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MADE IN THE USA: MANUFACTURING POLICY, THE DEFENSE INDUSTRIAL BASE AND U.S. NATIONAL SECURITY

HEARING

BEFORE THE

SUBCOMMITTEE ON NATIONAL SECURITY AND FOREIGN AFFAIRS

OF THE

COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

HOUSE OF REPRESENTATIVES

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MADE IN THE USA: MANUFACTURING POLICY, THE DEFENSE INDUSTRIAL BASE AND U.S. NATIONAL SECURITY

WEDNESDAY, SEPTEMBER 22, 2010

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON NATIONAL SECURITY AND FOREIGN AFFAIRS,
COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:05 a.m., in room HVC–210, the Capitol, Hon. John F. Tierney (chairman of the subcommittee) presiding.

Present: Representatives Tierney, Murphy, Welch, Foster, and Luetkemeyer.

Staff present: Andy Wright, staff director; Talia Dubovi, counsel; LaToya King, professional staff; Boris Maguire, clerk; Matt Donaldson, legal fellow; Ian Churchill and Eric Inafuku, interns; Kathryn Prael, communications director; Laura Keiter, press assistant; Justin LoFranco, minority press assistant and clerk; Tom Alexander, minority senior counsel; and Christopher Bright, minority senior professional staff member.

Mr. TIERNEY. A quorum being present, the Subcommittee on National Security and Foreign Affairs' hearing entitled, "Made in the USA: Manufacturing Policy, the Defense Industrial Base, and the U.S. National Security" will come to order.

I ask unanimous consent that only the chairman and ranking member and Mr. Foster of the subcommittee be allowed to make opening statements. Without objection, so ordered. I ask unanimous consent that the hearing record be kept open for 5 business days so that all members of the subcommittee will be allowed to submit a written statement for the record. Without objection, that is so ordered as well.

So again, good morning and thanks to all our witnesses for being here. Today the subcommittee turns its attention to a matter that has far-reaching consequences for both our economy and our national security: The U.S. manufacturing and defense industrial base.

For decades manufacturing has been the backbone of the American economy. The United States has been known as the land of innovation, the home of the car, the computer and the jet plane. These innovations lead to good jobs for hard working Americans.

American manufacturing is also a bastion of quality where the words "Made in America" signifies superior craftsmanship, durabil-

ity and value. However, despite the importance of innovation and manufacturing to our national economy, manufacturing jobs have been dropping steadily over the last several decades. Right after World War II, manufacturing accounted for 40 percent of the American jobs; today that number is closer to 11 percent. While the decrease in manufacturing affects many aspects of U.S. economy, today we will focus on one area in particular, the defense industrial base.

The decrease in manufacturing at home has forced the Department of Defense to look abroad to acquire the tools it needs to arm our forces and provide for our national security. Outsourcing takes control of our supply chain out of our hands, and when foreign companies or governments control the production of necessary parts our critical defense needs are subject to geopolitical forces that are beyond our control.

Now as far back as May 2003 and the 108th Congress I was focusing on this issue, and I remember that during consideration of the fiscal year 2004 defense authorization bill I offered an amendment that sought to expand the scope of the Defense Industrial Base Assessment Program, and it was included in the committee-approved bill. It required additional information on why contracts are transferred outside this country, it would have mandated an action plan on how our defense manufacturing sector could be revitalized and restored. In fact, the amendment was approved by a voice vote and it had the support of the then chairman of the Armed Services Committee, Republican Duncan Hunter. But opposition from the Bush administration caused it to be stripped from the final version, and the regrettable effect of that was that the Defense Industrial Base Assessment Program wasn't nearly as effective as I think it should have been.

The following year I went a step further and I offered an amendment to the fiscal year 2005 defense authorization bill that was aimed at keeping taxpayer support of defense jobs here in this country. My amendment would have required the Secretary of Defense as a condition of any defense-related manufacturing contract to mandate that the contract performed substantially all or in no event less than 65 percent of defense-related manufacturing services in the United States. The provision allowed the Secretary of Defense to waive that requirement in cases where the products and services were not available in the United States or if national security concerns necessitated a waiver. Unfortunately, the then Republican-led Rules Committee prevented the amendment from receiving a vote on the House floor.

But we have had a number of examples where relying on foreign companies has been detrimental. For example, in 2003 a Swiss company decided to delay delivery of essential parts of the Pentagon's Joint Direct Attack Munitions [JDAMs], commonly known as smart bombs due to their ability to pinpoint targets, because of the Swiss Government's opposition to the Iraq war. Not only did this force the Defense Department to acquire these parts at a higher price, it was a significant delay in getting these munitions to our forces overseas.

Further, it is only when critical parts are made in America that we can be sure that the quality meets our needs. There have been

countless situations where the Department of Defense has received foreign parts that did not meet its quality standards, including substandard and counterfeit materials. In one example seatbelt clasps purchased by the U.S. Army would break when they were accidentally dropped because they were fabricated from a substandard grade of aluminum.

One particularly salient example of our dependence on foreign countries to supply us with essential materials used for defense is our need for rare earth materials. These metals are used for making a wide range of commercial and defense applications, including the engines of the F–14, F–15, F–16 fighter jets. Such materials are also critical components of high tech computer chips, cell phones, and smart bombs that are hallmarks of warfighting in the Information Age. China produces and therefore controls 97 percent of rare earth oxides. It would take about 15 years to establish a domestic supply chain, and the national security implications of this imbalance are impossible to ignore.

We also face significant work force training and capacity issues. The Government Accountability Office has consistently reported that there are not enough highly skilled workers to perform the critical tasks needed to sustain our industrial base. We have more people retiring than entering the work force, which means companies that want to build in America cannot find workers with the right skills to do so. As such, we will have to invest in our education system as well as our training programs.

We must also look at our manufacturing capacity and ensure that we have modern, technologically advanced facilities that can respond to both civilian and defense needs. We need smart policies that assure that a skilled manufacturing work force has the flexible capacity to shift between defense, public works, and commercial activity as the times demand.

Creating a robust manufacturing sector also requires careful consideration of tax, trade, innovation and regulatory policies. I want to stress that this is not about protectionism or stifling free trade; it is about being competitive.

I applaud the House for passing H.R. 4692, which would require each President to develop a national manufacturing strategy and assess progress. I encourage the Senate to do the same. We can no longer afford to jeopardize our economy, the livelihood of Americans, or our national security by ignoring the manufacturing sector. Modernizing and improving our industrial base will ultimately improve our economy, provide better employment opportunities to Americans, and strengthen national security. We have to start to think strategically about the industrial challenges we face and take aggressive action to fully address them. Our economic and national security demand it.

With that, I would like to ask Mr. Luetkemeyer for his opening statement.

[The prepared statement of Hon. John F. Tierney follows:]

Statement of John F. Tierney
Chairman
Subcommittee on National Security and Foreign Affairs
Committee on Oversight and Government Reform
U.S. House of Representatives

Hearing on "Made in the USA: Manufacturing Policy, the Defense Industrial Base, and U.S. National Security."

As Prepared for Distribution

September 22, 2010

Good morning. Today, the Subcommittee turns its attention to a matter that has far-reaching consequences for both our economy and our national security: U.S. manufacturing and the defense industrial base.

For decades, manufacturing has been the backbone of the American economy. The United States has been known as the land of innovation, the home of the car, the computer, and the jet plane. These innovations lead to good jobs for hardworking Americans. American manufacturing is also a bastion of quality, where the words "Made in America" signify superior craftsmanship, durability, and value.

However, despite the importance of innovation and manufacturing to our national economy, manufacturing jobs have been dropping steadily over the last several decades. Right after World War II, manufacturing accounted for 40% of American jobs; today, that number is closer to 11%. While the decrease in manufacturing affects many aspects of the U.S. economy, today we will focus on one area in particular: the defense industrial base.

The decrease in manufacturing at home has forced the Department of Defense to look abroad to acquire the tools it needs to arm our forces and provide for our national defense. Outsourcing takes control of our supply chain out of our hands. When foreign companies – or governments – control the production of necessary parts, our critical defense needs are subject to geopolitical forces that are beyond our control. For example, in 2003 a Swiss company decided to delay delivery of essential parts of the Pentagon's Joint Direct Attack Munitions – commonly known as 'smart bombs' due to their ability to pinpoint targets – because of the Swiss government's opposition to the Iraq War. Not only did this force the Defense Department to acquire these parts at a higher price, there was a significant delay in getting these munitions to our forces overseas.

Further, it is only when critical parts are made in America that we can be sure that the quality meets our needs. There have been countless situations where the Department of Defense has received foreign parts that did not meet its quality standards, including substandard and counterfeit materials. In one example, seatbelt clasps purchased by the United States Army would break when accidentally dropped because they were fabricated from a substandard grade of aluminum.

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We also face significant workforce training and capacity issues. The Government Accountability Office has consistently reported that there are not enough highly skilled workers to perform the critical tasks needed to sustain our industrial base. We have more people retiring than entering the workforce, which means companies that want to build in America cannot find workers with the right skills to do so. As such, we will have to invest in our education system as well as our training programs.

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Modernizing and improving our industrial base will ultimately improve our economy, provide better employment opportunities to Americans, and strengthen national security. We have to start to think strategically about the industrial challenges we face and take aggressive action to fully address them. Our economic and national security demand it.

Mr. LUETKEMEYER. Thank you, Mr. Chairman, and I welcome our panelists today.

The debate today raises important questions about how traditional free market principles coincide with national security concerns. While the United States sometimes relies on foreign labor and equipment because they can provide cheaper alternatives to domestic sources, the result at times can be less than ideal. The sensitivity and quality of foreign made equipment are valid concerns. Does this mean that all military equipment should be produced in the United States? We should consider whether a logical balance can be struck. Sensitive equipment should be made in the United States or in collaboration with our closest allies. For nonsensitive equipment we should employ greater quality controls and more stringent oversight of foreign products.

I believe we should go a step further and examine the policies that drive business offshore to begin with. We should examine whether Congress and the administration need to reform corporate tax rates, labor policies and environmental regulations so that they are conducive to domestic industrial growth. Creating an environment in which businesses will financially thrive will go a long way toward bolstering the domestic industrial base. Whichever path we take we must also be mindful of likely retaliation as a factor if we choose a path that many of our trading partners will construe as protectionist and in violation of international trade agreements.

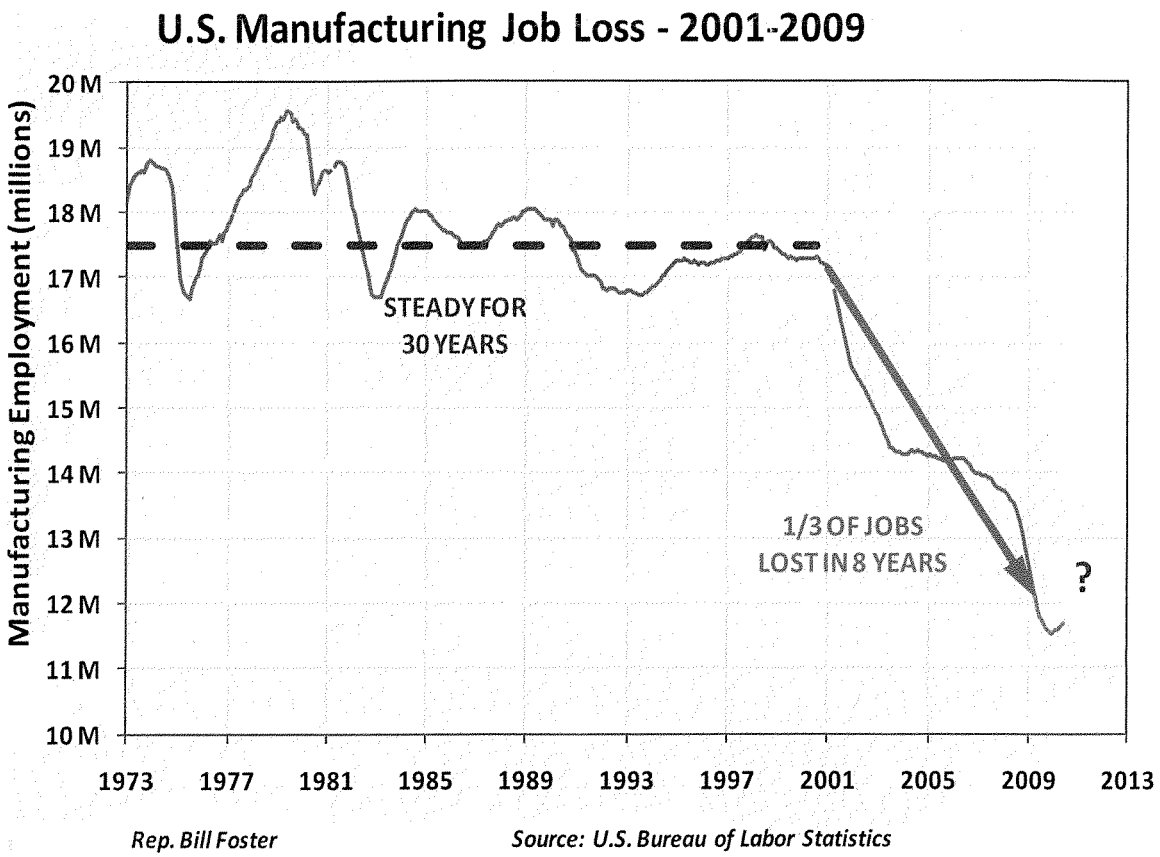
Mr. Chairman, I thank you for convening this hearing and look forward to today's testimony.

Mr. TIERNEY. Thank you. The subcommittee will now receive testimony from the panel before us today. Oh, before we do that even, Mr. Foster has an opening statement. Mr. Foster, we invite you to present that.

Mr. FOSTER. I would like to thank the chairman and I would also like to introduce a graph, which I think often a picture is worth tens of thousands of words and this graph, which I hope will be visible to our panel.

Mr. TIERNEY. Without objection, it's entered into the record.

[The information referred to follows:]


U.S. Manufacturing Job Loss - 2001-2009
Manufacturing Employment (millions)
20 M
19 M
18 M
17 M
16 M
15 M
14 M
13 M
12 M
11 M
10 M
1973
1977
1981
1985
1989
1993
1997
2001
2005
2009
2013
STEADY FOR
30 YEARS
1/3 OF JOBS
LOST IN 8 YEARS
?
Rep. Bill Foster
Source: U.S. Bureau of Labor Statistics

Mr. FOSTER. This is simply a plot of manufacturing employment in the United States from 1973 until today. And it was remarkably constant for 30 years, from the early seventies until early 2001. It was basically 17 to 18 million. It didn't matter who was in charge, good times and bad, Democrats and Republicans, it was relatively healthy. During this period of course industrial output more than doubles because of increases in productivity and technology. But in early 2001 a cataclysm overtook us and more than a third of our manufacturing jobs have been lost. This is not and should not be a partisan issue. We are able—we were able for decades to keep healthy manufacturing going in the United States. Of course businesses grew, businesses failed, sectors increased and decreased. But overall we stayed relatively healthy. But something very bad happened starting in early 2001 and as a country we have to understand what it was that did that. It wasn't a single cause; it was a number of things. We have to understand how to reverse this.

And I am someone who started a manufacturing company when I was 19, actually, back right around 1973. I started a company that now provides hundreds of manufacturing jobs in the Midwest and has competed and exported a very high fraction of our production. And we are faced, every single trade show we go to, we are worried that one of our competitors will have offshored their production and be undercutting us. And so we have to understand things like currency manipulation that we ought to be able to fix, and things like labor arbitrage which are going to be very tough. And so we have to have an honest national discussion about this and we have to decide what fraction of things like national defense frankly trump mindless free trade points of view, and that there be certain things we are going to have to be able to do. It has to be a national goal that after an electromagnetic pulse event that wipes out all of our electronics that we have the ability, by ourselves, to recover our capacity to communicate in this country. And things like that have to be thought out and very consciously separated.

Anyway, this is a wonderful hearing and I thank the chairman for having it.

Mr. TIERNEY. Thanks, Mr. Foster.

Now the subcommittee will receive testimony from the panel before us today. First I will introduce the panel.

Mr. Jeff Faux, is the founding president and distinguished fellow at the Economic Policy Institute. Mr. Faux has studied, taught, and published on a wide variety of economic and political issues, is the author or coauthor of five books. He also has worked as an economist for the Departments of State, Labor and Commerce, as a manager of the finance industry, as a blueberry farmer, and as a member of the Municipal Planning Board in the State of Maine. He sits on the boards of several nonprofit institutions and magazines, has written articles for numerous newspapers and journals, and regularly appears on television and radio. Mr. Faux holds a B.A. from Queens College, an M.A. from George Washington University, and an honorary degree from the University of New England.

Mr. Robert Baugh is the executive director of the Industrial Union Council of the American Federation of Labor and Congress of Industrial Organizations [AFL–CIO]. The Council is comprised of

the Nation's leading industrial unions and is chaired by the AFL–CIO president, is the coordinating body for the AFL–CIO's manufacturing policy and legislative initiatives. Mr. Baugh is also the co-chair of the AFL–CIO Energy Task Force and served as a leader as the U.S. Labor Delegation to the U.N. Climate Change Conference Negotiations in Bali, Posman, and Copenhagen. Mr. Baugh is also the author of several publications on issues ranging from economic development to manufacturing and climate change. He holds a B.A. from the University of Detroit and an M.A. in industrial and labor relations from the University of Oregon.

Mr. Mark Gordon, serves on the Executive Committee of the National Defense Industrial Association and is the director for defense programs at the National Center for Advanced Technologies, where he covers all technology, manufacturing, and research and development policy topics. He also heads the Evolutionary Acquisition Training Team, which provides industry perspective to the Department of Defense technical and policy groups on acquisition policy. Additionally, Mr. Gordon sits on the Joint Defense Manufacturing Technology Panel as a defense industry representative and as a member of the Diminishing Manufacturing Sources of Materials Shortages Working Group of the Department of Defense. He is a board member of National Center for the Defense Manufacturing and Machining and a member of the National Defense Industry Association Manufacturing Division Executive Committee. For the purposes of full disclosure, Mr. Gordon is also under government contract as an industry liaison for strategic planning initiatives involving technology transition mechanisms within the Department of Defense. He holds a B.A. from the University of Rochester and an M.A. from the Georgia Institute of Technology.

Mr. Michael Wessel is a member of the U.S.-China Economic and Security Review Commission, a senior advisor at the Alliance for American Manufacturing and president of the Wessel Group, a public affairs consulting firm. He is also a member of the Council on Foreign Relations, staff advisor to the Labor Advisory Committee to the U.S. Trade Representative and previously served on the U.S. Trade Deficit Review Commission from 1999 to 2000. Mr. Wessel worked for House Majority Leader Richard Gephardt for more than 20 years. In addition to serving as general counsel he also served as Mr. Gephardt's principal Ways and Means aide, participating in the enactment of major trade policy initiatives, and as the executive director of the House Trade and Competitive Task Force. Mr. Wessel holds a B.A. and a J.D. from George Washington University.

So thank you to all of our witnesses for making yourselves available today, for sharing your substantial expertise. It is the policy of this committee to swear you in before you testify, so I ask that you please stand and raise your right hands.

[Witnesses sworn.]

Mr. TIERNEY. The record will please reflect that all the witnesses answered in the affirmative. We can advise you that your full written statement will be entered into the record. I thank all of you for substantial witness statements that were very informative and ask that you might keep your opening remarks to approximately 5 min-

utes so we can get a good series of rounds of questions and answers on that.

Mr. Faux, we will start with you, please.

STATEMENTS OF JEFF FAUX, FOUNDING PRESIDENT AND DISTINGUISHED FELLOW, THE ECONOMIC POLICY INSTITUTE; ROBERT BAUGH, EXECUTIVE DIRECTOR, INDUSTRIAL UNION COUNCIL, THE AMERICAN FEDERATION OF LABOR AND CONGRESS OF INDUSTRIAL ORGANIZATIONS; MARK GORDON, EXECUTIVE COMMITTEE, THE NATIONAL DEFENSE ASSOCIATION; AND MICHAEL WESSEL, PRESIDENT, THE WESSEL GROUP, COMMISSIONER, U.S.-CHINA ECONOMIC AND SECURITY REVIEW COMMISSION, AND SENIOR ADVISOR, THE ALLIANCE FOR AMERICAN MANUFACTURING

STATEMENT OF JEFF FAUX

Mr. FAUX. Well, thank you, Mr. Chairman, for holding this hearing on such a vital and often ignored national issue, and Mr. Foster and Mr. Luetkemeyer and the rest of the subcommittee for inviting me to share my thoughts and concerns.

It seems self-evident to many people, most people I think, that a healthy industrial base is essential to our national defense. Yet over the last several decades we have followed the national policy of allowing that base to deteriorate with little regard for our future. As a result, our supply lines for strategic parts and materials are stretched around the world, the pool of domestic workers with high-tech industrial skills needed in future national emergencies has been allowed to drain. We've accumulated massive overseas debt to China because of our trade deficit and other creditor nations, which is a potential economic and national security threat. And many American manufacturing corporations, including those producing advanced technology products, now see their future and, disturbingly, perhaps in the future their corporate loyalties elsewhere.

Now in this country we have a long successful history dating to the beginning of the republic of government encouraging and guiding the private sector to build and maintain a strong manufacturing base in support of national goals. But beginning in the 1980's administrations headed by both parties have slowly adopted the posture that a strong industrial base is in effect not the public's business. Leave it all to the market.

The problem is that the market is essentially indifferent to our country's national security. And the global market, subject to currency manipulation, mercantilist trade policies and similar practices by potentially rival states, can be hostile. To its credit the current administration and Congress recognize some of this and are beginning to make important initiatives, but there's still in the country and in the government and in our political discussions that we listen to every day on television and radio, there's a lack of sense of urgency about this.

Ironically, we have had a sort of industrial policy over the last several decades, but the favored industry has not been manufacturing but finance. So it's no surprise that while our goods markets have shrunk, we lead the world in the finance sector's major prod-

uct, debt. Offshoring and downsizing manufacturing may often be in the short run financial interest of the average investor, but at a heavy cost to the long-term interest of the average American citizen.

One result of these imbalanced policies has been a continuous trade deficit for 30 years, after having 100 years of trade surpluses and balance, and a growing deficit in high-technology products for the last 12. Yes, we have a trade surplus in high-technology services, but that is not necessarily good news. It represents the relentless transfer of advanced skills and knowledge to other nations.

This experience as well as economic common sense tells us that without government leadership, private investors will not largely make the long-term commitment necessary to rebuild and retool a competitive manufacturing sector. There is no one single magic bullet that will solve this problem. We need a variety of mutually reinforcing trade, tax procurement, currency adjustment and other policies. But today our economic and national security policies are too often made in separate multiple unconnected silos.

For example, there is now wide agreement that government should finance more high-tech research and development. But without a policy to assure that the products that are generated are made in the United States, it will end up subsidizing the future economies and strengthening the global power of other nations at our taxpayers' expense.

Another set of silos are our policies toward China. For 20 years one part of the government has been helping buildup China's high-tech industrial capacity while another part of the government is practicing for future conflict. Taken separately, each policy might be rationalized, but taken together they make no sense at all.

My testimony outlines a few suggestions on how we might begin to organize for more integration of our policies, including a Presidential commission on linking the two areas and the appointment of select committees in Congress to deal with integrated global strategies. But whatever the most effective organizational structure, the most important point is that we urgently need an integrated national industrial strategy to promote a future for Americans that is both prosperous and secure. And my fear, Mr. Chairman, is that the time may be running out.

Thank you again for taking the leadership on this, and I'll be happy to answer any questions.

[The prepared statement of Mr. Faux follows:]

Industrial Policy and National Security

Testimony of Jeff Faux, Distinguished Fellow, Economic Policy Institute

Subcommittee on National Security and Foreign Affairs,
Committee on Oversight and Government Reform
US House of Representatives

I. De-industrialization and National Defense
II. Industrial Policy: The Road Not Taken
III. Needed: An Integrated Strategy

Jeff Faux
September 22, 2010

Industrial Policy and National Security

I. De-industrialization and National Defense

That the nation's industrial base is vital to our national security was for most of our history a core assumption of American economic policy. The manufacturing sector had been a driver of our prosperity, a guarantor of our independence and the basis of our rise to world leadership. Had the United States not had the capacity to become the "arsenal of democracy" the Second World War might well have ended differently.

The war's end left the US as dominant manufacturing power in the world for some three decades. Our ability to provide our military with the most advanced weaponry and our civilians with the most advanced consumer goods were two sides of the same policy coin – and both crucial to the United States prevailing in the Cold War.

But, as we all know, over the last several decades the American industrial base has dramatically weakened. Economists debate the exact causes, but the decline in US manufacturing has been thoroughly documented, and widely acknowledged by both policymakers and the public. We have been running trade deficits in manufacturing for over thirty years, relentlessly off-shoring production and steadily losing ground in our capacity to produce cutting edge technologies.

Yet, the threat to our national security has not been reflected in our economic policies, or the way in which we are organized to meet the national security challenges of the future.

Our shrinking manufacturing capacity undercuts our national security a number of ways:

1. We have become more dependent on other nations for vital products and parts. As the supply lines for our industrial production stretch around the world, so a growing share of components for our military systems now come from abroad.

2. As the industrial base has hollowed out, it will become much more difficult to ramp up domestic production in a time of national emergency. The

relatively simply technology of World War II enabled us to quickly train unskilled workers to perform rote tasks on an assembly line. Today's manufacturing systems demand specialized skills and training. Without a pool of such workers from the civilian sector to call on, the United States will have a much harder time adjusting to wartime and or terrorist disruptions of overseas supply lines.

3. Innovation, design and engineering follow production. For years, US policymakers rationalized the movement overseas by manufacturing on the grounds that the technical jobs and capacity would remain in the US. Today that capacity is also shrinking fast. The diminished share of young people going into engineering and other technical education is no surprise. They understand that on this nation's present trajectory there is very little future for those skills here. As a result more and more of the future technology upon which the US military depends will also come from outside the US.

4. The chronic trade deficit in goods has been financed by borrowing from overseas, indeed, from those countries, particular China, that have been running huge trade surpluses from the United States. China now holds close to two and a half trillion dollars of our IOUs. This huge debt has already constrained US foreign and domestic policy and represents a huge potential weapon against us should tensions between our countries increase.

5. The potential problem of a weakening sense of loyalty to this country by the managers of hollowed-out American corporations. This is not hidden. CEOs now regularly acknowledge, even boast, that they are global, not American corporations. Take for example CEO of Cisco Systems -- a major military contractor -- explaining why he was expanding his R&D facilities in China: "What we are trying to do," he said, "is to outline an entire strategy of becoming a Chinese company."

   As individuals, such people may be as patriotic as the rest of the citizenry, but their jobs are to maximize profits for their global shareholders. In previous national emergencies, America could reasonably count on the support of American corporations in any confrontation with other nations. Today, it is not so clear.

The deterioration of America's industrial capacity has been evident for some time – at least since the 1970s. Despite this, the United States government still lacks any serious plan to restore the US industrial base. To its credit the Obama

Administration has take some steps in the direction. It has stepped up to seeding of manufacturing innovation and needed public infrastructure as part of the economic stimulus. In December 2009 it published a "Framework for Revitalizing American Manufacturing." But we still lack a coherent strategy.

There many reasons for this lack of a sense of urgency. One is the claim that somehow an effort to assist a specific sector of the economy might violate our tradition of free enterprise. But even a cursory look at American history shows that aid to economic sectors deemed critical for our future was and is an American tradition. Private investment and free enterprise have always been the fundamental mechanisms through which our economy grew, but conscious government policy to assure the health of a dynamic industrial base was essential.

Alexander Hamilton's famous Report on Manufactures of 1791, calling for tariffs, subsidies and public works to support infant American industries was adopted by Congress in the early days of the Republic. The ideas were elaborated by Henry Clay and Abraham Lincoln and became the basis for the "American system" of economic development championed by the Republican Party during the last half of the 19th and early 20th century. Tariffs, taxes, procurement and other policies were employed to pick industrial "winners," including clipper ships, railroads, assembly line technology, airplanes, telegraph, telephone, long distance radio, and television.

The purpose was not simply to *buy* it in America or to *invent* it in America, but to *Make it in America.*

II. Industrial Policy: The Road Not Taken[1]

By the mid-1970s, cracks in the American industrial base were already visible. For the first time in the 20th century the United States began running trade deficits. Factory closings that had earlier been limited to apparel, shoes and plastic toys spread to steel, small appliances and auto parts. And the decision by the Arab states to control oil prices signaled that the era of cheap energy that had fueled American manufacturing was coming to an end.

These early signs of trouble set off this country's last serious debate over the question of whether the government should have a policy for supporting a healthy

[1] This section is taken from my article of the same name in the January/February 2010 issue of The American Prospect

manufacturing industry. The question was: if our government could help rebuild the manufacturing sector . For many it was a no-brainer: if our government could help Germany and Japan rebuild their industrial base, why would it not now help U,S. manufacturing to stay competitive?

Specific proposals included:

- A national development bank, inspired on the depression-era Reconstruction Finance Corporation that had provided investment funds to manufacturers when private banks were not lending.
- Tax code revisions, such as ending the favorable treatment of foreign over domestic investment, and the introduction of a "border adjustable" value-added-tax that other countries used to give an advantage to domestic production.
- Civilian adaptations of the Department of Defense use of procurement contracts to spur technological innovation.
- Generous government financing of technical education and training and lifetime learning to acquire and upgrade skills.

The idea of a purposeful industrial policy was also connected to a growing interest in how the nation should think about its long-term future. Towards the end of his presidency, Dwight Eisenhower had established a Commission on National Goals. John Kennedy gave the country an example of how modern goal-setting could work in his pledge to go to the moon. Richard Nixon in 1970 proposed a National Growth Policy that would guide public and private investments. Later that decade, Senators Ted Kennedy and Hubert Humphrey (Democrats) and Jacob Javits (a Republican) introduced legislation for a National Economic Policy Commission to counterbalance Washington's penchant for short-term economic fixes with a longer-term perspective. Similar bills started to make their way through the House, and the Joint Economic Committee held extensive hearings.

These concerns were not limited to Washington. Organized around the celebration of the nation's bicentennial in 1976, hundreds of state and local governments around the country sponsored citizen forums to develop plans for what their community might look like by the year 2000. Issues included energy conservation, land-use and transportation planning, poverty and equal opportunity and – especially in declining industrial areas, the future of manufacturing.

But the democratic discussion of the future of the nation in general, and its industrial base in particular, had powerful enemies. The Republican Party had been a champion of industrial policy during America's rise as an economic and political

power, but ironically those elected as "conservatives" in the 1970s, rejected that successful model.

Within the Administration, opposition was led by the chair of the Council of Economic Advisors. But his objections were not economic, but ideological -- what the private economy produced – whether it should have a manufacturing sector at all -- was none of the public's business.

His view reflected the postwar "neoclassical synthesis" of two strains of capitalist economic thought. One was the post-Depression *macro*-economic focus on economy-wide aggregate numbers, symbolized by the Gross Domestic Product, the dollar value of everything the economy produces. The other strain came from 19th century *micro*-economics – the modeling of how perfectly informed rational autonomous individuals maximizing short-term profits respond to price changes. The synthesis conceded to the liberals that government had a responsibility for fiscal and monetary policies to stabilize the overall economy. It conceded to the conservatives that all other decisions should be made by the unfettered market.

About the vast, messy *meta*-economy in between, where most corporate managers, workers, investors, speculators, inventors, schemers and rent-seekers actually lived and worked, synthesis economists had nothing to say. This world could not easily be fit into the mathematical modeling that economists felt necessary in order to assert their discipline's claim to being a science. Moreover, understanding it required tools beyond the economists' training – engineering, psychology, politics, management, marketing, labor-relations, law and most of all the study of how complex institutions behave and change over time.

Such an approach to economics has a distinguished American intellectual tradition reaching back to figures such as Thorsten Veblen, John R. Commons and Adolph Berlet. But by the late 1970s their work was largely swept outside the economic policy mainstream – as were even prominent economists whose support for industrial policy came from their study of business institutions. These included John Kenneth Galbraith, whose widely read books dissecting the behavior of the modern corporation were deemed by the synthesis majority as insufficiently mathematical; Nobel prize winner Wassily Leontieff, whose pioneering "input-output" methodology analyzing the flow of resources to and from economic sectors made him seem too friendly toward planning; and Lester Thurow of MIT, who seemed too interested in studying the way businessmen actually behaved and the effect of their behavior on the distribution of income and wealth.

Over the next decade a widening circle elaborated the case for a conscious nurturing of a high-wage road to future prosperity as an alternative to the low-wage road on which the country was traveling. Analysts at the Business Roundtable at the University of California at Berkeley insisted that we had something to learn from the Japanese. Robert Reich, a lawyer, and Ira Magaziner, a business consultant, argued that sectoral policies were essential for growth. Labor economists at the Economic Policy Institute showed how the erosion of wages from the manufacturing sector was spreading throughout the labor force. Economists Barry Bluestone and Ben Harrison wrote a book whose title; the Deindustrialization of America became the iconic phrase in the policy debate.

But policy debates are rarely settled on their philosophical merits alone. To a large degree, the conflict within the policy class was a proxy for the conflict of interests among those with power and money at stake. For example, the State Department, which favored helping foreign industries to capture U.S. markets as a way to gain Cold War allies, was opposed.

More important was the hostility of the Treasury Department, which represented the interests of financiers who were against giving the government power to guide private investment in ways that would serve the interests of American *producers*, rather than American *global investors.* America's financial elite was also aware that if manufacturing industries were to shrink, so would the political power of the strongest American unions.

The industrial policy debate consummated the marriage of Wall Street and theoretical economists that continues today. As always, a dowry helped. Wall Street firms contributed funding to friendly economics departments and think-tanks, and gave generous consultant contracts to economists to build models showing that their exotic derivatives were low-risk bargains.

On the other side of the debate, considerable support for industrial policy came from people with a more real world perspective. The Departments of Commerce , Transportation, and Labor started joint programs to help certain industries modernize to meet international competition. Supporters outside the government included the AFL-CIO, and CEO's of several industrial corporations, such as Ford, Cummins Engine, RCA and Bendix. The editors of Business Week were supportive. Even a few Wall Street leaders joined up. Felix Royatyn, of Lazard Freres, commented that "the thought that this nation can function while writing off its basic industries is nonsense."

Carter himself was a both champion of private enterprise and sensible government planning. As a career navy officer he had been involved in long term strategic planning, and he certainly understood the role of government in maintaining his family's peanut business. His great and tragically aborted effort to make the US energy independent was in fact, industrial policy.

Had Carter won a second term, manufacturing and energy policy might have been integrated, which could have significantly changed the direction of the U.S. economy over the last 35 years. At the very least, the country would be way ahead of where it is now in the development of green industries, energy-efficient transportation and a 21st century workforce. It would likely have a much smaller trade deficit and foreign debt burden. And having the country conscious of the importance of a healthy domestic industrial base could have prevented the Clinton Administration from later making two decisions that undermined the long term health of the U.S. economy – the deregulation of finance that shifted growth from production to overleveraged consumer debt, and the abandonment of U.S. industry to unwinnable competition with low-wage Chinese mercantilism.

But it was not to be. Following the advice of his macro-economists, Carter went into his re-election year with back-to-back recessions and an inflation rate in double-digits. Upon becoming president, Ronald Reagan immediately ripped out the solar panels that Carter had installed in the White House. The search for energy independence was left for dead.

The end of the Cold War seemed to provide another opportunity to shape the country's industrial future. In the campaign of 1992, Bill Clinton promised government help to redirect the technological resources and talents of the military-industrial complex to work on such civilian projects as medical technology and high-speed public transportation. But, after his election, the promise was quickly abandoned. Economic policy was reduced to cheap money, tight budgets and free trade. Seeing the writing on the wall, American manufacturers accelerated their flight to factories overseas.

But industrial policy, in the sense of government aid to specific sectors, was *hardly dead. Only the major assisted sector was not manufacturing, but finance.* Over the last two decades, the US government has consistently subsidized, protected and rescued the banking and finance sector. Among the perverse results of this "too Big To Fail" industrial policy has been the systematic redistribution of capital from the making of the products of manufacturing to the making of the products on Wall Street, i.e., speculative debt.

Today, we stand amid the ruins of that policy.

III. Needed: An Integrated Strategy

President Obama wisely has said, ""We cannot rebuild this economy on the same pile of sand...We must lay a new foundation for growth and prosperity that will move us from an era of borrow and spend to one where we save and invest, where we consume less at home and send more exports abroad."

In response a number of sensible policy proposals to help manufacturing are now being discussed. They range from launching more aggressive trade and globalization policies to new investment incentives to the redevelopment of our energy and transportation sectors. These are important initiatives, which others here I believe will discuss.

My final comments concern the need for a comprehensive approach. The absence of an overall integrated economic and national security strategy has created a high-level "silo effect" where policies aimed at separate missions work against each other. For example:

- For the last twenty years, we have been subsidizing the development of Chinese mercantilism at the price of de-industrializing America, while at the same time making strategic military plans with China as a potential adversary. One can argue for one or another policy, but not both together.
- There is widespread support for more public support of research and development programs. Yet, there are no policies to assure that actual production of the new products generated will not be off-shored or licensed to be produced elsewhere for re-import back into the US. Without such policies, money poured into US research and development is likely to be a waste of taxpayer money.
- Everyone is in favor of increasing US exports. But the competitiveness problem has two parts – imports and exports. As we have steadily opened up our economy to the global market place, imports have raced ahead of exports. The resulting trade deficit has been a major cause of the dismantling of American manufacturing, yet we continue to barrel ahead with these same trade agreements and policies that have generated our huge foreign debt.

Thus, we need to pick up the thread of comprehensive, connected industrial policies that was tragically lost some thirty years ago. The questions are not simply how to help this or that economic sector be more efficient; they are about making

the American economy as a whole strong enough to support both rising living standards at home and our strategic objectives abroad. It simply makes common sense that if we want policies that are sustainable over the long term, we need to think about them for the long term.

For starters, I offer for your consideration three steps toward integrating US government policies toward making our country more economically and politically secure:

1. A presidential commission on the relationship between our industrial base and our national security authorized to study and recommend policies and governmental organization changes to integrate global strategies.

2. Select Committees on Globalization in both the House and the Senate that would include members from committees dealing with taxes and trade, armed services, foreign policy, Commerce, Labor and Transportation.

3. Relieving the Office of the US Trade Representative of its cabinet rank. The USTR has become a trade agreement lobbyist, making the negotiation of new trade agreements the definition of US interests in economic globalization. Rather, it should be an instrument for negotiation of trade objectives set by policy makers responsible for the long term economic health of people the American people.

The time is ripe. Polls show that majorities of American think we need to rebuild manufacturing. And business leaders are starting to speak out in support of industrial revitalization.

But this time around, we must begin by acknowledging our own history and accept that government aid guidance for the long term health of industrial base is in the American tradition.

Mr. TIERNEY. Well, thank you, Mr. Faux. I appreciate it.
Mr. Baugh.

STATEMENT OF ROBERT BAUGH

Mr. BAUGH. Thank you, Chairman Tierney and members of the committee, for inviting me here this morning to testify on this important subject.

We believe the decade long decline in the American manufacturing base is a crisis that has undermined our economic security, national security, and I subscribe to all the comments that were made by members of the panel this morning.

The question before us is what has happened to that prosperity and security and what must we do to strengthen the Nation's industrial base. I would like to make three main points in this testimony. One, the health of our manufacturing base and the health of our defense industrial base are one and the same, and the diagnosis is critical. No. 2, our own trade, tax, and investment procurement policies and the globalization of production has helped create this situation. And three, it simply doesn't have to be this way. There are steps we can and we must take to revitalize our manufacturing base and our national security with policies, investments and incentives we enact that must be both strategic and employment linked. To Jeff's point a moment ago on research and development policy.

For the American manufacturing communities this recession has just been one more big wave in a decade of economic tsunamis. Mr. Foster, your chart says it all. In little more than a decade we lost 6 million manufacturing jobs, one-third of our manufacturing jobs, 57,000 facilities closed. And I would make note I'm not just speaking for the front line skilled workers but I'm talking about a million of those jobs that were engineers, designers, developers, scientists, the very core of our professional and technical capacity for innovation in this Nation lost their jobs. They are out of that market. That is part of our future and we have been wasting it away.

It is a myth to think that the manufacturing base and the defense industrial base are somehow separate and independent. The National Research Council has made this point over and over, and it is in the other papers we have submitted as part of our testimony, the manufacturing and security paper that documents critical industries, critical technologies that are fading away from our economy and our expertise. And your point that was made about the metals is absolutely correct and straightforward, and something is very serious and strategic consequences when China controls 90 percent of the world market for those rare earth metals.

Import penetration studies by the U.S. Business and Industry Council parallel this and show the degree of import penetration into the U.S. economy. It's dominated. In 27 of 114 sectors, over 50 percent of our consumption is of imports in manufactured materials, and this shows up. These are global trends and these are economic trends that are a disaster for this country.

The military policies of dual use have helped do this because we seek the cheapest vendor, the cheapest product. We find decisions made by the Navy to lease vessels rather than make them, the Coast Guard to make ship parts over in Korea and just assemble

them here. It diminishes our capacity to address these things in the future. The threatened closures of Avondale and Ingalls Shipyards are a case in point.

While we've had these warnings from the National Research Council, I think more poignant is watching how research and development innovation has been offshored, and nothing is more striking than the recent announcement by Intel and Applied Materials and other major technological innovators in our economy that have gotten billions of dollars of illegal subsidies and have opened major facilities in China. These are the same products that will come back to haunt us as they already do in so many other fields.

Our trade deficits, as Jeff has pointed out, are symptomatic of the rot eating away at our industrial base. The Economic Policy Institute estimates that we have lost up to $2.4 million to China alone from this. And what do we do with about China's strategy? Will they target industries, target technologies? They back it with a whole series of illegal trade practices, the leading one of which we are talking about in this Congress. That is currency manipulation. It is time we do something about it. A 40 percent subsidy goes a long way. It not only subsidizes the issue of things that are imported into our economy; more importantly, it subsidizes the research and development that's going into their economy from American firms and other international corporations.

We need to take action to end currency manipulation, and House bill 2378 does that, and this Congress should move on it immediately. The Ways and Means Committee has had it under consideration, and we had a hearing on it just this last week.

The Congress has made important steps, and this was noted in the chairman's testimony, of the idea that we actually need a national manufacturing strategy, that we need a trade deficit commission, that we need to take the steps forward to address a manufacturing strategy for the Nation. Every other country in the world has one, and it's focused on employment and income. We do not. Shame on us, shame on us. It is part of our problem.

What you have done so far is a start, but we need to do much, much more. And we need policies in the Senate, as I said before, that are strategic and employment linked. And we don't necessarily have that in this case. It is the silo effect that Dr. Faux was talking about, it is the idea that the one hand doesn't see what the other is doing here as we move on these things. We put a good policy in place around energy, for clean energy production, but it's not employment linked, and therefore we stand to spend a good portion of that resource on foreign corporations producing these things. We have to be more strategic in how we do this.

There are six things we need to do. One is about bringing fairness to the global economy. That strengthens our laws practiced by America, but it means we enforce our trade laws and we do something about currency. We must invest massively in this Nation's infrastructure, not just to bring it up to speed but for the future. We should do that strategically with employment linked policies that in fact make the technologies and the things that we are going to build our country with. And the same thing needs to happen in the field of energy and our infrastructure. Again, 48(c), section 136 for autos, the idea that we are going to have loan guarantees, and

these things that invest in the American economy are technologies that we used to lead the world in and we no longer do. And we need to reinvest in these things and recapture that. It is about revitalizing the manufacturing base that protects our defense industrial base. We need tax policies that encourage investment, as Mr. Luetkemeyer talked about. We agree with you on that. We also need to get rid of the tax policies that are incentives for offshoring work. I think we have conflicting ideologies on this, that we need to fix and address in terms of a strategy. And we must protect innovation and we must invest in our R&D so that things are made here.

And finally, we absolutely have to have a skilled and trained work force for our future. As I said in the beginning, the health of our economy and our national security are inextricably tied together, and we must have a vibrant manufacturing sector to make sure it works. We must revive manufacturing as a clear centerpiece for our Nation's economic and national security strategy.

Thank you.

[The prepared statement of Mr. Baugh follows:]

Testimony of Robert Baugh
Executive Director
AFL-CIO Industrial Union Council

Before the House Committee on Oversight and Reform
Subcommittee On National Security and Foreign Affairs

On

Made in the USA: Manufacturing Policy, the Defense Industrial Base, and U.S. National Security

September 22, 2010

Thank you Chairman Tierney, Ranking Member Flake and Members of the Committee. I welcome the opportunity to be here today to testify on behalf of the AFL-CIO whose affiliate unions represent some 11.5 million workers across the United States. We believe that the decade long decline American manufacturing base is a crisis that has undermined our economic security and is a direct threat to our national security.

I want to commend Chairman Tierney for the focus of this committee hearing. Economic security and national security are two sides of the same coin. Manufacturing is the key to that security. Speaker Pelosi recognized this when is speaking about the Make it in America agenda that "America's manufacturers have long stood at the center of our nation's prosperity and national security." The question before is what has happened to that prosperity and security and what must we do to strengthen the nation's industrial base?

The American economy remains mired in a deep recession. Unemployment, underemployment, wage stagnation, foreclosures all paint a grim picture of an economy still struggling to recover.

The current recession is just one more big wave in a decade of economic tsunamis that have hit the workers and employers in American manufacturing. Over the last ten years, we lost approximately six million jobs, two million over the past two years, and saw 57,000 manufacturing facilities close. The loss of these skilled workers, engineers, designers, scientists and more has eroded the nation's working middle class and dangerously undermined our

technical, industrial and innovative capacity. This nation will not be able to double net exports, reduce our trade deficits substantially nor meet our economic and security needs unless we produce more of what we consume.

This testimony will provide an overview of the impact of the manufacturing sectors decline on the defense industrial base, the reasons for that loss and the steps the nation must take to revitalize American manufacturing. Also included with the submission of this testimony is a recent Buy America article and a new report on the defense industrial base.

Manufacturing Insecurity

It is a myth to think that the manufacturing base and the defense industrial base are independent of one another. A National Research Council study has noted, the boundaries between the defense industrial base—the set of industrial and military facilities devoted to the production of defense-related products—and commercial industry have become blurred. Workers see this on a daily basis as they produce commercial goods and technology that are used or modified for defense purposes.

It is this understanding that led the IUC to commission a report by Dr. Joel Yudken, "Manufacturing Insecurity: America's Manufacturing Crisis and the Erosion of the U.S. Defense Industrial Base." The report documents the dangers the nation faces from this erosion. There has been a continuous weakening in manufacturing value-added output, acceleration in manufacturing's steady decline as a share of U.S. GDP, stagnant and even negative growth—the first time in seven decades—in industrial capacity, and the substantial drop in capacity utilization since 2000. In addition there is the shocking growth in trade deficits and import penetration that have led to the loss of millions of U.S. jobs.

Losing Critical Industries

America's manufacturing sector continues be the largest, most productive and technologically advanced in the world. But its lead in a number of industries vanished years ago, and many of its remaining areas of strength are facing powerful challenges. The Manufacturing Insecurity report shows how the economic indicators translate into eroding industrial sectors and the loss of critical industries.

The pattern of decline in key sectors is such as semiconductors, printed circuit boards, machine tools, advanced materials, and aerospace is apparent. It can also be seen in defense critical technologies where domestic sourcing is endangered including propellant chemicals, space qualified electronics, power sources for space and military applications (batteries and photovoltaics), specialty metals, hard disk drives, and flat panel displays (LCDs). And, it can be found in critical materials like rare earth metals and magnets where the Chinese purchased U.S. manufacturing facilities and closed them (Magnaquench 2004). China now holds a monopoly on the rare-earth minerals used in the manufacturing of the missile magnets. The only operating rare-earth mine is located in Batou, China.

Import Penetration

Another critical indicator of the erosion of U.S. manufacturing competitiveness is the Import Penetration Rate (IPR), the share of the U.S. market held by imports. According to the 2010 U.S. Business and Industry Council (USBIC) study of Import Penetration Rate (IPR)— in 2008, 69 of the 114 capital and technology intensive industries examined lost share of their home U.S. market to imports, and that their aggregate import penetration rate increased from 34.30 percent to 36.23 percent.

In 27 of the 114 sectors, imports controlled 50 percent or more of the U.S. market as of 2008. These import-dominated sectors include aircraft engines and engine parts, construction equipment, and turbines and turbine generator sets. In addition, 15 of the 114 industries studied lost 15 percent or more of their home U.S. market to imports from 2007-2008 alone, including

semiconductors, aircraft engines and engine parts, and plastics and resins.

In a companion study the USBIC looked at the Chinese penetration of U.S. advanced manufacturing. In 1997, Chinese imports accounted for 20 percent of more of total U.S. imports in only two of the 114 industries. By 2008, Chinese imports represented a fifth or more of total U.S. imports in 31 of these industries. These sectors include computers, broadcast and wireless communications equipment; industrial valves, environmental controls, industrial gases, miscellaneous industrial machinery, pumps and pumping equipment, motor vehicle brakes, and printed circuit boards and assemblies.

The broad domestic and global economic trends and import penetration rates reflect a sustained and dangerous erosion across nearly all manufacturing industries, including many that supply products, components, and technologies that the Pentagon considers important to defense. The capacities required for national security needs rest upon a defense industrial base embedded in, the nation's overall domestic manufacturing base.

Offshoring Innovation

The impacts of an eroding domestic manufacturing base on national security stem not only from transnational firms moving research and development, engineering and design offshore, but also from the military's growing reliance on commercial cutting-edge technology. Defense procurement policy emphasis on "dual-use" technology products is that drawing on the an innovative civilian sector would yield not only more up-to-date products, but big cost savings. Those cost saving can come at the expense of our ability to meet the needs of our national defense.

There are other ways technology and capacity leave our shores. The extensive use of offsets in the sales of defense technology creates technical capacity in other nations at the expense of our own is one example. The potential closure of the Northrop Grumman shipbuilding facilities such as Avondale in New Orleans and Ingalls in Pascagoula Mississippi is another that will constrain

the ability of this nation to build naval vessels. Decisions by the Navy to lease ships from foreign manufacturers and the Coast Guard to purchase of major ship sections from Korea that we only assemble here diminishes our technical capacity to have a robust shipbuilding industry.

As the commercial industrial base globalizes, the loss of domestic production facilities can lead to the loss of innovation capabilities. Specifically, the migration of manufacturing offshore is associated with the following trends:

- Weakening innovation capabilities of domestic industrial sectors;
- The transfer—deliberate and unwitting—of cutting-edge technologies and know-how to economic rivals and potential military adversaries; and
- Foreign countries establishing industrial and technology policies aimed at enhancing their technological capabilities relative to America's.

Losing Our Lead

United States has long been—and remains—the world leader in most materials-related technologies, but during the first half of the 2000s decade, the National Research Council warned that this leadership was eroding. This is reflected in the doubling of the U.S. advanced materials industry's global trade deficits between 2002-2006, according to the U.S. Census Bureau's Advanced Technology Products (ATP) trade data, as foreign competitors make inroads into U.S. markets. The NRC found that:

- *Domestic materials production is disappearing and moving offshore.* Materials subsectors have consolidated significantly since 2000, driven by financial difficulties and foreign competition. Plant capacity and employment both have declined, and production of critical materials, such as specialty steels, advanced ceramics, and magnesium, has been moving offshore.

- *Materials R&D and innovation is following production offshore.* The migration of materials producers and users has harmed domestic advanced materials R&D by inducing many U.S. companies to shift materials R&D overseas. The offshore movement of manufacturing is weakening U.S. R&D capabilities in several materials technologies vital to national security, including night vision systems, lanthanides (rare earth elements), and specialty metals.

- *The margin of U.S. leadership in advanced materials R&D is eroding and increasingly challenged by other nations.* The largest U.S. advanced materials trade deficit is with Japan, whose imports into the United States grew steadily over the decade, more than doubling between 2002-2008 ($417 million to $948 million). Until 2008, China's exports outpaced imports, reflecting its increasing appetite for advanced materials products that it currently lacks sufficient internal capacity to meet. However, China is aggressively seeking to develop its own technological and production capabilities in this area.

Disappearing Advanced Materials

A 2005 National Research Council (NRC) study identified a range of materials science and engineering subfields as the most important to advanced production, and for which there are important and often critical national security applications and products. These include biomaterials; ceramics; composites; magnetic materials; metals; electronic and optical-photonic materials; superconducting materials; polymers; catalysts; and nanomaterials.

The NRC study concludes that, as U.S. materials manufacturing disappears and moves offshore, domestic materials R&D capacity has diminished. U.S. companies, attracted to the growing availability of often lower cost foreign intellectual resources, are shifting their materials science and engineering R&D activities to follow their manufacturing operations overseas. The net result is the erosion of U.S. leadership in advanced materials R&D. The following illustrations from the NRC reports for the National Academy of Science highlight this trend:

- *Metals*. Research into the production, processing, and development of metallic materials in the United States has been declining since 1998.
- *Superalloys*. Superalloy R&D has declined significantly over the past decade. Attracted by lower costs, superalloy manufacturers increasingly are locating their production offshore.
- *Composites*. Composites are a critical technology used in major defense systems Once unchallenged, other countries in several areas have supplanted U.S. leadership in composites. U.S. defense and commercial programs—the Joint Strike Fighter and Boeing's 787 Dreamliner—are outsourcing production and supporting R&D in composites overseas.
- *Electronic and Opto-Photonic Materials*. These are critical technologies for maintaining leadership in semiconductors. This industry and its material supply chain are moving toward a global processing and manufacturing infrastructure that is taking some of its R&D capacity with it.

Building Other Nations R&D

The flip side of the migration of U.S. innovation capabilities offshore is the buildup of other countries' R&D capacity. The strengthening of foreign technology capability does not always result from market forces and commerce-facilitating progress in communications and transportation. Instead, this development often results from multinational companies taking one of three tacks:

- Actively exploiting the business environments created by U.S. trade policy – for which they have lobbied hard – that encourage them to supply the U.S. market even for highly sophisticated manufactures from low-cost foreign facilities;
- Responding to foreign government carrots and sticks; or
- Formulating various investment strategies synthesizing these two approaches.

The carrot-and-stick approach by foreign governments is a direct reflection of a broader strategic and tactical approach to capture markets and technological dominance in specific sectors. The recent announcements by Intel, Applied Materials and other advance technology firms of multibillion dollar investments in research and production facilities in China show how aggressive and successful the Chinese government has become at this game.

Trading Away Jobs and Innovation

Our trade deficits are symptomatic of the rot eating away at our industrial base. In 2008 the U.S. goods trade deficit grew to a staggering $821 billion, or $2.2 billion a day. Through the decade our manufactured goods trade deficits with China soared. It has almost tripled in since WTO accession -- from $84 billion in 2001 to $266 billion in 2008 and $227 billion in 2009, some $2.4 trillion across the decade. In all manufacturing, China's share of the U.S. trade deficit rose continually from 28.5 percent in 2002 to 75.2 percent in 2009. In 2009, we ran a trade deficit with China in advanced technology products of $73 billion while with the rest of the world, we ran a surplus in ATP of $17 billion in 2009.

U.S. foreign direct investment (FDI) in China has jumped, especially in manufacturing. FDI in China is all about new production and job creation unlike the United States where it is overwhelmingly about change of ownership not new production. The Economic Policy Institute has estimated that the growth in the U.S. trade deficit with China between 2001-2008 has displaced about 2.4 million American jobs.

Perhaps even more disturbing than the aggregate growth in the U.S. trade imbalance with China is the composition of our imports and exports. Our top fifteen exports to China (by 4-digit HTS code) include five categories of waste products (ferrous scrap, paper scrap, copper scrap, aluminum scrap, and offal); two categories of raw materials (soy and polymers), and at least three categories of parts. In contrast, all of China's top fifteen exports to the United States are manufactured products or parts.

This is clearly not the trade profile that the U.S. government predicted as the likely outcome of China's WTO accession. But it is the result of concerted strategic interventions, starting with currency intervention, by the Chinese government over many years – and inaction by our own. With an explicit export strategy targeting key industries, sectors, and technologies, China has captured a growing share of U.S. and world markets. It has used a wide array of unfair trade practices, including currency manipulation, export subsidies, widespread suppression of worker rights and wages, and tariff and non-tariff barriers to exports, to support this strategy.

The financial crisis has proved to be another opportunity for China to take advantage of the rest of the world by increasing its share of U.S. and other markets for manufactured products.

Subsidizing Exports and Investment

Through systematic and one-sided intervention in currency markets, the Chinese government has kept the renminbi approximately 40 percent undervalued with respect to the U.S. dollar for many years in support of its export strategy.

Undervaluation serves the their strategy of building powerful export markets rather than their own domestic consumer markets. It takes market share and jobs from the United States by penalizing our exports. It subsidizes imports into this country while subsidizing investments into their economy. The Chinese government's practices amount to as much as a 40 percent subsidy for the products they send here and a tax on products we try to send there while siphoning investment dollars vital to keeping the U.S. at the forefront of research and development.

This is not free trade nor is it the way the major economies of the world have agreed to behave. And the Chinese government's actions influence the monetary policies of other countries compounding our trade problems. The U.S. Treasury bi-annual currency reports acknowledge the fact that other nations (South Korea, Indonesia, India, etc..) mirror the Chinese government's behavior.

In real terms currency manipulation has cost American workers and communities good jobs while undermining this nations technical and industrial capacity to make the things we consume and export. It uses our dollars to stimulate another nation's economy while racking up unsustainable trade deficits at home. It subsidizes foreign direct investment and the migration of research and development to the Chinese economy.

Ending Currency Manipulation Generates Jobs

The drag on GDP growth that comes from the bilateral trade deficit has significantly broader economic implications. Preliminary estimates from the Economic Policy Institute point to as much as a $500 billion reduction in our nation's federal budget deficit over the next six years from ending China's currency manipulation.

While addressing China's currency manipulation is one of the highest priorities for workers and employers in the manufacturing sector, it is time to recognize the broader impact of China's practices. Lost manufacturing jobs lead to lost tax revenue and higher budget deficits that limit our ability to invest in our future. This puts substantial pressure on federal, state and local budgets resulting in layoffs of teachers, police and other emergency responders. And it has undermined our future by undercutting the array of career choices and educational opportunities especially in science, engineering and the technical occupations needed for a vibrant innovative manufacturing economy.

It doesn't have to be this way.

Taking action to end currency manipulation will generate jobs and investments in the U.S. economy. Nobel laureate, Paul Krugman, estimates an end to the manipulation would produce a net export gain to the United States, Europe and Japan amounting to about 1.5 percent of GDP, increasing the U.S. economy by about $220 billion. The Peterson Institute and the Economic Policy Institute agree that a 25 percent to 40 percent revaluation in the renminbi would reduce

the U.S. trade deficit between $100 billion and $150 billion per year, adding between 750,000 and 1 million jobs to American payrolls.

It is time for Congress and the Administration to act decisively to end currency manipulation and other illegal trade practices.

Taking Action: A Strategy for the Future

The AFL-CIO recognizes that this Congress has taken important steps to stabilize the economy by helping ensure the survival of a domestic auto industry, investing in needed infrastructure and a diverse efficient clean energy economy along that included Buy America requirements, and putting critical financial reforms in place. More recently the House passed a series of manufacturing bills that included a National Manufacturing Strategy and Trade Deficit Commission. The Administration has also proposed needed new investments in small business, research and development and infrastructure and they are now reviewing the 301 trade case filed by the United Steelworkers against the Chinese government for illegal trade practices designed to capture clean energy market.

This is start but much more needs to be done at scale. The policies, investments and incentives we enact must be strategic and employment linked. Essential to a comprehensive program to restore domestic manufacturing are the following elements:

- **Bringing fairness and equity to the global economy:** While many steps need to be taken, including the expansion and strengthening of Buy America laws and a more vigorous enforcement of unfair trade laws, addressing the manipulation of currency by China and other countries is key. Congress must act now by passing HR 2378 the Currency Exchange Rate Oversight Reform Act of 2010.

- **Investment in infrastructure:** America's infrastructure needs—energy, roads, transit, bridges, rail, water, etc.—are huge. We have a $2.2 trillion unfunded

infrastructure deficit, according to the American Society of Civil Engineers. Not only will spending here employ people right away, it will lay the foundation for economic growth in the future. Congress should pass an enhanced Surface Transportation Act now to rebuild our roads and bridges and expand mass transportation. FAA Reathorization, Clean Water, and more are infrastructure investments

- **Tax policy:** Eliminate tax incentives and loopholes that encourage financial speculation rather than investment, outsourcing and off shoring production, and enact tax incentives for companies that produce domestically. The use of tax deferals encourages offshoring.

- **Energy:** America must not cede leadership of clean energy technology including renewable, nuclear and advanced coal and production equipment for these industries to other nations. We must invest in these 21st century energy infrastructure technologies on a similar scale to our investment in replacing the failing infrastructure of the last century. Enact measures that will expand funding for 48(c), section 136 (the Advanced Technology Vehicles Manufacturing Incentive Program), tax credit programs for clean energy production and higher loan authority. These investments must be coupled with expanded utilization of domestic supply chains.

- **Innovation:** There is a direct correlation between R&D and production and we must protect our nation's innovative leadership. Doing so requires that we maintain strong intellectual property protections to ensure that companies have the incentive to make investments in plant and equipment here at home. We must also increase efforts to fight the intellectual property right violations of competitors that seek to profit from the creativity of our people. Increased support for research and development in the United States, coupled with support for testing and deployment of those new technologies in our factories, will ensure that our manufacturing capabilities expand.

- **Workforce development policies:** Revitalizing our manufacturing sector requires that we make investments in our people to ensure they are equipped to meet the needs

> of industry. We cannot afford to have a skills deficit, which would only fuel a trade deficit. Congress must increase access to training funds for people who are out of work as well as those seeking to enhance their skills. Employers must also be encouraged to make corresponding investments in the skills of their workforce.

While the economic crisis that began in 2007 has done massive damage to our country, the truth is our problems run far deeper and none is more fundamental than catastrophic decline of U.S. manufacturing. The health of the economy and our national security are inextricably tied to a vibrant and innovative manufacturing sector. We must revive U.S. manufacturing as a clear centerpiece of our nation's economic and security strategy.

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Economic Reality and Alarmist Rhetoric: Getting Real About Buy America

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In the midst of the greatest financial crisis since the Great Depression, the U.S. Congress passed the $787 billion *American Recovery and Reinvestment Act* (*ARRA*), and President Barack Obama signed it into law. The Buy America provisions contained within the *ARRA* drew an immediate response from Canada, the European Union, China, and other countries that condemned the provisions as "protectionist," claiming they would "lead to retaliatory measures" and even "trade wars." These alarmist reactions need to be seen for what they really are – warning signs about everything that has gone wrong with trade and economic policy. It is time to step back and use this response as a learning moment – to come to grips with the manufacturing crisis, a dangerously unbalanced trading system that is out of step with economic and political reality, and the potential conflict over climate change.

The *Recovery Act* and Buy America

As both the U.S. and the international economy imploded in 2008, the American Federation of Labor and Congress of Industrial Organizations (AFL-CIO) and the Canadian Labour Congress joined unions across the world to urge their governments to move aggressively on economic stimulus measures designed to generate employment stability. In the United States the AFL-CIO worked with Congress and the Bush and Obama administrations to support the largest stimulus investment in our history. The *ARRA* investments are designed to be the leading edge of a new environmental economic development policy designed to reduce carbon emissions and create good jobs. To ensure, as U.S. taxpayers have every right to expect, that public dollars are recycled to maximum effect in the U.S. economy, Congress included Buy America language in the Act.

The language reaffirms and strengthens existing well-established legal precedents, dating back to the *Buy American Act* of 1933. The Department of Defense has had Buy America provisions since 1941, and the Federal Highway Administration, Federal Transit Administration, and Federal Railroad Administration all have long-standing provisions. The *ARRA* Buy America requirement simply states that, for the publicly funded projects, "all of the iron, steel, and manufactured goods used in the project[s] are produced in the United States." It also allows for reasonable waivers.

Most notably, the *ARRA* requires that the Buy America provision be "applied in a manner consistent with U.S. obligations under international agreements." It is important to note that negotiated trade agreements allow for domestic preferences under a number of circumstances. These preferences were negotiated for a reason, and they are all perfectly legal. The United States would be irresponsible not to use them to the fullest extent possible, just as Canada and our other trading partners do.

The Pot Calling the Kettle Black

While Canada, the European Union, and China have been vociferous critics of the Buy America provision, each one of them has its own far-reaching domestic preferences. China, which is not a member of the World Trade Organization (WTO) Government Procurement Agreement (GPA), can discriminate against imported products in its $586 billion economic stimulus package, and, in addition, it has imposed an 80 percent domestic content requirement. The EU and its member states are GPA members but have excluded significant sectors from coverage, including all federal and sub-federal transportation, telecommunications, and energy contracts. They are therefore free to discriminate against imported goods in these government projects.

Canada is also a GPA member, and it has excluded significant sectors from coverage – even broader exceptions than those claimed by the United States. For example, Canada excluded shipbuilding and repair, urban rail and urban transportation equipment systems and the components and material incorporated therein, as well as all project-related materials made of iron and steel; all contracts for communications equipment; and, at the provincial level, all procurement of steel, motor vehicles, and coal. With regard to the procurement of construction

services, Canada also excluded dredging and all construction service contracts tendered on behalf of the Department of Transport.[1]

So, what is all the fuss about? The Buy America and the EU and Canadian provisions are all legal and covered under the GPA. In fact, the Buy America policy rewards other nations with reciprocal government procurement agreements by exempting them from certain restrictions. Ironically, Canada did not have a reciprocal relationship with the United States because it had failed to bind its provincial procurement under the GPA. When the crisis hit, it was obliged to enter into negotiations to find a solution.

What is more telling is the reaction that the U.S. provision elicited from our trading partners. Why does an economically and politically sensible action generate such heat, and, if it is legal under the precepts of a negotiated trading system, why is it branded "protectionist"?

Protectionism as a Pejorative

The charge of "protectionist / protectionism" has become a pejorative label applied by free-market / free-trade advocates against any contradictory view. It is used to cut off debate by defining an opponent's point of view in a negative light. U.S. and Canadian trade unionists, businesses, and economists know well what it feels to be stigmatized in this way. It doesn't matter that we believe in fair, balanced, and smart trade. Every time an objection or a question is raised about trade policies or agreements pursued by government, multinational corporations, and financial interests which undermine labor, economic, environmental, and other standards, the labeling begins. At times it borders on the absurd. The barrage of protectionist accusations in response to a decision in a trade case filed by the United Steelworkers Union is a good example.

In this case, a Chinese government representative charged at an international meeting held by the Carnegie Institute in Washington, D.C., that the decision imposing tariffs on its tires was protectionist. A number of diplomats present made similar comments. A U.S. union representative responded by pointing out that the decision was based on the illegal actions of the Chinese government – as determined by the independent U.S. International Trade Commission. He explained that the Chinese government's own testimony revealed how it required a new Cooper tire plant in China to export all its first five years' production, with the U.S. market as its primary target. The diplomats at the meeting then agreed that the Chinese actions violated WTO rules, though many of them still insisted that the United States was somehow being protectionist.

The reactions to Buy America provisions are only the latest example of labeling without supporting facts or context.

The *ARRA* is not protectionist. In part, it is a response to worldwide demands for U.S. stimulus investments and carbon emission reductions. It included spending $150 billion over two years on infrastructure projects. Excluding construction and other costs, the actual figure spent on U.S. manufactured goods as a result of Buy America will be much smaller. This amount pales in comparison to the total two-way U.S. trade in goods and services in 2008 of $4.4 trillion, or the $2.5 trillion worth of goods and services that the U.S. purchased from the rest of the world. It also pales in comparison to the $600 billion of trade in 2008 between the United States and our number one trading partner, Canada.[2]

When the United States runs a goods balance of payments deficit of $840 billion (including a $144 billion deficit with Canada and Mexico), as it did in 2008, any charge of protectionism rings hollow.[3] Chinese accusations of U.S. protectionism seem Orwellian given the 80 percent domestic content requirement in their own stimulus investments and their recently instituted "indigenous innovation" rules designed to capture foreign technology.[4]

What should raise far more concern on both sides of the U.S.-Canadian border are the state of U.S. manufacturing, the trade deficit, and the behavior of the Chinese government. The implications of each of these factors are far more important than Buy America to the future of our mutual economies.

A Cross-Border Crisis

The economic integration of the United States and Canada and their shared policy interests can be seen in the level of two-way trade between them – most obviously in the automotive sector. Over 20 percent of U.S. manufacturing is tied to an industry where capacity crashed from 17 million cars to 10 million in annual sales in less than two years. As a result, Michigan and Ontario's cross-border trade (half auto related), which peaked at $8 billion in September 2007, plummeted to $3 billion by June 2009, and unemployment skyrocketed.[5] With GM and Chrysler in bankruptcy, the U.S. and Canadian governments were faced with a tough choice: Do we still want an automotive industry?

Thankfully, for millions of workers and communities, the United States, Canada, the United Auto Workers (UAW), and the Canadian Auto Workers (CAW) all stepped up, ignoring

the free-market fundamentalists who said, "Let them fail." Today General Motors is a public corporation owned by the U.S. Treasury (60.8%), the employees' agent (17.5%), the Canadian government (11.7%), and the old GM's bondholders (10%). The restructured Chrysler (not a public company) has four owners: the U.S. Treasury (9.9%), the employees' agent (67.7%), Fiat (20%), and the Canadian government (2.5%).[6]

Other countries around the world also made similar "protectionist" choices, but they have been making comparable strategic policy choices in support of a manufacturing strategy for decades. While the auto sector serves as a specific example of our cross-border integration and crisis-driven industrial policy decision-making, it is just the tip of the iceberg.

The United States and Canada are both nations without clear industrial development policies or manufacturing strategies in a world where all our other competitors have one. The consequences have been wage stagnation, spiraling trade deficits, and job loss. Canada is not immune from the contagion. The economic crisis has created a situation that finds both countries stumbling toward an industrial policy. The dire situation in American manufacturing is bad news for both countries.

The Crisis in American Manufacturing

American manufacturing jobs and capacity are being lost at an alarming rate. Between 1998 and 2009, more than 57,000 manufacturing establishments closed.[7] Since 1998, the United States has lost one-third of its manufacturing jobs – more than 6 million in all. Two million of those jobs were lost in the current recession that began in December 2007. At the end of 2009, U.S. manufacturing employment hit 11.63 million, the lowest figure since 1941.[8] Two-thirds of those who lost their jobs were skilled production workers, and a significant portion of the rest were engineers, scientists, designers, managers, software specialists, and industrial machine installation/repair workers – all in occupations critical not only to the operation of production systems but to product and production innovation.

Manufacturing has declined in real terms. Between 2000 and 2009, manufacturing's share of GDP fell from 14.5 percent to 11.5 percent. Machine tools, the heart of a vibrant industrial base, has seen U.S. consumption decline by 30 percent since 1998.[9] The greatest economic downturn since the 1930s accelerated a decade-long freefall in manufacturing.

This recession drove manufacturing output down 16.7 percent. The 46.1 percent decline in real automotive output is a big part of the problem, but it runs across the spectrum. Real output during this period is down, 47.4 percent in primary metals (including steel), 27.3 percent in machinery, while information technology (IT), hardware, and chemicals are all down significantly. IT hardware (semiconductors, computers, and telecom equipment) is down 15.8 percent, and chemicals are down by 21.4 percent.[10]

Massive job losses and the offshoring of technical capacity are a threat to innovation as an engine for the nation's growth. With few exceptions, product development cannot be geographically separated from production without threatening a firm's long-run ability to innovate, and innovation in high-tech services depends heavily on innovation in high-tech manufacturing.[11] The loss of research, design, engineering, and development capacity, along with skilled production workers, means that future investments and innovations are more likely to be made in the economy of another country.

The decline is occurring even in industries that are not labor intensive and in which other highly developed, high-wage countries such as Germany, Japan, and Finland are doing well. The complete loss of U.S.-based industries and U.S. market share makes it clear that the explanation for loss of employment is much more than simple increases in productivity.

The U.S. manufacturing crisis runs in tandem with a decade of deepening trade deficits that have contributed to the decline in manufacturing jobs and wages. The offshoring of jobs, technical capacity, and innovation are a threat to the future of the U.S. and the Canadian economies alike. The continuing failure to address the practices of the Chinese government in world trade imperils both our countries.

Trading Jobs Away

In 2008 the U.S. goods trade deficit grew to a staggering $821 billion, or $2.2 billion a day. A $266 billion deficit with China accounted for 68.6 percent of the manufactured goods deficit. In 2009 the United States ran a $240.1 billion "all manufacturing" deficit with China. From 2002 to 2009, the United States ran a $3.7 trillion trade deficit for all manufacturing, including a $1.6 trillion deficit with China. In all manufacturing, China's share of the U.S. trade deficit rose continually from 28.5 percent in 2002 to 75.2 percent in 2009.[12]

According to the Economic Policy Institute, the growth of trade with China since it entered the WTO in 2001 has had a devastating effect on U.S. workers and the domestic economy.[13] Between 2001 and 2007, 2.3 million jobs were lost or displaced, including 366,000 in 2007 alone.[14] Research shows that, even when re-employed in non-traded industries, these workers lost an average $8,146 per worker per year.[15] In 2007 these losses totaled $19.4 billion.

Canada and Mexico are not immune from the China factor. In 2007 Mexico reported a $34 billion trade deficit and the closure of thousands of manufacturing facilities. Parts once made in Mexico are now produced in China, then imported for assembly and export. Canada reported a $32.6 billion deficit with China in 2008, based on a trade profile of raw materials exports and finished goods imports.[16]

With an explicit export strategy targeting key industries, sectors, and technologies, China has captured a growing share of U.S. and world markets. It has used a wide array of unfair trade practices, including currency manipulation, export subsidies, widespread suppression of worker rights and wages, and tariff and non-tariff barriers to exports, to support this strategy. The Chinese government has purchased massive volumes of foreign exchange in order to suppress the value of its currency. The unsustainable trade imbalances with the United States and other nations allowed the Chinese government to increase its total foreign exchange reserves by $453 billion last year, to a total of $2.4 trillion. The financial crisis has proved to be another opportunity for China to take advantage of the rest of the world by increasing its share of U.S. and other markets for manufactured products.

The United States cannot continue to run trade deficits with the rest of the world and, in the process, destroy its own manufacturing base. There must be a rebalancing, and that requires a vibrant American manufacturing sector producing goods for a domestic and world market. The Buy America provision is a small tactical step in that direction, though it foreshadows much larger concerns.

Common Problems, Common Sense

The economic and environmental challenges the world faces are compounded by trade distortions and market failure. The 2006 *Economics of Climate Change* report by the British government's Stern Commission stated that "Climate Change presents a unique challenge for economics: it is the greatest and widest-ranging market failure ever seen." The 2008 worldwide

economic meltdown is another market failure driven by the reckless, unregulated behavior of financial markets and speculation which rewards short-term gain to the detriment of long-term investments in manufacturing. The "win-win free-trade hype" has proved untrue – the hard, cold reality is that current trade policy has become a vehicle for offshoring and outsourcing good jobs.

It is time to drop the free-market and free-trade fundamentalism and to find ways to end global imbalances. The United States and Canada need to focus on how best to revitalize manufacturing, which is responsible for a large share of our innovation and production. Moreover, we must begin fostering jobs again in this difficult business environment.

These concerns are not unique to North America. Workers and governments across the world are focused on the same issues, especially when it comes to climate change. The AFL-CIO and the Canadian Labour Congress are working at home and internationally with the International Trade Union Confederation to promote an environmentally sound economic development agenda – a just transition – in domestic legislation and within an international climate agreement.

A just transition to a greener economy requires an aggressive, sustained commitment of national resources to create and retain good jobs, increase per capita income, modernize industry, develop and deploy technology, and educate and train workers. It requires assistance for any workers, families, or communities that may be adversely affected by the transition, and a democratic voice for workers in their workplaces and their communities.

These are important goals for every country. And it is exactly what they are doing – investing in their own economies to reduce carbon and create jobs. It is a straightforward economic, political, and environmental common-sense decision. But here's the rub: in the world of free-trade fundamentalism, one nation's investment becomes another's accusation of illegal subsidy and protectionism. As nations move toward massive climate change investments, the reaction to Buy America portends a coming conflict between international environmental, economic, and trade policy.

Investing in Our Future

The United States faces critical investment decisions on energy and carbon reduction and on infrastructure. The American Society of Civil Engineers estimates that $2.2 trillion is needed in the next five years to bring aging infrastructure up to date. In the coming decades, climate

concerns will drive additional trillions of public and private investment into energy efficiency, carbon reduction, and new energy technologies. Buy America provisions will be part of a fundamental strategic discussion about how we invest in America and the public policies needed to rebalance trade, revitalize manufacturing, develop new industry and technology, and create good jobs. Unions in the United States and Canada know that all these issues are critical.

Ken Neumann, the national director for Canada of the United Steelworkers Union, made this point in an opinion piece published in the *Toronto Star*. He wrote: "Instead of lecturing Americans about the merits of unregulated global trade, Canada should have its own 'Buy Canadian' policy and recognize that, due to the integrated nature of the Canadian and U.S. economies, this current debate in the U.S. is really an opportunity for Canada … We believe the current challenge for Canada is to develop meaningful policies to support Canadian manufacturing while continuing to be part of an integrated and co-operative North American market. This is an approach that will work for both Canadian and U.S. workers and their economies."[17]

The obsession with American protectionism serves as nothing more than a diversion from the real questions that need to be answered. Our workers and communities deserve less rhetoric, more respect, and real answers.

{BOX}

Buy America Provision from the *American Recovery and Reinvestment Act*

SEC. 1605. USE OF AMERICAN IRON, STEEL, AND MANUFACTURED GOODS

(a) None of the funds appropriated or otherwise made available by this Act may be used for a project for the construction, alteration, maintenance, or repair of a public building or public work unless all of the iron, steel, and manufactured goods used in the project are produced in the United States.

(b) Subsection (a) shall not apply in any case or category of cases in "which the head of the Federal department or agency involved finds that -

(1) applying subsection (a) would be inconsistent with the public interest;

(2) iron, steel, and the relevant manufactured goods are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or

(3) inclusion of iron, steel, and manufactured goods produced in the United States will increase the cost of the overall project by more than 25 percent.

(c) If the head of a Federal department or agency determines that it is necessary to Waive the application of subsection (a) based on a finding under subsection (b) the head of the department or agency shall publish In the Federal Register a detailed written justification as to why the provision is being waived.

(d) This section shall be applied in a manner consistent with United States obligations under International agreements.

Notes

[1] GPA, Annex 5 and general Notes (Canada).
[2] U.S. Census Bureau and the U.S. Bureau of Economic Analysis.
[3] Ibid.
[4] Tony Romm, "Tech groups Press Congress to Fight Chinese Restrictions," *The Hill*, February 22, 2010.
[5] "Auto Slump Stalls Trade with Canada," *Detroit News*, September 4, 2009.
[6] *The Auto Bailout*, National Taxpayers Union Brief no. 15, November 2009.
[7] U.S. Department of Commerce, Economics and Statistics Administration; U.S. Census Bureau and the U.S. Bureau of Economic Analysis.
[8] Ibid.
[9] U.S. Federal Reserve, seasonally adjusted NAICS output data.
[10] Ibid.
[11] Tassey, "Rationales"; Gary P. Pisano and Willy C. Shih, "Restoring American Competitiveness," *Harvard Business Review*, July–August 2009, 114–25.
[12] U.S. Department of Commerce, TradeStats Express, NAICS All Merchandise and All Manufacturing categories.
[13] *Trade Deficits and Manufacturing Job Loss: Correlation and Causality*, EPI Briefing no. 171, 2006.
[14] Robert Scott, *The China Trade Toll*, Economic Policy Institute, July 2008.
[15] Ibid.
[16] Trade Data Online, Industry Canada, October 23, 2009.
[17] Ken Neumann, "Buy American Policies Not All Bad for Canada," *Toronto Star*, February 11, 2009.

EXECUTIVE SUMMARY

MANUFACTURING INSECURITY

AMERICA'S MANUFACTURING CRISIS AND THE EROSION OF THE U.S. DEFENSE INDUSTRIAL BASE

Report Prepared

for

Industrial Union Council, AFL-CIO

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I. Introduction

Even as America's armed forces were fighting wars in Afghanistan and Iraq during the Bush Administration's first term, the Pentagon embraced policies to globalize the American defense industrial base. Rather than relying on traditional U.S. defense suppliers, it looked overseas for sources of products, components, and materials for all but the most defense-critical technologies, claiming that this would lead to faster innovation while cutting costs. Defense industry executives echoed this position, arguing that the Department of Defense (DOD)—and its prime contractors—should not be restricted to domestic suppliers for its products.

Ironically, the Pentagon and industry calls for greater reliance on foreign sourcing—often argued in efforts to weaken Buy America requirements in defense procurement—are a tacit recognition that the United States lacks the commercial manufacturing capacity to supply vital products needed by America's defense industrial base. The DOD has conceded that there are advanced technologies critical to military systems—armor plate steel, defense-specific integrated circuits, night vision goggles—for which domestic sources are inadequate.[i]

However, a much larger number of items once supplied by U.S. manufacturers are now obtained from foreign suppliers—flat panel displays, machine tools, advanced electronics and information technologies—because they are not readily available from U.S. producers. According to Col. Michael Cole, of the U.S. Joint Forces Command, the problem is not just a matter of a handful of highly specialized items designed to meet narrow defense requirements, but the "eradication of U.S. industry capability." He also warns that current strategies to deal with an industrial base that increasingly is unable to supply the military with manufactured parts and electronic components are not working.[ii]

The purpose of the study presented in this report, is to examine the extent this capability has been eroded, and the corresponding weakening of America's defense industrial base in the coming decades. In contrast to other assessments of the military's reliance on foreign sources that only focus on a small number of critical technologies or industries, this study seeks to evaluate the health and competitiveness of the nation's overall *civilian industrial base* upon which a strong defense industrial base—including the ability to produce specialized defense-critical products—ultimately rests. Specifically, drawing upon a large body of evidence from government and industry, the professional literature and other sources, the study:

- Analyzes key domestic and international economic trends—which taken together show that the foundations of U.S. manufacturing have been deteriorating across the board, especially over the past decade.
- Describes the linkages between manufacturing and the defense industrial base, and how erosion in a wide range of American manufacturing industries is hurting the domestic capacity to supply critical products for national security, forcing the Pentagon to depend on less secure foreign sources.
- Explores how a diminishing domestic manufacturing base contributes to a decline in American technological leadership and innovation capacity, widely recognized to be vital for maintaining U.S. defense capabilities.

These findings are troubling enough for America's economic future, especially for working families and communities. The danger to our national security that these trends also signify, should elevate revitalizing American manufacturing to a very high priority among policy makers.

II. Indicators of Industrial Decline

No single indicator can by itself represent economy-wide manufacturing capabilities or trends. But several key indicators of domestic economic performance—*value-added output*, *industrial capacity* and *capacity utilization*, *employment*, and *number of establishments*—and global competitiveness—*balance of trade in goods* and *import penetration rate*—when taken together, do provide strong evidence that America's manufacturing base has greatly weakened over the last decade. The former indicators reflect the economy's ability to maintain and increase output growth over the long run. The latter reflect the American manufacturers' ability to compete with foreign producers in domestic and global markets.

Indicators of Domestic Economic Performance

Although signs of America's industrial competitiveness problems first appeared in the 1970s and 1980s, the erosion of America's manufacturing capabilities began to deepen in the first half of the 2000s decade.

- *While manufacturing's share of U.S. Gross Domestic Product (GDP) has fallen steadily since the late-1960s, it dropped at nearly twice the rate between 2000-2008 compared to the previous fifteen years.*
- *Although U.S. manufacturing's real value-added growth has generally been positive, its annual rate of growth since 2000 has been substantially lower than its growth rates in prior decades.* Its 1.3 percent real annual rate of growth between 2000-2008, was less than a third that of the previous decade. Industries with weakening or negative rates of real value-added growth after 2000 include many important to defense.
- *Both manufacturing industrial capacity growth and capacity utilization have been much lower since 2000 compared to previous periods.* The industrial capacity index for manufacturing accelerated to 6.8 per year in the 1990s, but slowed to 1.3 per year from 2000 on. Not including hi-tech industries, the index was 0.3 per year for the 2000 decade. Capacity utilization reached its lowest peak (79.2 percent) in 2006, slightly lower than the average utilization rate throughout the 1972-2008 period. It dropped precipitously to 67.0 percent in 2009, its lowest level for at least the last four decades.
- *After steadily growing between 1990 and 1998—by over 25,000 or nearly 6.6 percent—the number of manufacturing establishments of all sizes in the United States has declined sharply—by over 51,000, or 12.5 percent—since 1999.* An additional 5,730 establishments disappeared in 2009, bringing the total losses to over 57,000.
- *American manufacturing employment has declined since its peak in 1979, but it's fall from a relative peak in 1998 has been the most precipitous since the great depression—over 6 million jobs or one-third the U.S. manufacturing workforce have disappeared.* The aggregate trends in manufacturing establishment and employment are replicated in most manufacturing sectors and subsectors.

b. Indicators of Global Competitiveness

U.S. manufacturing competitiveness has been declining in global markets, as indicated by America's growing trade deficits in goods, including advanced technology products, and foreign import penetration into U.S. markets.

- *The annual U.S. trade deficit in goods has grown steadily since 1979, and at an especially rapid rate since 1998, rising to record levels of over $800 billion each year between 2006-2008—it was $816 billion in 2008, nearly 6 percent of U.S. GDP.* The United States imported more goods than it exported at a rate of $2.2 billion a day. In real terms, the deficit in goods in 2008 was 18 times larger than it was in 1980. This includes chronic goods trade deficits with every major trading country and region in the world.
- *Import penetration rate (IPR)—the share of the U.S. market held by imports—has been increasing for most manufacturing products and sectors.* There has been an across-the-board, aggregate increase in IPRs for 114 high-tech and capital-intensive sectors evaluate of 61 percent—from 21.4 percent of domestic consumption to 34.3 percent—between 1997 and 2007. That is, imports grew from one-fifth to over one-third of the value of this diverse group of items consumed domestically in one decade.

c. The Eroding Base

The secular downward trends for almost all the indicators, especially when the linkages between them are considered, show that U.S. manufacturing has been losing capacity for well over a decade.

- The erosion is apparent in the concurrent trends of weakening manufacturing value-added output, acceleration in manufacturing's steady decline as a share of U.S. GDP, stagnant and even negative growth—the first time in seven decades—in industrial capacity, and the substantial drop in capacity utilization since 2000—not to mention the long-term average yearly decline in utilization.
- The peak levels in both manufacturing capacity utilization and manufacturing employment during business cycle expansions have been in secular decline from the 1970s on.
- As industrial capacity stagnated and fell, manufacturing employment and establishment numbers declined sharply from a little before 2000 to the present.

Manufacturing's erosion is even more evident when the domestic economic trends are viewed in light of growing trade deficits and import penetration. Demand factors and productivity alone cannot explain the large losses in manufacturing jobs and establishments, over the past decade in particular. Empirical studies show that millions of U.S. jobs have been displaced or job gains foregone as a result of international trade, including losses associated with specific trade agreements (e.g., the North American Free Trade Act). Some studies tie the growing U.S. trade deficit with China, to the hug loss of U.S. jobs. A large share of these losses, are linked to consolidations and plant closures arising from foreign competition for domestic and global markets, and the offshoring of operations by large OEMs and their suppliers in almost every major manufacturing sector. [iii]

III. Eroding Industrial Sectors

America's manufacturing sector continues be the largest, most productive and technologically advanced in the world. But its lead in a number of industries vanished years ago, and many of its remaining areas of strength are facing powerful challenges. The broad domestic and global economic trends examined above reflect a sustained and potentially dangerous erosion across nearly all manufacturing industries, including many that supply products, components, and technologies that the Pentagon considers important to defense. The significant losses in plant capacity and jobs in these industries raise serious concerns about their ability to remain sufficiently innovative and robust to meet the Pentagon's supply needs, especially in times of political and military crisis.

The industrial capabilities required to serve national security needs, which constitute the defense industrial base, not only rest upon, but are embedded in, the nation's overall domestic manufacturing base. The Defense Production Act of 1950 (DPA), as amended, defines the "domestic defense industrial base" as those "domestic sources which are providing, or which would be reasonably expected to provide, materials or services to meet national defense requirements during peacetime, graduated mobilization, national emergency, or war.[iv] A central question is, does the domestic manufacturing base have the capability to supply the huge array of items—technologies, materials, components, parts, subsystems—needed to meet these requirements, or will the U.S. national security system become increasingly reliant on foreign sources for critical products and service?

There is no bright line between the production systems that design, develop and manufacture defense-unique items with those the produce defense-critical products and processes. As a National Research Council study has noted, the boundaries between the defense industrial base—the set of industrial and military facilities devoted to the production of defense-related products—and commercial industry have become blurred.[v] Many of the most militarily valuable products are versions of commercially produced commodities modified for unique military functions.

However, several factors have contributed to a weakening ability of domestic suppliers to provide critical items needed in defense products:

- For a large number of defense-unique items, there often are only a single or small handful of domestic sources, which may in turn depend solely on their military customers to remain financially solvent.
- Many suppliers, which tend to be small and medium-sized, mainly serve commercial domestic and global markets, while tailoring a small part of their business to provide specialized products to military industrial customers. Many of these, as well as suppliers of commercial-off-the-shelf (COTS) items, face increasing foreign competition and are under pressure to relocate or outsource some or all of their operations overseas, to stay in business.
- Consolidations by suppliers in the face of stiff foreign competition also have contributed to shrinking the available number of qualified domestic sources for many defense critical items. Small, lower-tier manufacturers tend to be at far greater risk in these situations.

Critical Industries

Well-known examples of defense critical technologies where domestic sourcing is endangered include propellant chemicals, space qualified electronics, power sources for space and military applications (batteries and photovoltaics), specialty metals, hard disk drives, and flat panel displays (LCDs). University of Texas at Austin engineering professor Michael Webber evaluated the economic health of sixteen industrial sectors "within the manufacturing support base" of the U.S. defense industrial system, "that have a direct bearing on innovation and production of novel mechanical products and systems," and whose output "is used directly in the design process of other industries." Of the sixteen industries he examined, thirteen showed significant signs of erosion, especially since 2001.[vi]

The HRS study examined a broader cross-section of the defense industrial base, to illustrate the full scope of the impacts of declining manufacturing capacity on the defense industrial base. They include several of Webber's industries (semiconductors, printed circuit boards, machine tools), and one not in his group, which nevertheless is important to the nation's innovation system (advanced materials). In addition, the study profiled the aerospace industry, the largest downstream systems integrator industry comprised of the large system-integrator firms that oversee the design, construction and assembly of major systems and weapons platforms used for the nation's defense. While some segments appear relatively healthy and globally competitive, the overall prognosis is one of a serious weakening of a wide-range of key domestic manufacturing industries, which could seriously undermine their ability to support critical defense requirements, resulting in an ever-growing dependency on foreign sources of vital defense products.

These industries supply critical materials, components and parts used in defense systems or they are enablers and enhancers of innovation within industries important to national security, including aerospace. The movement of these industries oversea, which increases the dependence of the defense industrial base on offshore or foreign-owned components and equipment (e.g., semiconductors, PCBs, machine tools), can adversely impact national security in several ways:

- Companies that serve U.S. military requirements need a direct connection to technology advancements in their industry. This linkage is weakened if not severed if production and R&D for critical technology products are moved offshore, hurting the ability of remaining companies to supply future military needs.[vii]
- The U.S. may lack the manufacturing capacity to build weapon systems if access to state-of-the-art products produced offshore are limited if not cut off in times of emergency (including natural disasters) or war, when quick response and surge capacity are needed.[viii] As, Dr. Paul Freedenberg, Vice President of the Association for Manufacturing Technology, observed, DOD's warfighting plan "does not seem to anticipate the threat of disrupted supply lines, a concern that existed during the Reagan Administration and was an integral part of all previous administrations' war planning."[ix]
- Dependency on foreign sources of some products, such as microelectronics and PCBs, increases the possibility that "Trojan horses" and other unauthorized design inclusions, such as viruses and worms, or hard-to-defect defects placed by overseas companies seeking to sabotage U.S. defense systems.[x]

- Continued migration of manufacturing offshore is both undercutting U.S. technology leadership while enabling foreign countries to catch-up, if not leap-frog U.S. capabilities in critical technologies, important to national security.
- Once lost from U.S. shores, vital industrial capacity would be very hard to rebuild. For example, the Aerospace Industries Association (AIA) estimates that it would take at least ten years to make the American machine tool industry viable again, especially in the ultra-precision market in which the United States does not participate.[xi]

Semiconductors

The importance of semiconductors to today's information-based "network-centric" military[xii] is well understood. Preserving a world-class domestic semiconductor industry is vital to national security. Earlier in the decade, many high-level government and industry groups, prestigious independent bodies, and Congressional leaders,[xiii] began warning that the United States semiconductor industry was losing its capacity and leadership. As a result, the ability of U.S. semiconductor fabrication plants (fabs) to meet the Pentagon's integrated circuit needs is limited and diminishing. This erosion is increasingly apparent:

- The industry lost nearly 1,200 plants of all sizes between 1998-2008, a 17 percent drop, including a 37 percent loss in large establishments (over 500 employees) and a 41 percent loss of mid-sized plants (100-500 employees).
- By 2008, employment levels, number of establishments, and GDP for the industry had fallen below its 2001 levels.[xiv] In 2007, imports accounted for nearly one-half the U.S. market for semiconductor and related devices.[xv]
- The U.S. share of global semiconductor capacity has been in descent, falling to 17 percent in 2007, and 14 percent in 2009. Once the world leader in semiconductor manufacturing, the United States fell to fourth place in 2009.
- In 2009, of 16 semiconductor fabs under construction around the world, only one was being built in the United States. Meanwhile, the United States leads in fab closures: 15 out 27 fabs closed worldwide in 2009, and 4 out of 15, in 2008.

These losses have been driven by the migration of critical microelectronic manufacturing capabilities to low-cost foreign locations, which could lead to a loss of "trusted" and "assured" supplies of high-performance microchips used in critical military applications. Although U.S. semiconductor firms typically have maintained control over their design work when contracting overseas for wafer fabrication, some U.S. firms—in order to maintain close contact with their Asian customers—have also been offshoring complex semiconductor fabrication and design services.

The primary beneficiaries have been Taiwan, Singapore, China, Korea, and Japan, which increasingly have been challenging U.S. leadership in semiconductor technology. Industry and defense officials have especially been concerned about China's rapid development in this area because of its military-industrial potential.[xvi] In 2006, China reportedly accounted for 70 percent of the semiconductor designing market in the Asia-Pacific region.[xvii] In 2009, China led the world in new semiconductor factory construction.

Printed Circuit Boards

As the underpinning of nearly all electronics systems, printed circuit boards (PCBs) are critical technologies for numerous military applications. The PCB industry, including its two main divisions, *printed circuit assembly* (NAICS 334412) and *bare printed circuit board manufacturing* (NAICS 334418), have experienced significant losses in its domestic production capacity and position in global PCB markets over the last decade.

- The U.S. PCB industry has shrunk an estimated 74 percent since 2000.[xviii] The number of U.S. PCB manufacturers fell from 400 in 2004, only 20 of which made military boards, to 300 by 2009. The industry's revenues fell dramatically, from $11 billion to $4 billion between 2000-2008.[xix]
- The U.S. PCB industry once dominated global PCB production, with 42 percent of global revenues in 1984, falling to 30 percent in 1998 and to less than 8 percent in 2008.
- By 2005, between forty and fifty percent of North America's PCB orders had migrated offshore.[xx] Between 1997- 2007, the PCB industry's import penetration rate increased from 24 percent to 35 percent, and the PCB assembly import rate rose from 37 percent to 47 percent.[xxi]
- Parts and materials suppliers to the PCB industry—including suppliers of laminates, drill bits, imaging materials, specialty chemicals, film and capital equipment—have also largely disappeared from the United States.[xxii]

While the U.S. PCB industry eroded, the PCB industries in America's major trade competitors grew, with China the chief beneficiary. By 2003, while Japan's top ten PCB producers dominated with 29 percent of the global market share, the United States had fallen behind China. By 2007, China/Hong Kong had moved to the top position, accounting for 28 percent of worldwide PCB production.

Today, high-volume, low-cost, commercial PCB suppliers of components used in commercial durable goods (automobiles, appliances, heavy equipment) can provide few defense-specific components that meet sophisticated DOD requirements.[xxiii] Analysts in the defense electronics community are even skeptical that the DOD's "trusted" approach to preserve U.S. PCB supplies will be sufficient. They view it as a stop-gap—like "putting a Band-Aid on a bullet hole."[xxiv]

Machine Tools

Machine tools are the principal devices used to cut and form metal, employed in nearly all manufacturing involving metals, from autos to airplanes to ball bearings. They are among the most critical industries in the defense industrial support base, because of their importance in producing weapons systems and other products the military relies on. By most measures, the U.S. machine tool industry—including its two main divisions, metal-cutting machine tool (NAICS 333512) and metal-forming machine tools (333514) manufacturing—has been in a steep decline for over a decade.

- Between 2001-2008, the metal cutting machine tool industry shed 16 percent of its establishments and 22.4 percent of its workforce (over 8 thousand jobs), and the metal forming machine tool industry lost 17 percent of its establishments and 14 percent of its workforce (2,200 jobs); another 5,000 jobs, and 2,700 jobs, respectively, were lost in the first 6 months of 2009 alone.[xxv]

- U.S. machine tool shipments fell to $2.2 billion in 2003, the lowest level, in constant dollars, since industry data began to be tracked in the 1920s.[xxvi] Although both U.S. machine tool consumption and production grew again over the decade, by 2008 they reached only a fraction of their peak a decade ago:
- Foreign penetration of the U.S. machine tool market rose steadily from about 30 percent in 1983 to 72 percent in 2008. From 1997-2007, the import penetration rate for metal-forming machine tools rose from 63 to 91 percent; for metal-cutting machine tools it grew from 59 to 65 percent.[xxvii]
- United States was surpassed by China in 2003 as the world's top consumer of machine tools,[xxviii] and fell to fourth place by 2008. U.S. consumption was a little under 20 percent smaller than that of Japan and one-third that of China in 2008.
- The United States fell from the world's third largest machine tool producer in 2000 to seventh (behind Japan, Germany, China, Italy, Taiwan, and Korea) in 2008; In 2008, both Japan and Germany each produced four times, and China 3½ times the worth of machine tools produced in the United States.

The U.S. loss of competitiveness in the five-axis machine tool market exemplifies the serious erosion in this sector. Five-axis machine tools are among the most technologically advanced machine tools, used in the production of precision components in the aerospace, gas and diesel engines, and automobile parts, and throughout the medical, textile, oil, glass, heavy industrial equipment and tool, industries. Between 2005-2008, U.S. producers' sales of five-axis machine tools fell 11 percent, and another 60.4 percent in 2009.[xxix] Only six U.S. firms dedicated to five axis machines reportedly remain, compared to least 20 in China and 22 in Taiwan.[xxx]

Dr. Paul Freedenberg, Vice President of the Association for Manufacturing Technology, observed that the decline of the domestic machine tool industry directly reflects decline in the broader U.S. manufacturing sector. The machine tool companies' industrial customers are disappearing, either closing down or moving to another country—often China.[xxxi]

Advanced Materials

Advanced materials encompass recent advances in the development of materials that enable further development and applications in other advanced technologies.[xxxii] A 2005 National Research Council (NRC) study identified a range of materials science and engineering subfields as the most important to advanced production, and for which there are important and often critical national security applications and products. These include biomaterials; ceramics; composites; magnetic materials; metals; electronic and optical-photonic materials; superconducting materials; polymers; catalysts; and nanomaterials.[xxxiii] Because materials are so technology intensive, keeping at the cutting-edge in materials R&D is critical for remaining globally competitive in manufacturing, as well as for national security.[xxxiv]

United States has long been—and remains—the world leader in most materials-related technologies, but during the first half of the 2000s decade, the NRC warned that this leadership was eroding. This is reflected in the doubling of the U.S. advanced materials industry's global trade deficits between 2002-2006, according to the U.S. Census Bureau's Advanced Technology

Products (ATP) trade data, as foreign competitors make inroads into U.S. markets. The NRC found that:

- *Domestic materials production is disappearing and moving offshore.* Materials subsectors have consolidated significantly since 2000, driven by financial difficulties and foreign competition. Plant capacity and employment both have declined, and production of critical materials, such as specialty steels, advanced ceramics, and magnesium, has been moving offshore.
- *Materials R&D and innovation is following production offshore.* The migration of materials producers and users has harmed domestic advanced materials R&D by inducing many U.S. companies to shift materials R&D overseas. The offshore movement of manufacturing is weakening U.S. R&D capabilities in several materials technologies vital to national security, including night vision systems, lanthanides (rare earth elements), and specialty metals.
- *The margin of U.S. leadership in advanced materials R&D is eroding and increasingly challenged by other nations.* The largest U.S. advanced materials trade deficit is with Japan, whose imports into the United States grew steadily over the decade, more than doubling between 2002-2008 ($417 million to $948 million). Until 2008, China's exports outpaced imports, reflecting its increasing appetite for advanced materials products that it currently lacks sufficient internal capacity to meet. However, China is aggressively seeking to develop its own technological and production capabilities in this area.[xxxv]

Aerospace

Aerospace (NAICS 33641) is a core industrial sector fundamental to America's economic and national security. It is a major source of high-skilled, high-wage jobs in the U.S. economy, employing around 500,000 workers, or about 4 percent of the manufacturing workforce. Its primary divisions include aircraft, engines and parts, guided missiles, and space vehicles. The largest segment, the aircraft, engines and parts industries (NAICS 336411-13), depends on both commercial sales (commercial jets, regional jets, general aviation), largely tied to the health of the airline industry and the demand for air travel, and sales (military aircraft) to U.S. and foreign governments.

The end of the Cold War led to a massive downsizing, consolidation, and restructuring of the aerospace and defense industries. The number of primary aerospace firms fell from 75 over twenty years ago to only a handful of remaining prime contractors, today—Lockheed Martin, Boeing, Raytheon, Northrop Grumman, and General Dynamics—serving the federal national security and space agencies. These are major multinational corporations with interests transcending the domestic industrial base, and increasingly reliant on foreign sales. Their drive to lower costs in the face of increasingly fierce foreign competition, including offsets and other foreign trade practices, has led them to offshore large portions of their own production operations, and to rely on an increasingly global supplier base.

Since the early 1990s restructuring, aerospace sales to both commercial and military customers fluctuated widely, sometimes counter-cyclically, which has kept the industry relatively strong. After another dip in the early 2000s, due partly to both the 9-11 attack and the recession, the industry saw a market upturn in the latter half of the decade; though its sales—$204.2 billion in 2008—as a share of GDP were down from 2000 and the 1990s. Aerospace has also been one of

the sole bright spots in the otherwise dismal U.S. trade picture. It long has enjoyed a positive trade balance, led by commercial aircraft and military sales to foreign governments (often U.S. government subsidized).

There nevertheless are some troubling indicators in the industry:

- Employment levels fell dramatically after 1990, recovered later in the 1990s decade, and declined again in the 2000s decade. Total aerospace employment dropped 41 percent between 1990-2008, and 15 percent from 1998-2008. Aircraft manufacturing and aircraft engine and parts manufacturing each lost about 18 percent of their workforces between 1998-2008.
- Most losses were associated with a net loss in mid-to-large scale establishments. The aircraft engines sector, in particular, lost 9 percent of its mid-sized plants (100-499 employees) and 28 percent of its large plants (500-999 employees). [xxxvi]
- Import penetration in the aircraft, aircraft engine and engine parts, and other aircraft part and auxiliary equipment manufacturing industries rose 117 percent, 34 percent and 45 percent, respectively between 1997 and 2007.

The large second and third-tier supplier chains that provide subsystems, parts, components, and materials to the prime contractors—as described elsewhere in the report—also have been weakening. The positive trade surpluses enjoyed by the aerospace sector also reflect the heavy dependence of U.S. aerospace manufacturers on international markets for sales, which increasingly is driven by the aerospace companies strategy to secure new foreign sales using *offset agreements*.

Offsets agreements require a U.S. exporter of articles and services to foreign customers (government or commercial enterprises) to produce parts of the exported items in the foreign location or agree to the purchase of goods and services unrelated to the exported goods. Most offsets involve the export of defense items, though major commercial deals, such as Boeing's foreign sales of its aircraft involve offsets as well. Offsets as a share of total contracts between U.S. firms and foreign customers was 50 percent in 2008. Offset arrangements totaled $68.9 billion or 71 percent of the total value of defense contracts over the 1993-2008 period.[xxxvii]

Offsets arrangements have been weakening American aerospace competitiveness not only by undermining domestic capabilities, but also by transferring technological and production capabilities to foreign governments and companies, helping to enhances or create current and future foreign competitors.[xxxviii]

Other Sectors

Many other sectors provide critical materials, technologies, products and systems to the defense industrial base, ranging from the relatively "low-tech" bearings industry to cutting edge technology products such as optoelectronics. Erosion of U.S. capacity in these industries at opposite ends of the technological spectrum follows similar patterns as the sectors profiled in this report. It also illustrates the breadth of the endemic erosion in the U.S. manufacturing base that has been contributing to a weakening of U.S. defense industrial capabilities.

IV. Eroding Technology Leadership

A concern of industry leaders and policymakers is how the erosion and migration of domestic manufacturing is weakening the America's R&D and innovation capacity and undermining its global technological leadership. The design, development and production of both commercial and defense-specific technologies and products are tightly linked. As Michael Webber warned, if the U.S. manufacturing base "that props up the entire national innovation system continues to deteriorate in the United States, but grows and thrives overseas, then large numbers of America's most innovative companies might be inclined to move overseas to be closer to production and the necessary support base. . . . Significant deterioration of companies that design and make discrete components is triggering a fundamental hollowing out of the national innovation system."[xxxix]

a. Offshoring innovation

Defense procurement policy promotes civilian-military integration and the purchase of commercial-off-the-shelf (COTS) products, to cut costs and increase access to the most advanced commercial technologies. This also has made it easier for defense contractors to go overseas to purchase needed items. However, a firm's ability to design, innovate and improve on critical technologies produced for defense markets depends on its ability to draw upon the technology edge obtained in its commercial business. But, as the commercial supplier base that the Pentagon relies on for these products globalizes, this technology transfer from commercial to defense-critical products, has become more difficult to achieve. Hence, the HRS study found the following trends associated with erosion of domestic manufacturing capacity across the range of industries it reviewed:

- Weakening innovation capabilities of domestic industrial suppliers.
- The transfer of cutting-edge technologies and know-how to economic rivals and potential military adversaries.
- A decline in America's technological leadership in the world, especially in areas critical to national security.

Laboratories of production. The close link between manufacturing and innovation is apparent in each of the profiled industries. As Dr. Jack W. Schilling, Chairman of the Specialty Steel Industry of North America testified, "[o]ur plants in the specialty metal industry are our laboratories."[xl] Experts note that because of the link between manufacturing and technology development, manufacturing's migration contributes to the erosion of U.S. innovation and R&D capacity itself. For example, a Defense Advisory Group on Electronic Devices (AGED) report warned about the impact of the "off-shore movement of intellectual capital and industrial capability, particularly in microelectronics" on "the ability of the U.S. to research and produce the best the technologies and products for the nation and the warfighter."[xli]

Semiconductor R&D. As semiconductor production has moved offshore to places such as Taiwan and China, research activities have followed in many instances. The DOD's Defense Science Board (DSB) has noted that maintaining U.S. leadership in semiconductors requires preserving the "close coupling of manufacturing with the development of advanced technology and the design of leading-edge integrated circuits," which is best achieved "if development and

manufacturing are co-located."[xlii] But if production has gone offshore, the collaboration between process engineers and designers needed for leading-edge microchip development would become ineffective for the U.S. defense industry.[xliii]

PCB R&D. According to a NRC report on the PCB industry, which traced the loss of R&D to the loss and migration of manufacturing, "the traditional sources of R&D funding dropped by two orders of magnitude. In reality, the critical mass of R&D in this industry disappeared, reducing the investment in new technology to near zero."[xliv] Another major source of R&D resources. U.S.-based PCB suppliers spent about 10 percent of all U.S.-generated supplier sales on technical activities and new process and product R&D in the 1990s, but by 2003 this share was only 3 percent.

Advanced materials R&D. A NRC report on the globalization of materials R&D similarly concluded that, as U.S. materials manufacturing disappears and moves offshore, domestic materials R&D capacity also is lost. Research into the production, processing, and development of metallic materials in the United States has been declining since 1998. Many U.S. companies, attracted to the growing availability of lower-cost foreign intellectual resources, have shifted their materials science and engineering R&D activities to follow manufacturing operations overseas.[xlv] Notable examples are superalloys, composites, electronic and opto-photonic materials, ceramics, and catalysis, all with important defense and commercial applications.

Aerospace R&D. Aerospace is another a critical industry seeing a migration in manufacturing accompanied by diminished R&D capacity at home. For example, industry specialists David Pritchard and Alan MacPherson reported on Boeing's lack of R&D investment for its commercial product lines, noting that Boeing trailed Airbus with regard to R&D and capital spending for many years. The USCC has warned that "[t]he ability of the U.S. aerospace industry to attract investment and sustain a base for high-technology development is . . . reportedly at risk and may deteriorate further as more aerospace technologies migrate offshore."[xlvi]

Measuring the extent U.S. industrial R&D has eroded warrants additional research. Existing evidence shows that U.S. innovation capacity in critical industries has weakened, and may continue to deteriorate as production in these sectors moves away. As the National Academy of Sciences report *Rising Above the Gathering Storm*, concludes: "Having reviewed the trends in the United States and abroad," it was "deeply concerned that the scientific and technical building blocks of our economic leadership are eroding at a time when many other nations are gathering strength."[xlvii]

Migrating R&D. The offshore migration of U.S. innovation capabilities has also been a contributing factor in the buildup of other countries' R&D capacity
The more U.S. firms build factories overseas, the more powerful the attraction of offshore R&D becomes, as multinational companies want their facilities to be in the closest proximity possible. For example:

- Aerospace offset arrangements foster technology transfer between U.S. commercial and defense firms and foreign companies, enabling countries such as Japan, China and South

Korea to build up their own aerospace manufacturing and R&D capacity.

- NRC's study of materials R&D globalization identified several subfields—including composites, ceramics, electronics and opto-photonic materials, catalysis, and magnetic materials—where U.S. firms are moving R&D and customer support functions overseas close to the new manufacturing bases they have created. [xlviii]

While Taiwan is a principal location for contract design outfits, China and India are leading sites for foreign direct investment (FDI) by multinational corporations (MNCs) for establishing R&D centers. A Cambridge University study shows that emerging economies like India and China are favored destinations for global R&D with top MNCs, such as GM, IBM, Cisco, Motorola and GE.[xlix] The numbers and quality of U.S. investments in R&D centers in these countries have accelerated over the past decade. A major attraction is their abundant pool of highly-educated engineers and high-tech workers capable of increasingly sophisticated high-tech work, while working for wages far below U.S. or European levels

China, in particular, has benefited from foreign corporate investment in R&D and technology transfer. The USCC's 2010 report noted that FDI in China had grown from a mere trickle of a few billion dollars in the 1980s to more than $80 billion annually by 2008; it bypassed the United States as the destination for the largest amount of FDI in the world in 2003.[l] Through the different arrangements China has forged with foreign corporations, from offsets to joint ventures and R&D centers, its ultimate goal is to greatly enhance its own internal capacity for producing globally competitive, world-class technologies and products. Thus, the migration of U.S. R&D capacity is boosting the technological capabilities critical to improving the military industrial prowess of a nation that the Pentagon worries could become a formidable military opponent.[li]

New world leaders? Although the offshore migration of American R&D resources may provide short-run competitive advantages to U.S. companies, America's overall technological leadership in the world has weakened, which translates into an erosion of U.S. leadership in technology areas critical to national security. Several studies indicate that although the United States remains a world leader, if not always *the* world leader, in technology competitiveness and innovation, its leadership has slipped over the past decade, not only relative to its traditional trading partners—Europe, Japan—but to major emerging economies, most notably China and India, but also other Asian nations, such as Korea, Singapore, Taiwan, and Malaysia.

The U.S. ability to assert or maintain leadership in emerging technologies also is jeopardized, such as in advanced materials R&D and semiconductors. For example, Intel's "teraflop research chip" and 45-nanometer technology was developed in Intel-funded labs in India, indicating a transfer of advanced microprocessor design capacity. Nanotechnology is another emerging technology area where the United States has been losing ground.

b. Offshoring Critical Skills and Know-How

As the United States loses its technological edge through movements of R&D offshore, underinvestment in R&D by U.S. industry and lack of attention by the U.S. government—with the shedding of millions of skilled workers as a result—the know-how needed for maintaining and advancing U.S. technology leadership vital for national security embodied in those displaced workers, is being lost as well. The dramatic loss of manufacturing jobs since 1998 afflicting

almost every industrial sector, were accompanied by comparable losses in the number of manufacturing facilities in almost every sector, and for establishments of every size. Aside from the economic hardship suffered by U.S. workers, their families and communities wrought by this movement, the nation also is paying a long-term price for the loss of these jobs in the deterioration of U.S. industrial and technology leadership.

Specifically:

- The large-scale reduction in the American high-skilled production and science and engineering workforces as manufacturing migrates offshore is leading to the loss of critical technological know-how needed to maintain U.S. leadership in technology areas critical to economic and national security;
- The deterioration in the nation's manufacturing base and technology leadership has created significant barriers to meeting the nation's near and long-term needs for sustaining a high-skilled, high-tech workforce.

The loss of skilled production workers, scientists, engineers, and technical and professional workers across the manufacturing sector means that the next best idea, the next innovation, and the next generation of products, will be made somewhere else, not in the United States. This loss of manufacturing capacity—and the intellectual and technical capability to make things—is a profound threat to the nation's economy and national security. The seed corn of our future is being invested in someone else's economy.

V. Conclusion

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[xxiv] "Printed Circuit Boards to Become Part of DOD's Trusted Production Program," *Manufacturing & Technology News,* Vol. 15, No. 5 (March 14, 2008).

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[xxix] "Precision Machine Tool Industry Loses Its Global Competitive Edge," *Manufacturing & Technology News,* Volume 17, No. 4 (March 5, 2010), 1ff.

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[xxxi] Freedenberg, "Testimony to USCC."

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[xxxiii] National Materials Advisory Board, Division of Engineering and Physical Sciences, National Research Council (NRC) of the National Academies, *Globalization of Materials R&D, Time for a National Strategy* (Washington, D.C.: National Academies Press, 2005), 21.

[xxxiv] NRC, *Globalization of Materials R&D,* 83.Military needs have long driven the development and application of new materials. The DOD has unique demands for certain high-performance metals, ceramics, polymers, and composites. several specific materials applications important to warfighting capabilities: new lightweight materials with greater strength and functionality, materials that enhance protection and survivability, stealth materials, electronic and photonic materials for high-speed communications, sensor and actuator materials, high-energy density materials, and materials that improve propulsion technology.

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[xxxvii] U.S. Department of Commerce, Bureau of Industry and Security (BIS), *Offsets in Defense Trade, Fourteenth Study, Conducted Pursuant to Section 309 of the Defense Production Act of 1950, as Amended* (Washington, DC, December 2009), 14. In 2008, BIS reported that 14 defense contractors entered into a total of 52 new offset agreements with 17 countries worth $3.48 billion, which equaled 57.1 percent of the $6.10 billion in related contracts for the sale of defense items to foreign entities. Over the sixteen-year period, 1993-2008, the BIS reported a total of 48 firms entering into 677 offset agreements with 45 different countries related to defense export sales totaling $97.13 billion.

[xxxviii] BIS, *Offsets In Defense Trade, Ninth Study*, 3-1; BIS, *Offsets In Defense Trade, Fourteenth Study,* 14: "Other kinds of offsets, such as technology transfers, may increase research and development spending and capital investment in foreign countries for defense or non-defense industries, thereby helping to create of enhance current and future competitors for U.S. industry."

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[xlv] NRC, *Globalization of Materials R&D,* 85.

[xlvi] USCC, *2005 Annual Report,* 105.

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[l] U.S.-China Economic and Security Review Commission (USCC), *2009 Report to Congress* (Washington, DC: USCC, November 2009), 58. Over the first half of 2009, largely because of the worldwide recession, China FDI fell by nearly one-fifth, though it retained its lead among the main destinations of FDI.

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Mr. TIERNEY. Thank you, Mr. Baugh.
Mr. Gordon.

STATEMENT OF MARK GORDON

Mr. GORDON. Chairman Tierney and members of the committee, on behalf of our members, 1,700 corporate and 83,000 individual members, I am pleased to appear before the House Subcommittee on National Security and Foreign Affairs today to discuss the national security implications of the U.S. manufacturing policy and to present some recommendations to improve that policy.

Succinctly, the U.S. manufacturing sector is of vital importance to our country, given its enormous impact across the fundamental underpinnings of our Nation's security, both economic and defense related. Manufacturing remains the largest productive center—sector in the overall economy at 12 percent and the U.S. produces more goods than any another country, although it is close. Manufactured goods also represent 50 percent of country's exports, limiting the deficit and our balance of trade. And to further bolster its importance, manufacturing generates a substantial benefit from other economic sectors, multiplying each dollar spent within the sector of manufacturing into an additional $1.41 in other sectors, higher than any other one. This raises the complete impact from the manufacturing sector to one-quarter of our GDP.

An often overlooked aspect of manufacturing is not simply the size of the sector, but the fact that manufacturing creates wealth within the United States by producing something of higher value from materials or components. There is only three ways of creating wealth—dig it up, grow it or make it. And unlike other wealth creating sectors, manufacturing jobs are generally high paying and represent an entry into the middle class for a large portion of the work force.

Our national security depends heavily upon our domestic manufacturing capabilities. The DOD relies upon the industrial base for leap-ahead, innovative technologies to provide combat equipment for our warfighters, and upon trusted domestic suppliers to deliver on time and at quality.

In my testimony today I would like to discuss four main things vital to manufacturing policy—leadership, research and development, strategic capabilities, and then work force and infrastructure.

The defense manufacturing capabilities have to be elevated to a higher level in the scope of U.S. policy considerations, and this requires active and senior leadership. To crystallize this point, let me make a simple comparison. The agriculture sector represents 1 percent of GDP, employs 1 percent of the work force, and is represented by a Cabinet Secretary. The manufacturing sector is 10 times larger and is represented by an Assistant Secretary for Manufacturing and Services within the International Trade Administration of the Department of Commerce.

In turn, defense manufacturing issues need more senior leadership within the Department of Defense to unite policy, strategy, investment, and implementation. This is a strategic requirement above all others, and I have recently seen congressional language on this topic.

Manufacturing research and development is literally the core of our national engine. Seventy percent of R&D in the United States is performed by manufacturing companies, and the technology and innovation results will make the United States more competitive, but only if the results of the R&D stay in the United States and add to the GDP. But simply, if R&D stays within the United States it represents an investment for us. If it goes offshore it represents simply a cost and the country gains little benefit from the R&D.

Turning to R&D for national security, DOD has a single program that is chartered under USC Title 10 to develop and transition manufacturing capabilities for defense systems. The DOD ManTech program. This program has recently delivered to Congress a strategic plan titled "Delivering Defense Affordability," with four strategic thrusts, and I have referenced the executive summary with my testimony today. However, more investment is needed. A Defense Science Board study recently concluded that the proper investment level for ManTech should be 1 percent of RDT&E, a 3 times increase.

Now for strategic considerations one of the most critical balancing acts that we've heard today with an industrial policy is between open competition and active support or subsidy of an industry capability. Industrial capabilities and manufacturing processes, raw materials components and technologies are disappearing from United States every day, and while some can be replaced with overseas suppliers, this is not possible for defense essential needs where access to domestic sources is a national security requirement. Therefore, when absolutely necessary the department will intervene to create or sustain essential manufacturing capabilities. There is a program that is part of the Defense Production Act, that needs to be adequately funded and fully utilized across the whole of government in order to help this.

Other strategic needs, the need for steady long-term access to affordable raw materials, counterfeit parts, environmental regulations and visibility into the lower levels of the supply chain. An NDIA white paper titled "Maintaining a Viable Defense Industrial Base" lays out the technical challenges and policy opportunities for each of these issues.

Finally, advance manufacturing technologies require a work force with core technology, skills, and an updated industrial infrastructure that is highly connected and enterprise driven for the future of the United States. An effective role for the defense industry would be as a first adopter for many of these enterprise level, advance manufacturing practices which would then transition to the domestic manufacturing base and help strategically position the United States in the increasingly hypercompetitive global economy.

Chairman Tierney, I'm honored to have this opportunity to provide with you an industry perspective on the critical nature of manufacturing and would be available to answer your questions.

[The prepared statement of Mr. Gordon follows:]

Testimony

of

Mark A. Gordon

Member of the Manufacturing Division of the

National Defense Industrial Association

House Committee on Oversight and Government Reform,

Subcommittee on National Security and Foreign Affairs

September 22, 2010

Chairman Tierney and members of the Committee, I am Mark Gordon, Director of Defense Programs at the National Center For Advanced Technologies and a member of the Executive Committee of the Manufacturing Division at the National Defense Industrial Association (NDIA). On behalf of the 1704 corporate members of NDIA including 83,000 individual members, I'm pleased to appear before the House Subcommittee on National Security and Foreign Affairs today to discuss the national security implications of U.S. manufacturing policy, and present several recommendations to improve that policy.

It must seem odd to some in the field of manufacturing and industrial production that after years of raising the alarm about the destructive trends in the U.S. industrial base and the lack of investment in vital manufacturing science, manufacturing technologies, and production infrastructure that the recent economic crisis brought on by the financial sectors has focused more attention on the inherent value of the U.S. manufacturing industrial base. This increased focus is driven by a growing recognition of the crucial role that manufactured goods play in our economic security and the potential for future growth. Likewise, the impact on National Security from an Industrial Base under pressure is beginning to get attention in critical forums such as this.

Simply put, the U.S. Manufacturing sector is of critical importance to our country, given its enormous impact across the fundamental underpinnings across many aspects of our nation's security, both economic and defense related. While manufacturing has been declining as a percent of our GDP since the 1950s, manufacturing still remains the largest productive sector in the overall U.S. economy at 11%, and the U.S. produces more goods than any other country — almost $1.6 trillion worth in 2009, according to the Federal Bureau of Economic Analysis. Manufactured goods also represent 50% of the country's exports, limiting the deficit in our balance of trade.

The most critical benefit of manufacturing is not simply the size of the sector, but that manufacturing CREATES wealth within the U.S. by producing something of higher value from materials or common components. There are only three ways of creating wealth: Dig

it up, Grow it, or Make it. It is not a service sector which simply transfers wealth between entities; rather, it creates something of inherent value. And unlike other wealth creating sectors, such as mining or agriculture, the jobs produced by manufacturing activities are generally high paying and represent an entry into the middle class for a large portion of the workforce. To further bolster its importance, the U.S. Bureau of Economic Analysis (BEA) shows the manufacturing sector to generate a substantial benefit for other economic sectors, showing that manufacturing multiplies each dollar spent within the sector into an additional $1.41 of economic activity, higher than any other economic sector.

Our National Security depends heavily upon our domestic manufacturing capabilities: the Defense Department relies upon the US defense industrial base for leap-ahead, innovative technologies with which to equip our warfighters and our national security is contingent upon our economic strength and viability. It is critical to understand that in the defense sector, if the government doesn't fund a particular system, industry will abandon the effort, including the underlying industrial capabilities. Work force and resources will move on to other funded programs. The segment that is not funded will eventually wither and industry will lose that capability, and once lost, these domestic capabilities take substantially more time and funding to regain. The US industrial Base is in crisis and needs attention, and based upon several key studies, the Defense Industrial base is facing a similar and parallel crisis. Moreover, the current government procurement policies will not produce the competitive, responsive, efficient and innovative industrial base that is required to face these challenges.

In my remaining testimony today, I would like to discuss four main themes for dealing with manufacturing: Leadership and cultural perceptions; Research and Development in Manufacturing; Strategic Manufacturing Capabilities for National Security; and Workforce and Infrastructure.

Leadership and the Cultural Perceptions

It should be fairly obvious at this point that manufacturing and the health of the industrial base has to be elevated to a higher level in the scope of U.S. Policy considerations, and this

requires active and senior leadership, both within the Administration and the Defense Department. To crystallize this point, let me make a simple comparison: the Agriculture sector represents 1% of GDP, employs 1% of the workforce, and is represented by a cabinet Secretary. The manufacturing sector is 10x larger and is represented by an Assistant Secretary for Manufacturing and Services within the International Trade Administration of the Department of Commerce. Manufacturing and the industrial base are important enough for representation by at least a Deputy Secretary, which would also raise the level of coordination between government agencies.

In turn, defense manufacturing issues need more senior leadership within the Department of Defense, to unite policy, strategy, investment and implementation. Currently the DoD has a Director for Industrial Policy, with responsibility for stimulating competition and sustaining industrial capabilities within the defense industrial base. This office monitors the industrial base and uses authorities to promote competition or defense priorities over commercial production. However, DoD requires senior leadership for manufacturing which has the authority to define strategy and set policy, but also implement R&D alignment, infrastructure revitalization and workforce investment across all of DoD. I have recently seen legislative proposals to create a position such as this.

There is also a problem in this country with the perception of manufacturing. In a recent survey by the Manufacturing Institute and Deloitte, 81% of respondents believe that America's manufacturing base is either important or very important to their standard of living and to economic prosperity, and 77% think the U.S. needs a more strategic approach to the development of its manufacturing base. However, only 30% of respondents would encourage their children to pursue a manufacturing career. The perception is that manufacturing is something akin to a 1900 iron foundry, but the reality is a manufacturing workforce as likely to use a keyboard as a wrench, and operates in a clean, safe environment. The government needs to change this perception in order to get the high-caliber workforce which is needed for the high-tech manufacturing, particularly in the defense sector where the workforce is aging.

Research and Development

Manufacturing research and development is literally the core of an innovation machine that this nation's economic engine is founded upon. Specifically, 70% of industrial R&D is performed by manufacturing-based companies, and the bulk of that R&D is applicable to manufacturing processes and procedures. This R&D results in the application of new technologies, new materials, and overall increased productivity within the manufacturing processes. All of these advances can make U.S. manufacturing more competitive within the global market, but only if the results of the R&D stay in the U.S. and add to the GDP for a significant period. Put simply- if R&D stays within the U.S., it represents an investment; if it goes offshore, it represents a cost and the country gain little benefit from the R&D.

The federal government has a role in the determination of R&D priorities, development of R&D clusters, investments for national security, and leveraging/incentivizing private industry investment. A crucial need at the macro level is the planning and management of a collaborative and highly connected research enterprise which spans large and small businesses, academia, and government research labs. Recent studies of best in class foreign R&D strategies have concluded that developing regional "Clusters" of specialized R&D partners provide the most effective model for government, academic and industry innovation, and increase the probability of transition to domestic manufacturing capabilities. These clusters also offer the highest leveraging potential for government investment and have proven to drive associated capital investment in regional facilities and infrastructure. Government policy should support the formation and management of these clusters by offering a centralized process for creating and developing them and provide for collaboration between these clusters utilizing a 'Hub and Spoke" model. Collaboration between the clusters offers innovation and product development opportunities that drive technology transition into complex systems, which offer the greatest benefits.

Turning to Manufacturing R&D for national security, the Defense Department has a single program that is chartered under USC Title 10 to develop and transition manufacturing processes and fabrication required for the production and support of Defense Systems: The DoD Manufacturing Technology (ManTech) Program. For over 50 years, the ManTech Program has been department's investment mechanism for staying at the forefront of defense essential manufacturing capability. This program has recently (March 2009)

delivered to Congress a strategic plan titled "Delivering Defense Affordability," and I have enclosed a copy of the executive summary with my testimony today. This plan establishes four Strategic Thrusts for the program:

1) Effective management and **delivery of processing and fabrication technology** solutions
2) Active support for **a highly connected and collaborative defense manufacturing** enterprise
3) Active support for a **strong institutional focus on manufacturability** and manufacturing process maturity
4) Active support for a healthy, sufficient and effective **defense manufacturing infrastructure and workforce.**

The effectiveness of this joint program is well demonstrated: a recent report to Congress identified over 100 projects funded by ManTech from FY03-FY05 which have been implemented and yielded a cost avoidance of $6.3B! However, the investment in the ManTech program, currently averaging $210M level in the President's FY11-FY16 budget, is not at the level required to effect substantial changes in the defense industrial base. A 2006 Defense Science Board study on the ManTech program concluded that the proper investment level for ManTech should be 1% of the DoD RDT&E budget, or about $700M. This investment level would enable the DoD to pursue technical solutions for the most pressing defense manufacturing and industrial base problems facing the U.S. today and in the future.

Strategic Capabilities for National Security

One of the most critical balancing acts within the industrial policy domain is between open market competition and the creation or subsidizing of a domestic industrial capability. Industrial capabilities in manufacturing processes, raw materials, components, and technologies are disappearing from the U.S. every day in the form of off-shoring, business failures, supplier mergers, material shortages, global environmental restrictions and lack of demand. In some cases, disappearing domestic capabilities can be replaced with oversea suppliers, but this is not possible for defense-essential capabilities, where access to

domestic sources is a national security requirement. The current Defense industrial policy is to rely on market forces (competition) to create, shape, and sustain the industrial, manufacturing, and technological capabilities necessary to provide our fighting forces with systems that can engage and win full-spectrum warfare. However, when absolutely necessary the Department will intervene to create and/or sustain competition, innovation, and essential industrial capabilities. If intervention is warranted, the department can use mechanisms such as direct investment in supplier infrastructure, leveraging R&D investments, procurement assistance, purchase commitments, or collaboration with other federal agencies to drive growth in domestic vendor demand.

One vital program which provides direct support for defense-essential manufacturing capability is the Title III program, part of the Defense Production Act. The Title III program provides a set of broad economic authorities, found nowhere else in law, to incentivize the creation, expansion or preservation of domestic industrial manufacturing capabilities for technologies, components and materials needed to meet national security requirements; each of which is determined through extensive evaluation as both defense essential and in need of support. The Title III program has the following four authorities:

1) Purchases/Purchase Commitments *(Sec. 303a)*
   - Purchases provide direct subsidy to company to assist in establishing production capacity
   - Purchase Commitments
2) Installation of Production Equipment *(Sec. 303e)*
3) Development of Substitutes (through R&D contracts) *(Sec. 303g)*
4) Loans/Loan Guarantees

The Title III program is, unfortunately, small in comparison to the needs of the industrial base, and multiple studies and reports have recommended a 10x increase in the funding, which has not been forthcoming.

Another critical issue is the need for steady, long-term access to affordable raw materials. Sometimes, having domestic manufacturing capability is not enough, as in the case of secure access to raw materials. A U.S. industrial base can depend upon materials which are not readily available or affordable, causing additional cost, schedule or failure. The Government Accountability Office concluded that the Defense Department lacks a consistent, department-wide framework to monitor its supplier base. This vulnerability is particularly salient for strategic materials such as titanium, cobalt and rare earth materials, which have major applications in advanced weapons systems such as smart bombs, night-vision goggles and radar. Today, China produces 97.3 percent of the world's supply of rare earth minerals; Russia produces 1.6 percent, while the United States produces only 1.1 percent. Policy is needed on this topic establishing a federal-level working group to identify and act upon the multiple options, such as stockpiling, pursuing trade violation cases, developing domestic/alternate sources, or entering into long-term purchase commitments.

Other key requirements exist for defense manufacturing, including the growing problems with counterfeit parts, environmental regulations, and visibility into the lower levels of the supply chain. Counterfeit parts are increasingly finding their way into the defense supply chain, particularly for legacy systems with longer life cycles. A key enabler for reducing counterfeit components is dealing with domestically based trusted suppliers, using a Qualified Vendor List. Trusted suppliers keep record of all transitions and thus can trace parts back to the Original Equipment Manufacturers (OEMs). However, in cases of obsolescence, there are no longer parts available from the OEM, and sources are used to procure these parts which do not have clear providence. The DoD is defining both processes and technologies which can assist the procurement workforce in spotting and rejecting counterfeits.

Similarly, there are a growing number of environmental regulations establishing de-facto global restrictions on critical manufacturing materials. An NDIA White Paper, "Maintaining a Viable Defense Industrial Base," lays out the dangers of global manufacturing standards, such as the elimination of lead-based solder and hexavalent chromium corrosion coatings. In the case of solder, the substitute lead-free solders are much less reliable than traditional

tin-lead solders for aerospace and defense applications that involve harsh operating environments and long operating lives. Also, the United States is increasingly unable to obtain Commercial-Off-the-Shelf (COTS) electronics that contain tin-lead solders and finishes. Further, pure tin finishes being increasingly used by COTS electronics suppliers as a low-cost approach to avoid the use of lead are prone to the random growth of "tin whiskers" that can lead to unpredictable short circuit failures. The solution demands focused investment in the development of alternative materials that offer performance equal to or better than the ones replaced, and a clear DoD policy determining how to identify and apply alternatives.

Finally, a crucial tool for assessing the U.S. defense industrial base is visibility into the lower levels of the supply chain, at the second and third tier. Traditionally, DoD takes the responsibility for monitoring the capabilities and competitive viability of prime contractors, OEMs, and key first tier suppliers. The capabilities and viability of lower tier suppliers is monitored by the primes and OEMS, which have access to and contracts with these suppliers. The recent economic challenges have highlighted the dangers in not understanding these lower tiers, which are predominately small businesses and most at risk for failure from demand volatility or access to capital. This situation must change and DoD policy should specifically state that the DoD is responsible for monitoring and stress-testing the industrial base to the lowest levels. Technology advances should help these assessments, with newer modeling of supply chain networks able to stress-test the vendor networks and highlight risk.

Manufacturing Workforce and Infrastructure

The manufacturing workforce has been shrinking over the past 40 years, as productivity increases have allowed manufacturing output to remain steady using fewer labor hours. However, in the past two recessions (2001, 2008), the drop in employment has been precipitous, with over 4.5 millions manufacturing jobs lost in the past 10 years. The reason for this large decrease has been the reinforcing interaction of three forces: offshore manufacturing, increased productivity and a decline in manufactured goods demand during the recessions. Offshoring is a response to lower foreign structure costs, and

increased productivity is the natural competitive reaction to those costs. The only method of increasing employment in the manufacturing sector is to increase the demand, either domestically or through exports, and this requires new technology, either in terms of new products or, more often, advanced manufacturing. Advanced manufacturing technologies, particularly at the enterprise level, requires a workforce with special skills, such as familiarization with 3-D models, distributed supply chain interaction and digital work instructions. These skills will be required in the near future in order for the U.S. to compete in either the domestic or export markets, and there are no current government programs or leadership to drive this innovation into the workforce. Unfortunately, many sectors of the workforce in China already have developed these skills (for example, in CNC machinery).

Moreover, our industrial infrastructure, and particularly that which supports defense manufacturing, has to be updated into a highly connected enterprise in order to enable the most advanced manufacturing practices. The use of Service Oriented Architectures and Model Based Engineering requires substantial infrastructure investments, and policies are needed to incentivize these capital improvements within both the nation's industrial base and the government organic base. An effective role for the DoD would be as a first adopter for many of these enterprise- level advanced manufacturing models. This would inevitably lead to a standards-based U.S. lead in these techniques and practices, which would transition to the domestic manufacturing base, create significant growth potential for new, cutting-edge U.S. manufacturing jobs, and help strategically position the defense industrial base in the increasingly hypercompetitive global economy.

Chairman Tierney and members of the Committee, I'm honored to have had this opportunity to provide you an industry perspective on the critical nature of Manufacturing to our nation. I believe that focusing on the four themes which I have covered, in addition to the on-going structural cost issues, will enable the U.S. manufacturing industries to stabilize and regain strength to provide for our economic and national security. Speaking

for the NDIA membership, I thank you all for pursuing valuable additions to U.S. Manufacturing Policies.

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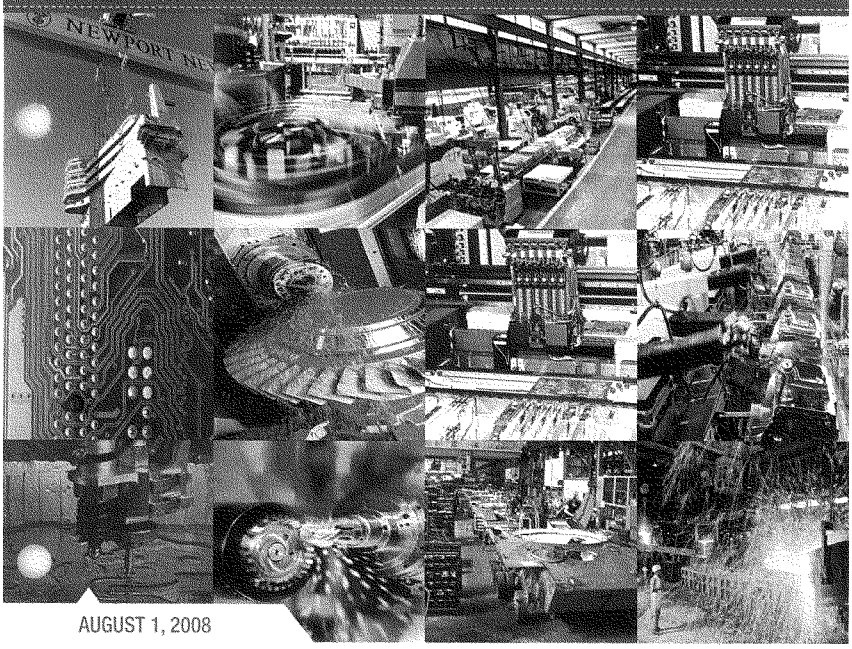
MANUFACTURING DIVISION

MAINTAINING A VIABLE DEFENSE INDUSTRIAL BASE



AUGUST 1, 2008

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Promoting National Security Since 1919

Preface

The origin of the National Defense Industrial Association (NDIA) dates back to 1919 with the formation of the Army Ordnance Association, which was later renamed the American Defense Preparedness Association (ADPA). With the merger of ADPA and the National Security Industrial Association (NSIA) in 1997, NDIA has become America's leading defense industry association promoting national security. NDIA is a non-partisan, non-profit, educational association located in Arlington, VA.

NDIA's mission is to advocate cutting-edge technology and superior weapons, equipment, training and support for the Warfighter and First Responder; promote a vigorous, responsive, Government-Industry National Security Team; and provide ethical forums for the exchange of information between industry and Government on National Security issues.

The Association's membership consists of companies and individuals from the broad spectrum of the defense and national security industrial base. Corporate member representatives are organized into thirty-two functionally oriented Divisions that serve as the vehicles by which NDIA brings attention and focus to a wide variety of defense industrial base sectors. NDIA's Manufacturing Division focuses its interests and actions on enhancing the security of the United States by promoting interaction and collaboration between government and industry in the vital areas of manufacturing research, design, development, test, technology and production.

Specifically, NDIA's Manufacturing Division:

- Advocates national support for defense manufacturing
- Promotes defense manufacturing excellence
- Supports promising manufacturing technologies, processes, and implementation methodologies
- Supports efforts to educate, recruit, and train a highly skilled defense manufacturing workforce
- Conducts government-industry forums focused on defense manufacturing
- Conducts research and analysis on manufacturing trends and policies

NDIA's Manufacturing Division has prepared this document to inform U.S. leaders of the current issues facing U.S. manufacturing, and the effort needed for the U.S. to maintain a strong defense manufacturing base, capable of surging to meet our Nation's needs in times of crisis.

Sincerely,

Lawrence P. Farrell, Jr.
Lieutenant General, USAF (Ret.)
President and CEO

Cover Graphics

NDIA Manufacturing Division wishes to acknowledge the organizations listed below for the manufacturing images employed on the cover of this document.

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Promoting National Security Since 1919

Executive Summary

The Manufacturing Division of the National Defense Industrial Association (NDIA) works to ensure the U.S. defense manufacturing industry is capable of providing critical supplies and equipment needed by our warfighters and first responders. This is particularly challenging in today's dynamic business environment. It is important that our federal government policy makers understand these dynamics and implement effective policies to maintain U.S. superiority. Serious manufacturing-related issues impacting U.S. defense industry include:

1) Manufacturing Technology. The U.S. must continue to develop and implement advanced process technology to enable new product development and promote greater productivity. Technology is the key to U.S. manufacturing superiority in the 21st century. Increasing the DoD ManTech budget is a start, but providing more funding for process development and providing incentives to encourage industry adoption of new technology is also a necessity.

2) Lack of a Skilled Manufacturing Workforce. The manufacturing workforce is aging. Help is needed to attract, educate, and retain future generations of skilled manufacturing workers. Programs are needed to encourage and promote manufacturing, especially defense manufacturing, as an important, respected and desirable career path.

3) DoD Supply Chain. Original Equipment Manufacturers (OEMs) are becoming systems integrators and relying more on a global supply chain. The key technologies and components needed by OEMs for increasingly complex weapons systems require development of new ways to communicate with an ever expanding supply chain.

4) Modernization of Defense Manufacturing Facilities. U.S. defense industry manufacturing facilities, especially government-owned facilities, often employ aged processing equipment and methods. Many foreign nations like India and China, are installing modern process technology as they build new manufacturing facilities. Investment is needed in U.S. defense industry facilities to improve our production capability and assure timely delivery of supplies and equipment needed by our warfighters.

5) Global Competition. Globalization is here and U.S. companies are competing against companies all over the world that have lower labor costs, the most modern processing equipment, and government policies that create an uneven playing field. We must encourage U.S. companies to invest in defense manufacturing infrastructure, and create a business environment that will help them compete on a global basis.

6) Manufacturing and Local Economies. Manufacturing employment has declined by over eight million jobs (36.3%), in the last twenty years. Today, there are 14 million manufacturing jobs across the U.S. - the same number we had when Harry S. Truman was President. Manufacturing jobs support a disproportionate share of local economies, making them a vital ingredient to healthy cities and towns across the U.S.

7) Environmental Protection. Defense industry is aware of the need to care for the environment and has responded. Industrial efforts are addressing the need to reduce hazardous elements, like Cadmium, Chromium and Lead. In addition, industry is pursuing alternative energy sources

and reduced energy consumption, and decreasing their environmental footprint and dependence on foreign energy sources. A key current challenge for industry is legislation mandating the elimination of certain materials from production prior to the availability of viable alternates, such as the elimination of the use of lead in solder for electronics.

Key Issues

I. Manufacturing Technology

Position: If we lose our preeminence in manufacturing technology, then we lose our national security. The U.S. must accelerate its development of new innovative manufacturing technologies and processes. This is the only thing that will allow us to enable product development and maintain a competitive industrial base. NDIA calls for the creation of an environment that promotes collaboration and that fosters development of innovative manufacturing methods, just as has been done for basic and applied research across the sciences. NDIA supports implementation of the recommendations contained in the February 2006 Report of the Defense Science Board Task Force on DoD Manufacturing Technology (ManTech).

Background: If we are to maintain the best fighting capabilities, our warfighters must be continually supplied with products of the highest performance and reliability. This will not happen without continuous advancements in manufacturing technology. Foreign firms and an increasing number of U.S. multi-national companies are gaining competitive advantage in collaborative innovation and commercialization research outside the United States. This presents a fundamental challenge to U.S. defense manufacturing competitiveness, as well as domestic manufacturing capabilities in other sectors.

Techniques used to manufacture products in the past are not capable of producing the latest defense and commercial products designed with new advanced materials, more complex shapes, and to more exacting tolerances. In many cases, new products are possible only through advanced manufacturing technologies, which can enable higher temperature, lower weight, or increased protection. In short, manufacturing technology is an enabler that must precede or be aligned with product development, starting with defining the product requirements.

There is strong consensus in industry, academia, and government that future U.S. manufacturing competitiveness will be primarily determined by how quickly new technology is integrated into high-value-added products and high-efficiency processes. Development of manufacturing technology has become more systems based and interdisciplinary, and therefore must be considered at the beginning of the product development cycle and continually addressed throughout all phases of the product lifecycle. To accomplish this, manufacturing readiness level (MRL) metrics for manufacturing process maturity have been developed and piloted in Science & Technology (S&T) and Acquisition programs, and now it is time to implement them across the Department of Defense and defense industry.

Commercial businesses are not positioned to successfully invest in long-term, high risk research activities by themselves, especially for defense manufacturing technologies. Venture capital has shifted its attention to short-term scalable projects. Federal funding typically does not support critical research beyond the "valley of death" and through commercialization. This shortcoming has been identified numerous times in the Small Business Innovation Research (SBIR) program, in our Federal Laboratories, and from a variety of university research programs. Today, it is more important than ever support and incentivize manufacturing technology advancement.

Recommendation: Specific manufacturing technology recommendations include:

1. Intensify efforts to establish and support advanced collaborative activities between federal, state and local governments, and consortiums, universities and commercial businesses that will promote defense manufacturing-focused innovation and advance the commercial manufacturing capability of the United States. Consider best practice models, such as the Rolls Royce partnership with the University of Sheffield and the British Government.[1]
2. Revive the joint-service Advanced Manufacturing Enterprise (AME) subpanel within the DoD ManTech program to manage collaborative research for "above the shop-floor" initiatives such as Model Based Manufacturing, Global Collaborative Manufacturing, Network Centric Manufacturing, and Sustainable Manufacturing.
3. Require the use of Manufacturing Readiness Levels to assess production risk at all milestones, and include manufacturing considerations in the DoD Acquisition Process from requirements through disposal.
4. Balance the S&T (product technology) investment with appropriate manufacturing process technology investment, as described in the 2006 DSB report on DoD Manufacturing Technology.
5. Emphasize the importance of measurements and standards (e.g. NIST) for adopting new manufacturing technologies, such as for nano-technology initiatives and collaborative model-based manufacturing.
6. Require consideration of manufacturing readiness technology criteria in all military logistic decisions and operations to ensure warfighters and first responders receive only the best and most sustainable equipment.

II. Manufacturing Workforce

Position: A highly skilled workforce is the lifeblood of any successful company, industry, or national economy. The majority of manufacturing companies in the U.S. now report a moderate to severe shortage of qualified engineers, scientists, technicians, and skilled production employees. The vast majority of created jobs in the future will require technical skills beyond the high school level; those same skills which are currently in short supply. An inability to fill these positions with skilled employees will contribute to the decline of the United States as a world economic power and the eventual decline in the standard of living of many U.S. citizens.

Background: In addition to the increasing demand for a skilled workforce, there are serious issues on the supply side of the workforce equation. The trend is getting worse as our older workers are not staying in the manufacturing workplace and our youth are not going into it at all. Adding to the problem, the U.S. education system is not keeping pace with the knowledge and skills necessary to compete in the 21st century global economy. Worse yet, more than 30% of ninth graders drop out

[1] See web page http://www.sheffield.ac.uk/business/portfolio/rr.html

from school prior to graduation. Only 18% eventually graduate from college and only half of those will receive technical degrees.

The manufacturing workforce in the United States stands at just over 14 million people, 25% less than it did 25 years ago. Over 50% of the workforce decline can be attributed to just 6 of the 27 business sectors: Apparel, Fabricated Metal Products, Machinery, Computer, Electronic Product, and Transportation Equipment. Each of these industries is critical to supporting our warfighters. If we do not manufacture the products, then we will not be in position to improve them. If we do not improve our current products, we will lose our technological preeminence. Increased emphasis is needed to attract, educate, and retain skilled workers.

Recommendation: In addition to the initiatives currently sponsored by industry, the federal government should:

1. Increase federal support of STEM (Science, Technology, Engineering, & Math) education initiatives.
2. Require school systems to enhance career counseling of all middle and high school students on their options for entering post-secondary education and/or the workforce.
3. Provide federal scholarships to students/workers pursing manufacturing engineering degrees and willing to work in a manufacturing environment for at least three years after graduation.
4. Include manufacturing workforce development criteria in the source selection evaluation process for federal contracts.

III. DoD Supply Chain

Position: We must transform the U.S. manufacturing supply chain with a Network Centric Manufacturing capability in order to preserve our national security.

Background: The world of the 21st century is indeed a Flat World. The impact of Globalization on U.S. manufacturing has been dramatic and devastating. It has contributed to the 3.5 million jobs lost in the manufacturing sector over the last seven years alone, and more importantly poses a threat to our National Security. For with each lost manufacturing job, our defense manufacturing capability declines. Today, the U.S. depends on other nations, who are not necessarily our friends, for strategic materials and technology. This is not an acceptable position for the United States of America.

In 2005, a report from the National Academy of Science said, "Americans are feeling the gradual and subtle effects of globalization that challenge the economic and strategic leadership enjoyed by the U.S. since World War II." In 2008, those effects are no longer subtle or gradual. They represent a real and present threat to our National Security by jeopardizing the long-term technical superiority of our weapons systems.

In March 2006, the General Accounting Office issued a report on the challenges faced by DoD in managing its supply base which states, "Changing security threats, rapidly evolving science and technology, and budget imbalances have created an uncertain acquisition environment." The problem exists on both sides, with the customer and with the supplier.

From the supply side, the transformation in manufacturing has already begun. OEMs are becoming integrators of systems and subsystems, which are not just manufactured by the supply chain, but increasingly are invented, designed and developed by other companies. Therefore managing the supply chain is becoming more complex and requires a total enterprise approach, or "Network Centric Manufacturing."

Network Centric Manufacturing takes full advantage of innovations from all tiers in the Supply Chain as well as from OEMs, integrators, universities, and the customer. It enables innovation throughout the extended enterprise and across the total life cycle of products ranging from complex systems to legacy parts.

Network Centric Manufacturing consists of "an enterprise capability that is customer focused and information based, one which embraces innovation, builds from the best commercially available capabilities, promotes appropriate competitiveness, and is resistant to many kinds of disruption." This approach requires a view of manufacturing that must include systems analysis, advanced manufacturing technologies, and culture and behavior changes. To facilitate and encourage this change, a number of new and creative programs and funding must be put in place to serve both the general economy and the defense manufacturing enterprise. The achievement of this objective requires political leadership of the highest order.

Recommendation: Establish a federally mandated Blue Ribbon Panel to report within 6 months on a series of initiatives to address those actions required to improve the agility, competitiveness and viability of the general manufacturing industry in the United States with particular emphasis on defense manufacturing and national security considerations.

IV. Modernization of DoD Manufacturing Facilities

Position: The U.S. must continually invest to modernize facilities that produce, repair and/or maintain equipment and supplies critical to our warfighters and first responders. No other nation on earth leaves this burden strictly on the commercial sector of the economy. The government must act to promote a favorable business environment for those industries which constitute the DoD supply chain, and thereby facilitate investment that enables companies to be globally competitive.

Background: Today, there are large numbers of facilities that are government-owned and government or contractor operated, including numerous Army and Air Force depots, Navy shipyards, and munitions plants. However, the infrastructure of many of these facilities is antiquated, requiring significant investment and upgrade in order to appropriately service the needs of today's U.S. military. Much of the equipment being used to manufacture or repair equipment critical to the warfighter was originally built and installed decades ago. As an example, the 10 government-owned and contractor operated (GOCO) ammunition plants have structures and equipment that were originally installed in the decade following WWII. Navy shipyards and DoD depots are in a similar situation.

To remain globally competitive, U.S. companies must continually invest in modern manufacturing infrastructure. Driving productivity up, reducing labor hours, and increasing efficiency is critical to

remaining globally competitive. Private industry recognizes that without planned periodic capital investment it cannot compete against aggressive, well-equipped international manufacturers.

Globalization is a fact and not a cliché. U.S. manufacturers compete against foreign companies with low cost labor operating the most modern equipment. Some countries, like China, emphasize (and even require) the use of new equipment, often subsidized by the government. Their production rates and quality are improving at an increasing rate. The U.S. must promote a business environment that incentivizes defense industry to invest in their defense manufacturing infrastructure.

Recommendation:

1. DoD and Congress must budget for, and commit to, long-term funding in order to support and maintain manufacturing excellence within government-owned manufacturing facilities.
2. An Industrial Modernization Incentive Program (IMIP) for capital investments must be revisited and updated to reflect changing global market conditions.
3. A mechanism must be introduced that offers favorable interest rates, tax breaks, and other incentives to companies prepared to invest in the procurement of state-of-the-art manufacturing equipment.
4. A nationally recognized program to reward defense suppliers that invest in modernization should be introduced and linked to a "Score Card" to be considered during Source Selection and Evaluation.
5. The opinions of industry participants in government-owned facilities should be given more "formal" weight in decision-making processes related to the military industrial base.

V. Globalization

Position: Globalization is here and U.S. manufacturers are competing against foreign companies, many of which have lower labor costs, are utilizing the latest (government sponsored) technologies, and are operating within foreign states that do not share the same policies as the U.S.

Background: Globalization is viewed as both good and bad for U.S. manufacturers. Many large U.S. companies see globalization as expanding markets, yielding more opportunity to drive overall revenue growth. The large companies also view globalization in the context of an opportunity to expand their outsourcing, which provides additional competitive pressure to keep supply chain costs low.

For manufactures participating in the supply chain of global companies, globalization can be a concern. Globalization often means competing against companies with lower labor cost, which is common throughout the Asia Pacific area including China and India. Companies in these areas often have new facilities with the most advanced process technology. Further, many of these countries do not operate on a level playing field with the U.S. with respect to government policies and currency.

Although globalization is viewed in different ways by industry, the U.S. government and military must not underestimate the impact it has on defense manufacturing. Currently, many components needed for today's weapons systems come from overseas. It is critical that manufacturing capability

needed to build, repair, and maintain strategically important weapons systems remains in the U.S. and not be subject to influence of foreign government leaders.

Recommendation:

One thing that is common between both large and small U.S. manufacturing companies is the belief that we can compete with any foreign company in the world if the playing field is level. To ensure the playing field is level we recommend the following:

1. Viable Foreign Corrupt Practices Act compliance certification. Not all foreign companies that sell products in the U.S. or compete with U.S. firms are subject to the Foreign Corrupt Practices Act.
2. Promote foreign states to allow their currency to float. Some countries, such as China and Japan, do not allow their currencies to freely float on the open market. This creates an uneven competitive environment.
3. Manufacturing is a significant consumer of energy, and securing a sufficient and reliable supply of energy that is competitively priced is vital to the industry.
4. ITAR revisions to support U.S. manufacturers and friendly nations are desperately needed.

VI. Manufacturing and Local Economies

Position: Manufacturing jobs are a key contributor to the health of local communities and therefore an essential ingredient to a thriving local economy. We must recognize the contribution provided by manufacturing businesses and ensure their long-term health to maintain vibrant local economies across the nation.

Background: Currently the manufacturing segments of the U.S. economy employ 14 million workers, which is nearly identical to that just after the end of WWII. The industry has seen a decline of over five million manufacturing workers from the peak in 1980, with over 3.5 million (about 20 percent) of the overall decline coming in this decade. This decline is the result of companies outsourcing manufacturing work to foreign countries and a continued increase in U.S. productivity.

Although overall employment has been on the decline, there is evidence that the demand for highly skilled employees is actually increasing, and that the decline in workforce is all from medium and low skilled labor. Technology and automation that has been replacing lower skilled labor requires a new generation of highly skilled personnel, thus increasing the demand.

The impact of this decline on local regions can be significant. Federal, state, and local governments must not underestimate the economic multiplier effect of well-paying manufacturing jobs on local economies. A 2003 report issued by The State of Kentucky's Cabinet for Economic Development (www.thinkkentucky.com) stated that every 100 new manufacturing jobs creates an economic ripple effect that creates an additional 159 indirect jobs and 153 induced jobs. These 412 employed persons pay federal, state, and local taxes, which vastly improves the tax base of a local economy. This is of great assistance to areas that are struggling financially.

Recommendation: With local budgets bursting from skyrocketing energy and food costs, we must reverse the downsizing trend of the American taxpaying workforce in our vital U.S. manufacturing industry.

1. Local regions must be prepared to help attract and train highly skilled manufacturing labor.
2. Federal government should assist state and local governments as they promote and train that workforce.
3. Require the utilization of price adjustment clauses in multi-year fixed price government contracts where inflation of prices for certain commodities (like petroleum products, or products which are dependent on the Euro) is driving companies out of business. Rather than leaving manufacturers strictly on their own, assist them when it is in the national interest to do so, as is true with many local manufacturers throughout the United States.

VII. Environmental Issues

Position: Government and industry must work better together to preserve the environment while maintaining the capability to manufacture critical defense components.

Background: Virtually all defense contractors have responded to the need for increased stewardship of the environment with strong corporate programs. Industrial programs focus on reduced use of hazardous materials in their products, with the ultimate goal of eliminating hazardous materials as technically viable alternative materials become available. Defense industry is also pursuing alternative energy sources and reduced energy consumption in order to reduce their environmental footprint and our collective dependence upon foreign energy sources.

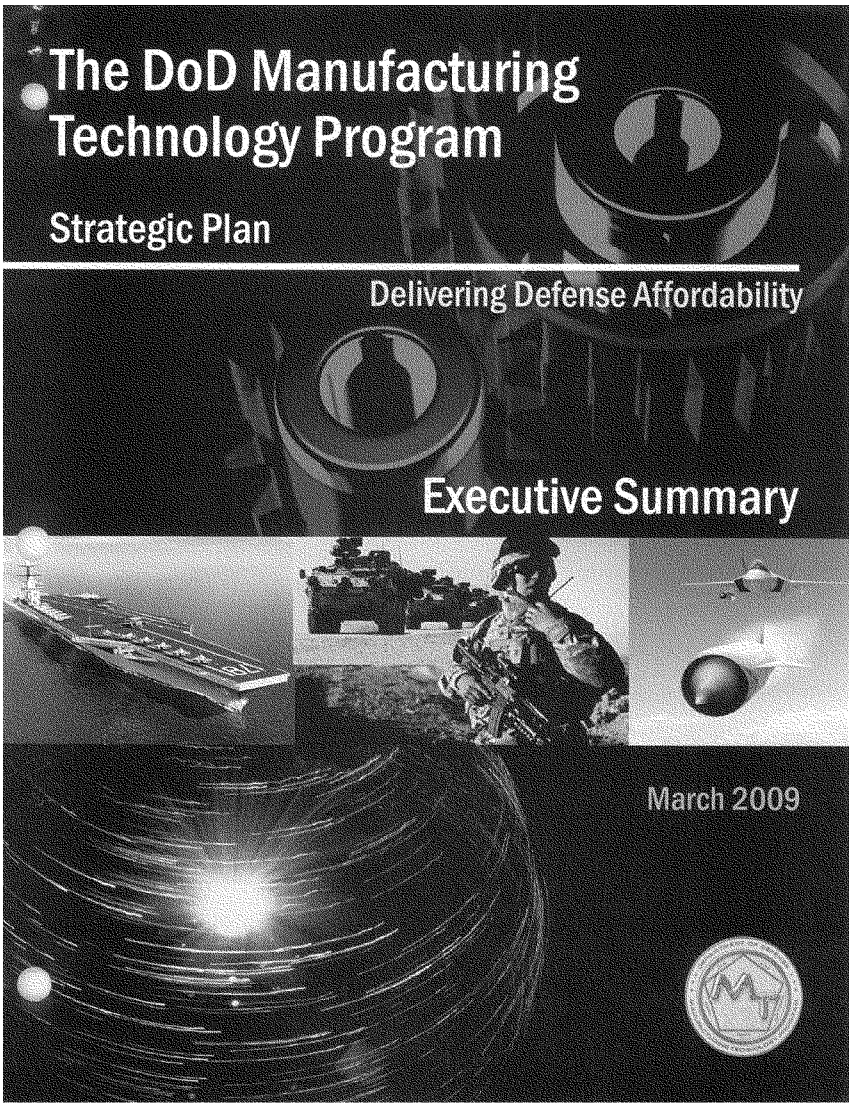
A key current challenge to the industry is legislation outside of the U.S., coming particularly from the EU, that is mandating the elimination of certain materials from products prior to the availability of viable alternative materials that will meet the requirements of the end product, such as lead (Pb) in electronics and the use of primers and coatings containing hexavalent chromium (Cr+6) to prevent corrosion. Globalization of the defense supply chain and increasing reliance on commercial off-the-shelf (COTS) components subject to the EU legislation, especially for electronics, are making it difficult to obtain suitable products required to achieve the necessary system performance, reliability, and maintainability for U.S. defense weapons systems. EU legislation regarding Waste Electrical and Electronic Equipment (WEEE), Restriction of Hazardous Substances (RoHS) in electronics, and REACH (Registration, Evaluation, and Authorization of Chemicals) in some cases is resulting in the use of alternate materials that in fact have a more negative impact on the environment than the banned material. Replacement "lead-free" solder alloys have higher processing temperatures that consume additional energy than the traditional tin-lead (SnPb) solders, and are also less reliable, leading to increased scrap material entering the environment. Even more harmful to the defense industrial base is the uncertainty in the reliability of many replacement materials, which have been rushed into production to meet legislative constraints.

Recommendation: Due to heavy reliance on the global commercial market for raw materials, state-of-the-art electronics, and numerous other items, the federal government, working closely with industry, should:

1. Carefully monitor international environmental legislation being developed, assess the impact on U.S. defense weapons systems, and attempt to influence the content of the final legislation when necessary to protect our interests.

2. Provide focused investment in the development of alternative, non-hazardous materials that offer performance at least as good as the items containing hazardous materials.

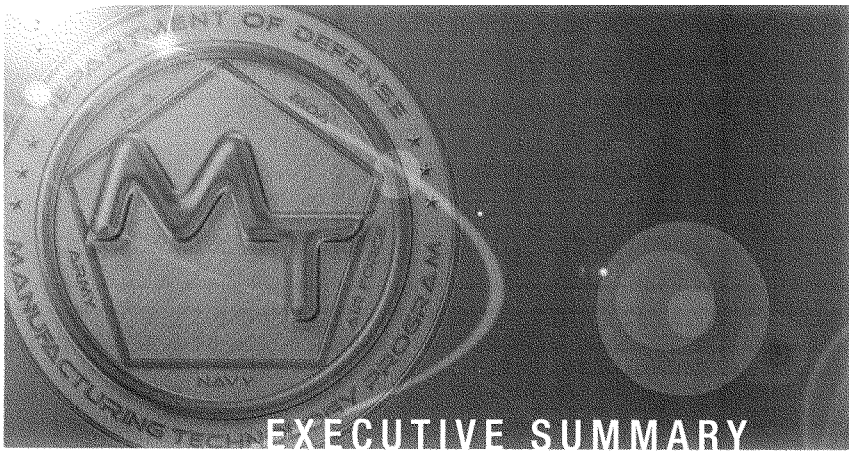
3. Evaluate the need to establish trusted domestic sources of traditional products containing hazardous materials until technically acceptable alternate products become available.


The DoD Manufacturing Technology Program
Strategic Plan
Delivering Defense Affordability
Executive Summary
March 2009

This is the Executive Summary of the Department of Defense (DoD) Manufacturing Technology (ManTech) Program Strategic Plan, dated March 2009. The full plan was prepared in response to Section 238 of the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2008, which added 10 U.S.C. 2521(e), requiring the Department to develop a five-year ManTech Program strategic plan that is to be updated biennially. The office of the Deputy Under Secretary of Defense for Advanced Systems and Concepts (ODUSD(AS&C)) prepared the strategic plan in close collaboration with the Joint Defense Manufacturing Technology Panel, comprised of ManTech Program leadership from each Military Department and participating Defense Agency.

The content and structure of this Executive Summary parallel the main chapters of the full DoD ManTech Program Strategic Plan. Additionally, the full plan offers a rich source of supporting information contained in several annexes. In particular, a detailed description of the organization, activities, and technology focus areas of the Department's component ManTech programs can be found in Annex C.[1]

This Executive Summary, as well as the full DoD ManTech Program Strategic Plan, can be viewed and downloaded from the DoD ManTech Program web site at https://www.dodmantech.com/.

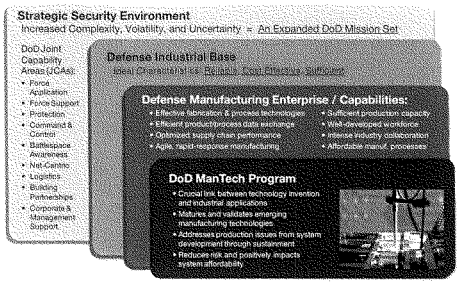


EXECUTIVE SUMMARY

For over 50 years, the DoD Manufacturing Technology (ManTech) Program has been the Department's investment mechanism for staying at the forefront of defense-essential manufacturing capability. This strategic plan is the Department's formal vehicle to unify and guide the ManTech community and support the broader defense manufacturing enterprise in delivering maximum value to the warfighter and the nation. The strategic planning process validated, through stakeholder interviews, ManTech's continued relevance in the coming years and squarely placed ManTech in the critical role of delivering affordability for defense acquisition and sustainment. This plan reinvigorates ManTech's central role within the DoD technology transition process with a renewed emphasis on the ManTech Vision and a formal statement of the ManTech Mission. These are then translated into four Strategic Thrusts and nine Enabling Goals to provide guidance and perspective for the Program.

STRATEGIC CONTEXT

Manufacturing is so important to the nation that the ManTech community is sometimes looked to as the champion for not only defense manufacturing technologies, but for the entirety of the defense manufacturing enterprise or even for enhancing US global manufacturing competitiveness. These larger topics go well beyond the charter of ManTech, but they form an important strategic context for ManTech planning. The ManTech program today exists in a strategic security environment of expanding DoD mission responsibilities and growing concerns about the affordability and responsiveness of defense acquisition and sustainment programs. Warfighter capability requirements, in turn, place demands on a defense industrial base that must be reliable, cost effective and sufficient in its response. Economic and policy analyses (including DoD's *2008 Annual Industrial Capabilities Report to Congress)* make clear that the dynamics of globalization and other



external drivers will increasingly shape the defense industrial base and the defense manufacturing enterprise. The growing intersection between commercial and military innovations has already created a climate in which the defense manufacturing enterprise must cope with the 21st century realities of widespread dependence on components from offshore suppliers. Defense manufacturing needs not only effective fabrication and process technologies, but also effective design disciplines, globally collaborative networks, and a highly capable workforce. Industry has underscored this point with studies from such associations as the National Council for Advanced Manufacturing (NACFAM), Aerospace Industries Association (AIA), National Defense Industrial Association (NDIA), and others. A recent NDIA paper, for example, identifies seven serious manufacturing issues–technology, workforce, supply chain, facilities modernization, globalization, manufacturing and local economies, and environmental issues–that need national attention.[2] ManTech cannot solve all problems, but this Plan makes clear that the program should take this overall context into account when planning investments.

THE ROLE OF MANTECH

ManTech has a broad charter, both in statute and in DoD policy (DODD 4200.15), to improve the quality, productivity, technology and practices of businesses and workers providing goods and services to the DoD. The program's vision and mission statements are similarly broad, and are framed to address wide-ranging needs for affordability and timely delivery. The mission to anticipate and close gaps in defense manufacturing capabilities makes the program a crucial link between technology invention and industrial applications–from system development through sustainment–giving ManTech a unique identity within the extended defense enterprise. ManTech carries out its mission through programs in the Military Departments, participating Defense Agencies, and OSD. The program's demonstrated ability to improve defense system affordability makes it a particularly potent tool in

Defense Manufacturing Vision:

A responsive, world-class manufacturing capability to affordably and rapidly meet warfighter needs throughout the defense system life cycle

ManTech Mission:

ManTech anticipates and closes gaps in manufacturing capabilities for affordable, timely, and low-risk development, production, and sustainment of defense systems.

the current budget environment. A recent report to Congress identified over 100 projects funded by ManTech in FY03 to FY05 that have resulted in implementations yielding a cost avoidance of more than $6.3 billion. [3]

The Deputy Under Secretary of Defense for Advanced Systems and Concepts administers and oversees the program through the OSD ManTech Director, with primary program execution at the Service/Agency level, and cross-component coordination via the Joint Defense Manufacturing Technology Panel (JDMTP). The JDMTP has an exemplary history of effective coordination at a technical level to ensure that programs are aligned with higher level objectives, that unnecessary duplication is avoided, and that investments have the greatest joint-service leverage.

The OSD ManTech Director and the members of the JDMTP adhere to four tenets in making policy and resource allocation decisions:

1. Address the highest priority defense manufacturing needs in the window of opportunity to make a difference.
2. Transition manufacturing R&D processes into production applications.
3. Attack pervasive manufacturing issues and exploit new opportunities across industry sectors.
4. Address manufacturing technology requirements beyond the normal risk of industry.

These tenets are applied in planning DoD ManTech investments that total over $200M per year, as shown in the following table.

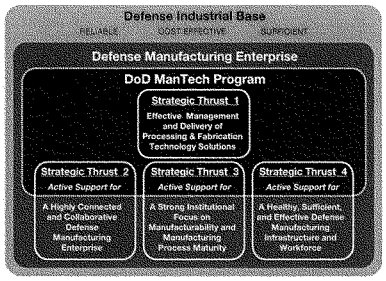
ManTech Funding, by Program Element (dollars, in millions)

PROGRAM	FY09 Approved	FY09 PB			
		FY 10	FY 11	FY 12	FY 13
DoD MS&T (PE 0603680D8Z)	18.4	14.9	19.9	19.9	24.8
Army ManTech (PE 0708045A)	91.1	69.6	70.2	71.7	73.4
Navy ManTech (PE 0708011N)	61.9	58.6	56.5	60.0	60.6
AF ManTech (PE 0603680F)	56.5	40.5	40.8	41.6	42.5
DLA ManTech (PE 0708011S)	55.3	20.8	21.3	21.7	22.0
MDA* (PE 0603890 YX29)	33.3	38.6	47.6	44.8	45.5
TOTAL**	283.2	204.4	208.7	214.9	223.3

* MDA line is the total for all Manufacturing and Producibility

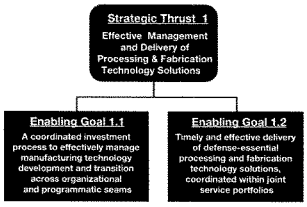
**This total does not include MDA's budget for Manufacturing and Producibility

STRATEGIC THRUSTS AND GOALS



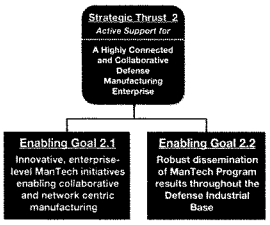
In keeping with its role to address needs in the larger context of defense manufacturing, ManTech has developed a strategy for the next five years that balances its traditional emphasis on processing and fabrication technology solutions with active support for broader defense manufacturing needs. Consequently, Strategic Thrust 1 is committed to manage and deliver processing and fabrication solutions in an area predominantly within ManTech's span of control, recognizing that ManTech is the only DoD program that has this as its primary mission. Thrusts 2, 3, and 4 commit active support for enterprise level solutions, manufacturability and process maturity, and manufacturing infrastructure and workforce, respectively, and recognize it is beyond the program's charter and resources to *fully* satisfy these thrusts. Goals are defined in all four strategic thrusts with sufficient description to enable focused action.

Strategic Thrust 1 in many ways represents the core focus of the program and drives the majority of program investment activity. It is supported by two enabling goals shown in the diagram to the right.



Goal 1.1 is to continuously improve a coordinated investment process ensuring ManTech Program adaptability and resilience, with a focus on successful transition. It recognizes the complexity of multiple organizational and programmatic interfaces across which increasingly mature manufacturing technologies need to be managed–for all phases of research, development, acquisition, and sustainment.

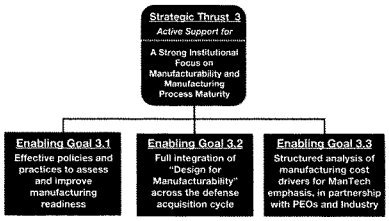
Goal 1.2 addresses the technical execution of the core ManTech Program, guided by the Goal 1.1 investment process. Technology portfolios are developed and managed by the Military Departments, Defense Agencies, and OSD using manufacturing roadmaps, analyses of defense system affordability drivers, and DoD determined priorities. The portfolios are coordinated by JDMTP joint-service technical subpanels.



Strategic Thrust 2 is the first of three program strategies applying to the broader defense manufacturing base. The cost and schedule of defense systems are driven primarily by activities "above the factory floor;" that is, in enterprise level processes, business practices and interactions with suppliers and with the government customer. 21st century defense manufacturing will rely on a networked, collaborative and increasingly global supply base, with capabilities that can be linked within and among the nodes to respond rapidly to dynamically changing defense needs.

Goal 2.1 encompasses the research, development, and implementation of capabilities which allow for a highly collaborative manufacturing environment among the multiple players in system development and production. Specific initiatives that fit include Model Based Manufacturing, Network Centric data environments, Collaborative Modeling and Simulation capabilities, and commercial practices within defense manufacturing. Each represents an innovative approach to enable stakeholders to collaborate at the enterprise level.

Goal 2.2 represents an important transition path for the results of research and development activities conducted by the ManTech program, primarily within Strategic Thrust 1. This deployment of program implementation results across the Military Departments, Defense Agencies, and industry helps to fully leverage the ManTech investment across the defense industrial base. In the best case, targeted dissemination resulting in subsequent transition into additional systems can help transform an innovative, initial manufacturing capability into a viable industry, thus benefiting all participants.

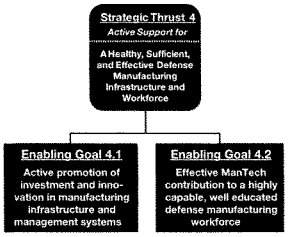


Strategic Thrust 3 points to the strategic need for a *pervasive culture of manufacturing* that embodies a cradle-to-grave focus, across DoD and industry, that persistently considers weapon system manufacturability and aggressively resolves associated production and sustainment issues over the Acquisition life cycle. This, in turn, maximizes opportunities to positively influence weapon system cost, schedule, and performance through manufacturing reviews appropriate for each phase of research, development and acquisition. This strategy seeks to drive a system-wide focus on manufacturing across these phases while ensuring that the central focus is sufficiently early in system acquisition for greatest benefit.

Goal 3.1 encompasses the development and maintenance of a body of knowledge sufficient to support the implementation of manufacturing readiness as a management criterion. A required element for this strategy is a strong institutional focus on manufacturing readiness. This will necessitate a validated scale of Manufacturing Readiness Levels (MRLs), an assessment process, and subject matter expertise to assist in performing manufacturing readiness assessments.

Goal 3.2 embodies the overarching objective of a strong institutional focus on manufacturability and producibility across the full defense acquisition framework. The full integration of "Design for Manufacturability" requires partnership with the technical community in combination with standardized practices appropriate for DoD and industry.

Goal 3.3 addresses the need to understand the highest priority opportunities for targeted manufacturing cost reduction, both within major defense systems and across multiple product lines. This is an important goal that directly supports the program's defense affordability improvement objectives, and feeds into Goal 1.1.



While the DoD ManTech Program is not structured to be solely responsible for meeting the broader industrial base needs in **Strategic Thrust 4**, it is a vital enabler for a highly effective defense manufacturing enterprise, and DoD policy requires the ManTech Program to promote the key attributes supporting these needs. Doing so is in ManTech's best interests. A healthy, sufficient, and effective defense manufacturing infrastructure, manned by a flexible, innovative and capable defense manufacturing workforce, underpins the ManTech Program's mission effectiveness and broader industrial preparedness in multiple ways.

The objective of **Goal 4.1** is to actively promote sufficient government and industry investment in new U.S. plants and equipment as well as in manufacturing management innovations, such as Lean and Six Sigma, all in support of industrial preparedness. Sustained achievement of this goal reduces the cost and risk of advancing and applying new and improved manufacturing technology.

Goal 4.2 supports a highly capable, well-trained and well-educated U.S. defense manufacturing workforce, including effective use of knowledge management for defense-essential manufacturing skills, and active support for a strong national manufacturing workforce. This goal has several aspects, aligned primarily with specific sectors of the defense manufacturing workforce, addressing both organic defense as well as non-organic/national workforce initiatives.

MECHANISMS FOR ASSESSING PROGRAM EFFECTIVENESS

Assessing ManTech Program effectiveness is essential for its proper management, coordination and oversight. Program effectiveness is assessed through various mechanisms at three levels in the ManTech Program's governance structure:

- At the execution level, within each Military Department and participating Defense Agency
- At the portfolio coordination level, by the JDMTP and its subpanels
- At the policy and oversight level, within the Office of the Secretary of Defense (OSD)

Annual reviews of these ManTech programs are conducted to ensure that each project is planned with specific cost, schedule, performance and technology transition objectives, and that each project has milestones for in-process reviews by the government program manager to assess progress toward the project objectives. Annual portfolio reviews by the JDMTP subpanels provide strong peer review of technical metrics and progress. At the program manager level, a transition plan is coordinated between the ManTech project team and the primary transition target (Acquisition PM/PEO, depot, logistics center, shipyard, company, or industry sector). Progress is tracked, project by project, through successful transition, and is reported through the ManTech governance structure.

CONCLUSION

The DoD Manufacturing Technology Program has historically demonstrated its value, not only through process technologies that make new products possible, but also through manufacturing process improvements that get at the heart of defense system affordability challenges. The dynamics of the 21st century manufacturing environment are blurring the boundaries of traditional defense manufacturing concerns, and forcing a more global perspective. The DoD ManTech program has adopted strategies and goals that will preserve its well-established focus on advancing fabrication and processing at the shop floor, and at the same time actively support advances at the enterprise and supply chain level, in design and manufacturing maturity assessments, and in the manufacturing workforce. The budgets, execution and oversight mechanisms are in place to implement these strategies. The result will be even greater realization of the vision of *"a responsive, world-class manufacturing capability to affordably and rapidly meet warfighter needs throughout the defense system life cycle."*

ENDNOTES

1. Annex C in the full strategic plan contains two parts. Part I is a detailed description of the DoD ManTech Program and supporting policies and processes. Part II summarizes the technology and investment focus areas of the Department's component ManTech programs and related manufacturing activities, namely: (1) the Defense-wide Manufacturing Science & Technology Program; (2) the Army ManTech Program; (3) the Navy ManTech Program; (4) the Air Force ManTech Program; (5) The Defense Logistics Agency (DLA) ManTech Program; (6) the Missile Defense Agency Producibility and Manufacturing Program; and (7) the Defense Advanced Research Projects Agency's (DARPA) manufacturing-related programs and activities.

2. National Defense Industrial Association (NDIA) white paper, "Maintaining a Viable Defense Industrial Base," August 1, 2008.

3. Report to Congress on Implementation of DoD ManTech Projects Receiving FY03-FY05 Funds. Department of Defense. Office of the Under Secretary of Defense for Acquisition, Technology and Logistics. 2008

Defense Manufacturing: A Crisis in the Making

June 2010

by Lt. Gen. Lawrence P. Farrell, Jr., USAF (Ret)

Defense manufacturing is like the weather. Everyone talks about it, but no one does anything.

This may seem like an exaggeration, but it is not, especially when defense manufacturing issues are coupled with manufacturing concerns writ large. In fact, it is almost impossible to examine the defense industrial base without including the issues that affect overall manufacturing in the United States. One may thus view manufacturing in the larger context as a national security issue, with defense manufacturing being a large component therein.

A recent Defense Science Board Report titled, "Creating a National Security Industrial Base for the 21st Century: An Action Plan to Address the Coming Crisis," concluded that Defense Department policies actually impede the transition to an affordable military force for the 21st century. Current policies don't facilitate development or deployment of affordable, innovative systems. Government acquisition policies, the study said, will not produce the required competitive, responsive, efficient and innovative industrial base.

The NDIA Manufacturing Division has identified six issues that demand attention.

The first issue is the need to recognize that U.S. firms now have incentives to manufacture domestically and keep jobs at home. High U.S. productivity rates and improvements in advanced manufacturing technology — coupled with the increasing costs of transportation — provide strong arguments against offshore manufacturing.

Next is the issue of foreign and domestic environmental policies. An NDIA White Paper, "Maintaining a Viable Defense Industrial Base," lays out the dangers of global manufacturing standards, such as the elimination of lead-based solder and hexavalent chromium corrosion coatings. In the case of solder, the substitute process is much less reliable. Also, the United States is increasingly unable to obtain replacement materials

and parts. The solution demands focused investment in the development of alternative materials that offer performance equal to or better than the ones replaced.

Unstable budgets impede industry's ability to plan and budget. Uncertainty creates risks for contractors. The inability to see predictable, reliable funding streams prohibits business case analysis for investment decisions and work force stability. If funding projections are not predictable, industry will opt for lower risk approaches. Skill development and technology investment will suffer as a result.

Another critical issue is the need for steady, long-term access to affordable raw materials. The Government Accountability Office concluded that the Defense Department lacks a consistent, department-wide framework to monitor its supplier base. This vulnerability is particularly salient in strategic materials such as titanium, cobalt and rare earth materials, which have major applications in advanced weapons systems such as smart bombs, night-vision goggles and radar. Today, China produces 97.3 percent of the world's supply of rare earth minerals; Russia produces 1.6 percent, while the United States produces only 1.1 percent. Much work needs to be done on stockpile adjustments and establishing a federal-level working group.

Shortage of skilled labor is another well-known concern. The U.S. education system is failing to produce the technically skilled work force that is demanded by an advanced, world-class manufacturing industry. While a globalized defense industry is a reality, there is no excuse for not having the domestic skill base and technical ability to understand the application and operation of technologies we buy in the global marketplace. More federal leadership is needed in support of science and engineering education and scholarships.

These problems are exacerbated when administration leaders lack business experience of the type that leads to an understanding of requisites such as meeting payroll, making investments in advanced technology and manufacturing, and competition. Recently we have heard pronouncements that the defense industry can surge to meet almost any need on an emergency basis. This ignores the reality of present day access to the special materials mentioned above as well as the complex nature of modern weapons systems and associated manufacturing processes.

Also of note is that, in the defense sector, if the government doesn't fund a particular

system, industry will abandon the effort. Work force and resources will move on to other funded programs. The segment that is not funded will eventually wither and industry will lose that capability. One worrisome example is that for the first time in decades, the U.S. defense industry has no fighter plane design team in operation. How long will it take for the United States to lose the capability to produce "best in class" fighters?

Although there have been many studies of industrial matters, none has produced a comprehensive overview of defense manufacturing issues. Also, much of the reporting has been anecdotal, and no study has compiled a list of manufacturing and process vulnerabilities such as single-source suppliers. A cooperative study between government and industry needs to be done.

In summary, manufacturing is too important to treat it as business as usual. Manufacturing accounts for 12 percent of the nation's Gross Domestic Product and 10 percent of employment. When in connection to consumption of materials and inputs from other sectors, it accounts for 30 percent of GDP. What is needed is a national manufacturing strategy. The Defense Department should take into account the manufacturing industrial base in its budgeting process, and acknowledge that increased federal investments must be made in advanced manufacturing technology. The manufacturing squeeze is coming. Whether this results in a crisis is still a choice that we can make.

Mr. TIERNEY. Thank you, Mr. Gordon.

Mr. Wessel, your remarks, please.

STATEMENT OF MICHAEL WESSEL

Mr. WESSEL. Thank you, Mr. Chairman, Mr. Luetkemeyer, other members of the committee, for the invitation to be here this morning, and I want to testify on this important topic. First, the general disclaimer. I'm here today in my individual capacity, and any views I express are my own. But as a Commissioner on the U.S.-China Economic and Security Review Commission, let me highlight that most of the past several years we have issued unanimous reports by the six Democratic and six Republican commissioners. Confronting our national and economic security does not have to divide us and can unite us in terms of moving forward.

Our national security interests have changed dramatically over the years. But while cyberspace and electronic spectrum are increasingly important to our national security interests, there will still be a need for a U.S. presence around the globe. The requirement for actual boots on the ground will not disappear. "Made in the USA" may be more important than it has ever been. The globalization of supply chains and decimation of our manufacturing base have already put our interests at risk. We no longer produce enough ammunition for our troops and law enforcement. Reports are that there is no longer a domestic supplier for the propellant used in Hellfire missiles. As you noted, Mr. Chairman, we are dramatically undermined by Chinese policies regarding the rare earth minerals that we need in JDAMs and smart bombs.

And as you also noted, Mr. Chairman, as we look at how other countries approach these issues, you mentioned the Switzerland example, but also France refused to grant the U.S. overflight rights for the bombing run on Libya. Turkey denied U.S. combat troops access to a northern invasion route in the run-up to the Iraq war. What would happen on a broader and longer term basis if other countries followed their example and limited our supply of spare parts, basic components, or full weapons systems?

The risks to our national security run far deeper. The first salvos in our next conflict may be lobbed in bits, bytes and bots. The electronic spectrum is key to everything we do and technology must be part of a secure and reliable supply chain. The growing risk that results from too many of our countries and our military abandoning the "Made in America" logo have increased dramatically.

As the United States has outsourced and offshored its production, we are increasing our security risks. We aren't just letting the fox guard the hen house. We are inviting the fox to the dinner table.

Several years ago there was a plan to procure Chinese produced Lenovo computers for our classified systems. This would have been a huge opportunity for their intelligence services. Our procurement officials weren't originally even cognizant of the original problem. Afterwards promises were made to update GSA's procurement regs, but to date I'm unaware of any real change in that area. Indeed, one government entity that I'm aware of that has to go unnamed recently had to seek a specific clause in a contract with a previously cleared government contractor to ensure that equipment by

the Chinese state-owned telecommunications firm Huawei was excluded from its systems. Despite ongoing and increasing concerns about Huawei's activities, the Chinese technology giant continues to supply telecommunications equipment across the country for networks that could carry U.S. Government traffic or other critical traffic.

The risk from the globalization of supply chains in the technology area are clear.

Our military and our Nation's critical infrastructure are completely dependent on computers and the Internet, and they are vulnerable.

As manufacturing capabilities move offshore, the basic skills of our workers are put at risk. The skills of such workers are too often taken for granted. And the decimation of our manufacturing base has an enormous impact on the strength of our economy, which is directly related to our national security.

Let me quickly highlight three areas for action. First, in the trade area, we need to update and reform our Nation's trade policies to make them results oriented. We cannot afford to look the other way when our rights and the commitments that our trading partners have made are violated.

As has been already noted, the failure to deal with China's manipulation of its currency is a perfect example of this problem. It is a much as a 40 percent subsidy for their exports and a 40 percent tax on our goods going there. How can U.S. manufacturers compete against those margins, not to mention other subsidies and predatory practices?

The resulting shift in production poses risks to our national security, but by failing to address China's currency manipulation we are also helping to fund China's massive buildup in advanced weaponry and strengthening its leadership.

In procurement, we should use the leverage of our procurement dollars to support the revitalization of our manufacturing sector and defense industrial base. "Buy American" policies are consistent with our international commitments and should be aggressively pursued as part of our procurement efforts, not only to help revitalize our manufacturing and defense industrial base but to advance our security interests.

We also need an assessment of where defense dollars are actually going and how the globalization of supply chains may threaten our interests.

We need to do a better job of focusing our tax and economic policies on revitalizing our Nation's manufacturing industrial base to R&D. We should extend the R&D credit to first stage deployment in domestic facilities so that produced with taxpayer-subsidized research are actually produced here. As well, we need to examine what the migration overseas of American R&D and production by some of our companies is doing to undermine our manufacturing and defense industrial base here and enhancing the capabilities of others.

Mr. Chairman, thank you for the opportunity to be here this morning, and I look forward to your questions and working with you and your staffs in the future.

[The prepared statement of Mr. Wessel follows:]

Prepared Testimony
of
Michael R. Wessel
Before the
Subcommittee on National Security and Foreign Affairs
Made in the USA: Manufacturing Policy, the Defense Industrial Base, and U.S. National Security
September 22, 2010

Mr. Chairman, Ranking Member Flake and Members of the Committee. I want to thank you for providing me the opportunity to testify on this important topic. Your hearing today addresses critical questions that, unfortunately, have not been given adequate attention. I look forward to today's hearing and future efforts by your Subcommittee to help ensure the nation's security interests are being properly protected.

I am here today in my individual capacity and any views I express are my own. That being said, my views are informed by my service as a Commissioner on the US-China Economic and Security Review Commission (China Commission), my work with a variety of private sector entities, and my more than 20 years of service on the staff of former-Democratic Leader Richard Gephardt where, in addition to having served as his general counsel, I handled trade, economic and other policy matters.

While I am here as an individual, let me quickly highlight the work of the China Commission. The Commission is a bipartisan Congressionally appointed panel created in the wake of Congress' passage of Permanent Normal Trade Relations. Its purpose is to provide analysis and advice to Congress on the U.S.-China relationship and the challenges and opportunities that result. In addition to our hearings and research – both internal and prepared by outside parties – we deliver classified and unclassified annual reports to Congress on the major economic and security aspects of our relationship. I'm proud to say that in most of the past several years, we have issued unanimous reports by the six Democratic and six Republican Commissioners. As we have seen with this Committee and with this Congress, confronting our national and economic security interests can unite us.

Mr. Chairman, our national security interests have changed dramatically over the years. For four decades, our challenges were defined by the Cold War. We lived in a fairly polarized world where our energies were focused on stopping the spread of communism and deterring the former Soviet Union. With the fall of the Berlin Wall and the subsequent attacks on 9/11, the principal challenges to our national security now come from a variety of places and in a number of different ways. We must be prepared to confront existing and emerging threats that are changing rapidly.

But, as we prepare for new challenges, we must recognize that we also have to maintain our traditional capabilities. While cyberspace and the electronic spectrum are increasingly important to our national security interests, there will still be a need for a U.S. presence around the globe. The requirement for actual "boots on the ground" and "traditional" hardware will not disappear.

As new threats develop, some believe that the importance of the U.S. defense industrial base will diminish. Nothing could be further from the truth. Indeed, I believe that there is a vital need to recognize that "Made In the USA" may, in fact, be more important than it has ever been. As Rosie the Riveter was a symbol of America's ability to confront the enormous power of our enemies in World War II, we must have the capability – here at home – to confront any and all challenges in the future. We cannot rely on the tender sensibilities of others as we are ultimately responsible for the security of our citizenry and the protection of our interests here and abroad.

Unfortunately, the globalization of supply chains and the decimation of our manufacturing base have already put our interests at risk. We no longer have the domestic capacity to produce adequate stocks of ammunition to supply our troops and law enforcement. There are actually waiting lists to fill the orders of police departments here at home. At a hearing of the China Commission, we were told that there was no longer a domestic supplier for the propellant used in Hellfire missiles – the helicopter launched missiles our armed services use – and that we would have to rely on China for future supplies. We now have to rely on China for supplies of rare earth minerals. They control 90 percent of the world's supply yet they have subjected these vital products to export restrictions. These difficult-to-obtain elements are critical components in the magnets used in the guidance systems of our Joint Direct Attack Munitions (JDAMS). These are the "smart bombs" that have allowed us to precisely strike targets from vast distances, thereby keeping our troops out of harm's way.

This is not just a "China problem." Press reports identified Switzerland's refusal to provide critical parts for the JDAMS after the beginning of the Iraq war because of that country's opposition to U.S. actions. France refused to grant the U.S. "over-flight" rights for the bombing run on Libya. Turkey denied the U.S. military access to a northern invasion route in the run up to the Iraq War. While Turkey eventually relented with regard to the provision of supplies, it refused to allow transit rights to our combat forces. What would happen, on a broader and longer-term basis if other countries followed the lead of Switzerland, France or Turkey in limiting our supply of spare parts, basic componentry, or full weapons systems?

The risks to our national security run far deeper. The first salvos in our next conflict may be lobbed in bits, bytes and bots. Our defense capabilities increasingly rely on "informationalized" capabilities. The electronic spectrum is key to everything we do– from GPS guided smart bombs, to troops on the battlefield linked to Predator drones to the logistical support for our armed services carried over the Internet. High technology and telecommunications play a significant role ensuring our capabilities. All of these technologies must be part of a secure and reliable supply chain. The growing risks that result from too many of our companies – and our military – abandoning the "Made In America" logo have increased dramatically.

Today, a growing percentage of the high technology equipment our military uses and which controls our nation's critical infrastructure is produced offshore – more and more of it in China. Many of our leading manufacturers display their company logos on the outside of the box, but little inside may be produced here (and, of course, the label may not be either).

You have read the stories of network intrusions apparently executed by Chinese entities. They have exfiltrated terabytes of data from our government and our government contractors. In their electronic reconnaissance efforts, they are attempting to map out the various ways we depend on the Internet for such essentials as power generation and emergency response. Just as any potential adversary might wish to determine how to deploy an offensive cyber strategy, in a possible conflict.

China is a strategic competitor. But, due to the lack of transparency in their system, what other intentions they may have are unknown. Admiral Mullen, in a speech at the Asia Society in June of this year said:

> *"Every nation has a right to defend itself and to spend as it sees fit for that purpose. But a gap as wide as what seems to be forming between China's stated intent and its military programs leaves me more than curious about the end result. Indeed, I have moved from being curious to being genuinely concerned."*

The role of the information spectrum in their plans was addressed in DOD's 2010 report, Military and Security Development Involving the People's Republic of China:

> *"An essential element, if not a fundamental prerequisite, of China's emerging antiaccess/area-denial regime is the ability to control and dominate the information spectrum in all dimensions of the modern battlespace. PLA authors often cite the need in modern warfare to control information, sometimes termed "information blockade" or "information dominance," and to seize the initiative and gain an information advantage in the early phases of a campaign to achieve air and sea superiority. China is improving information and operational security to protect its own information structures, and is also developing electronic and information warfare capabilities, including denial and deception, to defeat those of its adversaries. China's "information blockade" likely envisions employment of military and non-military instruments of state power across the battlespace, including in cyberspace and outer space. China's investments in advanced electronic warfare systems, counter-space weapons, and computer network operations— combined with more traditional forms of control historically associated with the PLA and CCP systems, such as propaganda and denial through opacity, reflect the emphasis and priority China's leaders place on building capability for information advantage."*

As the U.S. has outsourced and offshored its production of technology equipment we are increasing our security risks. The ability of the Chinese to alter code, to alter hardware to include electronic back doors, and to embed malicious code and other capabilities in our network are just some of the many risks. By outsourcing so much of our critical electronic componentry, we aren't just letting the fox guard the henhouse, we are inviting the fox to the dinner table.

This is not an academic issue. Some in the government are asleep at the switch.

Several years ago, I was reading the Washington Post business section and came across a small item reporting that the State Department had put in an order for about 15,000 computers and, via CDW, Lenovo, a Chinese state-invested enterprise, had won the contract. The contract was for computers to be placed on both classified and unclassified systems. As you may know, computers placed on classified

systems are configured differently and it would have been clear to the Chinese which computers would be carrying that data. The opportunity to monitor traffic, exfiltrate data or engage in "zero day" activities, for example, was clear.

Working with then-Chairman Frank Wolf, colleagues on the Commission and I raised the issue with procurement experts in the government who hadn't even thought about the matter. They were unaware of Lenovo's recent purchase of IBM's PC division, despite the fact that it had been subject to review by the Committee on Foreign Investment in the United States (CFIUS). Ultimately, the State Department agreed to change its procurement to ensure the security of its system. Flaws in procurement regulations and processes were clear and promises were made about the need for reforms. To date, I am unaware that sufficient reforms have been made. Indeed, one government entity that I am aware of, that shall go unnamed, recently had to seek a specific clause in a contract with a previously-cleared government contractor to ensure that equipment by the Chinese state-owned telecommunications firm Huawei was excluded from its system. Despite ongoing and increasing concerns about Huawei's activities – including, for example, a recent letter by eight Republican Senators questioning the provision of that company's equipment to Sprint-Nextel, the Chinese technology giant continues to supply telecommunications equipment across the country for networks that could carry U.S. government traffic.

The risks from the globalization of supply chains in the technology area are clear. An increasingly informationalized military and our critical infrastructure – including our nation's financial sector, which is completely dependent on computers and the Internet, are vulnerable. These risks are growing and little is being done about it. Only recently, a Washington Post headline summed up the problem: "U.S. cyber-security strategy yet to solidify".

These are just a few examples of the risks to our security interests that result from the hollowing out of our manufacturing base. And, quite frankly, it appears that the Department of Defense does not have a good handle on actually what's happening to our supply chains. In research done for the US-China Commission, we identified significant problems in identifying lapses in knowledge throughout military supply chains, especially beyond the first and second tiers. Finding information below Tier II suppliers is extremely difficult to obtain to actually assess what risks might exist. It may be because the information is too hard to obtain with the multitude of weapons systems, suppliers and component parts. But, it could also be a function of simply not wanting to know.

The problems associated with the hollowing out of our manufacturing base run deeper. As manufacturing capabilities move offshore, the basic skills of our workers are put at risk. Highly complex industrial machinery – five axis machine tools, for example – take substantial training to run. Nuclear-qualified welders, to assist in the production of Navy ships, for example, require years and years of training. The skills of such workers are too often taken for granted. Industrial processes have changed dramatically over the years; when you go into today's plants, you're just as likely to see a worker seated at a computer terminal as someone driving a forklift.

And, the decimation of our manufacturing base has an enormous impact on the strength of our economy. Today's economic problems, in part, are the result of an over reliance on financial services, and the blatant neglect of our "productive sector." The strength of our country is not simply measured in terms of the number of missiles we have, the planes we can launch, but is also a function of our economic success. American "power" is multifaceted but Made In America is a critical component of our ability to succeed.

Mr. Chairman. The above is just a quick summary of some of the risks to our national security interests resulting from the decline in our manufacturing and defense industrial base and Made In America. The question is, what do we do about it?

There is no proverbial "silver bullet." Indeed, the decline of our manufacturing base, the outsourcing and offshoring of production, the globalization of the economy have taken place over many, many years and will be difficult to remedy. In addition, the pace of change has accelerated and the problems have been severely aggravated by the economic meltdown our nation faced and is still grappling with.

But, that does not mean that there aren't a number of steps that can, and must, be taken to help revitalize our manufacturing and defense industrial base – broadly defined. Restoring Made In America as a fundamental tenet of our policies, within the scope of our international commitments, is vital.

Trade: For far too long trade policy has been seen as a separate "in-box" on the President's desk--one that has often been pushed to the side. Our nation's trade officials, until only recently, looked at enforcement as protectionism rather than as self-defense. We need to update and reform our nation's trade policies to make them results-oriented. Too many other nations break the rules, on a consistent basis, but we do little about it. We cannot afford to look the other way when our rights, and the commitments that our trading partners have made, are violated.

The failure to deal with China's manipulation of its currency is a perfect example of this. Most major economists have pointed out that China's currency manipulation amounts to as much as a 40% subsidy for their products coming to the U.S. and a 40% tax on our goods going there. How can an American manufacturer compete against those margins? And, the impact of China's currency manipulation is on top of its subsidies and other predatory practices. More than 50% of China's exports to the U.S. come from foreign-invested enterprises: Companies that have moved to China for a variety of reasons, including the subsidy that results from the manipulation of the Chinese currency.

And, as I noted earlier in my testimony, this shift in production poses risks to our national security. But, it is important to also recognize that, by failing to address China's currency manipulation, we are also helping to fund China's buildup in advanced weaponry. With $2.5 trillion in foreign currency reserves – the vast bulk of which are in dollar-denominated assets – the communist leadership has the additional resources to buy high tech weaponry from other countries, to fund the expansion and development of its own defense industrial base, and to help fund the sale of weapons to other nations,

many of which engage in activities adverse to our interests. And, this shift in production supports China's lock on power that allows the government to trample on human rights, freedom and democracy.

Procurement: The U.S. Government has substantial leverage in terms of its procurement dollars to support the revitalization of our manufacturing sector and defense industrial base. There are a number of steps that must be taken to ensure that U.S. taxpayer dollars are used to promote, and not undermine, their security interests.

The first step is for a more aggressive assessment of where our defense dollars are actually going and how the globalization of supply chains may threaten our interests. Clearly, in this time of rising federal budget deficits, we need to ensure that our defense dollars are deployed in the most cost-effective manner. But, at some point, there is a tradeoff between cost and security. After the fall of the Berlin Wall, there was an aggressive move to a procurement strategy based on Commercial Off The Shelf (COTS) contracting. This shift from "mil-spec" procurement to buying items on the open market allowed for cost savings and an ability to buy 1st generation technology, rather than long-lead time items that often were outdated when they were finally placed in service. But, by moving to this new system, the Defense Department opened itself up to new risks, some of which are only now becoming clear.

Earlier this summer, Senators Tom Carper and Sherrod Brown wrote a letter to Defense Undersecretary Ashton Carter, about the need for stronger policies to address the problem of counterfeit parts in defense supply chains. Their important effort needs to be supplemented by an assessment of procurement policies and an examination of supply chains to determine where, in fact, the components and parts for our military, first responders, and our critical infrastructure actually come from. Do the Department of Defense, the Department of Homeland Security and other responsible agencies even know what the risks are for the proliferation of foreign-sourced components?

The telecommunications infrastructure of our nation is vital to our security. Yet, procurement policies of our government fail to adequately protect our interests in this vital area. Components from foreign suppliers whom security officials have identified as potentially harmful are making their way onto our systems. In addition to monitoring the major telecommunication systems, the Government Services Administration needs to assess its contracting rules to ensure that prime contractors are not using questionable components or services on their networks.

This concern is evidenced by the letter that Representatives Shea Porter, Forbes, Wolf and others sent to the Director of National Intelligence recently asking him to assess the risks and vulnerabilities to our defense and intelligence interests and critical infrastructure from the increasing globalization of supply chains and provision of services. This is an important request that needs to be carefully reviewed by this Committee and the Congress.

And, as noted earlier, Americans want to know that their tax dollars are being used to put their fellow citizens to work, whenever possible. Buy America policies are consistent with our international commitments but, all-too-often, policymakers seek to avoid the requirements. These policies should be

aggressively pursued as part of our procurement efforts not only to help revitalize our manufacturing and defense industrial base but to advance our security interests.

Research and Development Policies: We need to do a better job of focusing our tax and economic policies on revitalizing our nation's manufacturing and defense industrial base. Often, our policies are developed based on broad theoretical approaches rather than what common sense might dictate. Take for example, the recent push to reauthorize the research and development tax credit. Clearly, there are a variety of reasons to extend the credit and provide more confidence to our companies that the R&D credit will exist in the future, allowing them to make long-term plans for the investments. But, simply focusing our policies on preserving the research here, without regard to where the ultimate manufacturing is to be done, might actually undermine our security in the long run. We should extend the R&D credit to first stage deployment in domestic facilities. Testing the R&D on the shop floor would more likely result in the products produced with taxpayer-subsidized research actually being made here at home. At any time, but certainly at this time in our economic history, we need to stimulate the expansion of new production in America.

As well, we need to examine what the migration overseas of American R&D and production by some of our companies is doing to undermine our manufacturing and defense industrial base here. We need to consider that this may actually be advancing the capabilities of potential adversaries. More and more of our firms are moving production facilities and R&D facilities to China and elsewhere around the globe. We need to better understand the implications.

For example, it's clear that the operations of international commercial aerospace firms have helped advance the ability of the Chinese to produce both commercial and military equipment. China is moving quickly to produce a regional commercial jet (ARJ-21) and a wider body airframe (C919). The operations of international aerospace firms have assisted the Chinese in developing their civilian sector, through platform integration, for example. But, this help has also resulted in the "leakage" of other technologies that has assisted the Chinese in the development of an increasingly sophisticated military industrial base. The resulting risks need to be more seriously assessed.

Mr. Chairman. Members of the Committee. The above are just a few recommendations that could be considered by the Committee. Despite the length of my testimony, I have only begun to touch on these issues. I would welcome the opportunity to work with you and your staffs as you continue your important work.

Thank you.

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June 2010

Defense Manufacturing: A Crisis in the Making

June 2010

by Lt. Gen. Lawrence P. Farrell, Jr., USAF (Ret)

Defense manufacturing is like the weather. Everyone talks about it, but no one does anything.

This may seem like an exaggeration, but it is not, especially when defense manufacturing issues are coupled with manufacturing concerns writ large. In fact, it is almost impossible to examine the defense industrial base without including the issues that affect overall manufacturing in the United States. One may thus view manufacturing in the larger context as a national security issue, with defense manufacturing being a large component therein.

A recent Defense Science Board Report titled, "Creating a National Security Industrial Base for the 21st Century: An Action Plan to Address the Coming Crisis," concluded that Defense Department policies actually impede the transition to an affordable military force for the 21st century. Current policies don't facilitate development or deployment of affordable, innovative systems. Government acquisition policies, the study said, will not produce the required competitive, responsive, efficient and innovative industrial base.

The NDIA Manufacturing Division has identified six issues that demand attention.

The first issue is the need to recognize that U.S. firms now have incentives to manufacture domestically and keep jobs at home. High U.S. productivity rates and improvements in advanced manufacturing technology — coupled with the increasing costs of transportation — provide strong arguments against offshore manufacturing.

Next is the issue of foreign and domestic environmental policies. An NDIA White Paper, "Maintaining a Viable Defense Industrial Base," lays out the dangers of global manufacturing standards, such as the elimination of lead-based solder and hexavalent chromium corrosion coatings. In the case of solder, the substitute process is much less reliable. Also, the United States is increasingly unable to obtain replacement materials and parts. The solution demands focused investment in the development of alternative materials that offer performance equal to or better than the ones replaced.

Unstable budgets impede industry's ability to plan and budget. Uncertainty creates risks for contractors. The inability to see predictable, reliable funding streams prohibits business case analysis for investment decisions and work force stability. If funding projections are not predictable, industry will opt for lower risk approaches. Skill development and technology investment will suffer as a result.

Another critical issue is the need for steady, long-term access to affordable raw materials. The Government Accountability Office concluded that the Defense Department lacks a consistent,

department-wide framework to monitor its supplier base. This vulnerability is particularly salient in strategic materials such as titanium, cobalt and rare earth materials, which have major applications in advanced weapons systems such as smart bombs, night-vision goggles and radar. Today, China produces 97.3 percent of the world's supply of rare earth minerals; Russia produces 1.6 percent, while the United States produces only 1.1 percent. Much work needs to be done on stockpile adjustments and establishing a federal-level working group.

Shortage of skilled labor is another well-known concern. The U.S. education system is failing to produce the technically skilled work force that is demanded by an advanced, world-class manufacturing industry. While a globalized defense industry is a reality, there is no excuse for not having the domestic skill base and technical ability to understand the application and operation of technologies we buy in the global marketplace. More federal leadership is needed in support of science and engineering education and scholarships.

These problems are exacerbated when administration leaders lack business experience of the type that leads to an understanding of requisites such as meeting payroll, making investments in advanced technology and manufacturing, and competition. Recently we have heard pronouncements that the defense industry can surge to meet almost any need on an emergency basis. This ignores the reality of present day access to the special materials mentioned above as well as the complex nature of modern weapons systems and associated manufacturing processes.

Also of note is that, in the defense sector, if the government doesn't fund a particular system, industry will abandon the effort. Work force and resources will move on to other funded programs. The segment that is not funded will eventually wither and industry will lose that capability. One worrisome example is that for the first time in decades, the U.S. defense industry has no fighter plane design team in operation. How long will it take for the United States to lose the capability to produce "best in class" fighters?

Although there have been many studies of industrial matters, none has produced a comprehensive overview of defense manufacturing issues. Also, much of the reporting has been anecdotal, and no study has compiled a list of manufacturing and process vulnerabilities such as single-source suppliers. A cooperative study between government and industry needs to be done.

In summary, manufacturing is too important to treat it as business as usual. Manufacturing accounts for 12 percent of the nation's Gross Domestic Product and 10 percent of employment. When in connection to consumption of materials and inputs from other sectors, it accounts for 30 percent of GDP. What is needed is a national manufacturing strategy. The Defense Department should take into account the manufacturing industrial base in its budgeting process, and acknowledge that increased federal investments must be made in advanced manufacturing technology. The manufacturing squeeze is coming. Whether this results in a crisis is still a choice that we can make.

UNITED STATES BUSINESS AND INDUSTRY COUNCIL
FIGHTING FOR AMERICAN COMPANIES AND AMERICAN JOBS SINCE 1933

RISING IMPORT PENETRATION HELPS SET STAGE FOR ECONOMIC CRISIS

Advanced U.S. Manufactures Suffer Decade of Lost Ground in Home Market

USBIC Import Penetration Survey 2010

By Alan Tonelson
with Sam Rose and Tory Clark

SUMMARY

As a U.S. economic and financial bubble inflated over the last decade, imports captured big, rapidly rising shares of U.S. markets for advanced manufactured products like aircraft, semiconductors, and pharmaceuticals, according to an analysis of new trade and output data by the U.S. Business and Industry Council (USBIC). By reducing output levels in these valuable sectors by hundreds of billions of dollars, growing import penetration greatly increased America's dependence on Wall Street gimmickry and consumer spending binges to generate growth, and marked the period as a de-industrialization decade, the USBIC figures show.

Because 70 of these sectors ran trade deficits in 2009 even though the recession depressed domestic demand, the study indicates that high import penetration continues to deny the stimulus-supported U.S. economy of major private-sector growth and employment opportunities.

USBIC's report – the only study available providing detailed import penetration and production figures for key U.S. manufacturing industries – also casts doubt on President Obama's policy of limiting his trade-related economic recovery policies to export promotion. The figures show that better control over U.S. imports could have boosted domestic manufacturing output and overall growth by as much as $404.59 billion dollars in 2008 alone (the last year for which relevant official data are available) in the 114 capital- and technology-intensive manufacturing sectors examined.

In other words, 2008 U.S. output in advanced manufacturing could have been increased by 20.46 percent. Total gross domestic product could have been increased by 2.80 percent. American employment levels and wages would have been much higher as well.

In fact, that $404.59 billion is a sum more than twice as great as the $185.10 billion current dollars that the recession-wracked U.S. economy lost from 2008-2009. And it is more than half the value of the new spending and tax cuts created by the Obama stimulus bill.

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Moreover, recapturing lost share of home markets – where they face no trade barriers – would no doubt be easier for domestic manufacturers than boosting sales to much less familiar foreign markets, where such barriers abound. In fact, a $404.59 billion boost in the total 2008 exports of these industries would have increased their export total by 69 percent that year. And such improvement by this group of industries alone would have boosted total 2009 U.S. goods and services exports by just over 26 percent – achieving more than a fourth of President Obama's five-year doubling goal in only one year.

In addition, as time passes, the benefits of controlling imports would probably cumulate for domestic manufacturers. They would surely lead to greater profitability, stronger capitalization, and therefore more scope to price these companies' products more aggressively at home and abroad, and increase their own share of markets and sales everywhere.

Like its two predecessor studies, this USBIC import penetration report also shows that dozens of America's most advanced manufacturing industries are becoming just as vulnerable to import competition – and in some cases to import domination – as labor-intensive industries like clothing and toys.

THE SAMPLE AND METHODOLOGY

This year's USBIC import penetration report covers 114 manufacturing sectors that are overwhelmingly characterized by high levels of technology- and capital-intensiveness. They are the nation's leaders in productivity, technological progress, and high-wage job-creation As a result, the sample constitutes a highly representative cross-section of the manufacturing industries in which public officials and observers across the political spectrum insist the United States must remain strong.

In this report, two changes have been made to the original group of 114 selected for the study. Iron and steel mill products had been left out of the first import penetration study because their absolute import levels had been affected by the safeguard tariffs put in place for 21 months by the Bush administration beginning in March, 2002. By 2008, however, any lingering effects of these tariffs clearly had passed, and so this manufactures category has been added.

At the same time, this year's study is not able to include figures on telecommunications hardware, a broad category of products encompassing household handsets and internet backbone equipment alike. The necessary output data is not available at the level of detailed needed by this study.

Most, but not all, of the products these industries create are widely exported and imported. None of the 114 sectors represents a labor-intensive industry, such as apparel, toys, or consumer electronics, which for years` have been dominated by imports. Nor do the 114 include 55 food product sectors or 19 construction materials sectors that so far are still dominated by domestic production.

The data does not provide any information about national ownership patterns in these industries. A certain share of domestic manufacturing output comes from foreign-owned facilities in the United States, and a certain share of imports comes from U.S.-owned facilities abroad. Yet official data on inward- and outward-bound foreign direct investment make clear that the vast majority of domestic manufacturing output is generated by U.S.-owned companies, and that the vast majority of U.S. imports are generated by foreign-owned companies.

Thus this study can shed considerable light on the competitiveness of U.S.-owned versus foreign-owned companies. But it sheds even more light on the competitiveness of the United States as a location for manufacturing.

Due to a lack of detailed data for most industries, the study does not show how these domestic manufacturing sectors are performing in global markets. Yet it is unreasonable to expect that these industries are faring better in foreign markets – which are relatively unfamiliar and where they face many major trade barriers – than in a U.S. market they know intimately, and where they face no trade barriers.

Both output and trade data are presented according to the North American Industry Classification System (NAICS), which has increasingly become the U.S. government's standard system for categorizing economic data. The one exception is the industrial molds sector (NAICS 333511). Because of flaws in the NAICS trade data, data from the comparable Harmonized Tariff System category (8480) have been substituted. 1997 is the first year examined because that is the first year for which NAICS data is available. The data in this report are data found at the 6-digit level of the NAIC system.

All output data comes from the "Value of Product Shipments" reports of the U.S. Census Bureau's *Annual Survey of Manufactures*. All import figures represent "imports for consumption." All export figures represent "domestic exports." Both sets of trade figures come from the U.S. Census Bureau.

MAJOR FINDINGS

>**Between 2007 and 2008,** as the burst finance and housing bubbles began damaging the rest of the economy and weakened domestic demand depressed imports, **69 of the 114 high tech and other capital-intensive industries studied** by USBIC **lost shares of their home U.S. market to foreign-made products.** That is to say, their import penetration rates rose.

>**The aggregate import penetration rate** for all 114 sectors **increased from 34.30 percent to 36.23 percent** between 2007 and 2008 – **up 5.63 percent.**

>Between 2006 and 2007, these industries performed somewhat better, with 60 of 115 (including both steel and telecoms hardware) losing shares of their home U.S. market.

>In 1997, the aggregate import penetration rate for the 114 sectors was only 21.36 percent. This means that **between 1997 and 2008, their total import penetration rate grew by 69.62 percent**. Between 2006 and 2007, this total import penetration rate rose only 1.39 percent, from 33.83 percent to 34.30 percent.

>**Forty-five sectors gained shares of their home market from 2007 to 2008** – i.e., their import penetration rates fell. By comparison, between 2006 and 2007, 55 of the 115 industries examined gained market share in the United States from imports.

>**The 69 sectors that lost share** of their home market to imports in 2007-8 **included many important leading-edge industries**, such as **semiconductors; semiconductor production equipment, aircraft engines and engine parts, pharmaceuticals, construction equipment; turbines and turbine generator sets;** and several machine tool-related categories. For a list of the 2007 and 2008 import penetration rates for the 114 sectors by decile, see Appendix A For specific 2008 import penetration rates of special interest, see Appendix B.

>In addition, **27 of the 114 sectors studied featured import penetration rates of 50 percent or more in 2008** – an increase from 26 in 2007 and from only 8 in 1997. Industries where imports controlled the majority of their home U.S. markets **included** – in addition to autos and light trucks, whose troubles with foreign competition are well known – **aircraft engines and engine parts; turbines and turbine generator sets; construction equipment; and machine tools**.

>In addition, **from 2007 to 2008 alone, 15 of the 114 industries lost 15 percent or more of their home U.S. market to imports**. These industries with unusually fast-growing import penetration rates **included semiconductors; aircraft engines and engine parts;** plastics and resins; and mining machinery and equipment. From 2006 to 2007, such fast growers numbered 12. For a complete list of the 2006 fast growers, see Appendix C.

>As these 114 industries collectively lost shares of their home market to imports **from 2007 to 2008, their combined output rose by a mere 1.27 percent in non-inflation-adjusted terms** (to $1.98 trillion). **Fifty-four of the 114 sectors saw output fall in non-inflation-adjusted terms from 2006 to 2007 – or 47.37 percent of the total.** From 2006-2007, when the economy-wide bubble was still inflating, current-dollar growth in these sectors totaled only 1.66 percent. Significantly, **in both 2007 and 2008, the combined growth of these industries trailed overall current-dollar economic growth (which was 5.06 percent and 2.58 percent during those years, respectively).** For a list of the industries with the biggest product shipment changes from 2007-8 before inflation, and a list of product shipment changes of special interest, see Appendix D.

>**Sectors where output fell in current-dollar terms from 2007 to 2008 include semiconductor production equipment, semiconductors, plastics and resins, and ball and roller bearings**, along with several automotive-related industries.

> Significantly, **more than 55 percent (38) of the 69 industries with rising import penetration rates also saw output fall between 2007 and 2008**. The clear implication: **Imports are displacing significant amounts of domestically produced goods**.

>**From 1997-2008, output fell in non-inflation adjusted terms for 44 of the 114 total industries** studied over this time span. **These "declining" industries include semiconductors; semiconductor production equipment;** electricity measuring and test instruments (critical for information technology hardware production); **metal-cutting and metal-forming machine tools; environmental controls;** and two of the highest-value automotive sectors – transmission and power train equipment, and engines and engine parts. For complete information on pre-inflation product shipments changes between 1997 and 2008, see Appendix E.

>The 1997 to 2008 trends also provide even stronger evidence of **a link between rising import penetration and falling output. Of the 44 sectors where output fell in non-inflation-adjusted terms between 1997 and 2008, 40 experienced rising import penetration rates**.

OTHER KEY FINDINGS

>Between 1997 and 2008, only six of the 114 industries examined gained shares of the U.S. market against import competition: saw mill products; motor vehicle stamping operations; semiconductor production equipment; computer storage devices; electron tubes; and electric coils, transformers, and other inductors.

>The 108 industries that lost shares of their home market between 1997 and 2008 include an especially long list of America's economic and technological crown jewels, including semiconductors, aircraft; aircraft engines and engine parts; electro-medical apparatus (e.g., CAT scan and MRI machines); pharmaceuticals; turbines and turbine generator sets, construction equipment; and several machine tool-related categories.

>Between 1997 and 2008, 22 of the 114 total industries saw their import penetration rates double or more. These sectors included pharmaceuticals; electricity measuring and test equipment; broadcasting and wireless communications equipment; turbines and turbine generator sets; and search, navigation, detection, and guidance equipment. For a list of those sectors that lost the greatest absolute and relative amounts of home market shares, see Appendix F.

>Between 1997 and 2008, eight 114 industries saw their import penetration rates nearly doubling (i.e., rising between 90 and 100 percent). These included environmental controls; cutting tools and machine tool accessories; plastics and rubber production machinery; and petrochemicals. For a breakdown of the sectors that experienced the fastest-rising import penetration rates, see Appendix F.

>As of 2008, imports had captured half or more of the U.S. market in 27 of the 114 sectors – an increase of one from 2007. Of the 27 industries where in 2008 imports captured at least half the U.S. market, 11 featured import penetration rates of 60-70 percent – up from six in 2007. In 2008, these sectors included aircraft engines and engine parts; turbines and turbine generator sets; metal-cutting machine tools; and heavy-duty trucks and chassis.

In 1997, only nine of the 114 industries had lost half or more of their U.S. market to imports. For a complete list of the 2008 import-dominated sectors, see Appendix A.

>In 2008, in six of these 27 industries, imports controlled 70 or more percent of the U.S. market – down from 10 in 2007. In 2008, these industries were metal-forming machine tools; medicinals and botanicals; plastics and rubber industrial machinery; electric capacitors and parts; electronic resistors; household furnishings; and autos.

>As of 2008, in 13 industries, imports will soon control at least half the U.S. market if present trends continue – down from 15 such sectors in 2007. In 2008, these sectors (with import penetration rates of 40-50 percent) included industries such as semiconductors; non-engine aircraft parts; household refrigerators and freezers; and motor vehicle engines and engine parts. For a complete list of these sectors, see Appendix A.

>From 2007-2008 alone, import penetration rates rose by more than 10 percent in 22 of the 114 industries – down slightly from 24 between 2006 and 2007. Industries with such rapidly shrinking home market shares in 2008 included such high-tech sectors as semiconductor production equipment; electricity measuring and test equipment; aircraft engines and engine parts; and search, detection, navigation, and guidance instruments. For a complete list of these sectors, see Appendix A.

>The complete 1997 to 2008 data on import penetration rates for the 114 industries studied is available to journalists upon request.

IMPLICATIONS

>High and rising import penetration rates for this many critical domestic industries over more than a decade represent powerful evidence of chronic, significant weakness in domestic manufacturing. Moreover, the figures show that competitiveness troubles are now as common in capital- and technology-intensive industries as in the labor-intensive industries that so far have been considered uniquely vulnerable to import competition.

>President Obama has rightly decided that an improved U.S. trade performance can help pull the country out of crisis and recession, but boosting net demand for U.S.-made goods and services. But he has also

apparently decided that such improved performance can only be achieved by boosting U.S. exports. America's multi-decade failure to expand its exports nearly as fast as import growth – the only way in which trade flow improvement can increase overall growth on net – indicates how formidable the barriers to the President's goal have been. And the continuing uncertainties hanging over the economies of America's major foreign markets indicate that these obstacles could increase in the foreseeable future.

Since it should be easier to sell into one's own domestic market than into foreign markets (given greater familiarity, the lack of internal trade barriers, and generally shorter distances and therefore lower transport costs to overcome) the President's failure to consider boosting growth limiting imports is puzzling. The import penetration data show what an enormous missed opportunity this oversight represents.

For example, consider the consequences had America's 2008 imports of the 114 products studied here remained at their levels in 1997. In other words, imports would not have been reduced in absolute terms from the $391.56 billion they hit that year. They simply would not have grown. All else equal, this lower absolute import total would have translated into $404.59 billion in new orders for U.S. companies in these industries that they failed to win in 2008.

Thus, these new orders would have boosted the output in these prized capital- and technology-intensive industries by more than 20 percent (20.46 percent, to be precise) over their actual levels. These larger industries would have employed many more Americans, and their higher demand for workers would have buttressed wages as well. The output figures used in the gross domestic product statistics are somewhat different from the product shipments data used for output in this study. Yet if they were identical, the $404.59 billion in additional product shipments would have increased the size of the overall U.S. economy by about 2.80 percent in 2008.

Put differently, this $404.59 billion in new output is more than twice as large as the $185.1 billion output loss suffered as the U.S. recession deepened from 2008 to 2009.

Even less dramatic reductions in U.S. imports over these eleven years would have yielded major gains in manufacturing output, employment, and wages. What if the total import penetration rate for this group of industries had stayed the same from 1997 to 2008? Imports would have risen a healthy 19.85 percent in pre-inflation dollars, but would have stayed at 21.36 percent of the American market for these products, rather than increased to 36.23 percent.

Under that scenario, all else equal, domestic output in these industries would have been $326.85 billion higher, an increase of 14.88 percent. And keeping in mind the difference between product shipments and gross domestic product, this $328.85 billion in additional imports would have increased the U.S. economy's overall size by 2.26 percent in 2008. This extra output equals 1.75 times the output lost by the economy from 2008 to 2009.

Moreover, recapturing lost share of home markets – where they face no trade barriers – would no doubt be easier for domestic manufacturers than boosting sales to much less familiar foreign markets, where such barriers abound. In fact, a $404.59 billion boost in the total 2008 exports of these industries would have increased their export total by 69 percent that year. And such improvement by this group of industries alone would have boosted total 2009 U.S. goods and services exports by just over 26 percent – achieving more than a fourth of President Obama's five-year doubling goal in only one year.

>Finally, as time passes, the benefits of controlling imports would probably cumulate for domestic manufacturers. They would surely lead to greater profitability, stronger capitalization, and therefore more scope to price these companies' products more aggressively at home and abroad, and increase their

own share of markets and sales everywhere. Further, these effects would continually reinforce one another, and by the same token, increasingly disadvantage foreign competitors. Indeed, many of these competitors, especially from the export-led mercantilist countries of East Asia, have prospered by using this exact strategy.

>Import penetration rate figures are superior in important ways to more widely cited trade deficit figures as measures of domestic industries' health. Unlike the trade deficit figures, they compare apples with apples: the performance of products made in the United States versus products made overseas in the same U.S. market. Trade deficit figures, though useful, compare apples with oranges – U.S.-made products' performance in overseas markets versus foreign-made products' performance in the U.S. market.

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Mr. TIERNEY. Well, thank you Mr. Wessel. I thank all of our panelists for very good testimonies as well as the written comments that you supplied earlier. We are going to go to our question-and-answer period, 5 minutes per member on that, and probably more than one round if you'll bear with us on that.

The U.S. Business and Industrial Council, a paper that was presented with some of the remarks here today, talked about import penetration. Mr. Baugh, I think you made mention of that report in there. One of the quotes is that high import penetration continues to deny the stimulus support of U.S. economy of major private sector growth and employment opportunities. Better control of the U.S. imports could have boosted domestic manufacturing output and overall growth by as much as $404.59 billion in 2008 alone in the 114 capital and technology intensive manufacturing sectors examined. In essence, it's easier to sell into one's own domestic market than it is into a foreign market.

So tell me, Mr. Baugh, if you would, how does one better control—get better control over U.S. imports in that situation?

Mr. BAUGH. Thank you, Mr. Chairman. I think this was stated in terms of a number—it is actually our trade policies and how we enforce them, how we deal with these questions. You know, I know the author of the paper, Alan Tomlinson from USBIC and I can tell you any number of the things he would say. He would talk about firsthand you have to address currency manipulation as part of this. But actually the trade agreements we have in place we don't enforce our trade laws, and we need to do that and we need to strengthen them. That's part of a multiple approach to this, because it is not just one thing and there is no silver bullet to this.

In terms of China it's more than just currency, they have all forms of illegal subsidies, the lack of enforcement of standards and laws in their own country, environmental safety and health standards and worker rights. So it's a series of actions that our trading partners engage in that we shouldn't stand for frankly. And these things all act as incentives. It is not just the 40 percent on the dollar currency. Instead all these other things are incentives for manufacturers from our country and other countries to go to China to produce access to the American market, short and simple, and we need to stop that.

Mr. TIERNEY. Thank you. Mr. Faux, this is not just endemic to China, and I have heard a lot about China today, because I think they are a major source, but there are a number of other countries that are involved in the same types of practices, whether it is currency manipulation or subsidizing industries, failure to enforce their own laws and regulations on environmental safety and all that. Are our trade agreements, as they are currently structured, adequate for us to address these situations and, if not, what must we do?

Mr. FAUX. The trade agreements are not.

Mr. TIERNEY. You might have to turn your microphone on.

Mr. FAUX. As a matter of fact, they are misnamed. These trade agreements are not particularly aimed at trade so much as they are about allowing American corporations, multinationals, to invest overseas and bring the products back into the United States. We still call them trade agreements, but you know, beginning with

NAFTA and going through to the entrance of China into the WTO, we have consistently negotiated on behalf of American investment interests overseas rather than American production here. This now is built into our economy. For every 1 percent increase in incomes in America we have a more than 1 percent increase in the trade deficit. So we have a ratchet effect going on now. And that's—your point about how the stimulus demonstrates that. We've poured money not to create jobs elsewhere but to create jobs in the United States in the midst of a recession. And a good deal of that, I certainly hope—not all of it certainly, but a good deal of that just leaked out.

The famous case in Texas with the solar panels where the money was supposed to go for green technology, and it turned out that 80 percent of the solar panels were coming from China. Now nobody designed that. It's now built into the way we run our economy, and that's why this is a multi-policy problem.

Mr. TIERNEY. Thank you. Mr. Gordon, give us some short-term solutions to this.

Mr. GORDON. Well, the short-term solutions I will go back to what you talked about in terms of H.R. 4692——

Mr. TIERNEY. Just put your mic up a little bit. There you go. Thank you.

Mr. GORDON. I'll go back to the 4692, National Manufacturing Strategy. That essentially will take a good long-term view on what you can do in the short term for tax policy as well as trade, but certainly intervention in markets which are distorted.

I want to say one thing—I heard you whisper—wind turbines. Wind turbines were one of the things that also were funded, hundreds of millions of dollars, and it went to foreign manufacturers of wind turbines that were then brought back into the United States. That's just something that did not at all meet the purposes of the stimulus funds.

For the Defense Department there is a program such as the Title III program, this is the Defense Production Act Title III, and it's not simply for DOD. It is for eight of the largest Federal agencies. It is revolving fund authorities that would support any number of different national security industry capabilities within the United States. This is one of the short-term actions that could happen if that was funded and actually implemented across all the agencies. Currently there is a Defense Production Act committee that was just stood up in January of this year, and they are trying to figure out how to use these authorities across energy, across Homeland Security and in other agencies. To this point there can be loan guarantees, production commitments and other authorities that are used in order to essentially intervene in those capabilities and bring manufacturing back into the United States. This directly combats the offshoring because it provides to corporate, to board rooms a required demand for the foreseeable future, and that takes the uncertainty out of the decision since therefore the offshoring equation now is unbalanced. And you can bring back to the United States or you can preserve manufacturing capabilities in the United States through Title III.

Mr. TIERNEY. Thank you, thank you very much. Mr. Luetkemeyer, you're recognized for 5 minutes.

Mr. LUETKEMEYER. Thank you, Mr. Chairman. Let me start with Mr. Wessel here, we haven't got to him yet.

You have in your testimony talked about some of the trade policies and your comments with regards to how we've gotten boxed in. What do you see are some things—currency manipulation is one of your key items here. Is there something else in there we need to be looking at? What do you see as a way we can find a balance here to be able to keep ourselves out of hot water with our allies as well as be able to protect ourselves? What do you see we need to do?

Mr. WESSEL. First of all, and thank you for the question. All of this can be done in compliance with our international commitments.

Mr. LUETKEMEYER. You must have some special powers.

Mr. WESSEL. Shedding light on the issue. All of this can be done in compliance with our international commitments, so we're not talking about WTO legality or anything else. We're talking about, No. 1, enforcing our laws better than we are and creating confidence among manufacturers so that there's actually a future here in America.

Fifty-eight percent of China's exports come from foreign invested enterprises. Those are United States and foreign companies that have moved to China in part hoping that they will be able to have a market to serve, but for many of them it's the products from the United States that are industrial tourists that go into their facilities there and come right back.

We've had haphazard implementation and enforcement of our trade laws so that our companies don't know where they should invest for the future. As you've seen in the papers recently, our companies are sitting on over a trillion dollars of cash. Now if we were to take a set of policies to create confidence, one that if we break the rules there are going to be repercussions for that, which is again haphazard.

No. 2, that we are going to have a set of domestic policies that make it clear that whatever your views are and what are causing those that there is a business climate here for the employers to be able to make the investments, R&D, all the various other things we need to do.

So it is a set of policies and a mindset that quite frankly has not existed for a while that needs to tell business, government, workers that we're behind you and we're going to be doing this for the long term.

Mr. LUETKEMEYER. In your view, if we would start enforcing the trade laws, which I've got a company that I'm well aware of and working on right now, the individual spent over a million dollars of his own money to document a dumping charge against China. We can't get enforcement of the law, it's just ridiculous. But I mean if we were to start enforcing the law and really hammering on it, what in your opinion do you think would happen internationally? Are they going to start realizing that there's a new guy in town, a new sheriff in town and start behaving themselves and respect us for that or are we just going to get ourselves in real big trouble?

Mr. WESSEL. Well, despite my party affiliation I think probably the President who did the best job on trade over the last many administrations was Reagan, who basically said, you know, we're

going to implement the rules, we're going to be tough and we're stand up for American interest. This was at a time, as you may recall, when Japan was breaking the rules right and left. As a result of that, with the Plaza Accord, with VRAs, with what he did in the technology industry with Semantec and a number of other things, he basically said we need to have a national security defense industrial base here. And the result was our trading partners ultimately realized that they couldn't get away with this. Japan, for better or worse, started moving many of their supply chains here. As you know, last year they actually started fielding for the first time. Toyota did a team at NASCAR, I mean they have been Americanized in a lot of different ways.

Our trading partners need to understand that we're serious about enforcing our rules, we're going to stand by them and we are going to stand by our companies and our workers, and it is not going to be a question of what do you have to influence the political system. If you are being damaged, you're going to get recompense.

Mr. LUETKEMEYER. OK. Mr. Faux, you in your testimony have a number of solutions here or suggestions of things that we need to do. Can you explain a couple of them that you think are important or identify what you believe is the most important of those solutions that can be most impactful and something we may be able to do for the short-term.

Mr. FAUX. The big gap that I see, Congressman, is that there is no place in the Federal Government where this kind of discussion takes place, at the place where we can make policy. We've got these silos of policymaking, and I think after so many years of continuous trade deficits, of this problem, as Mr. Wessel said, beginning back in the 1980's that President Reagan understood, so that we know that the organizational structure doesn't work. We need in the Congress—and I think in the executive branch—we need a place where this discussion gets had and it connects with policy.

My suggestion is to begin with some Presidential Commission on National Security, which includes economic security. We have to broaden the definition of national security beyond that of the Defense Department.

Second, I think this needs to be some parallel reorganization in Congress. I suggested some select committee. You are a better expert on how all of that works than I am, but I know that we have these silos here in Congress.

One of my other suggestions is that the U.S. Trade Representative be taken out of the Cabinet. I think what's happened in trade policy is that making trade agreements has become the measure of success or failure, rather than trade policy in the service of U.S. national goals. And I think it was a big mistake to elevate the making of trade deals to the Cabinet level.

So I would start with those.

Mr. LUETKEMEYER. Thank you, I will yield back, Mr. Chairman.

Mr. TIERNEY. Thank you. Mr. Welch, you are recognized for 5 minutes.

Mr. WELCH. Thank you very much, Mr. Chairman. And I very much appreciate the witnesses. Manufacturing obviously is important everywhere, related to defense. Important everywhere including Vermont. General Electric in Rutland is a big, big employer,

and people are always anxious to hang onto those jobs. They do a great job in green aviation.

But you know, the thing that is troubling is this: We've got a Republican leader here—our ranking member and our chairman, Mr. Tierney, and I think they both share the objective that we have more manufacturing in this country. And there is probably across the aisles—both aisles—a lot of support for that in theory, but it doesn't happen.

And the question I have is what are the dynamics that are the impediment to this Congress being able to do something that, whether you are in a red state or a blue state, would be good for the folks who are struggling to have jobs? And I don't think Mr. Faux as much as it would be beneficial to have that kind of fight to concentrate attention that's necessary—I would agree with that, but my question is what are the dynamics that are making it from the perspective of those opposing real action that make its rational for them to oppose something that I think all of us at this table, Republicans and Democrats, think would be in the long-run beneficial for this country?

Mr. FAUX. If I could answer that.

Mr. WELCH. Yes, go ahead. Go down the line.

Mr. FAUX. I think one part of it is the way economic policy is nested in a view of economics that doesn't consider what it is that we make, and there is a long history of this. It—it, I think, started after World War II, and we didn't have to worry about what we were making. But today at the highest levels of policymaking, whether it's under Republican or a Democratic administration, raising this question in a small room without the press gets snickers and ridicule.

Well, you're talking about the government intervening in some way. And this is an ahistorical look at our country. From the very beginnings, I said before, we had governments that were concerned about what we made in this country. And it started with Alexander Hamilton's famous report on manufacturers. There is a wonderful story about Franklin Roosevelt at the end of World War I when he was Secretary of the Navy. What he found out was that the British were buying up patents for long-distance radio communication. Marconi had invented it and they were buying it from the Italians and everyone else.

Many of those patents were in the United States in Westinghouse, GE and others. Franklin Roosevelt called it in—this is the end of the Woodrow Wilson administration—and said we're not going to give this technology away. And so he got them to organize a corporation. The individual patent holders donated their patents and got equity from the corporation. And that corporation was charged with developing long-distance radio communication. It was called the Radio Corp. of America [RCA]. And I am not—I am not a military historian, but people I talk to tell me that the war in the Pacific in World War II would not have gone the way it did so easily had we not had the advantage of long-distance radio communication over the Japanese.

So this is embedded in our history. But for reasons that would take me a 2-hour speech about the sociology of economics and the influence of the finance industry, which I think is part of this, this

is seen as something that is obsolete. Manufacturing is gone. We have to have a new kind of economy. I think we see where that's gotten us, and it's time to go back to our roots on this issue.

Mr. BAUGH. Briefly, I think there are a couple of things that are very apparent about the conflictual interests. One is the multinational corporations and the financial interests which say go to the low-cost producer overseas and do that and take advantage of all of those things, the seduction of the low wages and the lack of standards and the currency manipulation in China, etc. And other governments understand this. China has a strategy. They're not the only one. So does Germany, so does France. I mean, our other competitors actually have a strategy to put policies in place to encourage manufacturing and employment to occur in their economy. We have done the opposite. All of the encouragement has been through our tax policy to do this.

So here in Congress—I sit as a partisan working from the labor side saying we need to do these things, but here in Congress we end up having this conflict where you find the transnational corporations opposing action on these things. You find the retail, the large, jumbo retailers, the Wal-Marts of the world, opposing doing things around currency manipulation. And you find the financial communication saying no. And all of this is directed toward short-term return as opposed to long-term investment dollars, which is one of manufacturing's problems. And I mean I think it's part of the source of the conflict. It's some of the things that we have to come to grips with and address and change the investment patterns back to saying that we are investing in this country for the right reasons. We can be competitive. We are competitive. But we actually want to create jobs income and employment in this country and be the technological leader.

Mr. TIERNEY. Thank you, Mr. Welsh. Mr. Foster.

Mr. FOSTER. Thank you, Mr. Chairman. I'd like to ask the whole panel, what you think the large sources of leverage that we have to deal with the currency manipulation problem are? And the relative merits of unilateral versus multilateral approaches to this. Because obviously currency manipulation is hurting the Europeans and many advanced countries.

And there is also a fairly well-documented dragging effect where the other low-cost Asian and south Asian currencies tend to follow the big dog in this, which is the Chinese. So that fixing the Chinese problem will also cause the other currencies to move as well.

I just wonder what you think the effective leverage that we have to try to apply to this problem are and I will go down the line.

Mr. FAUX. Well, I think what we have left is still the largest consumer market in the world. I don't know how long that piece of leverage is going to last. The Chinese eventually are going to buildup their own source of demand and that's—that's clearly their long-term plan.

So I'm not sure that we have leverage left under WTO and I would defer to Mike Wessel on this. But it seems to me that the efforts at persuasion, the effort at telling the Chinese—which is often what we do when we go there—that it is better for them if they would let their—let their currency get back to more realistic levels, that has not worked.

So we need a 2-by-4 here. At least a 2-by–4 behind our back. And the only 2-by-4 that I know that we have left is the U.S. market. So in some way we have to ratchet up our determination to make it too costly for the Chinese to continue this kind of currency manipulation.

Mr. BAUGH. Thank you Congressman Foster for the question. I think there are a couple of things here and I think testimony brought it out in the Ways and Means Committee the other day. I think you actually have to operate off of your own piece of paper in negotiating, as Leo Gerard, the President of the Steelworkers said. You actually have to have a strategy and a plan and as Teddy Roosevelt said, "the ability to speak softly and carry a big stick."

We aren't doing that. We are just talking with no stick and no threat of action and no actions having been taken that give veracity to what you are trying to do at the negotiating table. What we do need is leadership in a number of ways that give you that. Dr. Faux is absolutely right. The market is the No. 1 thing and that is what everybody wants in this country. That is why other people want to come here and do business here and that is why they want to import to the United States.

So that is the one thing that we do have. But what do we do about defending it and carrying our case forward? Action by Congress to pass legislation sends a strong message and provides some tools that we obviously need since the Commerce Department says they can't find specificity and charges of currency manipulation of specific products. Well, let's fix it. We have a law to do that.

Congress and congressional action sends a message to the people who are violating and it is other countries. It's not just China, they are the poster child, but there is a whole series of countries as I noted in my testimony that are doing this.

The second thing is take multilateral action. Absolutely. Engage with our partners and trading partners out there that are just as troubled. Intervention by the Japanese last week was a very, very serious move. They are troubled. So we should take multilateral action. We should take the unilateral action of passing legislation. We should engage in trade cases. We should consider the 301 case. It is not one tool or the other; it's all of the above that sets you straight on a path in negotiations so that when you sit down and talk to the other side, they are going to take you seriously.

We have learned the Chinese will talk us to death. That is the role their government plays in this. And until they take us seriously, they keep talking to us till the sun sets.

Mr. GORDON. I agree, especially with the multilateral. When you have that type of coordination and a coordinated response, it is much more powerful.

I would also say that the Congress has a platform and one of the ways of using that platform in order to deny or change access to a very, very large market is to really make the case to American citizens that when you buy from China, with the currency manipulation, what is the harm that you are doing to this country? And that perception is a strong perception that can sway markets more than a unilateral action or more than a trade agreement.

Mr. WESSEL. Quickly, and there is staff here from the China Commission, so I will ask them to validate my figures afterwards.

We have leverage as Jeff and others have pointed out. If I remember correctly, 22 percent of China's exports come to the United States and 4 percent of our exports go there. We have leverage.

The Chinese leadership cannot afford what might come from trade conflict. There were 80,000 incidents of public unrest in China the year before last, the last time it was publicly noticed. That is incidents where there are 10 or more people who are coming together to raise concerns. The Chinese leadership needs this market. And the answer is, while they will huff and puff and do everything else, if we are serious, we can put them on a path to eventual market based currency. It is not going to happen overnight. I don't think anyone is asking for that. The question is how do we put them to a sustained course toward a market-based currency, with confidence that it is going to change quickly enough.

I am all for doing it multilaterally, but I'm not sure we have a lot of time left. When we talk about what is happening to our manufacturing base, the confidence of our businesspeople in terms of investments, if we take the full 3 years that it could take to go through a WTO action, I don't know what is going to be left at that point.

Mr. FOSTER. Thank you, I yield back.

Mr. TIERNEY. Thank you. Interesting enough, Mr. Baugh, you were talking about in your testimony about innovation being offshored, subsidies, money manipulation and things of that nature and you talk about Intel. I think you said that Intel had gotten some R&D investment and actually had taken it offshore; is that accurate? So it reminded me of not too many weeks ago Andy Grove, who was, what, one of the co-founders of Intel, wrote an article in New Yorker or New York Magazine or something of that basis where he basically called for a tariff. He basically said that we should take any product that is the result of cheap labor overseas and gets dumped on to our market at a disadvantage to our companies, assess a fee or levy on it, take the money from that levy and deposit it in banks, but only those banks that agree to lend to only those businesses that agree to scale up in this country, their research, development, and manufacturing.

So I'd be curious to know what the reaction of each of the panelists is to that, starting with Mr. Faux.

Mr. FAUX. I think, as Mike said, we are running out of time. If it was 10, 15 years ago, we might have answered that question with—in a more deliberate way. But I think when Grove and Warren Buffett and other people have come to point—and these are, nobody can doubt their free market capitalist credentials—when it has come to the point where they think that in order for this country to save its economic future, we have to raise barriers if other countries don't play on an equal playing field, I think that's a signal that the Members of Congress and in government need to pay attention to.

The interesting thing is that someone like Buffett who is a financier and, of course, has made a lot of money on the current condition, understands what this is doing to our basic economic future. And the movement away from this country is going on daily. A few years ago, the President of Cisco Systems, CEO of Cisco Systems said that what we are trying to do is outline an entire strategy of

becoming a Chinese company. Now that was several years ago. I don't know how far along he is on that plan, but I'm sure he is more far along than he was then. So time, as Mike said, is not our friend. And something like the Andy Grove or the Warren Buffett proposal, I think, needs to be serviced right now and supported. And maybe then that will get the Chinese attention.

Mr. TIERNEY. Mr. Baugh.

Mr. BAUGH. I think it is a good idea. I think we should consider things like this. The whole point is to punish the behavior of countries taking illegal practices. This form of punishment is a tariff and the money that then is plowed back into this economy to create good jobs and technology and secure our leadership. That is the fundamental thing, whether it is this proposal or another, that is what needs to be done. We need to be serious about it and we need to think of scale. I wish we were hearing more from current executives, the retired executives. Unfortunately, I think the dynamic of the financial markets and the incentives are all the other way. And that is the kind of change we have to come to in the course we have been on. We have to find another path that changes that behavior, that changes that pattern, that changes those incentives for our economy, not someone else's.

Mr. GORDON. I'd agree with conforming tariffs, especially as it brings the capital and productivity back to the United States. It is a natural consequence when you take manufacturing facilities and you offshore them that the next step a year or two later is to put product development facilities right to it so they can understand the manufacturing. And so the next step after that is that R&D facilities are now moving out of the United States and overseas in order to be lined up in this area and we need to stop that.

The chart that Representative Foster put in earlier showed a huge turn right around the 2000 timeframe. And there is no secret that is the time period which one sector in manufacturing products, which is advanced technology products, all of a sudden started to look at a deficit in our trade—in our trade balance. Before that advanced technology was not a trade deficit, and since then it has gone down.

And so what we see is we see all the of our seed corn in terms of R&D going offshore. So if that tariff was to bring that back and put capital and productivity enhancements into manufacturing in the United States, that would be successful.

Mr. TIERNEY. If my colleagues will indulge me, I will ask Mr. Wessel for his opinion as well.

Mr. WESSEL. I think it is a great idea. I think that as the House earlier this year looked at having border adjustment mechanisms regarding climate change, that the right or the privilege of selling into the U.S. market and accessing our consumer bears with it certain responsibilities. Whether it is to address the questions of labor issues, labor rights, labor arbitrage, whether it is a question of bespoiling the environment, etc. Our public wants to be able to maintain their standard of living and their quality of life and they don't want it denigrated by a race to the bottom. So any mechanisms that can be put in place, serious mechanisms that will have a real impact, I think they are worth pursuing.

Mr. TIERNEY. Thank you very much. Thank you for the indulgence, Mr. Luetkemeyer.

Mr. LUETKEMEYER. Absolutely, Mr. Chairman. Good questions. I don't have a specific question for anybody right now. I just want to ask a question, and anybody can jump in with regards to—to me, one of the things in my opening statement, I made a comment that sensitive equipment should be made either in the United States or in collaboration with our closest allies. I think we have a huge problem. We have sensitive equipment and we can't control the parts that make up that piece of equipment—someone made the comment, I don't know if it was in testimony, that 97 percent of the rare earth minerals are in China. I mean, this is a huge problem for us.

To me, at some point, we need to have some sort of legislation or rules or some sort of agency that is able to not necessarily waive the rules, but be able to allow the rules to be put in place to be able to produce or mine these minerals in our country here in a way that is economically viable as well as environmentally safe. I can't believe that we can't do that in this country. At some point we ought to be able to have policy.

What do you all think of something like that? And where do we need to start on that?

Mr. WESSELL. If I can, let me—first of all, I think your point is right on. And I think this committee, this subcommittee, the jurisdiction will allow you to really look deeply into these supply chains. At the China Commission, we commissioned a report to look at what was happening with the defense industrial base and how it was dispersing. We had a classified contractor that was in charge of the study. They were unable beyond the tier 2 suppliers—and if tier 1 is Boeing, tier 2 may be a major system within there—beyond tier 2, they had no ability to get information on where things were.

So as the chairman noted about his amendments in the past, whether it was with Mr. Hunter or others, we have to do a full assessment of what is happening with our supply chains. That is No. 1.

If you look at, for example, high-tech, we have one trusted foundry left in the United States to be able to deal with—I think somebody raised EMP chips, radiation-hardened chips, etc. So we need to do a much better job of understanding the risks and then addressing them. And we're not—information is the first thing I think we need to look at.

Mr. LUETKEMEYER. Anyone else want to tackle that? Mr. Baugh.

Mr. BAUGH. I would just note that there is a bill in the House currently—and I apologize I don't have the number, it doesn't come off the top of my head—but it was a bipartisan bill that actually looks at rare earth metals. And it says we actually need to understand where this is. We need to develop a strategic supply. In a period of time, we need to redevelop this industry in this country on that specific piece, but I agree very broadly with what Mr. Wessel said that we need an assessment of this base. We have been in the conversations. We do not know what is going on below tier 2.

And Mr. Chairman, you made reference to some of the scandals where people found defective parts and defective materials. What

happened here? Well, we do not pay attention. And frankly, this is the nature of what has happened in manufacturing where the people who used to make things as the prime contractors—when I was a kid, I went to the Ford Rouge plant in Detroit. You walked in those gates and they made everything there that went into a car. By the time I worked in the plant, we only made some of the things. By this century, things were outsourced and then they were offshored. And this has happened across industries where the prime developers, it's been passed on to subcontractor to subcontractor to subcontractor. And we have been living on a legacy of the way we used to make things as opposed to the way we do make things. And we need to get a better handle on that.

Mr. LUETKEMEYER. My time is running, Mr. Faux. One more question. Mr. Baugh you brought up the question here and continue to develop the idea and the topic here of our industry, our manufacturing base is leaving. What in your judgments is the things that we need to do? I know that there is one of when we talked about tax rates, level policies, and environmental regulations are a problem right now. What do you see, what are your suggestions on how we need to get our manufacturing base to this country?

Mr. BAUGH. I think we need to do things on the trade front immediately to change that pattern of behavior and understand that we are going to enforce those laws. And again, secure sort of the investments of the businesses into this country by having some surety of how we're going to do that.

The second thing is to change the tax policies to direct investment into domestic manufacturing in a way that we are not doing. We have tax deferrals that allow corporations to hold these profits offshore. They are not invested in the U.S. economy. The last time people were allowed to bring them back and not pay much tax on it, they didn't invest here to create jobs. So we need to change that behavior.

We need to do what Secretary LaHood did. I commend him, he and Ron Bloom, our manufacturing person in this administration, they pulled together the high-speed rail industry or the rail industry and they said to them: "We are going to build high-speed rail in this country. We want to make sure we make it here. We're not going to grant waivers." We have to bring the industry together to think about industry developing the ways that we move forward on things like that.

So that is a form of leadership within government that we have suggested that fits with what Dr. Faux has talked about, what everybody has talked about, in the way of bringing focus toward the incentives in the investment policies and bringing industry together and say this is the way we're going to start doing business here and thinking and acting in a way like a business as a government.

Mr. LUETKEMEYER. Thank you, Mr. Chairman.

Mr. TIERNEY. Thank you, sir. Mr. Welch, you are recognized for 5 minutes.

Mr. WELCH. Thank you very much. I want to go back to this question of how we can make some progress. In listening to your testimony, it seems as though in a very broad sense economic poli-

cies have favored the increase in the gross domestic product as opposed to the reduction of unemployment, and that finance has triumphed over manufacturing. And the dilemma that we have here in Congress is that it doesn't seem that even when we agree on the long-term objective, we can't seem to agree on doing it together. So there is a political impediment to doing things that are in our interest to do.

So the question I have for a quick round of suggestions from each of you would be give two ideas that you believe potentially could have the support of Mr. Tierney and Mr. Luetkemeyer, who both share the objective of increasing manufacturing employment. And I will start with you, Mr. Wessel.

Mr. WESSELL. I will give you the first one which I noted in my testimony is make the R&D credit. Research, development, and deployment credit. We all want research here. We all want innovation to occur here.

We should also be moving to the next stage to make sure that research is being applied in our own factories, again, within the boundaries of international commitments, etc., and I believe it can be done in a WTO legal way.

Another thing that I think we need to do——

Mr. WELCH. I want to get two suggestions from everyone.

Mr. WESSEL. The other one is to address asymmetry in our law that's a problem. It was mentioned, the wind farm earlier today. The problem with the Texas wind farm is that we allowed uncapped money to go out and build wind farms, but we capped the money to help develop the domestic supply chain. So you had all of these financial people going out here wanting to build a wind farm, but not enough domestic supply and the result was they went out and made orders for Chinese goods.

The President last December said let's increase 48(c), which was the domestic support and said $5 billion. We are still waiting for that. That is the kind of thing that we can do immediately to start revitalizing the supply chain.

Mr. WELCH. Mr. Gordon.

Mr. GORDON. I would tell you, overall, one of the things you want to do is have that R&D investment come back and that directly deals with the false perception that you can't be competitive while manufacturing in the United States. That is just false. One of the ways to do that, or one of the ways to build on it for national security is to combine different functions within the defense industrial base assessments. Right now within the DOD there is the industrial policy division which finds out where defense essential production is needed and then somewhere else where they implement things, such as Title III for capital investment or ManTech for substitutes. We need to combine those things together into one implementation as well as identification of those capabilities.

Mr. WELCH. Thank you. Mr. Baugh.

Mr. BAUGH. No surprise here. I think this Congress should pass currency legislation. A bipartisan bill, the Ryan-Murphy bill, that has 140 or more cosponsors, a lot of Republicans and Democrats together on this. It is simple. We should do it. That is No. 1.

And I agree completely with this issue of asymmetry of policies in research and development. This is the holy grail of the business

community. R&D tax credits, not that you have to come back here and renew it every year. They want it made permanent and the President has said that. I would say 25 years ago you could assume that money for commercialization—R&D and commercialization would be done in this economy. We would make it here. That it is a false assumption today.

You need to think like a State economic development agency, like I did when I used to run one. What is the return on the investment? Will that R&D investment create jobs in our domestic economy with making the things we invested in the R&D for? That is something that we should do and something frankly that every other country does with their industrial policies. I met with the Japanese MITI folks a month ago and they told me this. And they laughed when they said we don't.

Mr. WELCH. Thank you. Dr. Faux.

Mr. FAUX. Quickly, I think the research and deployment issue is one of the two more important. The other is currency. The currency manipulation in trade. I think that we ought to insist and have a time line. I think the Congress ought to come up with a time line that will get people's attention for reducing the trade deficit dramatically with China. If we can do that, perhaps again we could get some serious discussion at the table.

Mr. WELCH. Thank you, thank you very much. I yield back.

Mr. TIERNEY. The gentleman yields back. Mr. Murphy you for recognized for 5 minutes.

Mr. MURPHY. Thank you, Mr. Chairman. And gentlemen, I'm sorry I'm joining the hearing late today. This is as important an issue as this Congress is going to talk about and it hits home for each and every one of us.

I am going to maybe pose an initial question to Mr. Wessel by means of an example. I have a company in my district in Connecticut by the name of Ansonia Copper and Brass. It is the last domestic company that makes copper nickel tubing for the defense industry. It is found on submarines but also in our entire ship fleet. They have one international competitor. And right now, that company in Waterbury, Connecticut, is at risk of losing its remaining contracts with the U.S. Government, making a foreign supplier the only supplier of a critical element of our shipbuilding process to the U.S. Navy.

And I guess this gets to a few issues, and I present them to Mr. Wessel. I'm concerned about one major component of our U.S. ship fleet being unavailable from U.S. suppliers. Currently this company is a German company based in Italy and so we could, I guess, have some relative sense of security that we're hopefully not going to war with Germany or Italy any time soon. But we do not know too much about their supply chain and where it comes from. We know that Ansonia Copper and Brass's supply chain was largely a domestic supply chain. We know that the supply chain of their foreign competitor is largely a foreign supply chain.

I am happy to pose this question to the entire panel. I imagine although this is one specific industry in which we could potentially lose total domestic capability, I imagine that there are others. I imagine that there are other major and important parts and major and important industries that may be nonexistent or risk being

nonexistent here in the United States because of our overreliance on foreign contracts.

And so I merely pose that question first to you, Mr. Wessel and to others: Are there elements of our manufacturing base right now that we are in special jeopardy of losing? Are there areas of focus that this Congress should have in terms of making sure that we preserve manufacturing bases critical to the defense supply chain that may vanish in the next 5 to 10 years, or may have already vanished with respect to this specific technology? It could be gone within a year or two. And something that is not easy to create with respect to this specific type of tubing.

Mr. WESSEL. Well, the answer is I agree completely that we need to have domestic sourcing on anything that is a critical system where there is not, you know, a multitude of suppliers that we can ensure that our defense needs are met. There is a large list of items—I mentioned in my testimony, for example, the propellant used for the hellfire missile. That is a missile launched from helicopters used as antitank. If there is a Taiwan scenario for example, that may be a missile that people might want to use, that the military might want to use again landing craft as well and we're going to be going to China to get the propellant. I think that is a greater problem than Italy; however, as I also noted with France denying overfly rights, with Switzerland as the chairman noted refusing to provide products for JDAMs, the fact is we can't be secure on anything unless we know that we are going to have a supply base here to be able to produce it.

Titanium rivets for airplanes was an issue 2 years ago under the Berry amendment. My view is that your manufacturing company should be getting the support of our own military and our own government to make sure that we have a secure, quality supplier that is going to have the ability to produce those goods for the future. It is vital to our national security.

Mr. MURPHY. And then let me ask a followup—and happy to take comments from the rest of the panel—what about that supply chain? Given the rapid escalation of parts and contracts being outsourced, we saw just from 2007 to 2008 in this country a 450 percent increase in the number of waivers given to the Buy American clause. That is an almost unexplainable increase in the number of waivers to our existing law. How do we better track the supply chain when it starts maybe in a country that they are not as worried about like Germany, but can then go into countries that we are much less confident about a long-term alliance with? How do we address that supply chain issue?

Mr. WESSEL. I think it has to be addressed quite frankly by this committee and this Congress. You have to make a question of supply chain integrity, globalization of supply chains a priority. Right after the cold war, the military moved off of Mil Spec procurement to what was called COTS, commercial-off-the-shelf. So they are just looking to find the cheapest way, cheapest price they can do to obtain any good.

We have to look at our supply chains and understand what is critical. We have what is called the MTCL, the military critical technology list, MCTL. It doesn't go deep enough. It is not being enforced aggressively enough. To Mr. Luetkemeyer's question re-

garding rare earth minerals, CFIUS approved, in 1996, the sale of the last rare earths company here that was making the rare earth magnets, etc. They made a promise that they would continue to produce here. Three or 4 years later they moved all the production equipment to China. There was no after action review. So this is a holistic issue and we have to take national security a lot more seriously than we have been.

Mr. MURPHY. Thank you, Mr. Chairman.

Mr. TIERNEY. Thank you. Would one of you volunteer to explain the concept of offsets in the context of manufacturing and trade?

Mr. BAUGH. I will take a shot at it. Actually I had recommended that this committee at some time should talk with one of my colleagues, Owen Hernstadt, from the International Association of Machinists, who has written extensively and testified on this.

Mr. TIERNEY. He testified years ago in front of a subcommittee hearing as well.

Mr. BAUGH. He has testified in other committees as well and he has written again on it recently. And he is who I look to for advice and guidance on this. Very simply—and I may not get this completely correct—but the idea of offsets, when we do defense contracting and sales to other countries, one of the questions is about where are parts going to be secured, where are these things going to be maintained, how much money is in that contract. And, in fact, we're ending up spending more money—or getting more money being spent in the people that are buying it in terms of the offsets than we are in our own country producing these things.

What this does is two things: one, it builds up their capacity and capability around the production for those goods. And capacity and capability to produce for that all the sudden become a producer as an ally of ours that qualifies under the Buy America rules. It comes back to haunt us and bite us in a number of ways. So I don't want to go any further because there is a good chance I'll get it wrong, Mr. Chairman.

Mr. TIERNEY. No, the point I want to point out is that we do have agreements where people get a contract and the result of that is we end up obligated to send them technology and then to buy parts and equipment. It makes them compete, sometimes not even fairly, against our own operations on that. And that is an issue that we have addressed in past committee hearings, and we will have to address it again.

One of the things we haven't talked much about is the manufacturing work force and the fact that we don't seem to have enough college graduates and others pursuing science, technology, engineering, and math. And that is going to take a while to get that turned around. I guess my question is what do we do in the short-term about this shortage of skilled personnel in the advanced manufacturing field? And what kind of incentives can we give to manufacturers to manufacture here in the face of that apparent shortage?

Mr. BAUGH. Mr. Chairman, I believe there are a number of things we can do. We actually have to put more funding in the training and education, both employed and unemployed. And I think in your opening statement, you noted a phenomenon that is coming up here very, very quickly. It is what we call the Silver

Tsunami. That is the fact that I am a Boomer like many people around here and we are out of the work force very, very soon. That is a real challenge. At the same time we have denigrated manufacturing in a such a way that it is not attractive to young people to go in. And frankly, there haven't been jobs here and we have lost millions in the last couple of months in manufacturing.

So we have to get around those impediments. Investments in that and our training and technical education system are part of that puzzle. There is another part too. That really has to make sure that we have employers adequately invested in the training and education of their work force too. It is not an either-or that they are just doing it or that the educational system is just responsible for it, but it is what both of them are doing together at the same time.

Mr. TIERNEY. We are in the process of reauthorizing the Workforce Investment Act, and this is a major part of this. How do we get that cooperative efforts between labor, industry, academia, technical schools, and things of that nature to get this turned around?

One of the issues that we have, not just here but also in energy technology and other areas, is getting the industries to spend the time and the effort and delegate the personnel to identify the standard of quality that they need out of our workers. What are the standards? What do they need to know to come in at a base level into your corporation so that you can then take them there and apply that to whatever it is you do, and determine who is it going to write the curriculum. And where? Is it going to be a technical school? Is it going to be at a community college or a 4-year college? Is it going to be some private vendor on that and get that working on that gear?

So if any of you have any comments or improvements you think we can have as we reflect on that, I'd like to hear it. If not now, I will certainly accept it in writing later. Mr. Gordon, I know you wanted to say something.

Mr. GORDON. I wanted to bring up one thing just in terms of the first question, how are we going to get in there and whether people are interested in it. There was a PricewaterhouseCooper survey on manufacturing about 6 months ago, and while in the high 70's and 80's everybody agreed that manufacturing was important, it had good jobs, and it was great for national security, only 30 percent of those same people said they would recommend that somebody in their family go into manufacturing. That is the problem. They believe there is no future in it, or that it is one of the three Ds: It is dull, dirty or dangerous.

If people understood in this country that it is a very, very clean, safe, enjoyable career, you would have more people going into it and more families pushing them into it. And I think that an advertising campaign much like the U.S. Army or the Navy, you know "Soldier of One," "High Tech," that is the kind of thing that would get people involved in it and say I am going to be involved in being a part of building this Nation.

Mr. TIERNEY. Mr. Luetkemeyer, any further questions? Mr. Murphy.

Mr. MURPHY. Mr. Chairman, on the work force issue I would note that I was visiting another company in my district, a District that has 9, 10 percent unemployment, an advanced manufacturing aerospace company who has had a help wanted sign out for months now because they can't find the type of tooling expertise that they need. Even though we have an enormous amount of our manufacturing work force base out of work, we don't have the high-skilled type of workers that they need.

Just one remaining question, and let me pose it to you Mr. Faux, but also to Mr. Baugh as well. It is this: How do we assess the true price of a particular contract when we are looking at a domestic supplier and a foreign supplier? Right now, the price is simply the contract price. That we will buy it overseas if it is a certain percentage cheaper than the contract that is offered to us by a domestic supplier.

And though that certainly is an accurate assessment for a private company who is only responsible for paying the bill that they get sent, the U.S. Government, I think, has a different calculation because that contract being awarded overseas, and by extrapolation, a job being lost in a U.S. manufacturing plant and then gained in a foreign manufacturing plant, has other costs to the U.S. Government. At the top of the list, obviously, lost payroll taxes, the lost income taxes, and then the increased social safety net costs of unemployment compensation and the like.

So I guess it is a loaded question to an extent, but the question is right now we seem to simply award, based on contract cost with no holistic understanding of the full cost of moving that contract overseas. How do we get—if we should make a change, and maybe I'm prejudging your response—but should we make a change? And if we should, how do we make that change given the fact that we have the Department of Defense making those decisions?

Mr. FAUX. Clearly, we need to make that change because that is basically at the heart of what we have been talking about all morning. The social costs. Not simply the employment costs and the costs of government programs, but the long-term costs to the economic health of the United States are not included in that contract, even though the United States is the contractor. And the problem is no one is responsible for that. And for those in the government who care, and there are people who care, they have no access to the levels of power that would change that calculation.

So the short answer is we don't have the calculation. We know that there are huge costs out there and huge benefits and historically, as I said before you came, there is plenty of history here. But we need to elevate that question to the highest levels of this government and public discussion. Because leaving it—we have found that leaving it to the Department of Defense, leaving it to the Treasury Department, leaving it to the CBO, who are not mandated to make that calculation simply puts us back into this simple, narrow and destructive obsessed-with-price issue.

Mr. MURPHY. And historically we have done that by some fairly inartful requirements: 50 percent content from the United States with certain percentages of waivers, a percentage above cost that—above the contract offered in the United States that gets you out of that Buy American clause. Is there a different way to force a cal-

culation of the true cost to the U.S. economy? Is there a way to, for instance, add on a percentage increase to a foreign contract that accounts for all of those lost taxes and increased government costs to that job moving overseas? Is there just a different way of calculating the cost that we are not looking at today?

Mr. FAUX. Yes, there is a different way, and the history of the literature on tariff economics is full of formula and theoretical discussions on that. But I think our history shows that the most important thing was a change in the consciousness of the people writing those contracts. And an understanding that there is this larger national interest floating on top of that—of that contract. And historically we have been successful when, from at the very top of Congress and the executive branch, that message has gotten to the civil service and the people making those contracts. So it is not just how do I figure this out; it is my job to figure this out. And if that's their job, the formula will come.

Mr. MURPHY. Thank you.

Mr. TIERNEY. Thank you very much. I have one last question. We talked about the rare earth minerals and metals in China having 97 percent of that market. There is a possibility or likelihood that the United States could get some of that market back, and do we have the wherewithal to do it? And what timeframe are we talking about getting to that if we were to start today? Mr. Wessel.

Mr. WESSELL. Well, first of all, as you may know, 2 weeks ago the steelworkers filed a trade case regarding the alternative and renewable energy sector. One of the five areas of action within that is to address China's actions and policies in the rare earth minerals area, which are clearly a WTO violation. So No. 1 is to open up the markets that will be able to get it.

No. 2, there are efforts to reopen mines here in the United States. There is a mine that is presently under discussion for California, as I recall, right near the Nevada border. There has not—because of the uncertainty in the market for so long, it has not been worthwhile to do it. Now that China is withholding so much, it is becoming economical to do it here again.

But, as I believe Mr. Luetkemeyer has said, it is going to take 15 years not only to get the mine back and operating but also to be able to transform those items into products that we can use in the clean and green chain, JDAMs, and everything else. So we can take action but the first thing is we have to get China to change its policies.

Mr. TIERNEY. Thank you. If there is anybody on the panel that believes we haven't addressed a matter that needs attention, I would like to give you one opportunity to state that for us. Otherwise, we will wrap it up. Mr. Faux.

Mr. FAUX. Just a quick footnote on the training question. One of the problems here is credibility. For the last 20 years, the government and other leaders have been telling young people that get into computers, get into this sort of technology, get into that. And it turns out that in many of these areas, the supply of workers is much greater than demand. So there is a confidence issue both in the labor market—that is to make it clear to people that there is government policy to create those jobs and to create that dynamic

sector, both for the labor market and for the financial markets to get the investment.

Mr. TIERNEY. Anything else? Mr. Gordon.

Mr. GORDON. I'd like to add one other comment on Representative Murphy's interests in how you add costs or take into account offshoring. Right now in Federal procurement policy you have a source election criteria and that source selection criteria doesn't allow you to understand or take into account what happens to domestic manufacturing capabilities. That means that a program manager that is making those decisions is not allowed—even if he understands those consequences, is not allowed to make a decision for a domestic versus an offshore supplier and that is a barrier to making that right decision.

The Aerospace Industries Association has an industrial base report that it put out that said we should add what happens to the industrial capabilities on the domestic front as a source selection criteria when its defense essential needs. And that would take care of that.

Mr. BAUGH. I would also add the same point. We have suggested over and over that we really do have sort of a social impact cost on those things about the employment side, the income side, which you have been getting to with your question, Mr. Murphy. And frankly, I would note that the industrial policies of most of our competitors, whether they are communist or whether they are democratic societies, they actually do have strategies for manufacturing, and it is based upon the desire to have employment and income and technology in their society and to be making those things. We're the only ones that really don't.

So it is just about twisting us all into a pretzel to find a cost accounting mechanism to get to it, it is also about the broader overview of how we think about manufacturing. It is not just the consumer interest. There is a vast society interest and an employment and income interest.

Mr. WESSEL. Many years ago there was a bill called the Save American Jobs Act which looked at the offshoring or outsourcing of production, and basically said we are going to look at the cost that you are leaving behind. So if a company is going to look at moving its operations or sourcing offshore, the public has a right to know what costs are being left behind. Whether it is diminution of the tax base or unemployment benefits, welfare, or anything else. And there is a way of doing that, to look almost at a severance tax, if you will, if you are going to pick up and leave. Which can be done in the defense area as well.

So when the internal rate of return is looked at by a company as to what their return is when they move operations, they will have to factor in the cost of those people that they leave behind. And that is something I suggest be looked at that hasn't been brought up in many years.

Mr. TIERNEY. I thank all of our witnesses again for your testimony. It has been extremely helpful to us and I hope this is not the last hearing that we have on this issue. And we would like to give a little bit of impetus to our colleagues in other committees to get moving on this, as well as the White House. And I thank my colleagues and staff as well. Meeting adjourned.

[Whereupon, at 11:55 a.m., the subcommittee was adjourned.]

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