreign demand for consumer products and capital equipment can create extraordinary opportunities for ***U***.***S***. companies. Ninety-five percent of the world'***s*** population lies outside the United States. The prosperity of emerging market economies represents significant potential for the sale of ***U***.***S***. products and services. Today, almost 80 percent of the world'***s*** purchasing power is located in markets outside the United States. For the largest American companies included in the ***S***&P 500, sales by foreign subsidiaries had increased from 25 percent of total corporate sales in 1985 to nearly 40 percent by 2005.

Be There to Sell There Relying solely on exports to penetrate foreign markets often does not suffice.

Localized operations may be necessary to market products effectively, to cut transportation ***costs***, to avoid tariff ***barriers***, and to meet local content requirements.

Services, the industry in which 61 percent of ***U***.***S***. foreign affiliates are classified, and a major growth area for Xerox, often cannot be exported and must be supplied locally.

The Race for International Competitiveness America'***s*** major international competitors are not standing still. We cannot afford to either. Every major trading nation in the world is actively negotiating free trade agreements, to ensure that their businesses and workers can compete successfully in a global economy and to secure strategic commercial, foreign policy and natural resource advantages. ***U***.***S***. economic success demands that we continue to match the energy and urgency of other major traders. The alternative is an international economy where ***U***.***S***. businesses and their workers compete at a disadvantage, and where the international economic landscape is shaped without the United States in a leadership role.

To keep the United States on pace with our international competitors, the ***Congress*** and Administration have critical roles to play. TPA/Fast Track must be renewed based on an open and bipartisan discussion among the Administration, the ***Congress*** and stakeholders. Free Trade Agreements that have already been negotiated need to be implemented in the coming year, and ongoing FTA negotiations and the Doha Round must be concluded on commercially meaningful terms.

Our Competitors Are Moving Forward, With or Without Us Approximately 300 FTAs have been negotiated globally with over half coming since 2002. In the Asia Pacific alone, the number of FTAs has tripled over the past five 145 years, from 57 in 2002 to 176 in October 2006. This activity is occurring across many countries - indeed, FTAs have become a regularized part of the international landscape, and every country in the world has entered into at least one FTA. Today, more than 50 percent of world trade occurs through FTAs.

Conclusion Xerox is an innovation based company - in 2005 we were awarded the National Medal of Technology by the President in recognition of over 50 years of innovation in marking, materials, electronics, communications, and software that created the modern reprographics, digital printing, and print-on-demand industries.

As the upstate region looks to the future, our opportunities lie exactly where America'**s** opportunities lie. We need to stay internationally engaged and competitive. We need to take advantage of this region'**s** strong educational system, and encourage more students to go into math and sciences. We need to continue to focus on innovation.

The support we need is primarily fourfold: 1. Continuous improvement in the quality of education, especially in technologies related to information and communications industry, as measured in relative global standards 2. Protection from infringement or violation of our Intellectual Property, the majority of which is created in Upstate New York 3. Relief on taxes and employee benefit ***costs*** to help make our US Operations more competitive globally 4. Implementation of Free Trade Agreement and resolution of Doha round Our new CEO, Ursula Burns, recently wrote to all Xerox employees and quoted a former Xerox CEO (and Rochester area resident) David Kearns. David was speaking over twenty years ago, but what he said remains true. It is true not ***only*** for Xerox, but for this region and the country as a whole: "We are in a race with no finish line." 146 Panel IV: Discussion, Questions and Answers HEARING COCHAIR MULLOY: Thank you very ***much***. I want to thank Xerox for having you testify or you coming because some of the other multinational companies that we wanted to testify did not want to do it. So we appreciate you coming in and giving us that perspective.

Commissioner Blumenthal.

COMMISSIONER BLUMENTHAL: There'**s** been a lot of debate about whether the world is flat or not today. Galileo, I thought he put that to rest.

[Laughter.] COMMISSIONER BLUMENTHAL: But I have two questions: one for Mr.

Patton and one for Mr. Barons.

Given your experience on the ground and in actually seeing some of the competition in China with respect to optics and lasers--and you do a lot of defense work on missile guidance systems and thermal imaging and these sorts of things-- what do you see coming up in China that looks to be of similar quality that'**s** worrying you in terms of outcompeting you, not just on price, but really on quality? MR. PATTON: Well, I think quality, I think they are still behind in some of those fields. For instance, infrared detectors, the ***U***.***S***. is many years ahead of China in what'**s** been developed through government funding. The uncool detector- - I'm not sure how familiar you are with that--but those are very important.

Night vision, the tubes, and some of the basic components in night vision, I think we're still well ahead, but China does provide things that work. I mean everything works. It might not be quite as good. It might not have quite as high a performance, but it works.

COMMISSIONER BLUMENTHAL: Are there particular areas within the industry that they're cutting into your market share? MR. PATTON: I think so. In the ***U***.***S***., in the optics industry, I think if it wasn't for the defense industry, there would be very little optics industry left.

When I say optics, I'm saying, lenses, lens systems, and things like that.

COMMISSIONER BLUMENTHAL: Yes. Is that the same in China or is there more-- MR. PATTON: Well, in China, there are so many large plants that make optics. It's all done by hand, and there are 5,000 people sitting at desks and polishing things on little machines.

COMMISSIONER BLUMENTHAL: What about the demand? Consumer demand? Is there more-- MR. PATTON: Well, the consumer demand is highest in China.

COMMISSIONER BLUMENTHAL: Yes.

MR. PATTON: Because most of the optics that are produced go into consumer cameras, you know, et cetera, consumer items.

COMMISSIONER BLUMENTHAL: So there's more consumer demand in China than-- 147 MR. PATTON: Well, there's more consumer products using optics made in China, Asia, Asia per se.

COMMISSIONER BLUMENTHAL: I see. Mr. Barons, I also would like to thank you for testifying, and we do go back and forth a lot about multinationals and the role, and so just out of ignorance really, my question is can you give a general explanation for the benefits and value that a company such as yours provides back here in the United States? You say your have operations and production and manufacturing and research and development in-- MR. BARONS: That's in Monroe County, 7,000 people I think we-- COMMISSIONER BLUMENTHAL: 7,000 people-- MR. BARONS: I think probably about 25,000 nationally.

COMMISSIONER BLUMENTHAL: And besides the employees, what other- - I mean your profits are kept here? Can you just give the general picture? MR. BARONS: Our profits are distributed to our shareholders, many of which are ***U.S.*** pension funds, private individuals, whatever. Some of the profits are reinvested. We're an American company. We do get about $225 million PBT from our investments in Fuji Xerox operations. So those are all repatriated back to the ***U.S.***.

COMMISSIONER BLUMENTHAL: Would you be as profitable if you weren't operating in some of these other places? MR. BARONS: Well, we may be bankrupt if we weren't operating in other places.

COMMISSIONER BLUMENTHAL: Okay. Thank you. Again, my questions are from ignorance.

MR. BARONS: No, I mean, David Kearns, whom I quoted already, for anyone who knows any history of Xerox, went out to Japan in the '70s, in the late '70s, early '80s, when we were getting killed domestically. We were a monopoly, and as soon as competition came in from Japan, we were just getting decimated, and we went out and found that we had to become ***much*** more productive at home, but also globally competitive in what we do, and if that meant sourcing offshore where it made sense to protect the rest of the jobs back home, that's what we had to do.

COMMISSIONER BLUMENTHAL: How would you compare the jobs that are back here in your company, back in the United States, with the jobs around the world in terms of salary, lifestyle, benefits, that sort of thing? The idea behind free trade was that better jobs would come back here? Are you seeing that sort of thing? MR. BARONS: Well, it's interesting. This is a sunrise R&D discussion, and as an old company, you could say our sunrise, our first sunrise was in the '60s, and we're going through a change where we're now moving away from physical hardware to software and services, and a lot of the software and services, jobs and technologies in the service industry have to be close to the customer.

So we are seeing some of that migration, and one way we look at it is the 148 older technologies we're moving over to China, Southeast Asia, things like that, and quite frankly, I think India is probably more of a threat to ***U.S.*** software and service jobs than China.

COMMISSIONER BLUMENTHAL: Thank you.

HEARING COCHAIR MULLOY: Thank you.

Mr. Patton, in your very first paragraph of your testimony, you hit a point that came up earlier, that is that there'***s*** a divergence of interest that has happened in this country ***between*** the national interests, working people, country, and the multinational corporations.

You state--the system we have is focused on shareholder value-- you say we believe the federal government could be better aligned with industry and our state and local governments, and then you also say that the photonics industry, it'***s*** very important that it remain on shore here in the United States, and you say it'***s*** not ***only*** an economic issue; it'***s*** a national security issue.

Do you see this divergence ***between*** the interest of the corporations, and if it'***s*** a national security issue, do you have ideas on how we can bring them back into alignment? MR. PATTON: I think on the national security interests, there are an awful lot of today'***s*** weapons systems that have optics on them, that are driven by optics, and as more and more of the jobs get displaced to China in the optics industry, and more and more of the businesses go away, we're left with not ***much*** in new development, and there are new developments that happen in optics. They've been around for many hundreds of years, but there are new developments all the time in shapes and designs and things like that.

So we lose that opportunity, and we lose that superiority that we have today. One of the reasons why we are so superior is because of the optics, because of night vision.

We own the night or we have owned the night, and so to lose that superiority and to lose the next step, wherever that might be, wherever we go, to have the basis that we have to go buy the technology, it would be terrible.

HEARING COCHAIR MULLOY: Dr.. Nasr, do you have any comment on that question? DR. NASR: Well, I believe in the importance of manufacturing to national defense and economic security and national security. It is very important for us to have a strong manufacturing base to be able to supply our military with all the latest equipment and the guidance for our missiles and so on. So this is a clear area of importance to our national security and economic security, as well.

One thing I would like to highlight is that the issue with China is that we are in a phase in the development of the Chinese industrial infrastructure. If you take a look at examples of how they entered certain markets with their industrial policy -- and I should mention it'***s*** a very well managed and financed industrial policy -- they go into phases. And many times those phases have tremendous impact on small and medium-sized companies in the ***U***.***S***., which are basically the economic engine for us and the backbone of our industry here.

I think the example that was mentioned earlier about the trade show, where 149 New York State does not have any presence while there are many other countries investing heavily in this area, basically shows the misalignment we have in this area. But I can't emphasize enough the importance of our manufacturing sector to our national security and economic security.

Our military uses a lot of equipment today that you cannot mandate has to be made in the ***U***.***S***. because we wouldn't be able to supply all the equipment that is needed today.

HEARING COCHAIR MULLOY: Yes. As I understand it, when a major manufacturer moves, there are lot of guys that supply the major manufacturers, and then they either have to move or they go out of business, right? DR. NASR: Right. I was in China not too long ago, and we were talking about some of the Chinese advisors to their governments in the industrial side and addressing some of the evolution of their development and their industrial infrastructure.

And one of the things that we talked about was machine tools. Machine tools are very difficult to get into that business. It takes many, many years, especially when you go to precision machining like grinding and so on, and they gave us some really interesting examples of how their approach is not to develop their industry in this area in an evolutionary way.

They went to Germany and bought some of those companies that were in financial trouble and, as a result, they have state-of-the-art equipment manufacturers in this area that are very, very strong. And they brought all this equipment and the German experts to China to make sure that they do this technology transfer.

HEARING COCHAIR MULLOY: If my colleagues will let me just ask one more question. Mr. Barons, I was reading Business Roundtable back in 1983. I think there was a guy named Reg Jones, General Electric, who was the head of Business Roundtable. He was the CEO of General Electric.

And they gave their list of things that the corporations should be focused on, community, workers, and shareholder value was like number six on that list.

And I think something has shifted here in the last 25 years, and you've been in the company for 35 years.

Am I mistaken or has there been an emphasis on shareholder value above everything else that's crept into our culture in the last 25 years? MR. BARONS: Okay. I'm worried I'm going to go too ***much*** off script here.

[Laughter.] MR. BARONS: Let me answer this question in a different way. The current CEO of General Motors was the CFO. The prior three CEOs also came from treasury, accounting, and audit. And as you begin to wonder whether companies lose focus of the customer and earning success from the quality of the product and the innovation of the product and pleasing and delighting the customer, and I when I hear--again, I'm going way off, off the reservation here--I think Xerox went on a path of increasing shareholder value through a stock buy- 150 back scheme where we started buying stock at 15. Today it's eight, $7.50. Sorry.

So when you hear companies buying back stock to increase shareholder value, you wonder if there's not a better purpose for that money such as R&D, acquisitions, market development, or whatever.

So, Commissioner Mulloy, I think I would agree to that statement, that I think the--actually, the Internet pressures where people are watching and daytrading the market, the expectations on the quarter, has caused many companies to act very, very tactically quarter-to- quarter, whereas, China, Japan, certainly, Southeast Asia, thinks long term. As the Japanese took us on, the Koreans are taking the Japanese on; the Chinese will take everybody else on eventually.

And there is no way we can cut our ***costs*** to compete with China so we have to provide something of greater value, and I think that value comes from intellectual property. So long answer to your question. I don't know if-- DR. LaVIGNE: I might just jump in on that as well. After having been with two small companies who went public, noticeable difference.

HEARING COCHAIR MULLOY: Once they go public? DR. LaVIGNE: Yes, absolutely. My advice to my current smaller companies is to stay private as long as you can. In New York State, one of our key medical device companies, Welch Allyn, is about a half million dollars a year in top-line revenue, still--was family owned, kind of just shifted over slightly, but several thousand employees.

I think that we need to look at what's driving our economy here and understand that the bigger companies who have gone public and the smaller ones who decided to take that plunge, less so now as the economy is the way it is, but I can tell you that it definitely took us off our strategic plan, and for a young company you cannot afford to do that. You just don't have the resources.

So I think that we as an overall economy need to understand how to focus on our small and medium companies, who are driving so ***much*** of our economy, and also have a strategy for the larger companies who-- absolutely--that analyst call every quarter is what you all live and die for, and when it comes to a point when even doing an acquisition can cause your stock value to go down, you know, people are sort of guessing at what the best strategy is from day to day.

HEARING COCHAIR MULLOY: Thank you. That's a very helpful point.

Commissioner Slane.

COMMISSIONER SLANE: Mr. Patton, on March 24, we had hearings in Washington on why American high-tech companies are moving to China. And one of the industries that testified was the optoelectronics industry, and the testimony from the trade association was that due to massive subsidies by the Chinese government, the entire industry with the exception of some chip manufacturing plants has moved to China.

And when we asked them about some of the incentives, they said to us what the Chinese had offered them was five years of no income taxes after they started making a profit, and after that, the rate was at 15 percent, the rebate of the 17 percent VAT tax on exports, and the most important thing was free R&D, which 151 they said in some companies, it's ten to hundreds of millions of dollars a year that they ***spend*** on R&D.

And it seems to me that unless we are able to institute some kind of national strategy to ***deal with*** that, the situation, at least in your industry, is almost hopeless. I mean can you talk about that? MR. PATTON: I don't think it's necessarily just our industry. I think it's all industries actually. Way back when, I was with a company--it was EG&G Optoelectronics; it's now PerkinElmer. And they had a company that they bought from GE in Pennsylvania. It was probably the original high-power laser diodes that GE had developed. It was in Pennsylvania. Well, the incentives were in Canada to move it there so it moved to Canada.

I'm not sure about the policies of the ***U***.***S***. and the incentives that we give other countries to bring technology here. I don't know if it exists, but I do know that certainly China is giving incentives for businesses to be there.

I think it's also above and beyond that. I think in our case, and what I've seen on a smaller basis, is if you're not in China, and there is a market there in China, then it's very hard to compete. There are markets for us in China, because of special kinds of things that we do, and if we're trying to sell it from the ***U***.***S***., there's not as ***much*** interest than if you had a facility in China.

But there are great incentives. There are great tax incentives and they have the free trade zones, and that was where we set up our facility. It's there.

DR. LaVIGNE: I would just point out as, one of our former speakers was saying, he has a tie to this region, he wants to stay in this region, and I think we need to capitalize on that. Where we force an individual like that to go--I think it was Mr. Vargovich--is when we do not coordinate our resources at all, and frankly that's what it looks like to a lot of these companies.

Completely put together comprehensive package that is unbeatable versus 20 different organizations I have to go to and beg them to give me anything. And then I have to hope that I can actually put the resources to fulfill those promises. I think that's the choice we're putting in front of people.

We only have to improve this package a little bit to let them say it's worth me staying here in New York and in the United States.

COMMISSIONER SLANE: We constantly hear that you can't do business in China unless you're there, and maybe what we have to say to the Chinese is you can't do business here unless you're here.

MR. PATTON: Good point.

COMMISSIONER SLANE: Thank you.

HEARING COCHAIR SHEA: Chairman Bartholomew.

CHAIRMAN BARTHOLOMEW: Thank you very ***much*** for very interesting testimony.

First, Mr. Barons, that was a very interesting observation about the CEOs coming out of treasury and audit, which is not out of strategic planning or product division or any of these things that we're identifying.

Several years ago, I had dinner with the senior management of an American 152 manufacturing company, and I remember distinctly they were talking about what they create is shareholder value, and I said but you also create product. This is a manufacturing company; you create product. And they burst out laughing, and they said to me, oh, you're so naive.

And perhaps, perhaps this global economic crisis and the economic crisis we're facing here will give us the chance to press the reset button and start thinking about the longer-term health of some of the companies.

You all represent sectors that are a big proportion of what many experts say is the economic future of this country, and earlier today we heard from Ed Kowalewski, who is the Director of International Trade Programs for Empire State Development, and the issue came up about encouraging Chinese investment.

This is a slightly different direction than Mr. Slane was going. But when you link it with what Dr. Nasr said--I think it was you who said--that the Chinese were buying German companies, German know-how, German technology, is this a good idea to be encouraging Chinese investment in some of these sectors? Mr. Kowalewski specifically said the Chinese investors are looking at knowledge-based industries such as solar energy, biotech and pharmaceuticals.

Are we going to find out that this is kind of a short-term infusion of capital into companies and sectors that end up being hollowed out? Can you speak to your own sector about that? DR. LaVIGNE: I'll comment that I do think "the world is flat," and we have to figure-- and our sector I think is a little different than some of the others-- so life sciences, first of all, for any of the Chinese- based companies to market anything here, they need to get through our regulatory system, and we have the opposite issue. So they have a lot of incentive to work with us, and I actually believe we need more talent to figure out the best win-win for everyone in that arrangement.

So they need us; we need them. I don't feel that taking their dollar is going to create a ***problem*** for us in the future. They have markets we want to get into, and the reality is at the federal level, I would tell you that in terms of regulation of medical devices and other products like therapeutics, we need to have more of a relationship so that they're not keeping us out of their markets as well as you're seeing in these other cases.

I would argue that we have to start opening up, and particularly in biotech, because it is a virtual supply chain, no question about it, and it ***isn't*** just manufacturing, but we're actually seeing a lot of R&D taking off in China, and some of it is very high quality, but they can't do it all, and they also seem to lack some of the relationships here that our feet on the street can provide.

So I would argue that we have to figure out a better way to work together than necessarily staying away from them.

CHAIRMAN BARTHOLOMEW: Mr. Patton.

MR. PATTON: I definitely agree. I think it is a small world today, and I think there are some things that can be done to protect ourselves. I think the protection of the IP, not sending out deliberately, you know, certain things like 153 that that we should be doing, but as far as just free trade, and I think we need to figure the way out.

We're a creative civilization-- look at us, in the short period of time where we are today, and we're a very creative people so I have no doubt we can find our way through it, but I think there are certain things that need to be looked at, and I hate to use the word, but regulated. And IP, I think, is one of those.

CHAIRMAN BARTHOLOMEW: Dr. Nasr.

DR. NASR: I'd add my observation. In the automotive industry, many of the medium-size companies that were actually seeking investment from Chinese counterparts ended up over time becoming a marketing arm for them here in the ***U***.***S***., and all the manufacturing operations that existed here are gone.

CHAIRMAN BARTHOLOMEW: It was branding. They wanted the brand.

DR. NASR: It was entry to market and the know-how. We have significant examples of companies where we have seen that happen over time.

So the issue, I think, in terms of investment from China or any other country, is really how do we govern that and how do we develop a policy or a long-term plan or guidelines to make sure that many of the small and medium-sized companies that actually enter this arrangement are also protected? Companies like GE, when they actually have ***deals with*** China, face certain rules in terms of how ***much*** work has to be done in China, how many parts you should get in China. The government requires them to transfer some know-how to some of their suppliers to make sure that they can do that in China. So I think many of our small and medium-sized companies, for example, when they enter into this kind of arrangement, don't have anything to protect them, and we don't have the--well, the sensitive issue of an industrial policy always comes up when you discuss something like this.

CHAIRMAN BARTHOLOMEW: Mr. Barons.

MR. BARONS: I think you have to pick your battles. I was involved in Brazil in the '90s, and I used to call it "Fortress Brazil" because they had high import tariffs, local manufacturing requirements, and any country or company like that to me is inherently uncompetitive and unsustainable.

Absolutely defense, things like that, are very, very important. I think we have to be very strategic about the industries we look to protect. We had the same angst in the '80s when the Japanese were so strong and were buying up the golf clubs and the studios and manufacturing and whatever, and that hasn't proved to be the end of America.

I believe that the Panama Canal is serviced and managed by a Chinese company, and if 14 percent of the world'***s*** GDP goes through that, and the Chinese have control over the locks, I would say that would be a little more worrying than them taking over the auto industry, which, in ***fact***, is my history because I worked for British Leyland, and MG was finally bought out by a Chinese company.

So I think consumer goods, things like that, are certainly nonstrategic, but military, defense, logistics like the Panama Canal, absolutely, we should be very, very concerned about that.

154 CHAIRMAN BARTHOLOMEW: Thank you.

HEARING COCHAIR SHEA: I'll ask the last questions. I apologize for missing part of your testimony.

I just want to get back to this issue of short-term approach, corporate, the pressure on corporate management to take the short-term approach. What can we do? What policy recommendations would you suggest to encourage companies to take more of a longer vision? Should we abolish the 10-Q and just have an annual report or a semi-annual report, or should we change the incentive structure for Wall Street analysts who watch these companies like hawks--the share price? Any ideas? DR. NASR: I can tell you my idea here. I think in my mind the government cannot change a lot of this structure that exists in industry. However, they can heavily influence it. And I would say that the incentive for R&D, many, many other, many initiatives can happen from the government regarding support for R&D, incentive for R&D, that happen within the company, as well as the government funding for R&D, and putting some of the caveats to ensure that a company is going to develop a long-term plan for compliance with some of these requirements can help influence that.

DR. LaVIGNE: I'm not sure if I can speak to the public company scenario, but the privately-held company, when we incentivize private investors, whether that'***s*** angels or VCs, to actually stay in for the long haul, so, in other words, you create an investment fund that'***s*** public dollars, but if it'***s*** going to be used and matched, that has to be for a five-year to seven-year to ten-year.

Right now any of our young companies, while they're not publicly traded, they still have those investors who are knocking on their door saying I want out in 18 months or three years or whatever the case may be.

So we do know that we can create those programs, and there's a number of states who have effectively done that, and I feel that we need the federal government to help pressure the states to move in that direction. New York State has actually been regressing, as many of you might surmise, over the past couple of years.

Our economic development programs have actually gone back to more traditional silos, and we really have kind of lost focus on moving to the new economy, and there's a lot of verbiage around new economy, but the reality is those programs are not happening.

So, right now, in New York State, the comptroller has been doing a sweep across the state, talking about common retirement funds, and how they're seeing a 30 percent IRR, which is terrific.

The group in Buffalo that's handled the funds has actually seen over 50 percent IRR so we're thrilled with that. But we're saying move slightly earlier in the pipeline and incentivize our private sector folks to jump in next to you because now this Valley of Death, we can address this with private money and public money for a long haul.

HEARING COCHAIR SHEA: Let me ask one final question. Tell me a 155 little bit about the tax and regulatory environment in New York State. Is it difficult? How would you rank it? You've traveled, you've been in other locations in the United States? DR. LaVIGNE: Yes, clearly it is among the worst, and so you almost wonder how we can manage to keep companies here, and that's why I tell you that this package--Mr. Vargovich, truly, there is something that keeps folks here. We do have talent; we have a lot of other pieces. But that is absolutely the worst piece of it.

So we certainly are on the most extreme end of the spectrum on both of those issues, and it is ***only*** getting worse, and so what ends up happening is our economic development programs end up being a way to counterbalance the excessive taxation and regulation.

HEARING COCHAIR SHEA: Okay. Do you want to add anything, Mr.

Barons or Mr. Patton? You feel like you've been off the script too ***much*** today.

[Laughter.] MR. BARONS: If we have the Empire State investment-- I've closed down a lot of factories which were put up for tax reasons. All right.

CHAIRMAN BARTHOLOMEW: I'm sorry? They were put up? MR. BARONS: They were put up for tax reasons.

CHAIRMAN BARTHOLOMEW: They were built for tax reasons? MR. BARONS: Yes, built for market access or tax reasons in India, in Brazil, or wherever. And you have to have the incentive--you can't bribe. You know an incentive is close to a bribe. So if you have to bribe people to go somewhere, there's something wrong.

So the best that we can do is to keep the talent base, the infrastructure, the resources here, and then take away the ***barriers*** that suppress that, and I'd rather see lower taxes that bribes. Right. I'd like to see a more proactive business environment.

I went over to Ireland to set up a factory over there. The Irish Development Agency were unbelievable in terms of the way they networked with the companies. I asked the head of Intel who just built a $5 ***billion*** facility why did you come to Ireland, expecting the answer to be because it's 12.5 percent tax rate, and he said because when we came to build the facility, every place in the world had a deficit of critical skills, and Ireland was the ***only*** place that had the critical skills.

CHAIRMAN BARTHOLOMEW: That's interesting.

MR. BARONS: So if we can get the good things right and take away the bad things, we'll get it right. But we're carrying a hell of a burden, as Dr. LaVigne says, in terms of regulation and taxes and benefits and infrastructure.

DR. LaVIGNE: I would almost toss out to you, as a New York State resident, I'm stymied at how to change any of this. It's so clear that we have too many people who own these programs. The CAT program that I mentioned with the 20-to-one return on economic impact, it was on the chopping block last December. So I ***spent*** three months doing advocacy work.

156 HEARING COCHAIR SHEA: Educational work.

DR. LaVIGNE: Educational work. But my point is when I looked into it, it wasn't that people really understood the program. It was that we have so many layers here in New York State government and I, as a citizen, I honestly do not know what to do about it, and I don't know if the federal government can assist us with that. But we're stuck.

CHAIRMAN BARTHOLOMEW: I don't think you'll see the federal government telling the state what to do on some of these things, but again, Mr.

Barons, it's interesting. What you point out with the Ireland example is--and I think my colleagues who have been on this get rid of taxes theme here--but having the trained workforce is something that's not sort of a traditional bottom line as you look at the corporate expenses or the corporate profits. And having that trained workforce is paid for, the training is paid for by the taxes that people pay in this society.

So it's not simply that if you reduce the taxes, then the ***problems*** all go away because if you reduce the taxes, you often are losing the services that add up to these intangibles that are the reason that people are where they are.

I mean I've heard several times just in the past day in Rochester that there's an incredible quality of life here, all of the ***problems*** aside, which is an incentive for people to want to live in a community where they feel that there are cultural activities or a lot of interesting things going on. There are always those intangibles that go into it, and I would just counsel my colleagues to remember that those intangibles are often paid for-- COMMISSIONER BLUMENTHAL: We're a bipartisan Commission.

CHAIRMAN BARTHOLOMEW: --by taxes.

[Laughter.] MR. PATTON: Well, I moved, 20 years living in Florida to New York, you know, really moved a year ago. I commuted for a year. It's outrageous living here as far as the tax burden.

CHAIRMAN BARTHOLOMEW: And the weather.

MR. PATTON: No, the weather was fine. I grew up in the Northeast--it was okay--but real estate taxes, et cetera. Rochester is a great city. It has very well educated people. Everything is close. It's a wonderful thing. There's been Bausch & Lomb, Xerox, Kodak. So you have all these people, cultural things, but creating jobs here, I mean it has to be difficult. I moved here, but I can't see a lot of other people moving.

CHAIRMAN BARTHOLOMEW: Interesting. Thank you.

HEARING COCHAIR SHEA: Thank you all for your time and the effort you put into preparing your testimony, and I officially close the witness panels of the hearing, and in about five minutes, at four o'clock, we will accept any statements from the public.

Thank you.

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