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Nobel-Prize Winning Economist Says Bottom Just Fell Out Of U.S. Economy

The United States economy is in a "steep nosedive" that is proving to be "horrific and awesomely dangerous," according to the most recent recipient of the Nobel Prize for economics. Few of the normal prescriptions for reversing a traditional recession are working to avert a potential depression.

"Right now, the numbers giving you some indication of where the economy is moving are quite frightening," says Princeton economist and New York Times columnist Paul Krugman. "Basically, I fire up my computer every morning, take a look at the economic numbers and generally say something I can't print in the New York Times because it's really, really bad stuff, day after day. The economy is headed downhill very fast right now."

With the economy currently losing more than 500,000 jobs per month, Krugman expects the unemployment rate to reach 10 percent in the next year. GDP is currently shrinking by a rate of 6 percent. The downturn is feeding on itself.

"As the economy sinks, businesses scale back their investment plans because why add capacity if you're going to have a sharp drop in demand?" Consumers are scaling back out of fear of losing their jobs, and the downward pressure builds.

"I'm scared to death of [2009]," Krugman told a luncheon of the National Press Club in December. "I'm quite optimistic about the year after that because the stimulus will be coming on line and we will be getting a lot of boost. The team coming into the White House does understand that. I start to get concerned again once you look further out because I take a look and say, 'Well, okay, we do know how to boost the economy. If we

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Promise Of Optoelectronics Is Headed To Asia

Optoelectronics will be a major global growth industry and will play a pivotal role in reducing U.S. energy consumption over the coming decades, but wide-scale deployment of the technology may not lead to many new American jobs.

Optoelectronics are used in photovoltaic panels, in new solid-state lighting systems that reduce electricity consumption by a factor of five; in a new generation of televisions and telecommunications networks; and in sensors that will be deployed to monitor thousands of mechanical and industrial systems, roadways, electrical grids and manufacturing production lines.

The markets for these systems are "large and underpin the world economy and sustainability," says Michael Lebby, president and CEO of the Optoelectronics Industry Development Association (OIDA) in Washington, D.C. There is the potential for strong growth in every segment of the optoelectronics industry, especially as global demand for electricity increases by a projected 50 percent by 2025.

But the bullish economic prospects for the industry may not accrue to the United States because most of the manufacturing capacity for optoelectronic products is being installed overseas. As that production goes into place, the R&D and technical know-how follows.

"Right now, whatever is coming out of research in the photonics industry is ending up outside of the country because of the trend among all the major players in photonics to ship everything offshore," says Lebby. "It's a negative trend."

Installed capacity of solar photovoltaic systems is projected to increase from 6 gigawatts in 2006 to 25 gigawatts in 2010; 90 gigawatts in 2015 and 206 gigawatts in 2020.

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U.S. Companies Doing Business In China Begin To Worry About Growing Chinese Protectionism

American companies operating in China increased sales and profits through the first half of 2008, but they are facing growing problems in operating there, according to the U.S.-China Business Council.

In its annual survey of the Chinese business environment for American companies, the council found that its members are growing increasingly frustrated by bureaucratic barriers to market expansion, increasing costs of doing business and shortages of skilled managers and workers. "Though optimistic about growth prospects, USCBC companies express rising concerns about PRC government policies under development that might restrict future growth in many key industries," says the survey.

There is also increasing concern about rising Chinese protectionism and proposed government policies that would restrict U.S. corporate investment and favor domestically developed technology and product standards.

But those concerns are not slowing U.S. corporate investment in China. Seventy-eight percent of USCBC members surveyed said they "will accelerate company-resource commitments to China" over the next 12 months compared to the previous year. Only 1 percent said they intend to invest less in the Chinese market and 26 percent said their investment will remain steady. Ninety percent of the companies said they were either optimistic or somewhat optimistic in their five-year outlook on their company's business in China.

"The survey asked respondents to assess how important China is to their company's global operations," says USCBC. "More than 85 percent reported that China was at or near the top of their companies' priorities." When asked if their Chinese operations were profitable, 88 percent said, "yes." Ninety-two percent said their operations in China are intended to serve the Chinese market, while 23 percent said they were using Chins as an export platform to serve the U.S. market. Twenty-six percent said they were using China as an export platform to serve markets other than the United States.

U.S. companies are having increasing difficulties with China's business and product licensing bureaucracies, which the council describes as being "major headaches with no improvement over the last 12 months." The system of dealing with government regulatory bodies is marked by a "slow, opaque and inconsistent licensing process [that] impedes both market entry and subsequent expansion." Only 15 percent of those operating in China say that the approval processes for virtually all operating decisions has improved, while another 29 percent said they had worsened.

In the area of Chinese protectionism "respondents mentioned a wide range of issues that concern them, including mergers and acquisitions, government procurements, standards, industrial policies, IPR and technology," says the survey. "The central government recently issued regulations that appear to favor domestic over foreign goods by imposing an extra, onerous review process on government procurement of imported goods. Other policies designed to promote 'indigenous innovation' and high- and new-technology companies may eventually require foreign companies to disclose proprietary information or transfer more technology to maintain access to the Chinese market. China has also indicated that it could restrict foreign companies' ability to participate on panels that determine standards for Chinese goods and services."

Good Cities Breed Good Citizens And Healthier Economies

An ongoing study by Gallup has found a direct link between the success of a local economy and the passion that people have in living there. When people connect with their community for its openness, social offerings and physical beauty, the local economy thrives.

"The data provide new insights to leaders focused on improving the long-term economic well-being of their communities beyond the immediate challenges of the financial crisis," according the Knight Foundation, sponsor of the Gallup study entitled "Soul of the Community."

The study measured residents' emotional connection to where they live and compared that to the communities' GDP growth over the past five years. The findings show a significant correlation.

The study will continue for the next three years during which "the researchers will analyze the trends to prove whether emotional connection drives economic growth, or the other way around," says the Knight Foundation. "Within a smaller microcosm, such as a company, Gallup has been able to show that increasing employee emotional connection will indeed lead to improved financial performance of the company."

Added Warren Wright, managing partner for Gallup: "The study is especially important in the current economic crisis because beyond addressing immediate needs, communities will have to make smart choices to direct resources to areas that have the greatest impact on engaging the community."

The results of the "Soul of the Community" survey are available online at www.soulofthecommunity.org.

ESSAY:

Obama Will Burn Through His Economic Team The Way Lincoln Jettisoned His Generals

I am on an airplane headed from Washington, D.C., to San Francisco. It is late Christmas Day, 2008. I am at 32,400 feet flying just south of Indianapolis on a Virgin America flight at 458 mph. It is negative 57 degrees F. outside my window and I just finished reading a very long article in the Dec. 1, 2008, issue on the New Yorker entitled "Anatomy of a Meltdown, Ben Bernanke and the Financial Crisis."

It did not inspire a verse of Joy to the World.

The author, John Cassidy, a New Yorker staff writer, does an extremely commendable job in describing the biggest economic calamity of the past 80 years. He speaks with all those who needed speaking to, repeating the phrase "he told me" when quoting such people as John Mack, chairman of Morgan Stanley, Glenn Hubbard, former chairman of the White House Council of Economic Advisors, Fed Chairman Ben Bernanke and many other notable economists.

Many thousands of words after starting his article, Cassidy writes that federal efforts to prop up the financial system "have so far had little effect on the housing slump, which is the source of the trouble."

That is A source of the trouble, but not THE source of the trouble, which was the collapse of the U.S. industrial base and the unsustainable trade deficits that sapped the energy out of the U.S. economy long before the housing bubble burst.

Why doesn't a single one of these economists mention the trade deficit as one of the primary causes of the meltdown? Their refusal is bugging tens of millions of non-economist Americans who have desperately watched as millions of good-paying jobs vanished — jobs making such things as refrigerators, shoes, microwave ovens, toys, golf clubs, bathroom fans, television sets, car parts, solar panels, socks, nuclear plants, printed circuit boards, luggage, ceramic tile, jewelry, dehumidifiers, air conditioners, clothing, candy and crock pots — this unbelievable list goes on forever, and basically includes virtually every product sold in Wal-Mart.

I spend my days studying what economists say and write, and comparing their version of reality to the one described by workers and executives of American manufacturing enterprises struggling to say afloat. Very little of what economists say — that outsourcing is a net plus for the U.S. economy and that the trade deficit is not a problem — jives with the reality of the more than one million workers who lost their jobs in November and December alone.

The United States is completely broke — it has been for a long time — because it has a trade deficit in goods that rose to an unbelievable $838 billion in 2006. It dropped to $819 billion in 2007, but it is persisting at elevated levels because the United States government — listening the advice of such economists — has decided that it is not important to manufacture the products that its citizens consume.

Now we have a new president and a new government that is, quite inexplicably, made up of many of the same people who got the country into this mess. It is stunning that at the very moment the United States faces one of its most grave economic periods in its history that there isn't one person in the new Obama cabinet or on his senior White House staff that has experience working for an American industrial enterprise.

This is no ordinary cyclical recession and ordinary responses like spending trillions of borrowed dollars for a "stimulus" will not solve the problem. When demand for products picks back up there will be no jobs for Americans to return to to produce the products to fill that demand. America's industrial base is vanishing and in many cases is gone. There is nothing left to stimulate.

Now, the task is for America to somehow build the factories that will produce the goods that Americans might demand. But without the jobs and the wealth that is multiplied through entire American supply chains that factories generate, it might be a long time before Americans have enough money to create demand. Until the United States starts producing the products it is consuming, the United States won't be consuming many products. It is a sobering fact well understood by manufacturing executives but that America's top economists don't ever seem to acknowledge.

President Obama will be taking advice from people like economist extraordinaire and former Harvard University President Lawrence Summers who said in November: "Frankly, I did not see this financial meltdown coming."

Really? He didn't see it coming? Had he not spoken with the tens of millions of Americans who understood that it was occurring as they were watching their beloved communities throughout the American homeland suffer through the economic meltdown of losing their industrial base? Where was Summers living? In the president's suite in Harvard, which has an endowment of $34 billion and whose students are of the upper crust and who pals around with other "we're-the-smartest-of-all-American economists"?

Obama's stimulus package will fail. He will spend a trillion dollars trying to resuscitate the U.S. economy. But without an industrial base, there will be little or nothing to show for it, save for more debt that will have to paid off.

That is when the economists who put the country in its present fix and who will have provided all of their

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Bottom Just Fell Out Of The U.S. Economy...(Continued from page one)

do a lot of federal spending, that will boost the economy.' But what I don't know is what the end game looks like. Eventually, you want the private economy to step back in. You want to withdraw the stimulus spending. Eventually we have to start worrying about servicing the debt we've run up in the course of the stimulus program. But I don't have a clear story about which part of the private sector takes up the slack after the federal government's stimulus is done. Hopefully we'll get a better read on that a little bit further out, but that is going to be a big issue."

Krugman is struck by the similarities between the conditions that led to the Great Depression and those that have occurred over the past year. A shadow banking system that grew up outside of the traditional banking regulatory system — one that includes investment banks, hedge funds, asset-backed commercial paper, money market funds and auction rate securities — has collapsed and "all hell has broken loose," he says.

This shadow banking system was bigger on the eve of the crisis than the traditional banking system — the one that is protected against bank runs with deposit insurance and regulations on capital and reserve requirements. The shadow banking system was worth at least $10 trillion.

"It hasn't all disappeared, but it has shrunk massively in what is basically a 21st century version of the bank runs that ushered in the Great Depression," Krugman told the scribes. "What made the Great Depression great was not the stock market crash but the banking failures of the early 1930s and we've essentially replicated that experience....The crisis that we have right now is like everything we've seen before all at once: there is a real kind of sum-of-all-fears quality."

The collapse corresponded with bursting of bubbles all around the globe — in Eastern European nations like Ukraine and Latvia, and with housing in Spain, the UK and elsewhere.

So far, the Federal Reserve and the federal government have responded "predictably" to the crisis, says Krugman. "If you look at [the] policy responses so far it looks a lot like we're moving down a check list."

The Fed has instituted a zero interest rate policy (ZIRP) to rates below where they were in 1935, "and that's not going to work," says Krugman.

The Fed has been aggressively purchasing assets, increasing its holdings from $850 billion to $2.5 trillion, including the purchase of mortgage-backed securities from Fannie Mae and Freddie Mac, which "is not your normal kind of policy," he says. "They are doing enormous stuff."

Those policies have helped mitigate the damage. Mortgage rates have come down, but nothing is working to reverse the nosedive.

> ***"Scary times. Let's wish ourselves the best of luck."***

The next item on the checklist is fiscal policy — a massive government stimulus. But even at $850 billion over the next two years "I will be shocked if the Obama people can stop the unemployment rate before 8 percent," he says. "Everything right now hinges on whether we understand this stuff even as well as I think we do, and whether the tools that are at hand are enough to pull us back from the brink. I think so. Not quite as confident of that as even I would have been a year ago. Professionally there is a part of me that says, 'You know, this is the crisis I always wanted to live through,' because that is what economists study. But of course, as an actual human being, it's horrific. Scary times. Let's wish ourselves the best of luck."

—Richard McCormack

Early Exit For Obama's Generals...(From page three)

sage advice to Obama will be thrown out — just as Obama's mentor Abraham Lincoln fired all of his idiot generals until he finally settled on one who could get the job done. The old ways will not work. Like in the modern American movie classic "Mississippi Burning," the solution to America's economic problem will require a radical change of approach.

In two years, when the country's ruling elite finally realizes that there is no wealth being generated — when there are tens of millions of unemployed Americans who are no longer hidden from Harvard and University of Chicago economists — that is when Obama gets desperate. That is when he gets livid with his economic generals. That is when he starts to look at real solutions to address the economic conflagration caused by his know-it-alls.

He will start to listen to people like Brian O'Shaughnessy, CEO of Revere Copper, the oldest company in the United States, Bob Baugh of the AFL-CIO Industrial Union Council, Clyde Prestowitz of the Economic Strategy Institute, Leo Hindrey and Ralph Gomory. None of the people in the "domestic production" community are perfect — but neither was Alan Greenspan nor his legions of cronies who, in a month's time, went from being Gods to being Goats.

The people who know what it takes to create wealth in America for American workers will be the ones who put together and implement an economic strategy that will save the United States from regressing into a Third World country where people's chief skills will be knitting, splitting firewood and canning tomatoes.

When the current class of economists finally get shoved out the back of the plane, as Lincoln did to his failed generals, that is when the country will start to implement a plan to revive U.S. innovation and the production capability to manufacture an entirely new generation of products that will lead to an economic renaissance. Hopefully, it won't be too late — hopefully there will be something left to build upon — when Obama alone and by himself finally comes to that realization.

Harvard Man To Head Pres. Science Office

President-elect Barack Obama has selected another Harvard man to serve in a top position in his White House. John Holdren, a 64-year-old professor of environmental policy at Harvard's John F. Kennedy School of Government and director of the Woods Hole Research Center in Falmouth Center, has been nominated to be Obama's science advisor. Holdren will also head of the White House Office of Science and Technology Policy.

Holdren studied aerospace engineering at Stanford University as an undergraduate, and plasma physics at MIT. He has worked as a professor of energy and resources at the University of California Berkeley (from 1973 to 1996); as a senior research fellow at the California Institute of Technology (1972 to 1973); and as a physicist in the magnetic energy fusion division at the Lawrence Livermore National Laboratory (from 1970 to 1972).

Holdren was president of the American Association for the Advancement of Sciences (AAAS) in 2006 and served on President Bill Clinton's Committee of Advisors on Science and Technology from 1994 to 2001. Most recently, he was appointed as a guest professor at the Tsinghua University in Beijing, China.

Holdren's research work has focused on causes and consequences of global warming, energy technologies and energy policy. He has been an outspoken critic of the Bush administration's policies and its ideological and political manipulation of scientific research.

Also joining Obama's science team as co-chairs of the President's Committee of Advisors on Science and Technology are Harold Varmous, a 1989 Nobel Prize winner for work on cancer research and former director of NIH during the Clinton presidency; and Eric Lander, a leader in genome mapping at Harvard and MIT.

The National Oceanic and Atmospheric Administration will be led by Jane Lubchenco, former president of AAAS.

The Economic State Of The Union: 2009

BY CHARLES McMILLION

For a generation, the U.S. lifestyle and role in the world has relied largely on wildly unsustainable asset appreciation and, even more, on the rocketing of private and public debt. The unsustainable has now stopped. America and the world face the collapse of a systemic paradigm and a shift that is certain to be, at best, very painful.

The record $14 trillion loss in presumed "net worth" of U.S. households since September 2007 is only the beginning. Adjusted for price changes, total household net worth is now lower than it was nine years ago, the first such period without double-digit growth since the mid-1930s. Real net-worth for most households has plummeted. And overpriced assets continue deflating, raising further — not lowering — the unprecedented leverage of near $15 trillion in record, crushing household debt that doubled over the past eight years and is now larger than personal income or even than the entire GDP.

For now, to cushion the crash, the federal government must continue and vastly accelerate equally unsustainable debt stimulus plans, including spending on public infrastructure, health care and the environment. But as the federal debt has soared from $0.9 trillion in 1980 (following 200 years of world wars, a civil war, depressions, run-away inflation, etc.) to $5.5 trillion eight years ago and $10.7 trillion today, creditors are nearing their limits even for U.S. Treasuries and the U.S. dollar.

The unimaginably irresponsible past eight years saw $7.2 trillion in new household debt and $5.2 trillion in new federal debt — a combined $12.4 trillion. This debt stimulated total nominal GDP growth of only $4.3 trillion and only three million new jobs, the worst since the early 1930s. That is, roughly $3 in mortgage borrowing, tax cuts or war spending for each $1 of GDP growth and $4.1 million in borrowing for each new job created!

As I've followed in this space over the years, including last year, ratios of household and federal debt to GDP, income or assets are far worse than in any past period of US history, including World War II (http://www.manufacturingnews.com/news/08/0124/art1.html). These unprecedented debt ratios that have soared relentlessly for a generation are rocketing now.

Soon, each American worker and business must pay interest on that debt and begin to earn — not borrow — a living in productive sectors badly damaged from three decades of cost-cutting hostility. And this occurs in an Internet age of brutal global competition against very cheap, state-of-the-art equipped workers and firms in China and elsewhere — each now with their own severe problems that will make global compromises difficult.

The utter failure of U.S. policy to adjust effectively to changing global economic realities over the past generation is at the heart of today's systemic crisis. Trade data do not tell the whole story because domestic employers systematically cut profits, wages, benefits and other investments, demand tax concessions and cut corners on environmental, health, safety and other regulatory costs to avoid losing more sales to imports. Nonetheless, since beginning to suffer chronic current account trade deficits in 1982, the United

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Economic State Of Union...(From page five)

States has accumulated $7.4 trillion in losses of which almost $5 trillion in losses have come in just the past eight years.

This means, for example, that since 2001 the U.S. produced $5 trillion less than it needed, including all U.S. exports, and made up the difference with net imports financed with borrowing from or selling assets to China and others. U.S. economic growth has been far weaker than world growth in each of the past eight years, a condition in which economic theory suggests a country should be enjoying large trade surpluses. And for extra measure, note that the trade deficit over the past eight years is much larger than the entire borrowed growth of GDP.

The chronic trade deficit for manufactured goods totals $5.8 trillion since it began in 1983 and, worsening sharply, totals over $3.5 trillion in just the past eight years. Notwithstanding a current false advertising campaign, most of the annual U.S. trade deficit — "the transfer of wealth abroad" — is in manufactured goods, not oil, and the import bill for manufactured products is almost four times as large as for crude oil.

Even now, facing the worst economic and financial crisis since 1932, the U.S. current account deficit means that the United States is producing almost $2 billion per day less than we need and making up the difference with net imports financed by foreign borrowing and the fire-sales on assets.

Briefly, how did the United States get into such a deep hole of underproduction and debt dependence?

Emerging triumphant after World War II as the world's unique economic and technological superpower, and with most of the world in rubble fearing the Soviet Union, U.S. policy emphasized consumption, taking for granted our vastly superior private companies and production capacity. At Bretton Woods, N.H., and elsewhere, U.S. leadership created a network of international institutions and programs to promote reconstruction and production abroad — including by our own companies — while building "the American dream" of middle class affluence and consumption in the United States.

With the successful reconstruction of Europe, Japan and others, this temporary period of vast U.S. superiority began coming to an end. In 1971, when the United States suffered its first annual post-WWII current account trade deficit, President Nixon reversed the commitment made at Bretton Woods pegging the global value of the dollar to gold at an uncompetitively high value. This lowered the dollar's value and restored the current account surplus, but it also lowered the revenue of the world's dollar-based commodity producers, particularly those producing oil. Two rounds of sharp oil prices hikes in 1973 and 1978 threw the United States and world economies into chaos, largely undermining empirical models of the U.S. economy based on post-WWII experience.

President Reagan stepped into this vacuum with his view that government was the problem and unregulated "free" markets were the answer. When his tax cuts failed to pay for themselves, as promised, public debt began to explode and financial deregulation soon led to an explosion of private debt and asset inflation. Similarly, when a flood of lower-cost imports did not pay for themselves with higher valued upstream exports, the United States plunged into ever-worsening trade losses moving relentlessly upstream to ever more sophisticated goods and services.

Despite soaring financial debts and trade deficits — and immense fees and power in the financial services/debt industry — the collapse of the Soviet Union was sold as an uncontestable victory for anti-government, unregulated "free" market forces. This crusade became essentially bipartisan in 1993 with President Clinton's no-holds-barred fight for NAFTA and "free" trade and investment in very low wage, virtually unregulated Mexico.

Aside from the debt industry, its chief sponsor and propagandist, the two key sectors involved in the NAFTA debate were textiles/apparel and autos. Most executives in the capital-intensive textile segment of their industry were led to believe that moving the labor-intensive apparel segment to low-cost Mexico would safeguard textile production and, by lowering the cost of final products, allow U.S. textile firms to regain market share from Asia.

These executives soon re-learned the basic rule of business is to be close to your customers. Today, 15 years after NAFTA was implemented, U.S. spending for textile and apparel products has doubled, but U.S. textile production is down by 40 percent. Apparel production is down by 62 percent. The industry has lost 1.1 million jobs and all but a few of its firms have gone out of business.

Auto executives were also convinced that moving more labor-intensive production to cheaper Mexico would allow them to lower total costs enough to take back market share from Asian and European rivals. Yet the industry's trade losses mounted steadily over the past 15 years, totaling $1.6 trillion including a loss of $1 trillion in just the last eight years and over $106 billion this past troubled year alone. Despite constant claims that much higher overall U.S. productivity would more than offset Mexico's cost advantages, today the United States faces persistent $30 billion per year trade losses with Mexico in the auto sector. The United States also imports half-again as many cars from Mexico as U.S. producers — including the transplants — export to the entire world.

Even in the dynamic category of manufactured goods that the Commerce Department defines as the most advanced technology products (ATP), the U.S. surplus of trade and production was lost in 2002. Record ATP deficits are now half again larger than any past

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Optoelectronics...

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Global revenue for the solar industry is projected to be almost $160 billion in 2019.

A total U.S. conversion to solid-state lighting could save the United States 212 trillion watt-hours per year in electricity. The use of energy for lighting could shrink by up to 20 percent in 2020 with the deployment of solid-state lighting systems.

Optoelectronics will substantially reduce the power needed in data centers, which consume 1.6 percent of all U.S. electricity. They will make possible the exponential growth of bandwidth capacity through the use of active optical cables, embedded terabit photonic (VCSEL) arrays and the installation of home broadband networks.

Optoelectronic sensors are being designed to detect pipeline leakage, pollution emissions, wind turbine performance, ground water monitoring, intelligent oil well systems, finding hot spots in electrical transformers and monitoring dissolved oxygen in marine ecosystems.

The market for all optoelectronics "is broad and growing," says Lebby. The new generation of organic light emitting diode television displays "has caught the imagination of the public" due to the thinness of screens, high contrast and high response speeds that allow designers to differentiate their products.

The use of OLEDs in televisions could save a huge amount of electricity. Televisions consumed 4 percent of residential electricity in 2004, or 46 billion kilowatt hours. With more and larger HDTVs being purchased, TV electricity consumption is projected to reach more than 70 billion kWh in 2009.

"Mature but rapidly disappearing CRT TVs are relatively efficient" compared to plasma televisions and LCDs, which consume up to 600 watts, says Libbey. By contrast, an OLED television would consume about 60 watts of electricity.

Lebby recently spoke with *Manufacturing & Technology News* editor Richard McCormack about the prospects for the industry in the United States. Here is what he had to say:

Question: Will the next generation of optoelectronic products be made in the United States?

Lebby: Other than those parts that are built to military specs, most manufacturing and assembly has moved outside of the United States or is in the process of doing so. We lost a lot of our core competence after the 2001 bubble burst.

One hope is that if we can really understand what green design is all about, then there is an opportunity to bring it back. The best potential from a manufacturing standpoint will be in the area of integration. In the silicon world over the past 35 years we learned how integrate and create CMOS [circuits]. One of the factors in photonic telecom, solar, lighting or sensing is that everything is in a discreet form. If we can actually bring integration to the forefront of photonics technology, then it will take some of the assembly, manufacturing and labor costs out of the process. That means you can afford to use slightly higher labor costs in the United States and get the same job done. But it's going to take intelligence and creative design.

Q: Optoelectronics was considered a strategic, critical technology in the late 1980s and early 1990s and DARPA was concerned enough about maintaining the U.S. ability that it helped create OIDA. Why was so much of the industry allowed to be lost?

Lebby: To some degree after the [2001] bubble, there was a herd mentality: we had to go to low labor-cost regions to get it done. Yet not that much labor goes into [component production], only 10 to 20 percent. If you build a [fiberoptic] amplifier, there are a lot of subcomponents that go inside and it's a big box of tricks. What's happened is that the infrastructure for all of the subcomponents is now in Asia. Even if the labor is the same price there as it is in the United States, you still have to be there. You can't just bring back the assembly and manufacturing of components. You have to get the subcomponents back as well.

The hope is that if we can put more components onto a platform of glass or plastic or semiconductor, then we can actually include some of the subcomponents as well. So you're not just bringing back the one device, you're bringing back the local infrastructure.

Q: Do you see any of that happening?

Lebby: Not really. But there is one vertically integrated company — Infinera Corp. — that is doing optical networking and photonic integrated circuits down to the epi-device level. They integrate all of those devices into their system box and they are doing that manufacturing in Silicon Valley where labor is expensive, and they are making it work.

Q: As the infrastructure has shifted to Asia, has the innovation shifted with it?

Lebby: It hasn't shifted yet, but we're beginning to see Taiwan, China and Korea come up with really creative solutions. They are doing the manufacturing and now they are tweaking the yields and the production lines and they understand how to make a better product. Over the next decade, they will be climbing the design and innovation ladder.

Q: How healthy is the optoelectronics R&D infrastructure in the United States?

Lebby: It has been decimated. I come from AT&T Bell Labs. How many companies have any corporate R&D of any major scale any more? Two of our members, Corning and Hewlett-Packard, have fairly big corporate R&D labs, but other than that most companies have jettisoned corporate R&D.

Q: Where is the research for advanced product

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Optoelectronics...(From page seven)

development being done?

Lebby: I don't know the answer. There are universities doing far-out research. Industrial companies — our members — have advanced development, but for the most part they don't have research. If they need new technology, the only option they have is to acquire a company that has it. But acquiring a company is a risk-filled enterprise especially when you're trying to integrate manufacturing. On top of that, there is no financing today anyway. So one big concern I have is that industrial R&D is waning in the photonics industry and there doesn't seem to be any indication that it's going to turn around.

Q: Has the federal commitment picked up some of the slack or is it in a similar predicament?

Lebby: I'm really scared because the government has not invested in the future and, without being political, it's the hope that they are going to realize that unless they do something soon, the country will lose a lot of this technology. The federal government puts some money into various aspects of photonics R&D, but I would say that is at least 1/10th if not 1/20th or 1/30th of the scale it should be.

Q: Given that so much production has moved offshore, has the United States stopped realizing the benefits of the research that is being funded by the federal government?

Lebby: Right now, whatever is coming out of research in the photonics industry is ending up outside of the country because of the trend among all the major players in photonics to ship everything offshore. It's a negative trend.

Q: What is the potential impact of optoelectronics on the national goals for energy independence and energy efficiency?

Lebby: Let's take solid-state lighting. The United States has a pretty strong role in device design with the companies Lumileds and Cree, although Lumileds is owned by the Dutch company Philips. The devices get put into other packages that go into a luminaire — the fixture into which you put the light bulb. From the LED package upwards, everything is done in Asia. So an LED light fixture in the future might have a U.S. LED in the center of it, but that is not where the big value is added to the product. The big value of the product is going to the Asian companies, and that trend is not going to abate.

Q: Why?

Lebby: Because Asian companies are quite happy to do metal bending. We shy away from that. Metal bending the luminaire is hard-core manufacturing. Unless we want to get into that business, we're not going to own it. We don't want to do that. That is the big issue. When the LED lighting industry takes off after the country decides that it wants to be sustainable on its energy resources, then most of the money to buy these things will go out of the country.

It's no different for solar. We can get a reasonable position by understanding photovoltaics technology, but the panels are all going to be made offshore. Unfortunately, in solar, we have not invested in it like Germany and Japan have over the past 10 years and so we're behind. Even with a considerable investment over the next decade, we will still be behind, which is looking at it from a device standpoint. So in solar we have to play catch up and we may never win that game.

Q: How does the United States change that dynamic, given the potentially vast size of the American market?

Lebby: We have to decide to get into the business of not only producing photovoltaic devices but the panels that go around them. Do we really want to be in the metal-bending business and manufacture those panels?

We can be creative with our research and, using our intelligence, we can combine a number of different devices and reduce our manufacturing and assembly costs. The United States could make a play for solar, but only if it gets intelligent in putting the systems together.

Q: Is there a role for government?

Lebby: Yes, in industrial research and technological and advanced product research.

Q: The government's National Energy Renewable Lab has funded a tremendous amount of research in PV over the years, but it has all left the country and there is nothing to show for it in the United States. If NREL is seeing this happening with their investment why aren't they changing course?

Lebby: It's like what I heard you say: we're not competing with companies, we're competing with countries, and that is true in the photonics field.

Q: What are some of the other potential energy savings that come from optoelectronics?

Lebby: You are going to see a significant impact on your electricity bill using LED lighting. You are going to get a significant impact if you have solar panels that are inexpensive to purchase and install. You will have a significant impact if you cut your electricity consumption by having a more efficient television, refrigerator and oven.

In power generation, photonics sensing measurement devices will be used to make systems more efficient. In telecommunications, fiberoptic interconnects are replacing copper interconnects, which allow consumers to connect their television screens to their computers. Fiberoptics lowers power and increases bandwidth at a lower cost.

For LED lighting, the production costs will come down as demand goes up. It's already happening in specialized lighting areas such as LED Christmas lights that save a big number on an electricity bill. The LEDs are made in the U.S. and they are all packaged in

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Optoelectronics...(From page seven)

China, so that manufacturing is gone. But right now if you take an MR-16 [LED light] and replace your halogen bulb, the halogen bulb is $2, but the MR-16 is $50 to $60: that has to come down to $5 or $10 before anyone gets serious about buying them.

Q: But does a LED MR-16 save $50 in energy?

Lebby: It will pay for itself over three years, but that is a difficult sell for somebody going into the shop with a budget of $100 for lighting and having to spend it all on two bulbs. Those arguments are tough.

I had a pot shelf with six halogens on it and I was given three MR-16s LEDs and I swapped out the halogens to see what it looked like. I liked it and I decided to buy the other three. I went online and found that they were $60 a piece plus tax. I was sitting there looking at the computer saying, "For $200, do I swap out all of my pot-shelf lights with three LEDs?"

I don't use the halogens on the pot shelf that often because of the fire risk. So it wasn't an issue of saving electricity. The issue was that if I put LEDs up I could leave the pot shelf lights on all the time and not worry about it. So there are other issues that come into play, fire risk being one. But for normal bulbs, the differential between an LED and an incandescent or a CCFL [cold cathode fluorescent lamp] is too high right now.

Q: How about LED streetlights that stay on all night every night?

Lebby: You will see streetlights gradually evolve into LED lighting, but it will take five to 10 years before the local governments see the return.

Q: The whole world is talking global warming, renewable energy, energy efficiency, energy independence. Is there a strategy in place in your industry to capitalize on this?

Lebby: Industry does not have a long-term strategy for energy efficiency. A lot of companies are quoting green specs because their competitors are doing it, but nobody has measured the direct impact of a green versus a non-green process. If the government shows long term vision, the industry will align to it.

If you look at the major lighting companies, five years ago, none of the big ones — like Philips or Osram — had a lot of LED action. They do now. All of the lighting companies have an LED division even though they are producing CCFLs and incandescents. Companies are looking at their own obsolescence.

One of the biggest and most surprising trends from a technological standpoint is in the display business. Sony and Samsung are very, very big in residential televisions and now very big in LCD residential televisions. LCD is the big one and you're not going to displace it over night. But both of those companies are investing in OLEDs [organic light-emitting diodes] even though they own the industry with LCDs. They both see that OLEDs are going to be very, very important because OLEDs are going to be the green solution for television. An OLED TV running at 60 watts versus a normal plasma or LCD running at 550 watts to 600 watts is a 10-x difference, which is huge.

Q: What is the power consumption difference between incandescent light bulbs versus LEDs?

Lebby: It's five-to-one. The rub is that CCFLs are pretty much the same as LEDs so it's a tough argument to win just on energy efficiency. Cold cathode fluorescents are fairly efficient, so the LEDs only win on the fact that CCFL has mercury inside of it and the color of the light coming out of it is not that brilliant. So for LEDs it's a tough one to win. Over the long term, LEDs will go head-to-head with the CCFLs.

Q: Given the problems of energy transportation and storage, along with the issue of energy security and the need for lightweight systems afforded by photonics, is the U.S. military interested at all of this technology?

Lebby. No. I would like to see the military come out with BAAs and projects where companies have to design more energy efficient solutions. That would be critical.

State Of Union...(Continued from page six)

surplus and are worsening every year, including in 2008. The U.S. ATP deficit with China is far larger than the entire U.S. surplus in intellectual property royalties and fees.

Virtually every economic sector that is exposed to imports (or capable of exporting) lost jobs over the past generation. Over the past eight years, of the three million net new jobs created from $12.4 trillion in new debt, 1.7 million were created in state and local government agencies and another 1.4 million in private bars and restaurants. While the overall number of jobs in the rest of the economy was unchanged, there were key shifts, for example, with 4.1 million highly productive/higher wage manufacturing jobs lost and 3.7 million jobs added in far less productive/far lower wage private health care and education bureaucracies.

Perversely, the utter failure of every major claim for unregulated "free" markets has been used to set American's against one another rather than to drive them to common purpose. For a generation, American culture, business and politics have been dominated by a new self-centered globalization fallacy: if my neighbor's wages are cut or (better yet!) if his job is sent to China, my taxes should be cut and my costs and interest rates should be cheaper. Even today many Americans do not believe that we are all in this economic crisis together.

— Dr. Charles W. McMillion is President and Chief Economist of MBG Information Services, a former Contributing Editor of the Harvard Business Review and former Associate Director of the Johns Hopkins University policy institute.

Recent Reports

The Offshoring of Engineering: Facts, Unknowns and Potential Implications from the National Academies of Sciences says outsourcing activities "will continue to expand in scale and sophistication," but that shifting engineering work overseas "is benefiting many U.S.-based companies and contributing to the creation and retention of U.S. engineering jobs in several industries." Government, universities, professional societies and individual engineers "will need to adapt to this changing situation," said study chairman William Spencer, president of Sematech. The committee found little data that has chronicled the loss of American engineering jobs to overseas firms, and said the implications of the trend are "unclear." The study is located at www.nap.edu.

The Role of Space in Addressing America's National Priorities from the Aerospace Industries Association is a white paper for the incoming Obama administration that recommends it "develop a mechanism to look at our space capabilities as a single enterprise consistent with national goals and objectives." The report is available at http://www.aia-aerospace.org/industry_information/reports_white_papers/.

2008 Global Temperature Ties as Eighth Warmest on Record from the National Oceanic and Atmospheric Administration says that global land surface temperature was the sixth warmest on record, with an average temperature that was 1.46 degrees F above the 20th Century average of 47.3 degrees F. The global ocean surface temperature was 0.67 degree F above the 20th Century average of 60.9 degrees F, and ranked tenth warmest. "Arctic sea ice extent in 2008 reached its second lowest melt season extent on record in September," says NOAA. "The minimum of 1.8 million square miles was 800,000 square miles below the 1979-2000 average minimum extent." The report is located at http://www.ncdc.noaa.gov/oa/climate/research/2008/ann/ann08.html.

Assessment of Achievable Potential from Energy Efficiency and Demand Response Programs in the U.S. (2010 - 2030) from the Electric Power Research Institute says the United States could reduce the rate of growth of electricity use by 22 percent over the next two decades by deploying energy efficiency measures. But that will not reduce total electricity consumption. The projected growth rate for electricity consumption is 1.07 percent per year. Applying energy efficiency measures will reduce that annual rate of growth to 0.83 percent. The report is located at the EPRI Web site, http://www.epri.com.

The Fiscal Survey of States from the National Governors Association is located at http://www.nga.org/Files/pdf/FSS0812.PDF.

University-Private Sector Research Partnerships in the Innovation Ecosystem from the Office of Science & Technology Policylocated at http://www.ostp.gov/galleries/PCAST/past_research_partnership_report_BOOK.pdf

Final Report on the Collapse of World Trade Center Building 7 from the National Institute of Standards and Technology http://wtc.nist.gov/NCSTAR1/PDF/NCSTAR%201A.pdf

Benchmarking for Success: Ensuring U.S. Students Receive A World-Class Education is a new report from the National Governors Association and the Council of Chief State School Officers. It describes five steps needed to build globally competitive education systems. The report recommends a new international benchmarking system for the states to use to determine the effectiveness of their educational systems. "International benchmarking will help state policymakers identify the qualities and characteristics of educational systems that best prepare students for success in the global marketplace," says the study located at http://www.nga.org/Files/pdf/0812BENCHMARKING.PDF.

More Variable and Uncertain Water Supply: Global Warming's Wake-Up Call for the Southeastern U.S. is a report from the National Wildlife Federation: http://www.nwf.org/news/clickThru.cfm?path=/nwfwebadmin/binaryVault/NWF%5FSEWaterSupply%5FFINAL2%2Epdf.

2028 Vision for Mechanical Engineering from ASME is available at http://www.admeconferences.org/asmeglobalsummit/index.cfm.

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Save America's Economic Future Commission Proposed

President-elect Barack Obama is being asked by prominent Republican Rep. Frank Wolf (Va.) to support a new commission that would have the teeth needed to put in place a new financial blueprint to save the federal government from potential bankruptcy. In a recent letter to Obama, Wolf, one of the lone surviving Republican members of Congress from Northern Virginia, asks that he support the enactment of the Securing America's Future Economy (SAFE) Commission.

The proposed commission, which has the support of 111 Republican and Democratic members of the House of Representatives, would hold meetings throughout the country "gathering comments and explaining the depths of America's current unsustainable financial problems," writes Wolf. The commission will report back to Congress with a plan of action. Like the base closing commission, Congress would have an up-or-down vote on the proposed plan.

"I believe the SAFE concept can provide the outline of a plan that you as president could embrace," writes Wolf. "Enactment of the legislation setting up the commission during the first session [of the 111th Congress] would ensure a vote on the commission's recommendations during the second session in 2010."

Wolf argues that such a commission is needed because the United States is facing $53 trillion in unfunded obligations promised through Medicare, Social Security and other entitlement programs, and that the U.S. manufacturing sector is no longer providing the federal government with the revenue needed to meet those obligations.

"How will we remain competitive, how will we rebuild our manufacturing base, how will our children compete in the global marketplace with the tsunami of mandatory spending obligations coming closer to our shores and the national debt racing past $10 trillion?" Wolf asks. "Is it right for one generation to live very well knowing that its debts are being passed on to its children and grandchildren?"

Rep. Jim Cooper (D-Tenn.) is co-sponsoring the legislation with Wolf in the House. On the Senate side, the bill is sponsored by Kent Conrad (D-Kansas), chairman of the Senate Budget Committee.

America's Worst State Economy Has The Highest Tax Burden

Michigan's economy is in turmoil, but the state has the highest property tax rate on industrial property in the nation, at 3.23 percent, compared to Delaware, which has the lowest effective tax rate at 0.52 percent. Michigan also tops the list of all states for the highest effective property tax rate, according to the "2008 Competitiveness Redbook — National Edition," recently published by the National Association of Manufacturing, the Association of Washington Business and the Washington Research Council.

The handbook compares all of the states in 51 categories, including venture capital investments (California is number one at $12 billion); unemployment insurance taxes (Alaska is number one at $860 per employee); workers' compensation benefits paid (West Virginia leads at $1,114); airport on-time performance (Cincinnati is best at 83 percent of the time for arrivals); net domestic population migration (Texas is gaining 218,745 with California last on the list losing 287,000); per capita personal income (Connecticut is first at $49,854, with Mississippi last at $26,535); per capita state and local taxes (New York is first at $5,752); gas tax (Connecticut is first at 43.9 cents per gallon); state and local government employment per 1,000 residents (Wyoming has 88.9, Nevada is last at 41.4),

The publication is available for $15 from the NAM Web site at www.nambooks.com, or by calling 800-637-3005.

Stanford Creates Energy Institute

Stanford University has created a $100-million research institute that will focus on energy issues. The center will hire additional faculty members and support new graduate students. Lynn Orr has been named president of the new institute, "which will function as an independent laboratory reporting to the dean of research," says Stanford. Funding is being supplied by Jay Precourt, Thomas Steyer, managing partner of Farralon Capital Management, Doug Kimmelman, senior partner at Energy Capital Partners, and Michael Ruffatto, president of the North American Power Group.

NIST Awards First TIP Contracts

The National Institute of Standards and Technology has made nine awards for new research projects to develop sensing technologies aimed at monitoring and inspecting bridges, roadways and water systems.

The awards are the first to be made under NIST's new Technology Innovation Program. The cost-shared awards will generate more than $88 million in research over the next five years, about $42.5 million of which will be funded by NIST.

Companies winning awards include Acellent Technologies (Sunnyvale, Calif.) for $3 million; Distributed Sensor Technologies (Santa Clara, Calif.) for $4.5 million; ELXSI Corp. (Orlando, Fla.) for $3.1 million; Newport Sensors (Irvine, Calif.) for $1.25 million; Northeastern University (Boston, Mass.) for $9.8 million; Physical Acoustics Corp. (Princeton Junction, N.J.) for $6.9 million; University of California at Irvine for $2.8 million; University of Michigan in Ann Arbor for $9 million; and the University of Texas at Austin for $3.4 million. For more information, go to http://www.nist.gov/tip/.

Container Trade Growth Ends

Retail container traffic in the nation's ports fell for the 16th straight month in November 2008, reports the National Retail Federation. Volume is expected to be 15.3 million twenty-foot equivalent units (TEUs) in 2008, down from 16.5 million in 2007. The 7.1 percent drop would be the lowest total since 2004, when 14 million TEUs moved through American ports.

November's decline of 8.5 percent to 1.26 million TEUs came on the heels of a 6.5 percent drop in October and a 6.0 percent fall in September. The last month there was a year-over-year increase in TEU imports was July 2007, when 1.44 million TEUs moved through the ports. For information on the data series, go to www.nrf.com/PortTracker.

Air Cargo Trade Growth Ends

International air cargo took a sharp drop of 13.5 percent in November, 2008, according to the International Air Transport Association. Such a decline in international cargo from the same month in 2007 "is shocking," says IATA CEO Giovanni Bisignani. "As air cargo handles 35 percent of the value of goods traded internationally, it clearly shows the rapid fall in global trade and the broadening impact of the economic slowdown. By comparison, this is largest drop since 2001, in the aftermath of September 11."

The largest decline in air cargo in November occurred among Asian carriers, with a drop of 17 percent. "Relief in the oil price has been outstripped by the falls in demand and capacity cuts are not keeping pace," says Bisignani. "The industry is back in intensive care. Improving efficiency everywhere will be theme for 2009."

Air Conditioning Is In The Tank

The air conditioning industry went into a trough in November, 2008, according to the Air-Conditioning, Heating and Refrigerating Institute (AHRI). Combined factory shipments of central air conditioners and heat pumps totaled 231,995 units, down 33 percent from the same month in 2007. Year-to-date shipments were off by 8 percent from 2007 to 5,595,194 units. Residential electric water heater shipments for November 2008 were down 24 percent from the same month in 2007 to 280,019 units. Commercial gas water heater shipments were down by 38.5 percent (to 4,910 units). Room heaters suffered a 60 percent drop in November compared to 2007, with total shipment of 13,860 units.

QUOTABLE:

"Economists like to tell me I'm not a trained economist and I don't know what I'm talking about, but my personal economic theory is that we're in this mess because for the last 15 years the United States has been producing essentially nothing and importing everything from China and Japan and wherever. We were paying each other high salaries and saying, 'Isn't this a wonderful world? We all make a ton of money, we produce nothing, and look at this great DVD player I just bought for $19.95?'

"What is wrong with this picture? It's not a normal state of affairs for a country to spend, spend, spend and not produce, produce, produce. The argument was always: 'Oh yes, but we have the world's best,most sophisticated and most powerful financial sector, so stop worrying. This country is so well run now by the financial establishment that we really don't have to produce things anymore.' And we saw what just happened. So in that I feel vindicated, because I've been saying that for years."

— General Motors chairman Bob Lutz at the January 2009 North American International Auto Show in Detroit

Bush Put In Same Category As Hoover

"It might seem premature to compare President George W. Bush to Herbert Hoover, the president who helped steer the economy into the Great Depression in 1929 and then presided over steady economic deterioration until the end of his term in 1933, but close inspection of the economic track records and ideology of these two presidents reveals that they are quite similar," writes the Center for American Progress in a report issued before the great financial collapse of 2008.

Both presidents presided over a suddenly deteriorating economy, yet resisted taking action to prevent further economic losses. "Both believed the market would naturally self-correct and that government intervention would be harmful," says the study. "And both took limited action once it became clear that it was needed — to help businesses rather than working families — to weather the storm."

When the Center for American Progress wrote its comparison between the two presidents, it found that certain aspect of the economy under Bush were worse than during Hoover's term. Between 2005 and 2007, foreclosures in the United States rose by 102 percent, compared to an 84 percent increase from 1929 to 1933. Between 2005 and 2007, housing starts fell by 35 percent (before the collapse of 2008), while during the Hoover term they fell by 79 percent. "The velocity of foreclosures since 2005 surpass the Depression era," says the study entitled "A Tale of Two Conservatives: Comparing Bush and Hoover on the Economy," located at www.americanprogress.org.

Cap And Trade Works

More than 102 million Americans are breathing cleaner air due to decreases in emissions of nitrogen oxides that have come about from the national cap-and-trade program, according to the Environmental Protection Agency. "The 2007 summertime NOx emissions from power plants and industrial sources were down by 60 percent compared to 2000 levels and 74 percent below 1990 levels in 20 eastern states," says the EPA. The emissions trading program has improved air quality in 95 percent of non-attainment areas in the east, with 64 percent of these areas now below the ozone standard. The analysis, "NOx Budget Trading Program Annual Report" is located at http://www.epa.gov/airmarkets/progress/nbp07.html.