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Before the
Subcommittee on Regulatory Affairs, Stimulus Oversight and Government Spending

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Thank you for the opportunity to speak with you today on this important issue.

I am an energy venture capitalist and serve on the boards of a half dozen U.S. energy and energy related firms, all of whom sell or seek to sell into international markets, and all of whom are hiring employees here in the US. Previously, I had the opportunity to serve as the Director of Financing for Energy Efficiency and Renewable Energy at the U.S. Department of Energy. I currently work on energy investment issues with large financial institutions and large real estate owners who are concerned about both the cost effectiveness of energy investment programs and broader policy impacts, including employment impact.

This hearing addresses several questions

1) Is it economically and financially prudent to invest in energy efficiency and green job programs, and do these programs successfully create jobs and strengthen businesses and the economy as a whole?
2) Has the ARRA funding of green jobs and green energy technology been successful, and does the slow ramp up in green job training programs and the high visibility bankruptcies of two recipients of ARRA cleantech funding- specifically Solyndra and Beacon - indicate a failure of the program?

Regarding the first question, there is a long bipartisan history of U.S. federal, state land city level investment in energy efficiency and green job training. In December 2007, President George W. Bush signed The Green Jobs Act of 2007 into law, authorizing $125 million per year for programs to train workers for green-collar jobs, such as energy-efficiency retrofitting and service, green building construction, and solar panel installation. The legislation was incorporated as Title X of H.R. 6, the Energy Independence and Security Act of 2007. The training targeted veterans, displaced workers, at-risk youth, and individuals in low-income families for jobs industries including energy-efficient building, construction and retrofitting, renewable energy energy-efficient vehicles, bio-fuels, and manufacturing using sustainable processes and materials.

The American Recovery and Reinvestment Act of 2009 (ARRA) appropriated $49 billion for programs to increase energy efficiency and renewable energy and biofuels.[1] The vast majority were awarded to four government agencies (1) U.S. Department of Energy (DOE) $35.2 billion for projects and activities[2] (2) GSA - $4.5 billion, (3) U.S. DoD - $2.1 billion, and (3) U.S. DOL (Department of Labor) - $500 million.[3] DoD Recovery Act funding covers four major areas: (1) Energy Conservation Investment Program (2) Near

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[1] See Congressional Research Service (CRS), "*Energy Provisions in the American Recovery and Reinvestment Act of 2009" (P.L. 111-5)* (Mar. 12, 2009) (R40412) (online at http://vcresearch.siuc.edu/R40412.pdf); U.S. Department of Defense, American Recovery and Reinvestment Act of 2009: Facilities Sustainment, Restoration and Modernization (FSRM) Program Plan (June 2010) (online at www.defense.gov/recovery/plans_reports/2010/pdfs/DoD%20FSRM%20Program%20Plan%20Update_FINAL_062110.pdf); House Committee on Energy and Commerce, Subcommittee on Oversight and Investigations, Statement of Frank Rusco, Recovery Act: Status of Department of Energy's Obligations and Spending (Mar. 17, 2011) (online at www.gao.gov/new.items/d11483t.pdf).

[2] House Committee on Energy and Commerce, Subcommittee on Oversight and Investigations, Statement of Frank Rusco, *Recovery Act: Status of Department of Energy's Obligations and Spending* (Mar. 17, 2011) (online at www.gao.gov/new.items/d11483t.pdf).

[3] Congressional Research Service (CRS), *Energy Provisions in the American Recovery and Reinvestment Act of 2009 (P.L. 111-5)* (Mar. 12, 2009) (R40412).

Term Energy-Efficient Technologies (3) Military Construction and (4) Facilities Sustainment, Restoration, and Modernization.[4]

DoD entered into a Memorandum of Understanding (MOU) with DOE in July, 2010 in order to "improve energy security and operational effectiveness, reduce greenhouse gas (GHG) emissions in support of U.S. climate change initiatives, and protect the DoD from energy price fluctuations,"[5] and to "speed innovative energy and conservation technologies from laboratories to military end users, and to use military installations as a test bed to demonstrate and create a market for innovative energy efficiency and renewable energy technologies."[6]

The rationale for green job and energy efficiency investment and training is broad and includes reducing energy costs, creating jobs, enhancing economic competitiveness, cutting health costs, and - increasingly – strengthening national security. Former Senator and former Secretary of the Navy John Warner wrote earlier this year that , "The brave men and women in uniform, whether serving on U.S. bases or on forward deployments overseas, clearly understand the linkage between strong energy policies and their ability to more safely perform their missions. Under the leadership of former Secretary of Defense Robert Gates, and now Secretary Leon Panetta, the Department of Defense is exercising aggressive energy-efficiency goals to lessen our dependence and to enhance our nation's energy security."

The Secretary of the Navy Ray Mabus (National Clean Energy Summit 4.0 Las Vegas, NV August 30, 2011) asked the question this way: "Why the interest in alternative energy? The answer is pretty straightforward: We buy too much fossil fuel from potentially or actually volatile places on earth. We buy our energy from people who may not be our friends. We would never let the countries that we buy energy from build our ships or our aircraft or our ground vehicles, but we give them a say on whether those ships sail, whether those aircraft fly, whether those ground vehicles operate because we buy their energy. There are great strategic reasons for moving away from fossil fuels. It's costly. Every time the cost of a barrel of oil goes up a dollar, it costs the United States Navy $31 million in extra fuel costs. But it's costly in more ways than just money. For every 50 convoys of gasoline we bring in, we lose a Marine. We lose a Marine, killed or wounded. That is too high a price to pay for fuel."

The strong beliefs of Senator Warner and Secretary Mabus are representative of the U.S. military and the Pentagon's views on the critical nature of green jobs and energy efficiency industries. Like the finance industry, the military does not have the luxury of taking positions for political purpose. US military views on

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[4] U.S. Department of Defense, *American Recovery and Reinvestment Act of 2009: Program Plans* (June 2010)

[5] U.S. Department of Defense and Department of Energy, *Memorandum of Understanding Between U.S. Department of Energy and U.S. Department of Defense Concerning Cooperation in a Strategic Partnership to Enhance Energy Security* (July 22, 2010) (http://energy.gov/sites/prod/files/edg/media/Enhance-Energy-Security-MOU.pdf). The U.S. military commitment to energy and green energy reflects its commitment to cost effectively fulfilling its mission and addressing security threats, including climate change. As the U.S. Army notes on its website: "Climate change and other projected trends will compound already difficult conditions in many developing countries. These trends will increase the likelihood of humanitarian crises, the potential for epidemic diseases, and regionally destabilizing population migrations." http://www.army.mil/aps/08/strategic_context/strategic_context.html

[6] *Id.*

clean energy and energy efficiency is based on its experience of cost-benefit performance and its actual impact on the safety and effectiveness of our men and women in uniform.

One challenge and limitation of the ARRA funding was the need to invest a large amount of money rapidly to check the rapid economic decline and reduce spiraling unemployment that many economists likened to the great depression. However, the necessary speed of scale up has posed serious challenges.

The green jobs portion of ARRA received $500 million or 1% of the American Recovery and Reinvestment Act of 2009 (ARRA) $49 billion in appropriations for energy programs aimed at increasing energy efficiency and developing and investing in renewable energy and biofuels.[7] This 1% of ARRA funding devoted to scaling up capacity for training, developing programs, and recruiting, has - because of the nature of training and recruiting - been slow. As of the end of September 2011 the majority of these funds had not been spent, and these funds are not expected to be fully spent by the end of the grant period.

Expenditure at the scale of ARRA is, by its nature, slow to ramp up. A March 2011 DOE Office of the Inspector General statement to the Subcommittee on Oversight and Investigations of the Committee on Energy and Commerce noted that the that the "size and skill mix of staff, then in place, was not adequate to meet the increased demands of the Recovery Act... Inadequate personnel to support such a steep ramp lead to delays in deployment. ... Federal, State and local government infrastructures were simply put overwhelmed. In several states, the very personnel who were charged with implementing the Recovery Act's provisions had been furloughed due to the economic situation. Ironically, this delayed timely allocation and expenditures of funds intended to boost the U.S. economy." (pp. 7-8)

As ARRA investment occurs, job creation impact also rises, and by early 2011 had become large – on the order of a few million jobs created.

A November 2010 report by the Council of Economic Advisors entitled "THE ECONOMIC IMPACT OF THE AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009" found that:

"• Following implementation of the ARRA, the trajectory of the economy changed significantly. Real GDP began to grow steadily starting in the third quarter of 2009 and private payroll employment increased on net by nearly 1 million from the start of 2010 to the end of the third quarter.

• The two established CEA methods of estimating the impact of the fiscal stimulus suggest that the ARRA has raised the level of GDP as of the third quarter of 2010, relative to what it otherwise would have been, by 2.7 percent. These estimates are very similar to those of a wide range of other analysts, including the non-partisan Congressional Budget Office.

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[7] See Congressional Research Service (CRS), Energy Provisions in the American Recovery and Reinvestment Act of 2009 (P.L. 111-5) (Mar. 12, 2009) (R40412) (online at www.crs.gov/Products//r/pdf/R40412.pdf); U.S. Department of Defense, American Recovery and Reinvestment Act of 2009: Facilities Sustainment, Restoration and Modernization (FSRM) Program Plan (June 2010) (online at www.defense.gov/recovery/plans_reports/2010/pdfs/DoD%20FSRM%20Program%20Plan%20Update_FINAL_062110.pdf); House Committee on Energy and Commerce, Subcommittee on Oversight and Investigations, Statement of Frank Rusco, Recovery Act: Status of Department of Energy's Obligations and Spending (Mar. 17, 2011) (online at www.gao.gov/new.items/d11483t.pdf).

• The CEA estimates that as of the third quarter of 2010, the ARRA has raised employment relative to what it otherwise would have been by between 2.7 and 3.7 million, consistent with the initial estimate that the ARRA would save or create 3.5 million jobs as of 2010:Q4."
See: http://www.whitehouse.gov/sites/default/files/cea_5th_arra_report.pdf

In February 2011 the National Bureau of Economic Research issued a report entitled "Did the Stimulus Stimulate? Real Time Estimates of the Effects of the American Recovery and Reinvestment Act." The report summary noted that job impact varied considerably but that "Support programs for low income households and infrastructure spending are found to be highly expansionary. Estimates excluding education spending suggest fiscal policy multipliers of about 2.0 with per job cost of under $100,000". The report also found that "The stimulus had a positive, statistically significant effect on employment...aid to low-income people and infrastructure spending showed very positive impacts."
See: http://www.nber.org/papers/w16759.pdf

The non-partisan US Congressional Budget Office issued a report in May 2011 entitled "Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output from January 2011 Through March 2011", (May 2011). In its report the Congressional Budget Office found that:

"ARRA's policies had the following effects in the first quarter of calendar year 2011:
 They raised real (inflation-adjusted) gross domestic product (GDP) by between 1.1 percent and 3.1 percent
 Lowered the unemployment rate by between 6 percentage points and 1.8 percentage points
 Increased the number of people employed by between 1.2 million and 3.3 million, and
 Increased the number of full-time-equivalent jobs by 1.6 million to 4.6 million compared with what would have occurred otherwise..."

See: http://www.cbo.gov/ftpdocs/121xx/doc12185/05-25-ARRA.pdf

These major non-partisan analyses all demonstrate that ARRA had large positive impact in slowing severe job loss, helping slow or reverse the economy's steep economic slide, increasing employment and in stimulating the economy. And as allocated funding gets spent at the local level the job creation impact can be expected to continue to rise quite substantially.

The issue of timing of job creation for ARRA funding has created some confusion and some apparently deliberate misinformation. Employment occurs **after** investments are made, so assessment of employment impact **before** investments are made is neither relevant nor intellectually honest. For example an article on CNS is entitled "Obama Visits Corporation Where His Stimulus Created 'Green' Jobs at $2 Million Per Job" See: http://www.cnsnews.com/news/article/obama-visits-corporation-where-his-stimulus-created-green-jobs-2-million-job
The article later acknowledges this job creation cost estimates is based on only 150 interim jobs created as Johnson Controls builds its high performance battery plant for 3000 employees in Michigan. Based on actual plant employment of 3000, the cost per job created is $100,000 per direct job created, not $2 million per job, as widely reported. The cost effectiveness is actually better than this because the 3000 direct employees at Johnson's new plant will drive a lot of indirect employment (supplying the plant, servicing employees etc.) This kind of manipulation of data appears to be widespread and may be politically expedient but it is dishonest and insulting to US corporations like Johnson Controls who are investing in

expanding the US economy. This kind of dishonest accounting also does a disservice to the need for a fair evaluation of the actual cost-effectiveness and impact of ARRA funding.

The 1705 loan guarantee program provided loan guarantees to Solyndra and Beacon, and like other bank and government commercial lending programs assumes a default rate as normal and expected. In establishing the 1705 loan guarantee program, for example, the Office of Management and Budget predicted and budgeted that the $2.5 billion in loan guarantees will experience a default rate of 12.85 percent. (See: http://www.whitehouse.gov/omb/budget/Supplemental) The two prominent defaults (to date) are Solyndra and Beacon: Out of a total $35.9 billion DOE loan guarantee portfolio, Solyndra received a $535 mil guarantee (1.5% of total) and Beacon Power Corp received a $43 mil guarantee (.1%) The Federal government can expect to receive a portion of the loans back. Defaults from Solyndra and Beacon after some funds are recouped are therefore likely to be in the 1% range, or less than one tenth the expected and budgeted-for default rate. From a portfolio perspective this is very low and leaves considerable room for further defaults without losses exceeding budgeted losses. The DOE loan program can therefore so far be fairly viewed as so far performing as well as or better than projected. The overall the loan guarantee program track record is so far on balance a successful one.

90% of loan ARRA guarantees are for clean power generation projects, and these look solid. These clean power generation projects will generate enough clean electricity to power over two and a half million homes, cutting oil imports, improving trade balance, expanding distributed domestic employment, and strengthening US corporate competitiveness in the very fast growing and internationally competitive clean energy markets. Recovery Act investments helped finance:

- Agua Caliente - the world's largest photovoltaic solar plant
- Caithness Shephers Flat in Oregon - the world's largest wind farm to date
- Diamond Green Diesel in New Orleans - a biodiesel project that will nearly triple the amount of domestically produced renewable diesel

Given that our principal trading competitors are providing heavy subsidies to their domestic clean energy industries, ARRA provided a large and timely boost to US clean energy industry, helping maintain US strength in the critical and fast growing international clean energy markets. Clean energy has been targeted by our major international competitors (including China and Germany) as a critical and perhaps the critical future growth and export industry. For most US citizens, businesses and policy makers, whether the US wins or loses in this race matters because the outcome will have a large impact on future US employment and economic strength. The ARRA has strengthened the hand of those who are optimistic – and ambitious – about the US capacity to compete successfully in the huge and fast growing global clean energy industry.

There have been larger questions raised about the cost effectiveness and merit of investing in energy efficiency – a large part of the ARRA clean and green energy funding. There is extensive documentation

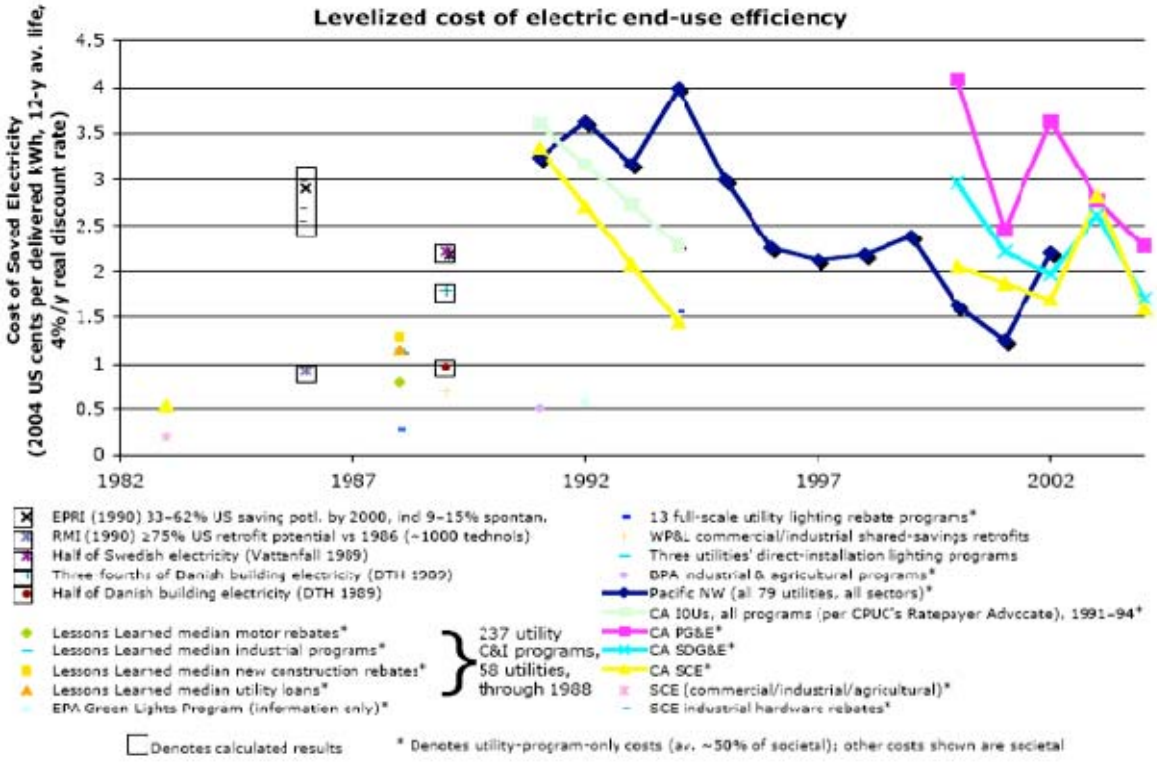
about the cost effectiveness of corporations, cities, and states that have adopted energy efficiency funding strategies. These experiences have generally been quite positive from a cost effectiveness and job creation perspective. A good example is California, our largest state with over 10% of the U.S. population. A recent Berkeley University review of California's moderate but sustained energy efficiency strategy over the last 3 decades provides some relevant conclusions. The study found that "Energy efficiency measures have enabled California households to redirect their expenditures toward other goods and services, creating about 1.5 million FTE jobs with a total payroll of $45 billion, driven by well-documented household energy savings of $56 billion from 1972-2006..."As a result of energy efficiency, California reduced its energy import dependence and directed a greater percentage of its consumption to in- state, employment-intensive goods and services, whose supply chains also largely reside within the state, creating a "multiplier" effect of job generation...The economic benefits of energy efficiency innovation have a compounding effect. The first 1.4% of annual efficiency gain produced about 181,000 additional jobs, while an additional one percent yielded 222,000 more." (Roland-Holst, 2008). These findings of expanding employment benefits from public investments in energy efficiency are directly relevant to the ARRA clean job creation timing and impact.

The study concludes that "California's legacy of energy policies and resulting economic growth provides evidence that innovation and energy efficiency can make essential contributions to economic growth and stability. Had the state not embarked on its ambitious path to reduce emissions over three decades ago, the California economy would be in a significantly more vulnerable position today. Looking ahead, California's ambitious plan to reduce greenhouse gas emissions as mandated by the California Global Warming Solutions Act (AB 32) puts the state on a more stable economic path by encouraging even greater investment in energy saving innovation. The current financial crisis reminds us of the importance of responsible risk management. The results of this study remind us that, in addition to energy price vulnerability and climate damage, the risks of excessive energy dependence include lower long-term economic growth. A lower carbon future for California is a more prosperous and sustainable future" (Roland-Holst, 2008).

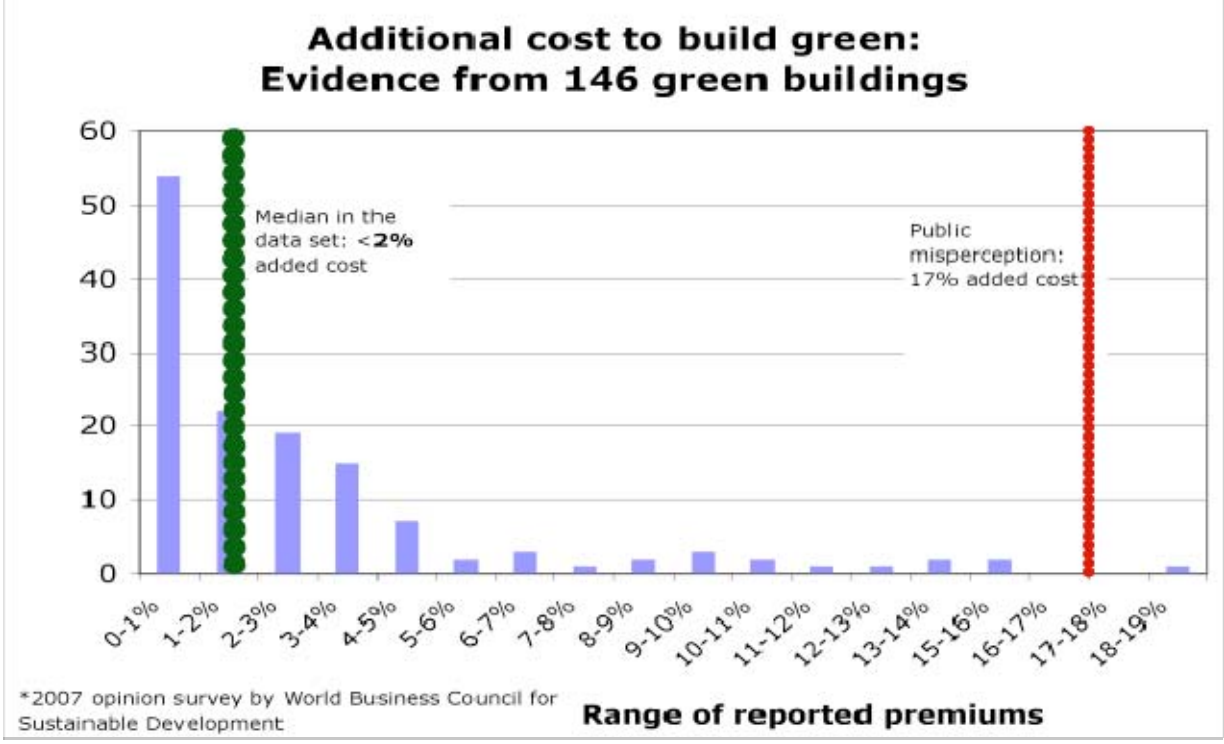
It is worth noting that the California efficiency success was achieved over a few decades. As the difficulty that ARRA green training funds had in being rapidly deployed demonstrates, the process of ramping up green jobs training and implementing energy efficiency are more easily done over a longer time frame. A current snapshot of ARRA funding success as measured in energy savings and jobs creation grossly understates the full employment and economic impact it will have over the coming years.

What the California experience illustrates, and what the principal U.S. economic competitors, including Japan, Germany and China now understand is that cutting waste and increasing efficiency increases economic and business competitiveness. To the extent that U.S. competitiveness is recognized as a valid objective, the ARRA funding for clean energy and energy efficiency is a prudent investment in enhancing competitiveness of U.S. firms and the U.S. economy.

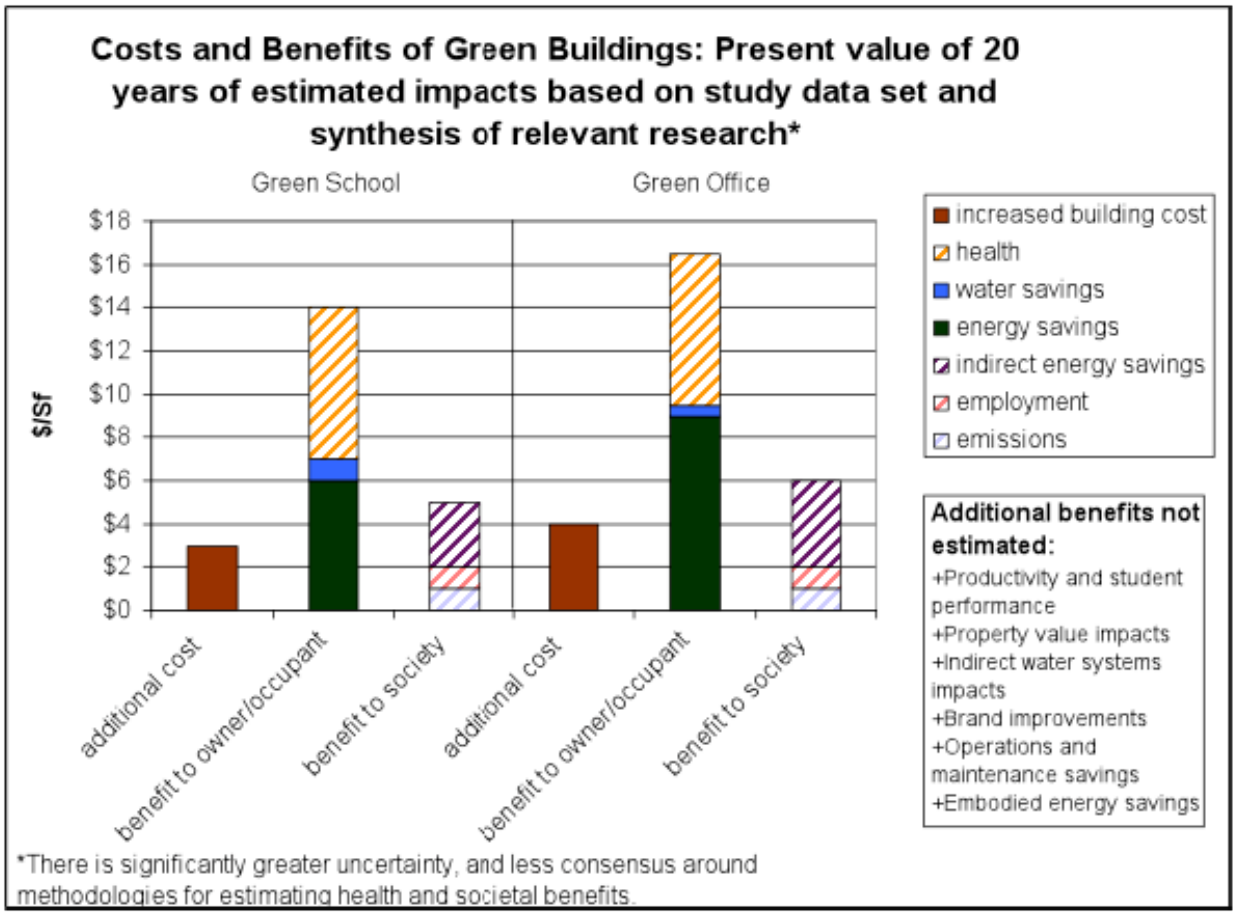
Much of U.S. investment in energy efficiency has traditionally been through utilities. As summarized below, these utility programs involving about $15 billion in funding show that the average cost of energy efficincy savings is about 3 cents/kWh or two third less than the average retail rates. In other words, public investments in energy efficiency are smart investments from a cost benefit perspective. The chart also shows that the marginal cost of acheiving efficiency declines over time as these programs build up. With respect to ARRA, the experience of past adminstrations, US states, corporations, and other countries investing in energy efficincy is generally very positive from the perspective of economic and financial returns and job creation.



There have also been questions raised about the cost effectiveness of the US government - including the US military - investing in greening buildings. Returns from energy efficiency and green energy investments range but are typically in the 3-6 year range. There is a widespread perception that green buildings – an area where the US military has been a leader - cost a lot more than conventional buildings. Recent analysis (See Greening Our Built World; Costs, Benefits and Strategies (Island Press, 2010)) demonstrates that this perception is incorrect – green building typically cost up to 2% more on median, far less than the 17% premium reported in one major survey.



The financial returns to investors in green buildings – including federal state and private sector investments have generally been very positive. Reductions in utility bills alone repay the average extra cost of greening building 2-3 times over just in the first 20 years of a buildings operation. When additional benefits including health benefits, operations and maintenance benefits, increased building value, and expanded employment are factored in, the total returns are about 10X. (Greening Our Built World) Federal investing in greening buildings is therefore a financially prudent investment with strong economic and employment returns.



Major banks have also generally become convinced that investments energy efficiency and green buildings are cost- effective and produce good US jobs. For example, Deutsche Bank Group in October 2011 released a report entitled "Repowering America: Creating Jobs". Deutsche Bank forecast energy supply and energy employment through 2030 based on projections of sustained US investment and growth in the areas of energy efficiency and clean energy. Deutsche Bank determined that such a strategy would result in 7.9 million cumulative net job-years of direct and indirect energy employment, of which 6.35 million jobs (80%) would come from energy efficiency or renewable energy sectors (e.g. geothermal, solar PV, solar thermal and wind). http://www.dbcca.com/dbcca/EN/_media/DB_Repowering_America_Creating_Jobs.pdf

Conclusion

The purpose of a hearing is commonly thought to be an effort to learn about an issue to then allow rational fact-based conclusions to be drawn. The title of this hearing "The Green Energy Debacle: Where Has all The Taxpayer Money Gone?" suggests that a conclusion may have been drawn before the hearing. Nonetheless I hope that the experience and views of US venture capital investors, US corporations and the US military – summarized briefly above - are recognized as valid and relevant to the evaluation of the ARRA programs. Evaluation of employment impact from multiple non-partisan organizations, including the Council of Economic Advisors, the National Bureau of Economic Research, and the US Congressional Budget Office demonstrate large and positive employment impact from ARRA clean energy and green funding.

Measures of investment success can vary, but for ARRA should include: economic and financial impact, U.S. and individual firm competitiveness, risk reduction, and security (including climate change risk) as defined by the U.S. military. From a policy perspective, evaluation of the cost effectiveness of the ARRA program should include effect on job creation, health benefits from cleaner air and water, and reductions in our trade deficit. Against this set of criteria a reasonable review of the facts and actual performance to date demonstrates that, despite some specific problems, that the overall ARRA clean energy and green jobs investment is successful and that the benefits are continuing to grow as ARRA funded projects build out. Despite the steep ramp up, insufficient personnel, high demands on transparency, documentation and review, ARRA performance to date can fairly be judged as successful in its objectives of driving expanded U.S. investment in clean energy, slowing job loss and expanding job creation, enhancing US economic and corporate competitiveness, and enhancing national security.