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"PUTTING A BAND-AID ON A BULLET HOLE"

DOD Broadens 'Trusted' Foundry Program To Include Microelectronics Supply Chain

The Department of Defense is developing a broad strategy to deal with the growing migration of semiconductor fabrication plants and electronics assembly operations offshore. The strategy will encapsulate DOD's "trusted" foundry access program, which has expanded beyond its initial contract with IBM to supply the military and the National Security Agency with safe chips from its wafer fabrication (fab) plant in Essex Junction, Vt.

BY RICHARD McCORMACK

There are now 10 companies that have been accredited under DOD's "trusted" supplier program for electronics production facilities located in the United States. The little-publicized program is expanding to include companies throughout the electronics supply chain, due to growing worry that more sectors of microelectronics — from design to fabrication, assembly, packaging and testing — are being outsourced overseas.

"We are not in a position to dictate the strategic direction of the integrated circuit market so our posture is how can we rely on the commercial products being developed while minimizing the risks to us," says Gary Powell, Deputy Undersecretary of Defense for Industrial Policy.

Powell's office has been given the task of developing the "trusted" supply policy, but it is proving difficult. Former Defense Deputy Secretary Paul Wolfowitz requested the policy in an October 2003 memo to the secretaries of the military departments, the chairman of the Joint Chiefs of Staff and all the senior-most appointed officials in the Pentagon. The Department of Defense "should ensure the economic viability of domestic IC sources," Wolfowitz wrote. "The health of the defense IC supplier community depends on the health of the larger commercial IC base....Therefore the DOD will support policies that provide a level playing field internationally for the procurement of commercial products."

That was followed in 2005 with a stunning Defense Science Board (DSB) report that raised national security concerns over the migration of the electronics industry offshore, particularly to China. That report, from the Task Force on High Performance Microchip Supply, has received no attention from policymakers in Congress or

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U.S. Trades Dependence On Foreign Oil For Dependence On Foreign Batteries

The national laboratories have helped create some of the world's leading edge electric vehicle battery storage technologies, but most of the companies that are commercializing batteries for plug-in hybrid vehicles are building their factories in China, according to Don Hillebrand of the Argonne National Labs. "Ultimately, we have not accomplished much if we transfer a dependence on imported oil for an addiction to foreign batteries," Hillebrand told a recent hearing of the House Appropriations Committee.

Research programs funded by the Department of Energy have led to the creation of many new small companies pursuing promising technologies, but these companies "build their factories in China," said Hillebrand. "The U.S. is dominant in the

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Hunter And Ryan Hope Press Corps Can Help Convince Congress To Take On China

Legislation aimed at addressing currency manipulation as an unfair trade subsidy is trying to be resurrected by its two main proponents: Reps. Duncan Hunter (R-Calif.) and Tim Ryan (D-Ohio). The two members of Congress were joined by four others and a dozen members of the China Currency Coalition in a small room in the basement of the U.S. Capitol to tell reporters that the time is nigh for Congress to address the Current Reform for Fair Trade Act of 2007 (HR-2942). Their tactic to get congressional leaders to act: get the press to write another story about the continued devastation being wrought upon the American economy by China's flagrant breaking of the rules.

"What we want to do here today is show the coalition and let the [House Ways and Means] Committee and the leadership in Congress know that this is a bipartisan deal," said Ryan. "Republicans and Democrats, free-traders and fair traders want to get this message out that this is a coalition that can pass [the legislation] and get it to the president."

Asked a reporter: "Why aren't you talking to the leadership? Why are you talking to us?"

Ryan: "This is a major issue in a lot of districts across the country. The more we explain and make our case, the more members will get involved and that will crank up the pressure on addressing this issue."

It was the third annual press conference extolling Congress to act, and the press wanted to know why, given that the bill had about 180 co-sponsors last year, the legislation was going nowhere. "There are obviously some powerful multinational corporations that don't want this," many of whom are members of the National Association of Manufacturers, Ryan replied. "This is why we have to continue to build this political process. These things take momentum. It's an election year, with bipartisan support, we hope we can continue to make these arguments. We think they're a winner and the American people are behind us, so the more we make the arguments, the better off we're going to be."

Others not in the room say that the Committee on Ways and Means is dragging its feet because its chairman Charles Rangel of New York City and others on the committee either represent or have been bought off by well-heeled Wall Street and corporate interests. Treasury Secretary Henry Paulson, former CEO of Goldman Sachs, is a good friend of Rangel's. Paulson has repeatedly said Congress should not get involved.

The press event took place on the day the government announced trade figures for 2007. The trade deficit with China's in 2007 of $256 billion now accounts for 31 percent of the total deficit in goods, up from 27 percent in 2006, when the U.S. deficit with China stood at $233 billion.

"Things are getting worse," said Ryan. "The economy has not gotten better — it continues to falter — so we are going to continue to press. We have a growing number of members of Congress to support this issue all over the United States. China is manipulating its currency. It is a subsidy. Just as direct a subsidy as if they gave money to a company to make their product cheaper."

Hunter said the currency manipulation bill "should be a priority issue for the leadership of the House

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Members of the China Currency Coalition

- The IUC AFL-CIO
- American Iron and Steel Institute
- Chicagoland Circuit Association
- Coalition for a Prosperous America
- The Committee on Pipe and Tube Imports
- The Copper & Brass Fabricators Council, Inc.
- EXEL Industrial
- Forging Industry Association
- Graphics Communications International Union
- The Industrial Union Council (composed of Bakery, Confectionary, Tobacco Workers and Grain Millers International Union)
- International Union of Electrical Workers/Communication Workers of America
- International Association of Machinists
- International Brotherhood of Boilermakers
- International Brotherhood of Electrical Workers
- International Brotherhood of Teamsters
- Paper Allied-Industrial Chemical & Energy Workers International Union
- Manufacturers for Fair Trade
- Metal Treating Institute
- Metals Service Center Institute
- National Council of Textile Organizations
- National Tooling and Machining Association
- Nucor Corporation
- Precision Machined Products Association
- Precision Metalforming Association
- Rescue American Jobs
- Sheet Metal Workers International Association
- Society of the Plastics Industry
- Specialty Steel Industry of North America
- Spring Manufacturers Institute
- Steel Dynamics
- Steel Manufacturers Association
- Tooling & Manufacturing Association
- U.S. Business and Industry Council
- United Automobile Workers
- United Food and Commercial Workers
- United Mine Workers of America
- United States Business & Industry Council
- United States Printed Circuit Alliance
- United Steelworkers
- Union of Needletrades Industrial and Textile Employees
- Vanadium Producers & Reclaimers Association
- Wood Machinery Manufacturers of America

Expiration Of Wind And Solar Tax Credit Could Be Costly

If the renewable energy tax credits are not renewed by Congress, then 116,000 U.S. jobs could be lost in the wind and solar energy industries, according to a report commissioned by the Solar Energy Industries Association and the American Wind Energy Association. "At risk are many thousands of construction jobs, operations and maintenance jobs and a major shot in the arm for the ailing U.S. manufacturing sector," says Gregory Wetstone, senior director for government affairs with the American Wind Energy Association.

The study, by Navigant Consulting, finds that 76,000 jobs will be at risk in the wind industry and 40,000 jobs in the solar industry. "Shuttered factories that once provided steel, railcars, trucks, submarines and household appliances are now being converted to manufacture renewable energy components," says Wetstone. "Today, however, investors are holding back because of Congress's delay in extending renewable energy tax credits, undermining one of the brightest and fastest growing areas of the American economy." Last year, more than 14 new wind turbine manufacturing plants were either announced or opened in the United States.

Without the credit, the wind energy industry is projected to install only 500 megawatts of capacity in 2009. With the production tax credit, 6,500 megawatts of capacity is projected to be installed.

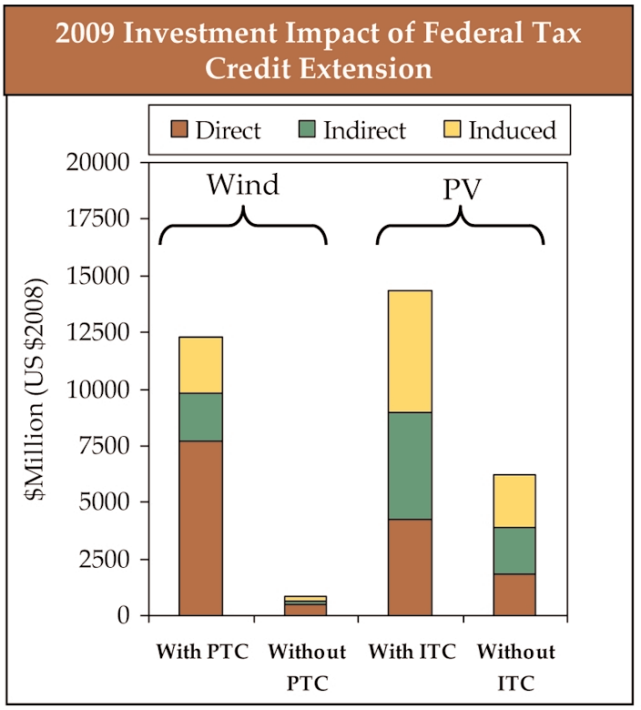
The wind energy industry has been hit extremely hard each time the production tax credit was allowed to expire. Between 1999 and 2000, the industry suffered a 93 percent decline in sales, after the credit expired. From 2001 to 2002, sales dropped by 73 percent. From 2003 to 2004, sales fell by 77 percent after the credit expired.

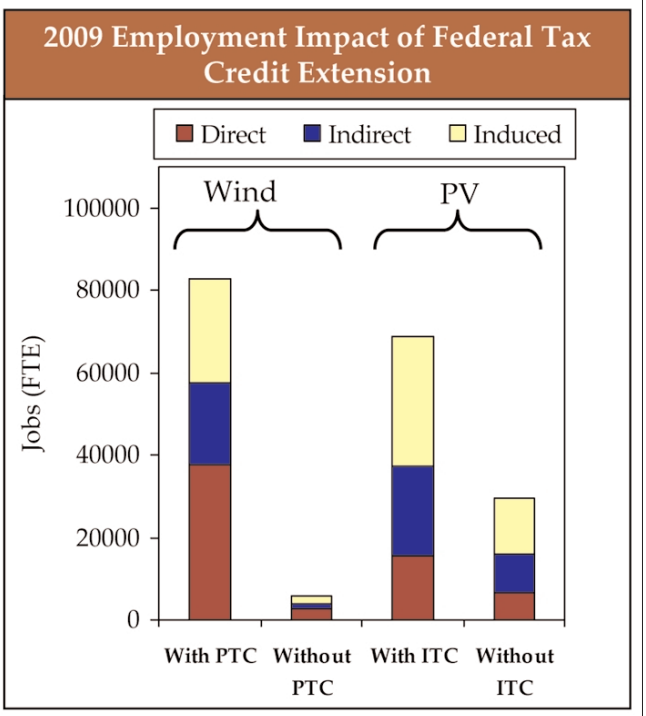
With the investment tax credit, employment in the U.S. wind energy industry is projected to be 82,620 in 2009. Without it: 5,740. Economic opportunity losses would amount to $11.5 billion.

Without the tax credit, the projected amount of solar installations is expected to be 325 megawatts in 2009. If the tax credit is extended, installations are projected to be double that: 790 megawatts.

The 29-page report "The Economic Impacts of the Tax Credit Expiration" is located at http://www.awea.org/newsroom/pdf/Tax_Credit_Impact.pdf.

Renewable Energy Tax Credit Expiration Could Result In $19 Billion In Lost Investment And 116,000 In Lost Employment





(Source: Navigant Consulting)

Barack Obama Talks Trade

If Democratic Sen. Barack Obama becomes President of the United States, the free trade agenda that has been pursued since the end of Ronald Reagan's presidency might be tossed out.

The likely Democratic Party presidential nominee voted against the Central America Free Trade Agreement and claims to have never supported NAFTA. He says NAFTA must now be amended. "While NAFTA gave broad rights to investors, it paid only lip service to the rights of labor and the importance of environmental protection," writes Obama in response to questions submitted to his campaign by the Wisconsin Fair Trade Coalition.

Obama says "binding" standards must be added to NAFTA to protect the right of workers to engage in collective bargaining and to enforce environmental regulations "so that companies from one country cannot gain an economic advantage by destroying the environment," he writes. "We should amend NAFTA to make clear that fair laws and regulations written to protect citizens in any of the three countries cannot be overridden simply at the request of foreign investors."

Obama will vote against the Panama Free Trade Agreement if it comes up in the Senate, citing the U.S. indictment of Panamanian National Assembly president Miguel Gonzales Pinzon for the murder of U.S. Army Sgt. Zack Hernandez Laponte in 1992. "Until that situation is resolved, [I] cannot support any trade agreement with Panama," Obama writes.

He will not vote for the South Korea Free Trade Agreement, either, due to unresolved issues regarding exporting cars from the United States to Korea. "The participation of workers in the American auto industry in considering the outcomes of this agreement went unsolicited and their legitimate concerns unaddressed," Obama claims. "This administration failed them because it ignored them."

Obama notes that Korea sold 700,000 cars in the United States, while the United States sold only 4,556 automobiles in Korea, and that the United States had an $11-billion trade deficit in automobiles with Korea. "The average level of automotive imports in the 30 OECD countries of U.S. cars is over 40 percent," writes Obama. "Korea's auto import rate of U.S. cars of 3.6 percent puts it at 30th out of 30 OECD countries. And it's not just that Koreans do not like American cars. This is the result of a centralized regulatory and tax structure that discriminates against our cars.

"In the U.S.-Korea FTA, we agree to open up our markets to their cars and trucks completely. And South Korea agreed to change some of its practices, but the FTA does not make it possible to enforce those commitments. South Korea and the United States agreed to create a specific dispute settlement mechanism for the commitments in the FTA. If a special panel finds that Korea has reneged on its commitments, the panel can permit the United States to return or 'snap back' the auto tariff from zero to 2.5 percent in the case of the United States but the 25 percent tariff on light trucks could never snap back.

"The auto industry and its unions neither trust the Korean government nor do they believe the concessions made are adequate. They also do not trust this administration to use the tools the deal includes protecting the auto industry from unfair Korean practices and history is on their side. I will not support this agreement."

Obama says he will pursue legislation to fight currency manipulation, bring the trade deficit into balance and eliminate tax breaks for offshore production. "I have co-authored and championed Patriot Employer legislation to reward companies creating jobs at home and treating their workers fairly," he writes.

Obama does not advocate a U.S. withdrawal from the World Trade

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U.S. Goods Imports Exceed U.S. Industrial Production

The United States imports more goods than it manufactures.

Imports of goods last year grew by $100 billion to $1,964 billion, or 14 percent of total U.S. GDP of $14,080 billion. Manufacturing as a percentage of U.S. GDP was 12 percent, or $1,680 billion.

The U.S. imported $284 billion more in goods than it manufactured.

U.S. exports of goods are growing robustly, however. Exports increased by $127 billion and reached $1,150 billion, the highest level ever, according to the Bureau of Economic Analysis at the Commerce Department. Imports of goods increased by $100 billion, to $1,964 billion, resulting in a goods trade deficit of $816 billion, down $23 billion from the 2006 deficit of $838.5 billion.

For services, the trade surplus improved by $24.2 billion in 2007 to $104 billion, up from a surplus of $79.7 billion in 2006. Service exports increased by $50 billion in 2007 to $472 billion. Imports of services increased by $25.7 billion to $368.5 billion.

The combined goods and services deficit last year was $711.6 billion, down from $758.5 billion in 2006. The deficit represented 5.1 percent of the U.S. GDP in 2007, down from 5.7 percent in 2006. Total imports into the United States of goods and services reached $2,333 billion. Total exports of goods and services were $1,622 billion.

The trade deficit hit a new record with China, growing by $24 billion to $256 billion. In the textiles category, the trade deficit with China increased by 19 percent over 2006 to $32 billion. Since 2002, when the textile trade deficit with China stood at $8.5 billion, the textile trade deficit with China has increased by 274 percent. Since 2002, the United States has lost 303,000 textile jobs, from 845,000 to 541,000 in 2007. The deficit in oil was $293 billion, up from $271 billion in 2006.

Obama...(From page four)

Organization, saying the United States can work within its framework "to ensure our international standards for workers, poor nations, public health and the environment are all improved" within the Doha round of trade negotiations.

"With regards to provisions in several FTAs that give foreign investors the right to sue governments directly in foreign tribunals, I will ensure that this right is strictly limited and will fully exempt any law or regulation written to protect public safety or promote the public interest. I will never agree to granting foreign investors any rights in the U.S. greater than those of Americans. Our judicial system is strong and gives everyone conducting business in the United States recourse in our courts. The tribunal system was created to ensure that our investors would have access to similar protections abroad. I understand the concerns surrounding this issue and am committed to working to address them."

He does not support extending "Fast Track" legislation that grants the president full rights to negotiate trade agreements with Congress relegated only to an up-or-down vote on the final deal. "I will work with congressional leaders to ensure that any new TPA authority fix [labor and environment] failings and open up the process to the American people for their participation and scrutiny. The rights of working people should be equal to those of commercial interests and their protections in trade agreements should be the same."

Update: U.S. Biofuels Industry

The biofuels industry is in a massive growth spurt. There are currently 68 ethanol biorefineries under construction that will add 5.4 billion gallons of new production capacity when complete, according to the Bob Dinneen, president of the Renewable Fuels Association. There are already 140 ethanol plants in operation, producing 7.8 billion gallons of ethanol per year. Total ethanol production for 2008 is projected to be 9 billion gallons.

"In an overall environment of slowing economic growth, the U.S. ethanol industry stands out in sharp contrast," says Dinneen. The growth of the U.S. ethanol industry created 238,541 new jobs during 2007, including more than 46,000 additional jobs in the manufacturing sector.

The industry is pursuing fuel stock other than corn. A new plant in Treutlen County, Ga., being built by Range Fuels Inc. will use wood and wood waste from Georgia's pine forests and mills as its feedstock. Another plant in Jennings, La., owned by Verenium is finishing a demonstration facility using farm scraps, sugarcane waste and wood chips as feedstock. Other cellulosic ethanol plants are being built in York, Neb., by Abegoa Bioenergy; in Emmetsburg, Iowa, by POET Energy; and in Shelley, Idaho, by Jogen.

The transportation infrastructure is also being built to move ethanol to markets. "Many ethanol plants have the capability to load unit trains of ethanol for shipments to ethanol terminals in key markets," says Dinneen. "Railroad companies are working with our industry to develop infrastructure to meet future demand for ethanol." Dedicated ethanol pipelines are being considered if demand continues to increase.

The infrastructure is not yet in place to provide E-85 at the pump, however. There are six million vehicles in the United States capable of using up to 85 percent ethanol, but there are only 1,400 E-85 pumps at the 170,000 service stations across the country. Wal-Mart is considering adding E-85 pumps at 388 company-owned gas stations.

Currently, the spot market price for regular unleaded gasoline is $2.19 per gallon. The net price of ethanol is $1.81 per gallon.

"While ethanol has received an undue amount of criticism for driving up the price of corn and subsequent food prices, the evidence does not support that conclusion," says Dinneen. "In fact, oil prices have twice the impact on rising consumer food prices than does the price of corn...In fact, just 4 percent of the change in the food CPI could be attributed to fluctuations in the price of corn," he added, referencing a December 2007 report from Informa Economics Inc. entitled "Marketing Costs and Surging Global Demand for Commodities are Drivers of Food Price Inflation."

Hunter-Ryan...(From page two)

Representatives and the U.S. Senate, and I'm a little perplexed on why the leadership hasn't brought up this important legislation to the floor. There is no American company that can compete with the treasury of a foreign nation and that is what American companies and American workers are being forced to do. We are in this for the long haul and we will do everything possible to make sure we get this legislation up this year."

It's doubtful President Bush would sign such a bill even if it does make it through the congressional process. Skip Hartquist, executive director of the China Currency Coalition, noted that Treasury Secretary Ron Paulson was testifying on the Hill the previous day and said the Bush administration is touting China's June 2005 decision to allow its currency to "float." Since then, the yuan has appreciated by 12 percent to 15 percent against the dollar. But "that is not true," said Hartquist. In real terms, the yuan has appreciated by only 3.6 percent, which amounts "to nothing," said Hartquist. "That is — nothing has been achieved."

Hartquist related that Paulson told Congress that " 'legislative attempts to control Chinese currency through macroeconomic policy border on silly.' " That statement, said Hartquist, "should make the blood pressure rise in about 200 members of Congress. That is the kind of attitude we're facing from the administration."

Trusted Program...

(Continued from page one)

the Bush administration. It recommended that the Defense Department immediately develop a comprehensive industrial policy aimed at stemming the hemorrhage of the semiconductor industry to foreign nations. The DSB task force said the Defense Department was the "logical steward to lead, cajole and encourage a national solution to this critical problem regardless of which arm of government must act...There is no longer a diverse base of U.S. IC fabricators capable of meeting trusted and classified chip needs."

Since the DSB report, more U.S. companies have shifted production overseas, have sold or licensed high-end capabilities to foreign entities, or have exited the business.

Most of the newest, highest tech semiconductor fabrication plants are being built offshore, and the Department of Defense continues to lose access to integrated circuits, according to analysts specializing in the electronics supply chain. Market trends are not reversing.

Raising even greater alarm in the defense electronics community was the recent announcement by IBM to transfer its 45-nanometer bulk process IC technology to Semiconductor Manufacturing International Corp. (SMIC), which is headquartered in Shanghai, China. In January, SMIC announced that it would be partnering with the Shenzhen municipal government in China to build a fab that will produce 45-nanometer chips based on its IBM license. IBM provides SMIC with a shot in the arm — allowing it to move beyond its present 90-nanometer capabilities, and leapfrog its Chinese competitors that are producing 65-nanometer chips.

There is a concern within the defense community that it is IBM's first step to becoming a "fab-less" semiconductor company. IBM is the only state-of-the-art IC manufacturer that has a "trusted" take-or-pay contract with the Defense Department and the National Security Agency at it plant in Vermont. Intel, the other cutting-edge U.S. integrated circuit maker, does not want to do dedicated work for the U.S. government. It is building a new fab in China, thanks to $1-billion in Chinese government incentives.

"Where is this going to lead us?" asks one defense industry analyst. "Urgent action is needed to stem this tide."

But urgent action isn't on the immediate horizon. Instead, as a stop-gap, DOD has embraced the "trusted" approach of accrediting U.S. facilities for production of electronics so that they do not contain any "Trojan Horses." The trusted strategy of validating and approving U.S.-based factories does not address the broader issues of foreign incentives and subsidies, and it is described by some in the defense electronics community as "putting a Band-Aid on a bullet hole."

Little has been written about the trusted foundry program and its implications, and a formal policy was expected more than a year ago. DOD's Office of Industrial Policy is working on putting together that strategy, but it has a long way to go.

"We decided to do this by partnering with industry associations — both the Government Electronics and Information Association (GEIA) and the Aerospace Industries Association (AIA) — to try to develop a consensus across the community," says Sydney Pope, microelectronics industrial analyst in DOD's Office of Industrial Policy. "You have to work across the entire supply chain to develop consensus because we're not going to get microelectronics companies like IBM, Intel and Texas Instruments to impose controls and additional protections on their normal process of doing things through a government contract," says Pope. "You need to have a blueprint — an overarching document that people can poke holes at and chomp on and build consensus with." Adds Powell: "What the implementation vehicle or vehicles might be, that's to be determined, but it is important to get all of the issues in one group so they can be addressed holistically."

The trusted program is already driving investment and DOD contracts to U.S. producers able to provide microelectronic components for military and national security applications. "Not everyone is going to want to sign up as a trusted foundry," says Pope. "Those companies that do will get a certain portion of the Department's business. We have put in some of our critical contracts language that requires our primes to come back as part of their systems engineering master plan with a strategy for insuring trust in the electronics components used in their systems, and we offer them as an approach the Trusted Foundry Program."

It is not mandated that contractors utilize products from the companies that have been accredited as trusted sources. "The prime can come back and utilize the trusted foundry or they can use another approach,"

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Companies That Have Signed DOD Contracts For "Trusted" Production Facilities:

- Aeroflex, Colorado Springs, Colo.
- BAE Systems Information and Electronic Systems Integration, Manassas, Va.
- HRL Laboratories, Malibu, Calif.
- IBM Systems Technology Group, Essex Junction, Vt.
- Intersil, Palm Beach, Fla.
- National Semiconductor Corp., South Portland, Maine
- Northrop Grumman Space Technology, Redondo Beach, Calif.
- Raytheon RF Components, Andover, Mass.
- Sarnoff Corp., Princeton, N.J.
- Teledyne Microelectronic Technologies, Los Angeles, Calif.

Trusted Program...

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adds Pope. "It's a program management decision and the program office responsible for that program has the responsibility to determine whether or not that will meet their needs. If it's a major acquisition program, it comes up to OSD for review."

Globalization has compounded the challenge of assured supplies. "We have circuit design in the United States," Pope explains. "We have wafers that are produced in Taiwan, packaged in the Philippines, tested in Singapore and sent to a distributor in Arizona. The supply chain is constantly changing. Even if the intent isn't malicious, a change in a design could have terrible consequences if we were not aware of it. So configuration management of the microelectronics is a major concern across the industry and the government."

Powell notes that DOD cannot require a 100-percent defense unique solution to its electronics supply chain woes. "We have to figure out what's really important from a system level and make sure those have an adequate level of protection and for less important systems, we have to rely more extensively on commercial best practices."

Fortunately, other industries are in a similar situation. The banking industry is dependent on equipment such as routers that cannot be corrupted.

But a company like Cisco Systems has pronounced that it is a "Chinese company," and that virtually all of its products are produced under contract in factories overseas. Does it matter if DOD is buying products made offshore so long as they are being produced under contract by an American-owned firm?

You bet, Pope responds. "Basically, if it's produced in the United States, then it's an American company. The rationale for that is this: If it is produced in the United States, then it is subject to our laws and therefore we have a lot more control over what happens than if it is produced anywhere else. I don't know if I'd say that a [subsidiary] in Singapore that is owned by a United States company is a United States company....I don't think we're saying that all of our microcircuits have to be produced in the United States. What we're saying is we have these trusted suppliers for these integrated circuits — foundries for particularly sensitive applications. For other applications, we're going to have to make sure they have documented, well-maintained supply chains even if they're not in the United States."

Release of a trusted policy "is dependent on industry agreeing with it," Pope explains. "I am working with committees of people who essentially are volunteered by their companies so this isn't the kind of thing that people are on the payroll to address. People are putting in their own time to try to work resolution, so it's hard to say, 'Here is our timeline.' The most important thing is to get a quorum of opinion that points in the same direction."

The trusted program is being run out of the Defense Electronics Agency in Sacramento. It oversees the initial contract with IBM. Shortly after that contract was signed some of the military services were not too keen on providing their portion of funding. But that problem was resolved when the Office of Secretary of Defense took a stand and stopped the bickering. The program has been fully funded. According to government budget documents, DOD and NSA are each providing IBM with about $45 million this year.

There is worry about the IBM deal, particularly since the military and national security agencies have growing demand for high-performance application-specific integrated circuits. The IBM contract is due to expire in 2011. But IBM may no longer be in the semiconductor fabrication production business.

If that were to occur, the federal government might be forced to open its own semiconductor facility, or at least contract with a company to run a dedicated plant to supply integrated circuits to the entire U.S. government. But it would come at a cost: such a fab would likely not produce state-of-the-art components. Being one or two generations behind would be the tradeoff for an assured supply.

The overall problem of trusted sources can only be solved by Congress and the President creating an industrial policy aimed at reviving and re-building the U.S. microelectronics manufacturing base. "This needs to be a priority," says one defense microelectronics analyst. "If we weren't in the middle of a war, things like this would be getting more attention. The real threat is being dependent on your potential adversaries for defense components. That is a big problem."

High Oil Prices Suck Wealth Out Of American Households

The doubling of the price of gasoline at the pump is sucking hundreds of billions of dollars out of the U.S. economy. At $3.00 per gallon, the average household is now spending $3,000 a year on gasoline to power its cars for 21,000 miles of travel, double the $1,500 spent when oil prices were $1.50 per gallon. "Because almost 60 percent of the petroleum we consume is imported, roughly $900 of the increased cost of gasoline is a transfer of wealth from American consumers to oil exporting countries," says David Green, corporate fellow in the Engineering, Science and Technology Division at the Oak Ridge National Laboratory.

The economic cost of the U.S. dependence on oil reached an historic high point at $350 billion last year. The transfer of American wealth to overseas producers exceeds $1 trillion for the past five years.

The situation is far different today than it was during the first oil shocks of the 1970s. At that time, there was still the ability to substantially increase production throughout the world. Demand also decreased substantially. In the United States, oil consumption fell from 18.4 million barrels per day in 1977 to 15.7 million barrels per day in 1985. Total world oil production sank from 63 mmbd in 1979 to 54 mmbd in 1985. Production outside of OPEC increased from 29 million barrels per day in 1977 to 38 million barrels per day in 1985. No such decrease in demand has occurred with the recent spike in oil prices.

Battery Technology...

(Continued from page one)

development of battery materials and chemistries, although many of the fundamental breakthroughs in battery technology have been subsequently licensed overseas."

Overseas battery companies have gained a substantial advantage over American companies "based on the large investments they have made in manufacturing," said Hillebrand. Toyota has made steady and significant investments in its battery manufacturing facilities and is able to produce batteries for one-third the cost of U.S. companies. All of Toyota's hybrid vehicles being sold in the United States are made in Japan. Toyota "is a generation ahead in manufacturing technology and experience," said Hillebrand.

Hybrids are a fast-growing sector of the automotive market, hitting 504,000 vehicles last year and projected to grow at 30 percent a year for the next four years. "Toyota produces 80 percent of the hybrids sold in the U.S. and this situation is not likely to change soon," said Hillebrand. "Ford has a hybrid system similar to Toyota's system, but they have publicly stated that they were severely hampered by a lack of access to battery technology and high battery costs."

Toyota's nickel metal hydride battery technology was initially developed in the United States, but was commercialized by Panasonic and Sanyo. It is now mainly manufactured in Korea and Japan. "Asian-based battery makers have marked advantages based on the large investments they have made in the manufacturing process," said Hillebrand. "No matter how good the chemistry, one needs manufacturing skill to produce commercial batteries."

Lithium-ion chemistries hold promise for being the next generation of batteries for plug-in hybrids. Lithium-ion is more environmentally friendly and has a power density that is 2.5 times that of the nickel metal hydride. They are low maintenance and do not have "memory" problems. The global market for lithium-ion batteries has surged from $3.4 billion in 1995 to $42 billion in 2004.

But the limiting factor for use of lithium-ion batteries in cars is the cost of manufacturing, which runs between $3,000 and $12,000 for a 40-mile plug-in battery. "At these levels, the major hurdle to introducing plug-in hybrid technology is that the projected fuel-dollar savings are considerably lower than the cost of depreciating the battery over its useful life," said Hillebrand. "In other words, there is no payback."

The lack of a high-volume manufacturing facilities for high-energy automotive batteries "is considered a major factor in the cost gap since lithium-ion uses low-cost and abundant materials compared to nickel metal hydride [batteries]," said Hillebrand. "Lithium-ion's higher energy density comes at a price. Manufacturing methods are more critical the denser the cells become. With a separator thickness of only 20 to 25 microns, any small intrusion of metallic dust particles can cause great problems. Appropriate measures are needed to achieve the desired safety performance. Lithium-ion batteries are nearing their theoretical energy density limit and battery manufacturers are beginning to focus on improving manufacturing methods and increasing safety."

Japan has recognized advanced battery technology as being an issue of "national survival." Its government is funding lithium-ion battery manufacturing research programs along with materials and systems development. Japan supplies more than 70 percent of the nickel-metal hydride batteries worldwide. "Basically, Japan is the only supplier for the whole world," said Hillebrand. Japan intends to maintain 60 percent to 70 percent of the global production of lithium-ion batteries.

In the United States, battery costs "can be lowered with increased funding for research and development of advanced materials, tax policies and R&D tax credits or incentives," said Hillebrand. Targeted battery manufacturing incentives could help create a battery manufacturing base in the United States, but "manufacturing capability does not occur overnight," he added. "Battery manufacturing know-how and capability are developed over time and require huge capital investments. A sustained effort to develop domestic battery manufacturing capability will be equally important. Specific, focused North American battery manufacturing incentives could spur further advancement. Perhaps a Sematech-like program focused on developing a manufacturing capability might help jump-start a homegrown battery manufacturing industry in the United States."

Semiconductor Applications Explode

Worldwide revenues from the sale of semiconductor chips increased by 3.2 percent in 2007, to $256 billion, up from $248 billion in 2006, according to the Semiconductor Industry Association. Demand was driven by a 14 percent increase in sales of personal computers. Mobile personal computers sales were up 32.2 percent while desktop unit sales were up by 4.1 percent. Cell phone unit shipments grew by 20 percent last year to nearly 1.2 billion units. MP3 players grew at nearly 20 percent; LCD television units grew by more than 50 percent and digital camera sales were up by 20 percent. Total "bit" shipments of DRAMs nearly doubled in 2007, but revenues declined by 7.4 percent due to a 39 percent decline in average selling prices. NAND flash revenues were up 26 percent, but shipments were up by 46 percent.

"Industry revenue figures tend to mask the growing pervasiveness and economic contributions of semiconductors," says SIA president George Scalise. "The most dramatic example of how advances in chip technology are benefiting consumers is the enormous increase in performance of a typical PC system coupled with a steep decline in prices, primarily driven by semiconductors that are faster, smaller and cheaper every year."

The average desktop computer last year was at least 100 times more powerful than the average system sold in 1997 but cost one-third as much — $630 in 2007 compared to $1,833 in 1997. SIA predicts the market for semiconductors will grow by 7.7 percent this year.

Manufacturing Educator Pleads With Industry To Help Recruit Students

The metal casting industry has to address a major manpower challenge in order for it to survive and prosper, according Prof. Robert Tuttle of Saginaw Valley State University. Universities like his that have traditionally recruited young engineers into the industry can no longer be counted on to fulfill that role, said Tuttle. "We need help from the industry going out and talking about the industry" — selling itself to potential engineering students on what the industry does, what types of jobs are available and where they can receive training.

The old model of relying on universities to recruit students into the engineering disciplines no longer works, said Tuttle. Kids coming out of high school — the "Millennials" born between 1980 and 2000 — are sophisticated about marketing. They see a person like Tuttle talking about the virtues of pursuing a career in metal casting and pay little attention. But that changes when there is an employer nearby able to make a real impact by stating: "I'm looking for people," said Tuttle. "The industry recognizes that it needs employees but getting the message out that there is an opportunity for them is where we are having trouble."

The biggest challenge associated with attracting the next generation of engineers into the $36-billion U.S. metal casting industry is overcoming the perception that metal casting is a dead-end career. Most parents have no desire to see their child pursue a job manufacturing.

"If we do not do a good job and we can't find good employees to just replace what we have let alone talking about an expansion of the U.S. metal castings sector, then we are going to shut doors because we are not going to get product out the door," said Tuttle.

Metal casting companies that have decided not to hire new talent are already being impacted. They are not able to provide customers with quotes on new jobs or produce tooling or castings on time.

There are a lot of engineering tasks in a metal casting operation that cannot be automated and require skilled and experienced engineers. There are attempts to automate engineering processes with software systems, but there will always be the need for knowledge workers throughout the process.

Without knowledgeable and experienced metal casting design and process engineers many designs are being produced that are not easily castable. Automakers are gradually losing their core of experienced product engineers who know about castings and young engineers replacing them don't know that much about them. They are designing parts with features that are difficult or impossible to cast "and they are beginning to really drive up the product's cost," said Tuttle.

The problem of adequately skilled engineers runs deeper than just replacing retiring Baby Boomers. Just at a time when the industry needs to innovate its entire process and product mix using new technology, new materials, automation, new software applications and energy efficient and non-polluting systems, there is not a new cadre of talented engineers and specialists being groomed for such an undertaking.

"You need the people working in the supplier industry to develop the technology for those specific needs," said Tuttle. "Where do you find people like that? Some will come out of schools like Saginaw State and the [25] universities associated with the Foundry Education Foundation

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Fermilab Physicist Runs For Congress

It's not often a scientist from a national laboratory runs for Congress. Bill Foster, a Fermilab physicist, is in a close race to fill the seat that was recently vacated by former House Speaker Dennis Hastert in Illinois. Foster, a Democrat, is running in a Republican district on the plank that Congress needs somebody who understands the basic principles of problem solving: logic, reason and demonstrable facts, "which have been suppressed and ignored by an administration and Congress more interested in pleasing their ideological patrons than in governing effectively," he says.

Foster faces a tough challenger: Jim Oberweis, a financial maverick who founded the Oberweis Emerging Growth Fund. Oberweis, who received his MBA from the University of Chicago and describes himself as a "common sense conservative," calls Faster an "extreme liberal Democrat" who wants to raise taxes. John McCain has endorsed Oberweis and is helping him raise money. Home-state Democratic Sen. Barack Obama has endorsed Foster and is helping him raise money, too.

If Foster wins the March 8 special election he will provide "the loudest voice the scientific community has ever had" in Congress, he claims. "There is no substitute for adequate scientific competence in Congress, and we have suffered from the lack of it."

Foster has received the endorsement of two dozen Nobel Award winning scientists, and has received support from another 1,000 scientists from across the country. He is hoping to ride Obama's Illinois' coattails into Congress.

Foster received a Ph.D. in physics from Harvard and has worked for 22 years at Fermilab, where he designed experiments and helped build the Collider Detector. He has participated in the discovery of the Top Quark, and help design integrated circuits that measure atomic collisions. He was co-inventor and director of construction of Fermilab's Antiproton Recylcer Ring, the lab's latest big machine with 500 magnets. His Web site is http://www.foster08.com/. Oberweis's Web site is http://www.jimoberweis.com/.

Educator Seeks Industry Support...(Continued from page nine)

[FEF], but getting them into the suppliers and not just foundries is going to be difficult."

Even design engineers going into the big OEMs and smaller makers of specialty components do not have experience with castings. "If all they're used to is machining and welding, guess what they are going to design: machined components and weldments," said Tuttle. "They will never do a casting because they don't have the experience. That is a disadvantage that I'm not sure people grasp yet. The only time they grasp it is when a smaller OEM has to cast a component and they get a design that has to be completely reworked, and that produces bad blood on both sides. It doesn't help us move forward. I don't think casting shops realize they need more engineers themselves because they are used to the customer providing them with a good castable design," especially as those designs become more complex. Engineers working in casting operations must now work closely with their customers on designing a make-able part.

New tactics are needed to attract the "Millennials" into careers in the metal casting industry. This group of students is unlike previous generations, said Tuttle. They have no memory of Ronald Reagan or the Cold War. AIDS, VCRs, microwaves and the Internet always existed. They believe that change is constant and that they must be self-reliant. They are family oriented, brand conscious, mobile and addicted to the media. They are fun seeking, hopeful and they prefer information to be delivered to them quickly. They select careers based on relations with family and friends, high-school teachers, television shows, the Internet, career fairs and scholarships.

So how does the industry fit into these mores?

Foundries are never seen on television and manufacturing in general remains a low-profile career among students. There is constant bad news about the American automobile industry, particularly in Michigan and Ohio. Many of the manufacturing industry's recruiting efforts are disconnected, and there is little information on the Internet, making it hard to find schools specializing in castings and career information. "Kids have no clue as to where even basic metals come from, much less castings, yet those materials surround them," said Tuttle.

Tuttle proposed a national recruiting model aimed at attracting students to the 41 schools with a foundry education program. He said American Foundry Society (AFS) chapters and foundry schools must coordinate their efforts by using "pre-built" and custom presentations that have a "shock and awe" value aimed at a media savvy group of kids who expect a lot of polish and like the unexpected. Holding plant and college tours and involving more chapters in high-school recruiting are also essential. "Plant tours are great," said Tuttle. The AFS chapters should be provided with recruiting "how-tos."

There also needs to be a central Internet resource for careers in the metal casting industry that describes the industry, the college majors who are employed by foundries, the schools specializing in metal casting and the summer programs that are available. The site should contain a repository of recruiting materials including off-the-shelf presentations and documentation on various recruiting programs. The industry needs a "www.metalcastingiscool.com" Web site, similar to SME's "www.manufacturingiscool.com" Web site, said Tuttle. "Industry has traditionally relied on us professors for recruitment, and I hope they get the point and understand the repercussions" of that model no longer working.

Tuttle said there is another aspect of engineering training that must be considered: the creation of "renaissance" men and women. Engineers must now be articulate enough to communicate very complicated subjects to non-technically trained people. They need a keen sense of business — determining whether a product will sell and how the enterprise will make money. On the technical side, they have to be able to lead because often the first position they hold after receiving a degree requires managing a staff. "In no other degree program does that happen," said Tuttle. "Classically, the best people you wanted were those who could do integrals in their heads with their eyes closed and that made a good engineer. But there are huge differences needed now in skill sets. The real test is did the product work? Does it sell in the marketplace? If it sells in the marketplace, it must be good."

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Global Manufacturing Wage Gap Impacted By Falling Dollar

Wages paid to manufacturing workers around the world are catching up to those paid in the United States, according to the Bureau of Labor Statistics. Wages paid in Canada to manufacturing workers jumped beyond those paid in the U.S. for the first time in over a decade. In 33 foreign economies, manufacturing wages averaged 82 percent of the U.S. level in 2006, up from 79 percent in 2005. U.S. average hourly compensation costs for production workers in manufacturing were unchanged in 2006 at $23.82. In the 33 countries BLS measures, wages rose an average of 2.6 percent, with a big portion of that increase accounted for by the value of foreign currencies rising by 2 percent against the U.S. dollar.

Fourteen of 20 European countries had higher hourly compensation costs than the United States, with Germany's costs more than 40 percent higher than those in the U.S. "Compensation costs in Europe, on average, continued to be almost $5 higher on a per-hour basis than in the United States," says BLS. But there is a great deal of variation among European nations, with Poland's hourly cost of $4.99 versus Norway at $41.05. Outside of Europe, only Canada and Australia had compensation costs higher than the United States when measured in U.S. dollars. In 2006, the lowest compensation costs relative to the United States were in Mexico and the Philippines (12 percent and 4 percent of the U.S. level respectively).

BLS does not have current information from China and again bases its analysis on a report done for the agency by Judith Banister, which found that China's average manufacturing worker compensation costs of 67 cents per hour were 3 percent of those of U.S. workers in 2004.

Buoyed by strong currency appreciation against the dollar, hourly compensation costs for manufacturing workers in Brazil increased by 17.8 percent in 2006; in Korea they increased by 15.5 percent; and in Singapore they were up by 17.1 percent.

"The movements of the foreign currencies relative to the U.S. dollar in 2006 had an influence on hourly manufacturing compensation costs measured in U.S. dollars," writes the BLS. "Hourly compensation costs on a national currency basis in the 33 foreign economies rose 2.6 percent. However, when adjusted for the appreciation of the foreign currencies against the U.S. dollar, this increase in costs was magnified to 4.7 percent."

Deemed Export Report Rankles Industry

The recent recommendations made by the Commerce Department's Deemed Export Advisory Committee will have a "significant negative impact on U.S. technological leadership" and should not be adopted, according to a group of 12 large business associations. The coalition, led by the National Foreign Trade Council, said the committee's recommendations would lead to a "logjam" in export licenses and would increase the number of denials of licenses for foreign nationals from a larger number of countries. This "would accelerate the shift overseas of industrial technology research and development," says the group in a Feb. 15 letter to Commerce Sec. Carlos Gutierrez.

The Deemed Export Advisory Committee, led by retired Lockheed Martin CEO Norm Augustine, did not narrow the list of dual-use technologies that need to be controlled by regulations nor did it clarify the criteria needed for revising the control list. "Without such guidance, the interagency process is unlikely to make any significant reduction in the scope of the

(Continued on next page)

Global Manufacturing Compensation Costs

Country or area	US=100		US$		All Employees (Production Workers= 100)
	Production Workers	All Employees	Production Workers	All Employees	
Americas					
United States	100	100	23.82	29.60	124
Argentina	-	22	-	6.57	-
Brazil	21	20	4.91	5.90	120
Canada	108	98	25.74	29.00	113
Mexico	12	13	2.75	3.72	135
Asia and Oceania					
Australia	110	102	26.14	30.10	115
Hong Kong SAR	24	-	5.78	-	-
Israel	54	49	12.98	14.37	111
Japan	85	82	20.20	24.40	121
Korea, Republic of	62	57	14.72	16.87	115
New Zealand	61	54	14.47	16.08	111
Philippines	4	5	1.07	1.36	127
Singapore	36	46	8.55	13.55	158
Sri Lanka	-	-	-	-	-
Taiwan	27	27	6.43	7.95	124
Europe					
Austria	128	124	30.46	36.70	120
Belgium	134	123	31.85	36.35	114
Czech Republic	28	-	6.77	-	-
Denmark	149	129	35.45	38.21	108
Finland	126	119	29.90	35.26	118
France	105	114	24.90	33.73	135
Germany	144	139	34.21	41.04	120
Greece	68	-	16.10	-	-
Hungary	26	28	6.29	8.39	133
Ireland	109	105	25.96	30.99	119
Italy	105	97	25.07	28.71	115
Luxembourg	116	-	27.74	-	-
Netherlands	136	119	32.34	35.34	109
Norway	172	156	41.05	46.31	113
Poland	21	21	4.99	6.26	125
Portugal	32	32	7.65	9.54	125
Slovakia	-	22	-	6.53	-
Spain	79	74	18.83	22.05	117
Sweden	133	116	31.80	34.21	108
Switzerland	129	121	30.67	35.68	116
United Kingdom	114	114	27.10	33.71	124

Commerce Rules In Favor Of U.S. Magnet Industry

Thin flexible magnets that are commonly used on refrigerators imported from China are being dumped into the U.S. market, according to a Feb. 20 "preliminary" determination by the Commerce Department. Chinese producers have received subsidies amounting to 70.4 percent on their exports of magnets to the United States, says the agency's International Trade Administration. "As a result of this preliminary determination, Commerce will instruct U.S. Customs and Border Protection to collect a cash deposit or bond based on the preliminary [countervailable] rate," says the agency.

Last year, Chinese imports of flexible magnets totaled 103 million units (up from 83 million units in 2005), valued at $18.2 million. The Commerce Department is scheduled to make its final determination in July. Magnum Magnetics Corp. of Ohio filed the countervailing duty petition against China Ningbo Cixi Import Export Corp. and Polyflex Magnets Ltd.

Meanwhile, the Commerce Department has responded positively to a petition from four U.S. parties seeking a countervailing duty investigation into imports of circular welded stainless pressure pipe from China. The pipe is used as a conduit for liquids and gases. Bringing the case against the Chinese were Bristol Metals of Tennessee, Felker Brothers Corp. of Wisconsin, Marcegaglia USA of Pennsylvania, Outokumpu Stainless Pipe of Illinois and the United Steelworkers of America in Pennsylvania.

Engineering Academy Identifies Grand Challenges

The National Academy of Engineering has identified 14 "grand challenges" that need to be tackled by the global engineering community. A committee of engineers from around the world met over the past year and received input from the general public on challenges that fall into four categories: sustainability, health, reducing vulnerability and the joy of living. "We chose engineering challenges that we feel can, through creativity and commitment, be realistically met, most of them early in this century," said committee chairman William Perry, former Secretary of Defense. "Some can be, and some should be, achieved as soon as possible." The challenges were not ranked and the public can vote on which one they think is the most important and provide comments at http://www.engineeringchallenges.org. Here they are:

- Make solar energy affordable
- Provide energy from fusion
- Develop carbon sequestration methods
- Manage the nitrogen cycle
- Provide access to clean water
- Restore and improve urban infrastructure
- Advance health informatics
- Engineer better medicines
- Reverse-engineer the brain
- Prevent nuclear terror
- Secure cyberspace
- Enhance virtual reality
- Advance personalized learning
- Engineer the tools for scientific discovery

Year Of Mass Layoffs

The number of mass layoff events involving more than 50 employees increased in 2007 to 5,170, up from 4,885 in 2006. Layoffs impacted 931,053 workers in 2007, down from 936,000 in 2006, according to the Bureau of Labor Statistics. Manufacturing had the largest share of mass layoff events last year, accounting for 25 percent of the total, with workers being hit hardest in the transportation equipment manufacturing sector (59,150) and in food manufacturing (42,541). Fabricated metal product manufacturing had the largest increase in separations, an increase of 2,650, followed by machinery manufacturing (plus 2,404) and wood product manufacturing (plus 2,209). The construction and finance and insurance industries had the highest levels of layoff events and separations since the series began in 1996, says the BLS.

The report is located at: http://www.bls.gov/news.release/pdf/mslo.pdf.

Deemed Exports... (Continued from page 11)

technologies covered," said the group.

The recommendations could also lead to having more foreign nationals being subject to deemed export controls and loyalty tests. The committee's suggested criteria for screening foreign nationals "would amount to processing Top Secret security clearances for thousands of foreign nationals, a procedure that takes months for U.S. citizens and that has been backlogged for several years," says the letter to Gutierrez.

The Commerce Department needs to "go back to the drawing board and work closely with industry in developing an approach that will produce a more balanced result," says the letter, signed by AeA, American Council on International Personnel, AMT - Association for Manufacturing Technology, Coalition for Employment Through Exports, Computer Coalition for Responsible Exports, Computer and Communications Industry Association, Emergency Committee for American Trade, Information Technology Industry Council, International Safety Equipment Association, National Council on International Trade Development, National Foreign Trade Council and the U.S.-China Business Council.

The letter is located at http://www.nftc.org/default/VISA/DEAC%20Letter.pdf. The Deemed Export Advisory Committee's report is located at http://tac.bis.doc.gov/2007/deacreport.pdf.