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GREEN BUILDING PRACTICES IN THE FEDERAL SECTOR: PROGRESS AND CHALLENGES TO DATE

HEARING

BEFORE THE

SUBCOMMITTEE ON GOVERNMENT MANAGEMENT, ORGANIZATION, AND PROCUREMENT

OF THE

COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

HOUSE OF REPRESENTATIVES

ONE HUNDRED ELEVENTH CONGRESS

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GREEN BUILDING PRACTICES IN THE FEDERAL SECTOR: PROGRESS AND CHALLENGES TO DATE

WEDNESDAY, JULY 21, 2010

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON GOVERNMENT MANAGEMENT,
ORGANIZATION, AND PROCUREMENT,
COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:07 a.m., in room 2154, Rayburn House Office Building, Hon. Diane E. Watson (chairwoman of the subcommittee) presiding.

Present: Representatives Watson, Connolly, Cuellar, Quigley, Towns, Bilbray, and Luetkemeyer.

Staff present: Bert Hammond, staff director; Adam Bordes, senior policy advisor; Deborah Mack, professional staff member; Valerie VanBuren, clerk; Justin LoFranco, minority press assistant and clerk; Sery Kim, minority counsel; and Molly Boyl and James Robertson, minority professional staff members.

Ms. WATSON. I call the meeting to order. And our first order of business is to wish Chairman Towns a happy birthday. OK. On three, let's hear it.

One, two, three, happy birthday, Chairman Towns.

And welcome. Thank you for sitting in with us.

All right. I would like to welcome all of you to today's hearing examining the application of green building practices in the Federal sector. In recent years, there has been a movement toward greening various aspects of the Federal Government, for improving energy efficiency to constructing buildings with environmentally sustainable materials and technology.

The subcommittee will receive testimony from the General Services Administration, the Department of Energy, and the Environmental Protection Agency, in addition to several witnesses from the private sector. I welcome our list of distinguished panelists and thank them for their participation.

Today's hearing will explore how well the key agencies responsible for greening Federal buildings are progressing and what additional steps should be taken to assure that the Federal Government is being proactive in its approach to green building practices. Despite the recent growth in green building construction and retrofitting of existing buildings across the Federal Government, Congress has been slow to conduct oversight in this area, in part due

to the rapid growth in green building projects and also due to the range of agencies involved in the undertaking.

Some of the issues I hope our panelists address today include: Finding out how successful current Federal green building programs have been to date, and what tangible outcomes have resulted from the agencies' collaborations with various government working groups, such as the Interagency Sustainable Working Group, which is managed by the Department of Energy.

I am particularly interested in hearing from today's witnesses on how the Energy Independence and Security Act of 2007 [EISA], and Executive Order 13514, among other relative statutes, have set the parameters for green building practices, and how effectively agencies are coordinating their efforts across the government to meet the timelines for reducing greenhouse gas emissions and achieve zero net usage in Federal buildings by 2030, as directed by Executive Order 13514.

Given the ongoing debate about the merits of various green building certification standards and ratings systems and DOE pending notice of proposed rulemaking calling for a revised performance standards and for a uniformed set of green building standards, I am interested in hearing from the witnesses as to what they might think is the best approach for the government to take in adopting a uniformed set of green building certifications standards.

With the infusion of funds from the American Recovery and Reinvestment Act of 2009, agencies have received additional assistance in meeting the requirements for achieving energy efficiency and increasing the stock of renovated or new green buildings. However, as this source of funding winds down, there is a growing concern that agencies will have difficulty in continuing to achieve their goals by the dates outlined in EISA and related Executive orders. I am, therefore, interested in hearing how GSA, DOE, and EPA intend to advance their green buildings agenda on an ongoing basis, given their budget projections and the deadlines imposed by Congress and the executive branch.

There has been an emphasis on energy reduction usage as it pertains to green building projects, and the subcommittee would like the panelists' input on how Congress may provide constructive guidelines and assistance in this area.

And, finally, I would like to hear more about how the Federal Government's implementation of green building practices is affecting the growth of green buildings across the country.

Again, I want to thank our panelists for joining us today, and I look forward to their testimony.

With that, I would like to call on Mr. Bilbray.

Mr. BILBRAY. Thank you, Madam Chair.

I appreciate you having this hearing.

And, Madam Chair, I would just like to start off by apologizing to the panel, because before you stands a man who stands as a very strong critic. I am very cynical about this entire concept.

Sadly, I am not a cynic by nature; I am a very optimistic person. Living proof is I actually thought I could get elected some day.

But the fact is that after 40 years involvement in environmental movement, over 34 years involvement in government environ-

mental strategies, just history has taught me that government is quick to make promises about the environment and not just slow to delivery but almost lacking in delivery.

You know, we promised people that we are going to clean up our gasoline; we put additives in that not only rob our gas mileage but pollute our air and claim it is good for the environment.

We promised to create offsets for the Washington Capitol and said that we are going to make sure that we are not responsible for pollution. And while we continue to burn dirty coal to power our Federal operations, we talk about how terrible it is and how we are so far against it, but we subsidize it consistently.

Frankly, as I look at this issue, I see that it has been government regulation that stands in front of innovative alternative technologies that could not only save energy but save natural resources.

And so I have to apologize up front. I am going to be very critical of saying, it sounds good in a report, but does it actually work out? I mean, I have actually seen government agencies tell individuals who have used appropriate alternative construction techniques: Tear it down, not because it is bad, but because it is unapproved by the government process yet. A sad commentary to the fact that those of us in government are quick to require everyone else or expect everyone else to change the way they do business, the way they live, the way they make everyday decisions, but government is so slow to change our regulations, our attitudes, and our procedures to reflect the environmental reality that all of us, all of us, including and especially those of us in government, have a responsibility to share.

So, with that, enjoy the testimony. I look forward to getting your little tidbits of wit and wisdom on this, but I am very critical that there is a huge gap, Madam Chair, between the theoretical approach here in Washington and what we think is going to get done and hope to get done and what actually happens in the real world.

And I hope by this hearing we can help to try to bridge that gap.

I yield back.

Ms. WATSON. Without objection, the chair and ranking minority member will have 5 minutes to make opening statements, and without objection, the Members may have 5 legislative days to submit a written statement or extraneous materials for the record.

I would like now to recognize the distinguished Member, Mr. Towns, for any remarks you would like to give.

Chairman TOWNS. Thank you very much, Madam Chair.

And thank you for recognizing my birthday. Thank you.

And let me thank you and Congressman Bilbray for holding this hearing.

Over the past several years, Americans have increasingly focused on ways to save energy while also saving money. This focus has given way to the popularity of what many see as part of a solution to America's energy needs, "going green."

The backbone of going green is saving energy, and saving energy means saving the environment and saving money. Today, we are here to talk about going green as it relates to the construction of Federal buildings; in other words, buildings paid for with taxpayer dollars.

The Federal Government is the Nation's largest energy consumer. Green building practices are essential to achieving the goal of energy conservation. And I fully support green initiatives. Going green is essential not only to the sustainability of our environment but to the sustainability of our country.

However, I do have some questions about the government's progress in implementing green initiatives, like the Energy Independence and Security Act of 2007.

Let me conclude by saying I am interested in learning how Federal agencies plan to continue greening the government once Recovery Act funds are no longer available. While I am all for the greening of Federal buildings, I strongly believe that we need to invest taxpayers' dollars very wisely. We need to make sure money is spent only on green initiatives that are cost effective.

And I strongly feel that the Federal Government ought to be leading the way to energy independence, but the question is, are we doing it right? That is the question. And I hope you can help us answer that question today.

Madam Chair, I yield back, and I look forward to the testimony.

Ms. WATSON. Well, I am very pleased that you are spending some time with us and made that statement. Thank you very much.

I yield now to Mr. Luetkemeyer for an opening statement.

Mr. LUETKEMEYER. Thank you, Madam Chair. I have no statement at this time.

Ms. WATSON. I will now yield to Mr. Cuellar for an opening statement.

Mr. CUELLAR. Thank you, Madam Chair. Thank you and Mr. Chairman, again.

First of all, I want to thank the witnesses that are with us here today. I think what we are looking at, we are certainly looking at some opportunities that I think we are all familiar with the opportunities, what it means to green the buildings. And I think the ranking member is right, that if we are going to be asking the private sector to do certain things, we ought to look at our own reflection and see what we are doing with GSA or with the other agencies to make sure that we do the same thing if we are going to be asking the private sector to do that.

I think we are familiar with the opportunities, what it means to the workplace. And I think our first witness has talked about what not only the ability to look at, but it is a place to work and to spend a lot of time there.

But I think what we ought to look at today and what I am interested in, Madam Chair, is that we look at, what are the performance measures? You know, when we talk about greening, what does that mean? How do we actually—I am not interested in measuring activity; I am more interested in measuring the results of what we mean by greening. What about having the trained Federal agency staff to make sure that we oversee those results? What does that mean? And, if we contract energy-saving performance contracts, making sure that we have that available. Certainly, activities and efforts that comply with the provisions in hindsight is important, also.

And the other thing that I am looking at also is to, as we do those performance measures, make sure that one agency, another agency, the other agencies are using uniformity in those performance measures.

And, again, we have to be very careful about this, Madam Chair, because I think in the past, when we talked about performance measures, agencies, with all due respect, sometimes—and I think Members of Congress do the same thing—is that we measure the activity. You know, what are we doing to do this? But I think the results, and that is the definitional challenges that we face is, I think, what we ought to be looking at.

So, again, thank you very much, Madam Chair. And I think we are going to have a great hearing.

Thank you to the witnesses.

Ms. WATSON. And I will now yield to Mr. Connolly.

Mr. CONNOLLY. Thank you, Madam Chair.

And thank you so much for holding this hearing, which I think is very important.

While I certainly join with my friend from San Diego in the caveat that he laid in front of us, I cannot join with him in his avowed cynicism. I actually think this is an exciting challenge with enormous potential. And when I was chairman of Fairfax County, until I came to this Congress, we were doing similar things, requiring LEED certification of all of our government buildings, a standard reflected certainly in the commitment embodied in the Energy Independence and Security Act [EISA], and the Executive Order 13514.

We spend $24½ billion a year in energy costs as a Federal Government, Federal facilities. And if we can meet the standards we have set for ourselves of 26 percent energy savings by going to LEED-certified buildings, we can save $6 billion of that cost every year. $6 billion. That is not trivial. That is significant. And those are real savings to be had as we move forward. And so I think the potential is enormous. And we have just got to, as my friend from Texas just said, we have to have real metrics and measurable goals and milestones along the way to make sure we are in fact reaching that savings. But that savings can really help us a lot as we go forward.

We have already got 12 LEED-certified buildings. We are committed to carbon-neutral buildings, and we have one now in Denver. Obviously, this committee wants to know more about, well, all right, what are the plans to making sure we get to our goals by 2030? Because they are generating 33 percent lower greenhouse gas emissions than normal buildings.

I might add that sometimes there are upfront costs in going to LEED-certified buildings, but the payoff is considerable. In my county, for example, we, as a matter of measurement, said, OK, it costs a little bit more to initially build a green-certified building, but by year 14, we start saving that money—we fully recouped those costs, and we started saving money every year thereafter. And we, as a life span, put 40 years in a building, even though we usually get more.

The Federal Government, it is much more dramatic. We put 100 years on a building. So the outyears in terms of cost savings are quite considerable.

The other thing we are committed to is predevelopment hydrology standards for storm water runoff at Federal facilities. Very important for endangered estuaries, very important for fragile ecosystems, certainly here in the National Capital Region, a very important standard as we are trying to restore the Chesapeake Bay, the largest estuary in the United States.

And finally, Madam Chair, I believe low-impact development techniques can make a big difference when we are looking at the entirety of a Federal facility. It may be impervious pavers. It may be rain gardens on the roof. It may be an alternative to asphalted and impervious service parking lot.

I will say, however, in my view, we should not be building one-for-one structured parking spaces on a Federal facility next to a transit station. That defeats the whole purpose of what we are trying to do here, and it is an unnecessary expense to the taxpayer, and I think we have to abandon that practice.

But we also, in urban areas, need to use these techniques to lower, if you will, what is known as the heat island effect. We know that in some urban areas, the temperature variance can be 22 degrees higher Fahrenheit than in the comparable rural areas because of the radiant heat effect on asphalt and buildings and structures. So we, the Federal Government, need to make sure that we are cognizant of that and addressing that as well. Every 1 degree increase in Celsius increases ground ozone levels by 5 percent, leading to higher asthma rates and other respiratory illness. So we have an obligation to be addressing that, too.

But finally, Madam Chairwoman, I want to congratulate you for holding this and a series of hearings. I think this is a very significant hearing, and I think here is an opportunity for the Federal Government to strike a blow for the environment, for public health, and to help save significant amounts of taxpayer dollars while we are at it. Thank you.

Ms. WATSON. Thank you, Mr. Connolly.

If there are no additional statements, the subcommittee will now receive the testimony from our witnesses that are before us today.

We will now turn to our first panel.

It is the policy of the Committee on Oversight and Government Reform to swear in all witnesses before they testify. And I would like to ask all of you to please stand and raise your right hands.

[Witnesses sworn.]

Ms. WATSON. Let the record reflect that the witnesses answered in the affirmative.

And you may be seated. And I will now introduce the first panel.

And I would like to start now with Kevin Kampschroer, who is the director of the Office of Federal High Performance Green Buildings for the General Services Administration.

Mr. Kampschroer oversees the framework for which GSA responds to the challenges of greenhouse gas emission reductions and of the American Recovery and Reinvestment Act's mandate to move GSA's Federal building inventory toward high-performance green buildings.

Kathleen Hogan is the deputy assistant secretary for Energy Efficiency in the Office of Energy Efficiency and Renewable Energy at the U.S. Environmental Protection Agency, where her portfolio of $900 million annually includes energy efficiency policy, program, and research. Previously, as a division director, Dr. Hogan directed EPA's clean energy programs and focused on removing market barriers for energy efficiency and renewable energy.

And Dennis Bushta is the deputy assistant director in the Office of Administration for the U.S. Environmental Protection Agency. Mr. Bushta previously served as EPA's director of the Safety, Health, and Environmental Management Division, and as acting director of Facilities Management Services Division. He was director of industrial relations for Newmont Mineral Corp., and he has worked as an adjunct faculty member at the West Virginia University.

And I would like to welcome all of you and thank you very much for being here this morning. I ask that each one of the witnesses now give a brief summary of their testimony, and to keep this summary under 5 minutes if you can do that. Your complete written testimony will be included in the hearing record.

And Mr. Kampschroer, please proceed.

STATEMENTS OF KEVIN KAMPSCHROER, DIRECTOR, OFFICE OF FEDERAL HIGH PERFORMANCE GREEN BUILDINGS, GENERAL SERVICES ADMINISTRATION; KATHLEEN HOGAN, DEPUTY ASSISTANT SECRETARY FOR ENERGY EFFICIENCY, OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY, U.S. DEPARTMENT OF ENERGY; AND DENNIS BUSHTA, DEPUTY DIRECTOR, OFFICE OF ADMINISTRATION, U.S. ENVIRONMENTAL PROTECTION AGENCY

STATEMENT OF KEVIN KAMPSCHROER

Mr. KAMPSCHROER. Thank you, and good morning, Chairwoman Watson, Ranking Member Bilbray, and members of this subcommittee. My name is Kevin Kampschroer, and I am the director of the Office of Federal High Performance Green Buildings in the U.S. General Services Administration. Thank you for inviting us today to discuss the progress and challenges with green building practices in the Federal Government, and thank you for including my full written statement into the record.

In 2007, under the Energy Independence and Security Act, Congress created the Office of Federal High Performance Green Buildings to enable and enhance Federal leadership in sustainable real property portfolio management and operations. The office now combines deep knowledge of Federal processes with multidisciplinary expertise in high performance green buildings, providing leadership both within GSA and the Federal Government, as well as influence and interaction with the broader commercial property market, to ensure that our buildings minimize their burden on both the environment and the taxpayer.

A principle duty of the office is to ensure full coordination of high performance green building information and activities within GSA, and this duty expanded with the passage of the Recovery Act. Under the Recovery Act, GSA received $5.55 billion to be rein-

vested in the Federal buildings portfolio and to create a few new buildings as well on an accelerated basis. And, in fact, GSA to date has done four times as much work in this regard as it ever has done before, and today we stand with contracts in place of $4.4 billion.

GSA has leveraged its specialized expertise in sustainability and procurement practices to support the investment of these funds consistent with the intent of the Recovery Act. In the months immediately following the passage of the Recovery Act, we engaged directly across GSA, in the public buildings in particular—service in particular, to provide support to the development of and the plan for executing these projects.

We established minimum performance criteria to guide the scoping and execution of projects to transform Federal buildings into high performance green buildings that use less energy, have better indoor environmental quality and health and performance conditions, reduce pollution, and produce less waste. Building tune-up, lighting, HVAC, retrofit and replacement, renewable energy generation and water conservation projects have all been incorporated into projects based on the limits of funding, the scope of the act, and return on investment analysis for the components of the investment.

An example of a project taking full advantage of these greening opportunities is the modernization of the Edith Green Wendell-Wyatt building in Portland, OR. It will attain LEED platinum, the highest LEED rating available under the U.S. Green Building Council's LEED rating system. Using advanced design features, including radiant panels fenestration on different sides of the building to react differently to the way that the sun rises and sets in that particular climate, the structure will consume 60 percent less energy of a typical office building in that location and will incorporate a facade that is designed specifically for the location within the city. I might also add that the oldest planted roof in GSA's inventory is on the parking garage of that same building. It was planted in 1975 and has never leaked.

Another example is the new Department of Homeland Security headquarters that we are building on the St. Elizabeth Campus in Washington, DC, the initial building, the new Coast Guard headquarters will have 5 acres of vegetative roof, narrow foreplates to maximize access to natural light, an innovative heating system that will be using combined heat and power for the facility and provide infrastructure support for the rest of the Department of Homeland Security in that campus, as well as being highly transit-accessible.

We are leveraging our Recovery Act investments to turn our large, varied, and stable inventory of buildings into a proving ground for green building technologies, materials, and operating regimes in order to become one of the real estate industry's sources for data on the actual performance of systems in use, and we will be measuring that performance over a minimum of 3 years after complete operation and acceptance.

We have worked to support and apply the most effective green building rating systems and standards, drawing on objective analysis performed by the Pacific Northwest National Laboratory, man-

aged by the Department of Energy, GSA has identified LEED as the most effective rating standard for the Federal real property inventory to attain with a focus on the LEED new construction system and a growing focus on existing buildings. GSA requires that a LEED rating of gold or better be part of the design criteria for all new construction and major renovation projects, and the agency currently has 48 LEED-certified owned and leased buildings, with approximately 150 more working toward accreditation at the end of their project period.

Eighteen of these projects to date have exceeded the minimum with LEED gold certifications, and one GSA-leased, the FBI regional office in Chicago, has achieved the LEED platinum rating for existing buildings, the first of those ratings ever to be given.

The Energy Star system developed by EPA and the Department of Energy together and managed by them is also used by GSA and other Federal agencies. GSA today has over 100 buildings with Energy Star ratings, and we are expanding that into the leased inventory as well. We track environmentally preferable purchasing in compliance with Federal mandates.

And I just want to conclude with a couple of challenges related to measuring green building performance outcomes.

A key issue is increasing the number of advanced or smart meters in Federal buildings that track energy and water usage, which we are doing in every building that was touched by Recovery Act funds.

Indoor environmental quality is particularly difficult to track and measure because it involves such a wide variety of pollutants as well as atmospheric conditions, all of which can interact with each other and impact occupants' health and productivity in many ways. Research to develop user-friendly indoor environmental quality metrics is needed.

Another area that the Federal Government's ability to invest in projects with greatest environmental benefits would also be advanced is if the authority of agencies to make contracts for renewable energy were extended from the current limit in GSA's authorizing legislation of 10 years to 20 years, and this would allow a cost-effective creation of markets for renewable energy that is not there.

And, finally, GSAhas long history of working cooperatively and effectively with Federal partners, and I will cover that in the longer testimony that is there. And with that, I think I should stop because I am over my time. Thank you very much.

[The prepared statement of Mr. Kampschroer follows:]

STATEMENT OF

KEVIN KAMPSCHROER
DIRECTOR

OFFICE OF FEDERAL HIGH-PERFORMANCE GREEN BUILDINGS

OFFICE OF GOVERNMENTWIDE POLICY

U.S. GENERAL SERVICES ADMINISTRATION

BEFORE THE

SUBCOMMITTEE ON GOVERNMENT MANAGEMENT, ORGANIZATION, AND PROCUREMENT

COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

U.S. HOUSE OF REPRESENTATIVES

JULY 21, 2010

Good morning, Chairwoman Watson, Ranking Member Bilbray and members of this Subcommittee. My name is Kevin Kampschroer and I am the Director of the Office of Federal High-Performance Green Buildings (OFHPGB) at the United States General Services Administration (GSA). Thank you for inviting me today to discuss the progress and challenges of green building practices in the Federal Government.

Congress created the OFHPGB to enable and enhance Federal leadership in the field of large scale sustainable real property portfolio management and operations. Chartered in December 2007 under Section 436 of the Energy Independence and Security Act (EISA), the office combines authoritative knowledge of Federal processes with multidisciplinary expertise in high-performance green buildings to provide leadership within GSA, the Federal Government, and the broader commercial property market to ensure that our buildings minimize their burden on both the environment and the taxpayer. The office is housed within GSA, which provides 362 million rentable square feet of work space and is one of the largest and most diversified public real estate organizations in the world.

Since initiating operations, OFHPGB has moved aggressively and resourcefully to fulfill its mandate. Even before the funding provided through the Recovery Act, the office began planning innovative programs to coordinate Federal high-performance buildings activities, accelerate technology commercialization, and foster adoption of sustainable practices at all the lifecycle stages of Federal assets.

A principal duty of the OFHPGB is to ensure full coordination of high-performance green building information and activities within GSA. Under the Recovery Act, GSA received $5.55 billion to be re-invested in the Federal buildings portfolio on an accelerated basis. GSA leveraged its specialized expertise in sustainability and procurement practices to support investment of these funds, consistent with the intent of the Recovery Act, to create jobs, develop high performing green buildings, and support the President's and Congress's vision for a clean energy future. GSA is committed to an integrated focus on the whole lifecycle of Federal buildings, to ensure that, by investing carefully in the best technologies and practices, we provide significant savings and value to the taxpayer over the full life of our buildings.

Greening GSA Recovery Act Projects

In the months immediately following passage of the Recovery Act, OFHPGB engaged directly with GSA's Public Buildings Service (PBS) to support Recovery Act procurements. Principal contributions by the office included establishment of Minimum Performance Criteria to guide the scoping and execution of Recovery Act projects to transform Federal buildings into *high-performance green buildings*.

Compared to average buildings, high-performance green buildings use less energy, water, and material resources; have better indoor environmental quality; reduce air and water pollution, and produce less waste; use environmentally preferable products; have integrated systems; use sites well and use local transportation to reduce adverse impacts on the local community; and improve conditions for the health and productivity of the buildings' occupants.

Among projects identified as appropriate for Recovery Act funding, GSA examined opportunities to improve the performance of projects already designed, with a focus on building systems, human performance, renewable energy generation and water conservation. GSA prioritized buildings with the worst performance in energy and poor physical conditions, and the best plans for improvement. The following improvements were incorporated into all projects, where possible, based on funding and return on investment:

1. Building tune-up (re-commissioning, controls improvements, minor systems repairs and equipment replacement)
2. Lighting (day lighting control and occupancy sensors; control systems replacement and re-wiring)
3. HVAC retrofit/replacement
4. Renewable energy generation by photovoltaic, thermal solar or wind
5. Water conservation projects

In addition, GSA has worked to establish geothermal and lighting technology acceleration programs.

An example of a GSA project taking full advantage of these greening opportunities is the modernization of the Edith Green/Wendell Wyatt Federal Building in Portland, OR to attain the US Green Buildings Council's (USGBC's) Leadership in Energy and Environmental Design (LEED)[1] Platinum rating – the highest LEED rating available. Using highly advanced design features, the finished structure will consume about 60 percent of the energy of a typical office building. It will incorporate an exceptional 18-story façade that integrates shading and reflective devices optimized for each direction of the building's location, orientation, and local climate. Compared to conventional high-rise buildings, the facility will use 65 percent less potable water.

GSA's Green Proving Ground

GSA is leveraging our Recovery Act investments to turn our large, varied and stable inventory of buildings into a proving ground for green building technologies, materials, and operating regimes. By adopting new ideas and

[1] LEED is a nationally recognized system for rating the design, construction, and operation of high-performance buildings. Buildings can attain four levels of certification: Certified, Silver, Gold, and Platinum.

products, then evaluating and publicizing our results, GSA is working to become one of the commercial real estate industry's "go to" sources for data on the environmental and economic payback of new systems and procedures. Our investments in innovative technologies and alternative energy solutions can help lead the transformation to new green jobs and green industries. Table 1 below identifies the number of green technologies we are including in our projects.

GSA is also pursuing projects that will upgrade the performance of specific systems within many of our buildings. These "Limited Scope" projects focus on improving energy performance and are evaluated in the context of the existing physical condition of the building. We evaluated these buildings and identified opportunities to "tune-up" the systems, improve building mechanical system controls, recommission building systems and retrofit or replace lighting or HVAC systems. To better achieve the goals of EISA, we particularly focused on those projects related to renewable energy production and water conservation.

In addition to the Limited Scope projects, PBS has obligated over $110 million for High-Performance Green Building Small Projects that represent other opportunities for implementing measures to convert our buildings to high-performance green buildings. These projects tend to be smaller in scope and size.

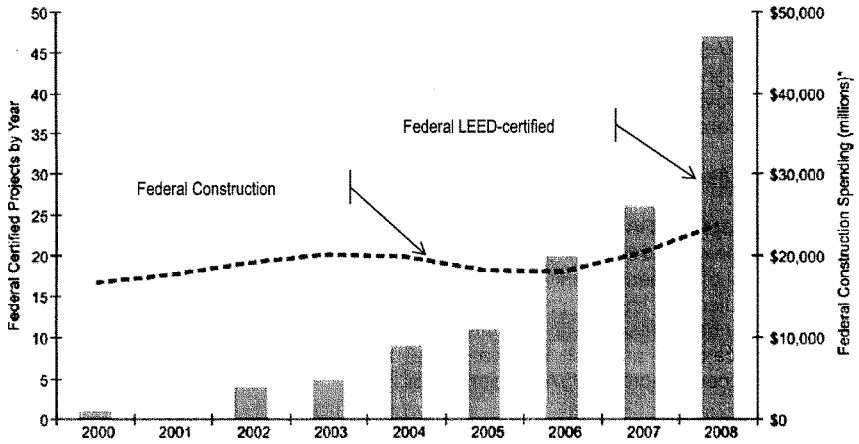
Incorporation of green building standards and practices

GSA has worked to support and apply the most effective green building rating systems and standards. Drawing from objective analysis performed by the Pacific Northwest National Laboratory (PNNL), GSA identified LEED as the most effective rating standard for the Federal real property inventory to attain, with a focus on the New Construction (LEED-NC) system and a minimum rating of Silver. The PNNL study, *Sustainable Building Rating Systems* (2006), screened more than 30 sustainable building rating systems and conducted in-depth analysis on 5 of the highest priority candidates. Based on the analysis, GSA selected the LEED rating system because it provides:

- The ability to be relevant to the scale and complexity of Federal buildings;
- Stability over time, such that evaluation of a building's performance is not subject to dramatic changes;
- Objective measures of sustainable design, verified by third parties;
- Wide availability, with broad practitioner awareness.

GSA formally conveyed this finding to the Department of Energy (DOE) in April 2008. DOE officials subsequently issued draft regulations that are currently

Figure 1: Federal LEED Certified Projects by Year



Source: Interagency Sustainability Working Group, based on US Census Bureau Statistics

undergoing review. GSA will evaluate sustainable building rating systems again in 2011 and may elect to provide additional guidance on this designation and its application.

GSA already requires that a LEED rating of Silver or better be part of the design criteria for all GSA new construction and major renovation projects; the agency currently has 48 LEED-certified owned and leased buildings with approximately 150 more working towards accreditation. Eighteen of these projects have exceeded the minimum with LEED Gold certifications, and one GSA lease, the FBI Regional Office in Chicago, has achieved a Platinum LEED rating for Existing Buildings.

As Figure 1 indicates, the number of LEED-certified projects across all Federal agencies has increased substantially in recent years. According to the USGBC, the Federal Government currently has 241 LEED certified projects with another 3,373 pursuing certification. At least 14 Federal agencies have policies to promote the use of LEED in their buildings.

EPA's ENERGY STAR® system is also used by GSA and other Federal agencies to track and improve building energy efficiency – GSA currently has over 130 buildings with an ENERGY STAR® Buildings label. EISA Section 435 requires

that all new Federal leases, with a few exceptions, must be with ENERGY STAR® labeled buildings.

In addition, GSA has supported and participated in the 3-year development process for the recently-published American National Standards Institute (ANSI)/American Society for Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE)/USGBC/Illuminating Engineering Society (IES) Standard for the Design of High-Performance Green Buildings (ASHRAE 189.1). The standard provides a code-enforceable "total building sustainability package" to enable Federal buildings to comply with Federal green building requirements.

Measuring Federal green building performance

A 2008 study[2] of GSA's 12 earliest green federal buildings shows energy consumption down 26% and occupant satisfaction up 27%, compared to commercial office benchmark data in those regions. More importantly, the top third of studied buildings, which use an integrated design approach, deliver significantly better results with 45% less energy consumption, 53% lower maintenance costs, and 39% less water use. We are now working to expand this analysis to cover more of GSA's green buildings.

As you will hear from our colleagues at DOE, DOE's Federal Energy Management Program collects extensive data on Federal energy and water use. GSA tracks these data closely for our buildings.

Since FY 2003, GSA has reduced its energy intensity by 14.3 percent in our public buildings and those leases where GSA is responsible for making utility payments. GSA has reduced its total annual energy consumption over the period FY 2003 to FY 2009 by nearly 878 billion BTUs, and is well ahead of its energy intensity reduction target of 12 percent by FY 2009. (These figures include "credits" for the purchase of renewable energy from energy suppliers.) GSA has also been actively working with the U.S. Environmental Protection Agency (EPA) to tailor *Portfolio Manager* – EPA's interactive energy management tool for tracking and assessing energy and water consumption across an entire portfolio of buildings in a secure online environment – for Federal uses. GSA has been working with EPA to add functionality to Portfolio Manager to include other building aspects besides energy and water consumption so that Federal agencies may use it to meet all the requirements of Executive Order (EO) 13514.

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[2] "Assessing Green Building Performance", K.M. Fowler *et al.*, US General Services Administration 2008, based on: KM Fowler and EM Rauch: Assessing Green Building Performance: A post-occupancy evaluation of 12 GSA Buildings, PNNL-17393, Pacific Northwest National Laboratory, Richland, WA, 2008. The full report and white paper summary can be found at http://www.gsa.gov/appliedresearch under Research Publications.

GSA also tracks environmentally preferable purchasing in compliance with Federal mandates. For example, in 2009, GSA spent over $2.3 million on recycled content products, and our national janitorial contracts now require the use of green cleaning products.

There are a number of major challenges related to measuring green building performance outcomes. A key issue is increasing the number of advanced or "smart" meters in Federal buildings tracking energy and water usage. GSA, as an active member of the Office of Science and Technology Policy's (OSTP) subcommittee on Buildings Technology Research and Development (BTRD), is supporting that committee's project to study metering issues and technology and how metering may be expanded.

Beyond the use of resources like energy, water and to some extent, materials and waste, other environmental and health impacts are frequently more difficult to track. Indoor environmental quality (IEQ) is particularly difficult to track and measure, since it involves such a wide variety of pollutants – chemical, biological, gaseous and particulate – as well as atmospheric conditions including ventilation, lighting, acoustics, daylighting and views, all of which interact and can impact occupants' health and productivity in many ways. Research to develop user-friendly IEQ metrics is, therefore, needed.

Other environmental aspects of buildings for which better metrics are needed include stormwater impacts of construction, lifecycle assessment of materials and products, and the impacts of siting on transportation and other community dynamics.

Federal Financial,Bbudgetary and Marketplace Issues

High-performance green buildings provide the best value for the taxpayer and for the public through both life cycle cost benefits and positive effects on human health and performance. According to the 2008 McGraw-Hill Construction SmartMarket Report: Key Trends in the European and U.S. Construction Marketplace, operating costs for green buildings are on average 8 to 9% lower, building values are 7.5% higher, buildings have a 3.5% greater occupancy ratio, and green buildings provide a 6.6% total return on investment.

Indeed, the life cycle costs of well designed and maintained green buildings are usually lower than the life cycle costs of conventional buildings. Even the initial capital costs are not necessarily higher, and when they are, only marginally so. GSA's study of the initial capital cost shows that the increase on average is about 3 percent, ranging from zero to ten percent, depending on the design. Similarly, a private sector study by Davis Langdon[3] in 2007 shows that green building

[3] Lisa Fay Mathiesson, Peter Morris, "The Cost of Green Revisited" Davis Langdon, July 2007, http://www.davislangdon.com/upload/images/publications/USA/The%20Cost%20of%20Green%20Revisited.pdf

features tend to have a lesser impact on costs than other building decisions, such as which kind of finishes and amenities the building might provide.

Currently, Federal capital budgeting processes do not adequately take into account the life cycle cost savings of high performance green buildings, even when upfront costs are higher. High-performance buildings can deliver additional benefits that are harder but not impossible to monetize, such as carbon emissions reductions, improved resiliency to energy market disruptions, and higher worker productivity. GSA has sought to make incremental improvements to existing lifecycle costing methodologies in order to better meet the needs of energy-related investments. Specifically, GSA has initiated preliminary discussions with the National Institute of Standards and Technology Office of Applied Economics to update the lifecycle cost methodology to take into account an EISA-mandated increase in the time period for lifecycle costing from 25 to 40 years. This change would provide a longer window for energy projects to pay back their first costs, thereby increasing the scope of viable projects.

The Federal Government's ability to invest in the projects with the greatest environmental benefits would also be advanced if the authority of agencies to make contracts for renewable energy were extended from the current 10 years to 20 years.

Another marketplace challenge is the lack of skilled labor to put green building technologies and practices into effect in new construction, renovation, operations and maintenance. Significant worker training and retraining will be needed to meet the green building goals of EISA and EO 13514.

Interagency Coordination

GSA has a long history of working cooperatively and effectively with our Federal partners on these issues. Consistent with its EISA charter, GSA has dedicated significant resources and expertise to a variety of interagency green buildings initiatives. GSA coordinates much of its interagency agenda through existing Federal interagency bodies – such as the Interagency Sustainability Working Group, which GSA has just begun to co-chair with DOE's Federal Energy Management Program, and the OSTP subcommittee on Buildings Technology Research and Development (BTRD). In addition, GSA participated in the creation of the DOE's Commercial Real Estate Energy Alliance.

OFHPGB is taking a leading role in GSA's compliance with and implementation of Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance .

- The office has participated in the testing of GHG accounting protocols and submitted reduction targets to CEQ for GSA's Scope I[4] and Scope II[5]

[4] Scope I emissions are those that come directly from sources owned or controlled by the Federal agency

emissions. The Office has already written guidelines on GHG accounting in Federal sector customer–landlord situations and developed internal accounting protocols for Scope III[6] emissions.

- GSA has also laid a foundation for agencies to build their internal capacity to meet the mandates of the EO by developing teams to train and assist other agencies in the development of their GHG reduction targets and abatement plans.

- GSA is assisting CEQ to implement the EO by developing simplified reporting requirements, metrics, and tools.

- GSA sponsored a symposium with the Federal Facilities Council, DOE, ASHRAE and the International Facility Management Association on the challenges related to the "net zero" carbon design goal. The proceedings provide a blueprint for agencies to use in meeting the already aggressive targets related to the reduction of the use of fossil fuel-generated energy, which have been accelerated by the EO.

- GSA also was the lead coordinating agency for the development of two sets of recommendations to CEQ required by EO 13514: "Recommendations for Federal Local Transportation Logistics" (Section 11) and "Recommendations for Vendor and Contractor Emissions" (Section 13). GSA is a designated collaborator on three other sections: "Recommendations for Greenhouse Gas Accounting and Reporting" (Section 9), "Recommendations for Sustainable Locations for Federal Facilities" (Section 10), and "Guidance for Federal Fleet Management" (Section 12).

Environmental and Health Benefits of High Performance Green Building

Buildings have countless impacts on the environment, the economy, natural resources and occupant health and productivity extending far beyond the building footprint. Buildings use almost 40% of all energy, emit nearly 40% of carbon dioxide emissions, use 13% of our freshwater resources, generate over two-thirds of all non-industrial secondary materials, and form an indoor environment where Americans spend 90% of their time, subject to higher levels of pollution than in the outdoor environment. [7]

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[5] Scope II emissions are those that result from the generation of electricity, heat, or steam controlled by the Federal agency

[6] Scope III are emissions associated with the products and services Federal agencies procure from third parties

[7] US Environmental Protection Agency, Buildings and their Impact on the Environment: A Statistical Summary, Revised April 22, 2009, http://epa.gov/greenbuilding/pubs/gbstats.pdf

Effective green building design, operations and maintenance offer economic, environmental and societal benefits. If a building decreases its energy consumption, the cost of operation is less, the asset value increases, and the production of greenhouse gases decreases. Building water use, wastewater generation and stormwater runoff affect the quality of our water bodies, the public water supply, and the need to build expensive new water infrastructure.

The careful selection and use of materials can reduce energy consumption during the manufacturing process and protect the health of occupants. Careful construction techniques can reduce the amount of construction waste that reaches landfills by 95% or more[8].

EISA states that a high-performance green building must not just perform well mechanically, but perform to improve the health and enhance the performance of the occupants.[9] Indoor air frequently has levels of air pollution 2-5 times, and sometimes as much as 100 times, higher than outdoor air, and poor indoor air quality can increase respiratory diseases and even the risk of cancer.[10] Lighting quality, including levels of daylighting and views, have significant impacts on employee productivity and satisfaction, as the PNNL has found. Carnegie Mellon University has documented over 100 scientifically valid studies that demonstrate the link between high-performance features and various aspects of productivity.

Some key green building approaches have multiple benefits. For example, a planted or "green" roof can lower roof temperatures, and thus cooling costs, while reducing the urban heat island effect and storm water runoff, absorbing some air pollutants and providing wildlife habitat. In cities like Washington DC, with a combined storm water and sewer system, this reduces water pollution both locally and downstream in the Chesapeake Bay.

We need to put at least as much emphasis on actual building performance, based on regular operations and maintenance, as on design, as several state and local governments are beginning to require.

Conclusion

Thank you again for this opportunity. All of us at GSA are excited by the contribution you have allowed us to make, and I am available to address any questions you may have.

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[8] Examples of this level of waste recovery in the U.S. Department of Energy's High Performance Buildings Database include Heifer International Headquarters, http://eere.buildinggreen.com/materials.cfm?ProjectID=781, and Yorktown Bachelor's Enlisted Quarters: http://eere.buildinggreen.com/materials.cfm?ProjectID=85.

[9] EISA Sec. 401(13).

[10] US Environmental Protection Agency, Indoor Environments Division, http://www.epa.gov/iaq/voc.html

Ms. WATSON. We will now proceed on to Ms. Hogan.

STATEMENT OF KATHLEEN HOGAN

Ms. HOGAN. Good morning, Chairman Watson, Ranking Member Bilbray, and members of the subcommittee. I do appreciate the opportunity to speak with you today about the Department of Energy's efforts with Federal green buildings.

The Federal Government is becoming a leader in green building practices across its 3.2 billion square feet and its very large annual facility energy bill. And it is raising the bar through Executive Order 13514, that was signed in October 2009. These efforts do make good sense by providing significant savings in taxpayer dollars, significant reductions in greenhouse gas emissions and, of course, creating jobs.

Today I would like to update the subcommittee on Federal facility performance, share how the Federal agencies do collaborate to make buildings more energy efficient and sustainable, and to discuss some additions to the Federal toolkit that could help the government more readily achieve future statutory targets and others recently set by Executive Order 13514.

The Department's Federal Energy Management Program [FEM], works with agencies to help them improve and to track their performance on key sustainability metrics that have been set forth by statute as well as Executive orders. Preliminary data for fiscal year 2009 are quite promising and show a number of things. They show a reduction in energy intensity of about 13 percent relative to fiscal year 2003, surpassing the annual goal that had been set. The data also show an increase in renewable energy use, which now meets more than 4 percent of the government's electricity demand, also surpassing the fiscal year 2009 goal. The data show a decrease of more than 4 percent in water intensity relative to 2007, surpassing the fiscal year 2009 goal. And the data show close to full compliance, 99 percent, with metering the electricity use in the buildings where that is appropriate and show very high compliance with the design of new Federal buildings to be substantially more efficient than the typical building built to code.

Further, we do expect to have strong results for fiscal year 2010, as investment and energy efficiency and renewable energy at Federal agencies did increase 84 percent in fiscal year 2009 over the prior year for really the highest year ever at about $1.7 billion.

Now, success does take a team effort, and the Department of Energy does work closely with GSA, EPA, and other agencies. We are organized through Executive Order 13514 into a set of topical working groups with clear roles and responsibilities. Through these working groups, we can tap the communal knowledge and resources available across the entire Federal Government, and my written statement provides greater detail on those efforts.

So as we look forward, and we know we have taken big strides, we also see that we have more room to drive down energy costs in Federal facilities and to meet future statutory and Executive order requirements. Energy efficiency does remain a top priority. There are literally hundreds of off-the-shelf technologies and products the government can use to save energy, technologies and products that

are lifecycle cost-effective. As facilities last decades, these energy efficient retrofits can reap rewards for years to come.

Cool roofs are another important efficiency measure. Cool roofs reflect the sunlight and reduce heat gain, lower air conditioning bills for direct benefits, as well as improve air quality. Just this week, DOE released guidelines for selecting cool roofs for Federal agencies, and the Department's Secretary Chu sent a memo to departmental leadership instructing them to use cool roofs when building or replacing existing roofs.

The Federal Government has a number of tools to overcome the higher initial costs of energy efficiency and renewable energy, which do frequently hinder investment. For example, as mentioned, energy saving performance contracts, which can provide investment capital to improve Federal facilities. This tool has provided around $2.3 billion in Federal facilities investment and helping us save more than $18 trillion BTUs of energy annually, enough energy to power a city slightly larger than Kansas City, Missouri.

With a few additional tools, we could help deploy energy efficiency and renewable energy at greater scale, which is necessary to meet our future targets. For example, as just mentioned, we cannot currently use power purchase agreements broadly across the Federal Government. Except for the Defense Department and the Western Area Power Administration, the government can only enter 10-year agreements with renewable energy producers. Extending that renewable energy power purchase authority to 20 or 25 years for all the agencies as well as changing the way these projects are scored in the budget process could significantly increase renewable energy use across the government.

We also need to look at ways for Federal agencies to reinvest savings to support additional retrofits so we can save even more money rather than reducing the agency operating budgets to match the reduced use of energy and water.

And, last, if the definition of renewable energy were changed to include renewable thermal energy that displaces our need for electricity, the agencies would have a much wider set of options for low-cost renewable energy.

So I appreciate the opportunity to be here today and to share this update, and I will be pleased to answer any questions you have. Thank you.

[The prepared statement of Ms. Hogan follows:]

STATEMENT OF

KATHLEEN HOGAN

DEPUTY ASSISTANT SECRETARY

OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY

U.S. DEPARTMENT OF ENERGY

BEFORE THE

SUBCOMMITTEE ON GOVERNMENT MANAGEMENT, ORGANIZATION, AND PROCUREMENT

COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

U.S. HOUSE OF REPRESENTATIVES

JULY 21, 2010

Madam Chairwoman, Ranking Member Bilbray, and Members of the Subcommittee, thank you for the opportunity to discuss high performance buildings practices in the Federal sector.

Preliminary Fiscal Year (FY) 2009 data indicates that the Federal Government used approximately 386 trillion British thermal units (Btu)[1] of energy in nearly 3.2 billion square feet of facility space.[2] Federal facility energy use is a little over a third of the Federal Government's total consumption.[3] The Federal Government consumed about 1.6 percent of the Nation's total energy.[4]

Within this context the Department of Energy's Federal Energy Management Program (FEMP) and Building Technologies Program (BTP) work together with other Federal agencies—particularly the Department of Defense (DoD), the General Services Administration (GSA) and the Environmental Protection Agency (EPA)—to help them adopt sustainable practices and technologies. I'm pleased to be here today to provide further information to this Subcommittee on these efforts.

Constructing and operating Federal facilities in a sustainable manner has numerous well-documented benefits, including:

- Saving taxpayer dollars through optimized life-cycle cost-effective actions;
- Enhancing employee productivity through the provision of safe, healthy and environmentally appealing workplaces;
- Reducing environmental impacts through decreased energy, water, and materials use; and
- Moving the overall market conditions toward higher performance, through the Federal demand for sustainable facilities.

Today, I will discuss DOE sustainability metrics; government performance; ongoing rulemaking at DOE; interagency coordination and cooperation, and federal investment; ongoing innovation; and the challenge of overcoming up-front costs to energy efficiency upgrades.

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[1] About 37 trillion Btu of this 386 trillion Btu is excluded from the energy intensity reduction goal as allowed by statute.
[2] Primarily, this energy heated, cooled, and illuminated Federal facilities. It also fed electricity to appliances, equipment, and significant process loads.
[3] Total Federal energy consumption includes energy subject to EISA reduction targets and energy for tactical mobility purposes, which is not subject to reduction targets.
[4] Source: *DRAFT Annual Report to Congress on Federal Government Energy Management and Conservation Programs Fiscal Year 2009*, Federal Energy Management Program, July 2009.

SUSTAINABILITY METRICS

Currently, Federal building sustainability performance is rated on Office of Management and Budget (OMB) Scorecards (Energy Management and Environmental) using six primary metrics, which link to requirements under the Energy Policy Act of 2005 (EPAct), the Energy Independence and Security Act of 2007 (EISA), and Executive Order (E.O.) 13423. The six current performance metrics are:

1. Reduced energy intensity;[5]
2. Consumption of electricity from renewable sources;[6]
3. The percentage of appropriate facilities which have been metered for electricity use;
4. Reduced water intensity;[7]
5. New construction compliance with Federal design standards to be 30 percent more energy efficient than applicable code; and
6. Application of sustainability guiding principles in Federal buildings.[8]

However, OMB Scorecards are expected to be updated this year, as OMB develops performance metrics that also reflect the new requirements of President Obama's E.O. 13514 which includes ambitious new targets for agencies to meet in the areas of:

- Greenhouse gas emissions measurement and reduction;
- Pollution prevention and waste diversion;
- Regional and local integrated planning;
- Improving water efficiency and management; and
- Strategic Sustainability Performance Planning.

GOVERNMENT PERFORMANCE

The Government's performance within the key sustainability metrics continues to improve and meet targets. I will discuss the government-wide FY 2009 preliminary results on the metrics featured on OMB's current Energy Management Scorecard: energy intensity, renewable energy, water intensity, metering, and high performance sustainable buildings.

Energy Intensity

The Government has made substantial progress in reducing its energy intensity. In FY 2009, the Federal Government reported a 13.1 percent decrease in site-delivered Btu per square foot compared with baseline year 2003. This surpasses the EISA statutory reduction goal for FY 2009 of 12 percent.

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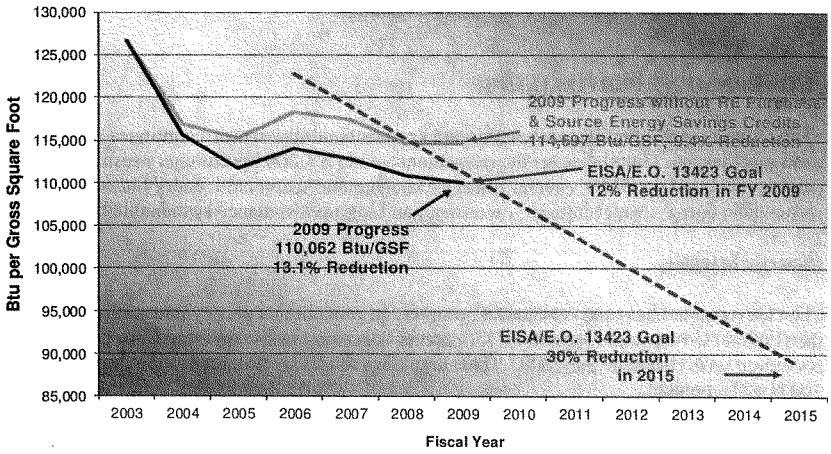
[5] Measured in site-delivered Btu per gross square foot of goal-subject facility space, compared annually with a 2003 base year.
[6] Noted as a percentage of total facility annual electricity use.
[7] Measured in terms of potable water used per square foot at facilities, compared annually to a 2007 base year.
[8] Measured in terms of percentage of buildings (this metric appears on OMB's Environmental Scorecard—the first five metrics are on OMB's Energy Management Scorecard).

Part of this decrease is attributable to subtracting approximately 14 trillion Btu for renewable energy purchases and for projects that reduce primary energy use (as opposed to site-delivered energy). These two adjustments to goal performance amount to approximately 7 trillion Btu each. Without these subtractions for credits authorized by implementing guidance, the Government's energy intensity reduction is 9.4 percent below the FY 2003 baseline.

The credits toward energy intensity reduction from the purchase of renewable energy can be attributed to the now revoked E.O. 13123[9] which permitted agencies to credit renewable energy purchases toward their performance under the energy reduction goals. During FY 2009, these credits were continuing to be phased out, per DOE's *Renewable Energy Requirement Guidance for EPACT 2005 and Executive Order 13423*.[10] The credits will be phased out completely by FY 2012.

The following chart shows the Federal Government's progress toward meeting the statutory energy reduction goal (red dashed line), with performance shown including the allowable adjustments (blue line) and without (gold line). The chart indicates the Government's overall rate of energy reduction is declining and suggests the Federal Government needs to continue to strongly emphasize energy savings and efficiency at its facilities. The energy intensity of Federal buildings is essentially the same as it was in 2005. However, the Recovery Act provided major funding for Federal investment in efficiency and should help move many agencies closer toward achieving Federal goals.

Overall Government Progress toward Facility Energy Efficiency Goals, FY 2003 through FY 2009



[9] 64 Fed. Reg. 30851 (June 8, 1999)
[10] Available at www1.eere.energy.gov/femp/pdfs/epact05_fedrenewenergyguid.pdf

Renewable Energy

In FY 2009, Federal agencies reported purchasing or producing more than 2,330 gigawatt-hours of renewable electric energy, comprising 4.2 percent of the Federal Government's electricity use and surpassing the EPAct 2005 goal of three percent. This more than doubled renewable energy use as a percentage of total facility electricity use since 2003. For FY 2010, the renewable energy goal for agencies rises to five percent of their total electricity use. The five percent goal remains in place until FY 2013, when it will increase to 7.5 percent under current statute. Not counted in this metric is the very significant amount of non-electric renewable energy produced and purchased by the Government that displaces the need for additional electric generation. This includes thermal energy, such as solar hot water and space heating, geothermal energy, steam from biomass, and landfill methane. These renewable sources of non-electric energy are often the most cost-effective means to displace fossil energy.

Water Intensity

Section 2(c) of E.O. 13423 requires agencies to reduce water consumption intensity, relative to the baseline of the agency's water consumption in FY 2007 by two percent annually through the end of FY 2015 or 16 percent by the end of FY 2015. E.O.13514 updated this section, requiring agencies to separate potable water intensity from industrial, landscaping and agricultural water intensity, and to achieve a 2 percent annual reduction in each.[11]

Based on preliminary data for FY 2009, the Federal Government's water intensity was 51.1 gallons per gross square foot, a reduction of 4.6 percent from the 53.6 gallons per gross square foot reported in FY 2007.[12] This reduction surpasses the 4 percent goal for the year. As reported by the agencies, the Federal Government as a whole used 160.4 billion gallons of water in FY 2009 at a cost of $476.3 million.[13]

Metering

EPAct 2005 requires all Federal buildings to be metered by October 1, 2012, and, to the extent practicable, agencies must install advanced meters that provide data at least daily while measuring the consumption of electricity at least hourly. This requirement targets larger buildings located on campuses or other installations that are not separately metered. EISA expanded this requirement to include metering for natural gas and steam by 2016. Agencies will begin reporting progress toward this goal in FY 2010.

According to preliminary FY 2009 data, agencies identified 107,250 buildings for which separate electricity meters are appropriate.[14] Of these buildings, 95,821 have standard

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[11] FY 2007 serves as the baseline for potable water; FY 2010 serves as the baseline for non-potable water.
[12] Water intensity reduction requirements were set forth in E.O. 13423.
[13] Average price: $2.97 per 1,000 gallons.
[14] "Appropriate" buildings for metering include those that agencies determine meet the criteria outlined in DOE's *Guidance for Electric Metering in Federal Buildings* (February 2006), and include buildings where metering is feasible, capable of providing useful data, a sensible application of the technology, and cost-effective

electricity meters installed and 10,723 have advanced meters installed. Although there may be a few instances of counting both the advanced and standard meters in a single building, overall compliance with the metering goal exceeds 99 percent (106,544 metered buildings out of 107,250 identified as "appropriate").[15]

Energy Efficiency Performance Standards and Sustainable Buildings

To assure that all new Federal buildings incorporate the best energy efficiency techniques available, Section 109 of EPAct 2005, "Federal Building Performance Standards," amended the Energy Conservation and Production Act (ECPA) to direct the Secretary of Energy to issue a rule that establishes Federal building energy efficiency performance standards.[16] The standards require that, if life-cycle cost-effective, all new Federal buildings will be designed to achieve energy consumption levels 30 percent below those of the current version that is in effect as of the date of enactment of this paragraph of the applicable American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) standard or the International Energy Conservation Code.[17] Additionally, whenever the ASHRAE or IECC is revised, the Department of Energy must determine whether the revised code would improve energy efficiency in residential buildings and must publish notice of the determination in the Federal Register. DOE will be initiating a new process to make these determinations with regard to the 2007 version of ASHRAE Standard 90.1 and the 2009 version of the IECC.

In FY 2009, only four agencies were not able to achieve full compliance with the mandate, although one of those agencies missed compliance by only a single building. Agencies also have an opportunity to revisit designs to bring them into compliance. Some agencies are also assessing performance of designs underway to determine compliance and will report these findings in future reports.

Both E.O. 13423 and E.O. 13514 require Federal agencies to demonstrate implementation of the Guiding Principles for *Federal Leadership in High Performance and Sustainable Buildings* for new, existing and leased buildings, and to ensure that at least 15 percent of their building inventory meets the Guiding Principles by 2015. For this metric on the OMB Scorecard, 10 of 25 agencies reported that more than three percent of their buildings with more than 5,000 gross square feet meet the Guiding Principles and are on track to meet the 15 percent goal by 2015.

ONGOING RULEMAKINGS

Congress provided clear direction and authorities regarding sustainable buildings. The Department of Energy responded by setting a high bar with rulemakings that can help the Government lead the way in sustainable facilities.

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within a 10-year payback period. Approximately 20 percent of all Federal buildings are determined to be "appropriate."

[15] Based on agency-reported data submitted to Federal Energy Management Program, January 2010.

[16] 42 U.S.C. 6834(a)

[17] 42 U.S.C. 6834(a)(3)(A)(i)(I)

DOE recently published a notice of proposed rulemaking (NOPR) to implement provisions of ECPA, as amended by EPAct 2005 and EISA, that require DOE to establish revised performance standards for the construction of new Federal buildings and major renovations of Federal buildings. The rule requires that sustainable design principles consistent with the Guiding Principles, be applied to the siting, design, and construction of all new and renovated Federal buildings if life-cycle cost-effective. Sustainable design principles must also be applied to the siting, design, and construction of certain new Federal buildings and major renovations.[18] This rule was published in the *Federal Register* on May 28, 2010, and is open for public comment until August 12, 2010. DOE will host a public meeting on the rule on July 28, 2010.

Another proposed rule under development outlines how the Federal Government will reduce and eventually eliminate fossil fuel consumption in new buildings and those that undergo major renovations. Section 433 of EISA requires DOE to issue revised Federal building energy efficiency performance standards that specify fossil fuel consumption reductions from "similar"[19] buildings, starting at 55 percent in FY 2010 and rising to 100 percent in FY 2030 and beyond. Like the sustainable design rule, this rulemaking will apply to certain new Federal buildings and major renovations. The rule is expected to be published in FY 2011 for public comment. This rule will represent one of the most ambitious and forward-looking EISA goals: to eliminate fossil fuel consumption in Federal buildings by FY 2030.

INTERAGENCY COORDINATION AND COOPERATION

It is appropriate that today this Subcommittee will also hear testimony from EPA's Dennis Bushta and from Kevin Kampschroer of GSA's Office of Federal High Performance Green Buildings. EPA, GSA and DOE have a long and positive record of collaborating with each other to advance sustainability within the Federal Government.

Executive Order 13514 sets aggressive goals for an integrated approach to sustainability across the Federal Government and assigns various lead and coordinating agency responsibilities in different areas. The following table highlights the key roles for EPA, GSA and DOE.

[18] The two categories as defined in Section 433 of EISA are public buildings as defined by 40 USC 3301 and new buildings or major renovations that cost more than $2.5 million in FY07 dollars.
[19] "Similar" as measured by DOE's Commercial Building Energy Consumption Survey and Residential Energy Consumption Survey.

Lead Agency	*Responsibility*	*Coordinating agencies*
DOE	Greenhouse Gas Accounting and Reporting Recommendations	EPA, GSA, DoD, Department of Interior, Department of Commerce (National Oceanic and Atmospheric Administration)
DOE	Federal Fleet Management Guidance	GSA
Department of Transportation (DOT)	Sustainable Locations for Federal Facilities Recommendations	EPA, GSA, DoD, Department of Housing and Urban Development, Department of Homeland Security
GSA	Federal Local Transportation Logistics Recommendations	DOE, DOT, OPM, Department of the Treasury
GSA	Study and Recommendations on Vendor and Contractor Emissions to the Office of Federal Procurement Policy	DoD, EPA
EPA	Federal Facility Stormwater Guidance	Existing interagency group

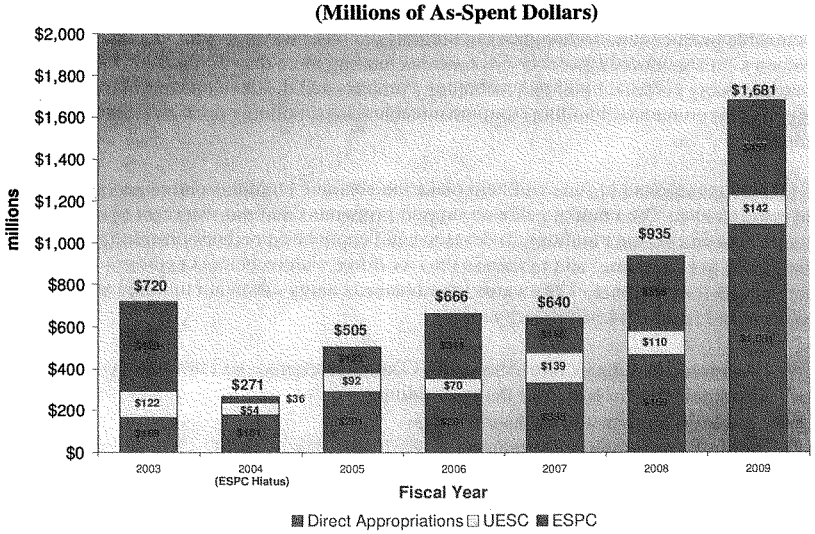
I'm pleased to report that each agency has met these coordinating responsibilities, and has delivered the required guidance or recommendations within the timeframe outlined in the Executive Order. This would not have been accomplished without close, cooperative inter-agency coordination and commitment.

The Interagency Sustainability Working Group (ISWG) co-chaired by GSA and DOE's FEMP provides additional Federal coordination. The ISWG is the coordinating body for sustainability of the built environment in the Federal sector and serves to advance the Federal Government's implementation of sustainable building laws, regulations, presidential directives, and other federal policies. Approximately 60 active members participate in the ISWG, including at least one representative from every major Federal department and agency. Key to the ISWG's success is the close collaboration between DOE's FEMP, GSA's Office of Federal High Performance Green Buildings, and EPA's Green Buildings Program.

FEDERAL INVESTMENT IN ENERGY EFFICIENCY

Preliminary agency data indicate that FY 2009 was the best year ever for energy efficiency and renewable energy investment at Federal agencies, with an 84 percent increase in overall investment and a 130 percent increase in appropriated investment, in part from Recovery Act funding. The following chart shows total agency investments over the last seven years. FY 2009 had record-setting investments in all three tracked categories: appropriations; energy savings performance contracts (ESPCs); and utility energy service contracts (UESCs).

Investment in Energy Efficiency and Renewable Energy, FY 2003 to FY 2009
(Millions of As-Spent Dollars)



ONGOING INNOVATION

In 2008, DOE announced its Net-Zero Energy Commercial Building Initiative (CBI). This initiative, led by the Building Technologies Program in the Office of Energy Efficiency and Renewable Energy, is a multi-faceted effort designed to achieve goals set forth in EISA Section 422(c) and public outreach activities in EISA Section 423. Section 422(c) establishes as goals of the CBI the development and dissemination of technologies, practices, and policies for the development and establishment of net-zero energy commercial buildings for:

(1) Any commercial building newly constructed in the United States by 2030;
(2) 50 percent of the commercial building stock of the United States by 2040; and
(3) All commercial building in the United States by 2050.[20]

The CBI is designed to overcome technical challenges, market barriers and institutional constraints inhibiting rapid and broad adoption of technologies, tools, processes and practices required to achieve net-zero energy performance levels in commercial buildings. DOE's CBI will engage in cost-shared research, development, and demonstration activities; engage and leverage the capabilities in the private sector through national energy alliances; work with commercial building partnerships with significant building portfolios; and participate in partnerships with standards and code setting bodies, as well as with State and local governments.

[20] 42 U.S.C. 17082(c)(1)-(3)

The Building Technologies Program works to accelerate the adoption of energy efficient, sustainable practices and technologies in buildings in other ways, as well. In June 2010, Secretary Chu announced Recovery Act awards totaling more than $76 million to support advanced energy efficient building technology projects and the development of training programs for commercial building equipment technicians, building operators, and energy auditors.

The 58 projects selected in June will help make the Nation's buildings more energy efficient and cost-effective. The funding will also support programs that train workers to service and operate new and existing buildings, to develop and deploy best practices resulting in fewer greenhouse gas emissions, and to increase the workforce with technical expertise to reduce energy costs for consumers. The awards for advanced energy efficient building technology projects were focused in five primary areas:

- Advanced Building Control Strategies, Communications, and Information Technologies for Net-Zero Energy Buildings;
- Analysis, Design, and Technical Tools;
- Building Envelope and Windows;
- Residential and Commercial Heating, Ventilation, and Air Conditioning and Crosscutting Air Conditioning and Refrigeration Research; and
- Water Heating, Residential, and Commercial Appliances and Miscellaneous Electric Loads.

These projects will help the U.S. lead the world in advancing energy efficient technologies and are expected to generate new knowledge and expertise to advance sustainability in the Federal Government.

COST VS. INVESTMENT

Numerous case studies and analyses demonstrate that the net benefits of incorporating sustainable practices into facility designs significantly exceed additional front-end costs. However, the challenge of overcoming higher initial costs impedes implementation of more sustainable practices that reduce total cost to the Government and to taxpayers over their lifetimes.

This is a challenge that the Government can help overcome by:

- Finding better ways to enable agencies to purchase and lease buildings with the lowest life-cycle cost especially when the initial cost of the building is higher than comparable buildings with lower initial costs but higher operating costs; and
- Identifying a source of lower-cost financing for Federal agencies, such as a Federal revolving loan fund, to utilize for investments in energy efficiency measures that would result in net savings to the taxpayer.

CONCLUSION

In conclusion, I would like to thank the Subcommittee for allowing me to update you on ongoing efforts and our collaborations with agency partners. These partnerships are bearing positive returns through the Federal facility space and encouraging more and more Federal managers to make decisions that make the Federal Government more sustainable. I would be pleased to answer your questions.

Ms. WATSON. And we thank you.

You may proceed, Mr. Bushta.

STATEMENT OF DENNIS BUSHTA

Mr. BUSHTA. Chairman Watson, Ranking Member Bilbray, and members of the subcommittee, thank you for providing me with the opportunity to appear before you today to discuss the U.S. Environmental Protection Agency's work, success stories, and challenges associated with green building practices and improving environmental performance in Federal facilities.

EPA occupies nearly 11 million square feet of office, support, and laboratory space across the country. The agency relies upon the General Services Administration to acquire virtually all of its office and nonlaboratory facilities.

The agency is currently meeting or exceeding the green building requirements found in the Energy Independence and Security Act of 2007 and Executive Order 13514, and considers itself to be a leader in the Federal Government in the renovation and construction of green buildings in both facilities owned by EPA and those provided through GSA. We have worked very hard to acquire the U.S. Green Building Council's leadership in energy and environmental design, LEED, new construction certification for buildings we have constructed or are leasing through GSA and private property owners. As of last December, EPA had gold or silver certification for over 186,000 square feet of property that we own and over 1 million square feet of rented property.

EPA has reduced energy at its reporting facilities by over 18 percent since 2003. Since September 2006, the agency has acquired delivered green power and renewable energy certificates equivalent to 100 percent of its conventional electricity use.

In addition, the agency has applied a variety of innovative approaches to reduce water use by almost 11 percent since 2007. Both EPA and GSA facilities contain numerous green roofs, large and small pervious pavement parking lots, rain gardens, and systems to harvest and reuse rainwater. EPA also makes extensive use of recycled materials in its construction projects.

Energy efficiency is an essential component of green buildings. Several of our offices include EPA's Region 8 Building in Denver, Colorado, which has earned the Energy Star rating, further highlighting the significance that EPA and GSA place on achieving top energy performance.

The agency currently has systems in place to collect and measure data for energy efficiency, water conservation, construction waste recycling, and scope one and two greenhouse gas facility emissions. And, throughout the Federal Government, agencies are working together to improve systems for collecting information related to employee commuting and waste diversion rates.

The EPA works within its appropriation to implement the many dimensions of our green building program. We are currently exploring ways to fund upgrading old mechanical systems in 4 million square feet of our laboratories to improve their energy efficiency. The agency is also committed to finding ways to ensure that building operators are available and trained to oversee and maintain increasingly more complex green building equipment.

EPA believes that Congress and the executive branch play a significant role in promoting the design and use of green buildings through the passage of the current Federal laws and Executive orders which set challenging energy and water reduction goals for Federal facilities. These current requirements have and will continue to make a meaningful impact in helping EPA and other agencies achieve significant energy reductions and improve their environmental performance.

The EPA has shared a very positive experience in collaborating on numerous projects with other Federal agencies in promoting green facilities. The Interagency Energy Task Force and the Interagency Sustainability Working Group, coordinated by the Department of Energy and GSA, have provided a critical service in assembling and sharing information about best practices, and GSA has provided a testing ground for new technologies in design approaches.

Several online energy management tracking and assessment tools that EPA developed include portfolio manager and target finder. An estimated 20 percent of the commercial building market representing 15 billion square feet uses portfolio manager to track energy and water usage, assess the performance of buildings, set goals, and make reductions across building portfolios.

Some of EPA's greatest success in promoting green buildings and technologies can be found in our numerous voluntary partnership and product labeling, programs including Energy Star, Water Sense, and Climate Leaders, just to name several. By following the Energy Star guidelines for energy management, buildings can achieve on average a 35 percent reduction in greenhouse gas emissions and realize energy savings.

The EPA has also issued storm water guidance to provide information about permeable pavement and roofing options that address environmental issues associated with water runoff. EPA strongly endorses the many benefits associated with green buildings and looks forward to continuing our work with the subcommittee, our partners throughout other Federal agencies, and the public to ensure an economically and healthier country.

Thank you again for inviting me to testify, and I look forward to answering your questions.

[The prepared statement of Mr. Bushta follows:]

TESTIMONY OF
DENNIS BUSHTA
DEPUTY DIRECTOR OF THE OFFICE OF ADMINISTRATION
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON GOVERNMENT MANAGEMENT,
ORGANIZATION, AND PROCUREMENT
COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM
UNITED STATES HOUSE OF REPRESENTATIVES
July 21, 2010

Chairman Watson, Ranking Member Bilbray, and Members of the Subcommittee, thank you for providing me with the opportunity to appear before you today to discuss the U.S. Environmental Protection Agency's (EPA's) work, success stories, and ongoing challenges associated with green building practices and improving environmental performance in federal facilities.

Background

EPA occupies 11 million square feet (SF) of office, support and laboratory space across the country, which houses over 17,000 federal employees and 8,000 support personnel. The Agency relies upon the General Services Administration

(GSA) to acquire virtually all of its office and non-laboratory support facilities. EPA owns most, but not all its 4 million SF of laboratory space.

The Greening of EPA

The Agency is currently meeting or exceeding the green building requirements found in the Energy Independence and Security Act of 2007 (EISA) and EO 13514. Historically, EPA has been a leader in the federal government in the renovation and construction of green buildings, in both facilities owned by EPA and those provided by GSA.

We have worked very hard to acquire the U.S. Green Building Council's Leadership in Energy and Environmental Design – New Construction (LEED-NC) Certification for buildings we have constructed or are leasing through GSA and private property owners. As of last December, EPA owned over 186,000 gross SF of newly constructed buildings that have LEED-NC Gold or Silver certification.

Through our very successful and collaborative partnership with GSA, EPA also occupies more than 1 million rentable SF that has LEED-NC Gold or Silver certification. A great example of this is GSA's recently renovated McCormack Post Office and Court House. This complex houses one of EPA's 10 Regional

Offices located in Boston. Just last month, these buildings received LEED Gold certification. In total, 1.3 million SF of space, or slightly over 10 percent of the office, laboratory, and support space EPA occupies is comprised of newly constructed, LEED certified, green buildings and EPA anticipates achieving the Executive Order goal to have 15% of its inventory meeting the Guiding Principles for High Performance Sustainable Building by 2015. Nine of ten EPA Regional Offices are currently housed in ENERGY STAR labeled buildings, with certification of the new EPA Boston Regional Office expected in 2011

Energy and Water Efficiency Savings

EPA has reduced energy use at its reporting facilities by over 18% since 2003. If the "temporary" Renewable Energy Credit is included, EPA was down 24.4%. A variety of approaches have been taken to achieve these results including implementation of Infrastructure Replacement Projects, Energy Savings Performance Contracting, upgrading mechanical systems, and mandatory commissioning and re-commissioning.

We are also proud of our achievements in purchasing Green Power and Green Power Renewable Energy Certificates (RECs). Since September 2006, the

Agency has acquired "delivered Green Power" and RECs equivalent to 100% of its conventional electricity use.

In addition, the Agency has found a variety of innovative approaches, such as condensate recovery to help reduce water use by almost 11 % since 2007 (exceeding the EO goal by 7% to date). We have extensive experience in implementing "Wet Weather Green Infrastructure" approaches to stormwater management as stipulated in EO 13514. Both EPA and GSA facilities contain numerous green roofs, large and small pervious pavement parking lots, rain gardens and systems to harvest and re-use rainwater.

EPA also makes extensive use of recycled materials in its construction projects and carefully protects and maintains indoor air quality in both new and existing buildings. Recycling rates for construction waste on large projects routinely exceed 70 percent.

Energy efficiency is an essential component of green buildings. Several of EPA's office buildings have earned the ENERGY STAR rating, highlighting the significance that EPA and GSA place on achieving top energy performance. EPA's Region 8 building in Denver Colorado for example, was specifically

designed to earn the ENERGY STAR rating, which it did after verifying its energy bills for one year.

Measuring Green Building Performance

EPA has implemented a number of performance measurement systems to track energy efficiency savings and other environmental results associated with green buildings. The Agency currently has systems in place to collect and measure data for energy efficiency, water conservation, construction waste recycling, and Scope 1 and 2 GHG facility emissions.

Throughout the federal government, agencies are working to improve systems for collecting information related to employee commuting (a Scope 3 GHG emission) and waste diversion rates.

More information is needed to effectively measure the impact that green buildings and improved indoor environmental quality have on employee productivity.

Barriers to Green Buildings

While EPA works within its appropriation to implement the many dimensions of a green building program, the goal of EO 13514 is for agencies to prioritize cost-effective improvements that have a positive return on investment. EPA's laboratories constitute 4 million of the 11 million total square feet the Agency occupies. The Agency continuously strives to improve our lab infrastructure and ensures our research is conducted in a safe environment. EPA is currently addressing the challenges of allocating funds to upgrade old mechanical systems to improve their energy efficiency. Additionally, EPA has successfully used Energy Savings Performance Contracts in the past and will continue to analyze how existing alternative financing approaches can potentially address the needs of highly complex laboratory facilities.

An area that is having a growing impact on our green building efforts is building operations and maintenance. Buildings designed to be energy efficient are frequently complex to operate and maintain. Locating and retaining qualified, competent and experienced building operators is becoming increasingly difficult, leading to inefficient and ineffective facility operations in certain locations.

EPA is using EISA required energy assessments and re-commissioning to identify and correct poor preventative maintenance practices, improve mechanical

system operating efficiency, and evaluate O and M contractor performance. EPA believes that EISA Sec 432 implementing guidance setting minimum training requirements for federal Energy Managers also should improve O and M at EPA and other federal facilities. EPA has also developed a Building Management Program to improve and standardize facility O&M best practices at all EPA-owned facilities.

Congressional Leadership

Congress and the Executive Branch played a significant role in promoting the design and use of green buildings through the passage of several significant pieces of legislation and executive orders including the Energy Policy Act of 2005, the Energy Independence Act of 2007, and EO 13423 and EO 13514. Taken collectively, these provisions have set challenging energy and water reduction goals for federal facilities and resulted in significant energy reductions. They have made and will continue to make a meaningful impact in helping EPA and other agencies reduce their environmental footprints.

Collaboration throughout the Federal Government

EPA has had a very positive experience working with other federal agencies to develop and transform our office and laboratory space into green facilities.

EPA's partnership with other federal agencies stretches back more than a decade. It includes participation in a number of collaborative efforts such as the Interagency Energy Task Force and the Interagency Sustainability Working Group, coordinated by the Department of Energy (DOE) and GSA; our work with GSA mentioned at the beginning of my testimony; engagement with the Office of the Federal Environmental Executive; and many other forums. EPA has also collaborated with DOT, HUD, and others to develop recommendations under the EO for green locations for Federal buildings so that agency actions are aligned with the Livability Principles.

The Interagency Sustainability Working Group (ISWG), coordinated by the DOE's Federal Energy Management Program and GSA, have provided a critical service in assembling and sharing information about the best practices found in federal green buildings. The education and technical assistance that we have received from the ISWG has been very helpful.

GSA's Office of Federal High Performance Green Buildings and GSA's Public Building Service are a testing ground for new technologies and design approaches for green buildings. In addition, we have relied on research from the

National Institute for Standards and Technology in helping us make green building technology decisions.

Several tools that EPA developed include the Portfolio Manager and Target Finder, two on-line energy management tracking and assessment tools. Portfolio Manager is being used by 15 billion SF of commercial building market (20% of the market) to track energy and water usage, assess the performance of buildings, set goals and make reductions across building portfolios. http://www.energystar.gov/ia/business/downloads/ENERGY_STAR_Snapshot_Spring_2010.pdf Recently, as part of a joint effort between EPA, DOE and GSA, EPA expanded Portfolio Manager to include the Federal Sustainability Checklist, allowing federal agencies to track and report their progress on the sustainability goals required as part of Executive Order 13514. EPA's ENERGY STAR Program is also providing training to federal agencies as part of this collaboration.

Additionally, EPA has worked with the Department of Transportation and the Department of Housing and Urban Development on a Partnership for Sustainable Communities (PSC). Formed in June 2009, this collaborative effort was designed to help improve access to affordable housing, identify more transportation options, and lower transportation costs while protecting the

environment in communities nationwide. Through a set of guiding livability principles and a partnership agreement that guides the agencies' efforts, the PSC is coordinating federal housing, transportation, and other infrastructure investments to protect the environment, promote equitable development, and help address the challenges of climate change.

The PSC is also working with GSA to educate federal and local officials and private real estate interests on ways to ensure that their location policies and practices follow agency-recommended location criteria. Along with the PSC, EPA is helping to develop tools and guidance to assist federal agencies to implement these criteria and to incorporate them into the Federal Management Regulations.

Taken collectively, we have been encouraged and pleased with our work with other federal agencies to advance green building throughout the federal government, and specifically, within EPA's offices and laboratories.

EPA's Role in Promoting Green Buildings

The Agency has known for a long time that buildings and development, in addition to using a major share of the nation's resources, have a significant impact on the environment and human health.

Some of EPA's greatest success in promoting green buildings and green technologies can be found in our numerous, voluntary partnership and product labeling programs including ENERGY STAR, WaterSense, Climate Leaders, Environmental Preferable Purchasing, Construction and Demolition Materials Recycling and Reuse and Resource Conservation Challenge, just to name a few.

Setting energy targets during the design phase of new building development, and tracking energy on a continuous basis to guide investment in efficient technologies and practices, leads to significant improvements in energy performance. The ENERGY STAR program, which provides government agencies and private organizations with ENERGY STAR Guidelines for Energy Management has resulted in average greenhouse gas emission reductions and energy savings in the range of 35% per building. http://www.energystar.gov/ia/business/downloads/Decade_of_Energy_Star.pdf

Another area in which EPA has taken a leading role in helping other agencies improve their green building performance was through our development of stormwater guidance released in December 2009. This guidance provides information about green building technologies that include permeable pavement

and roofing options to control the potential environmental impact on our nation's waterways associated with water runoff.

The private sector has made great strides in advancing green building through programs such as LEED Certification. We have also seen how the concept of "green building," is growing exponentially in the marketplace. These advances, however, can create problems when buildings advertised as "green" perform below claims or expectations. Key stakeholders and members of the public frequently ask EPA to serve as a neutral arbiter of green building standards, labels and claims. To address these issues, EPA works both in partnership with other federal agencies and with the marketplace to ensure that green building systems lead to the most environmentally protective results possible for air, land, water quality and human health – across the life of a building.

In addition, EPA works with voluntary standards organizations, such as the American Society for Testing and Materials International, the U.S. Green Building Council, the National Association of Home Builders, the International Code Council, and Underwriters Laboratory-Environment to strengthen their green building standards. The Agency also supports critical research in building

products and supporting small business innovations for green building technologies.

EPA has also collaborated with other government agencies to develop and disseminate tools such as the Whole Building Design Guide and the Federal Green Construction Guide for Specifiers. Educational tools are also available to the public through resources like our new Green Building and Green Homes websites.

Green Buildings are Good for the Environment

EPA's mission is to protect human health and the environment. EPA's green building practices have reduced the consumption of energy, water and materials in our facilities. Looking at our most recent performance data and using 2003 as the baseline year, energy use is down 18.1%, water use is down 10.8% and we are recycling 70% of our construction waste. By continuing to adopt green building practices, the federal government reduces energy and water consumption and the volume of agency generated waste. These practices also increase the use of both materials with recycled content and environmentally preferable products. All of these steps maximize economic and environmental performance by reducing the federal government's overall environmental foot print, and demonstrate a commitment to sustainability.

Conclusion

To address and reduce the environmental and health impacts of buildings, EPA has worked across the federal government to facilitate the mainstream adoption of effective green building practices, through better standards, targeted research and strategic technical assistance. Our green building activities are helping to ensure that local governments, architects, planners, facility managers, builders, remodelers, homeowners, and others can make more environmentally sound decisions when it comes to locating, designing, constructing, operating, renovating and reusing buildings.

EPA strongly endorses the many benefits associated with green buildings and looks forward to continuing our work with this Subcommittee, our partners throughout other federal agencies, and the public to ensure an economically and environmentally healthier country for all Americans.

Thank you again for inviting me to testify here today, and I look forward to answering your questions.

BIO for Dennis J. Bushta, US EPA

Dennis is currently the Deputy Director for the Office of Administration at US EPA.

Profile: A successful and highly experienced manager with unique and diverse expertise and experience in the public and private sectors as well as academia. During his career, Dennis has successfully met the evolving challenges of technology, environment and the workplace. This has included numerous and increasing responsibilities with Consolidation Coal Company ranging from Safety Coordinator to Assistant to the Vice President of Washington Operations; Director of Industrial Relations/Newmont Gold Company for Newmont Minerals Corporation; adjunct faculty member of West Virginia University; and multiple senior level responsibilities at the Environmental Protection Agency including Director of Safety, Health and Environmental Management Division, Acting Director of Facilities Management Services Division and Deputy Director for the Office of Administration.

EDUCATION:

Johns Hopkins University, Post Graduate Studies	1991 - 1995
West Virginia University, Master of Science, Safety Studies	1974 - 1976
United States Navy, Naval Aviation Officers Candidate School, Commission	1971
West Virginia University, Bachelor of Arts, Communications	1970

EXPERIENCE:

- ***U. S. EPA*** – Deputy Director of the Office of Administration
- ***U. S. EPA*** – Director – Safety, Health and Environmental Management Division
- ***Newmont Minerals Corporation*** - Director of Industrial Relations for Newmont Gold Company with responsibility for safety, health, environmental affairs, human resources, security, compliance, benefits administration, worker's compensation, labor relations, community services and government relations
- ***Consolidation Coal Company*** - Multiple responsibilities including Safety Coordinator, Supervisor of Employee and Industrial Relations, Certified Mine Foreman and Assistant to VP - Washington Operations.
- ***West Virginia University*** - Adjunct faculty for the graduate school in Safety Studies, College of Engineering and Mineral Resources. Developed curriculum and taught numerous courses applicable to the graduate program.

Ms. WATSON. Thank you so much.

I would first like to make the statement, and I am sure that all of our Members would concur, that we are struck by the fact that the Federal Government is the Nation's largest consumer and greenhouse gas emitter. And I am particularly struck by the fact that our Nation's buildings account for 40 percent of our primary energy use.

Obviously, the Federal Government can and must play a leading role in providing guidance on how the buildings must be constructed in the future to maximize the goals of energy efficiency and environmental sustainability, and I appreciate the testimony.

I think that you have addressed a lot of the initial areas of concern that I have. I will call on other Members in just a second, but I would like to start with Mr. Kampschroer and say, is the GSA committed to eventually making all of its buildings LEED certified? And, if so, how long will this take? And at what cost to government?

Mr. KAMPSCHROER. Today, we require every major renovation and new construction project and major lease construction project to achieve a LEED gold rating. That is the new buildings.

Ms. WATSON. So most of it is prospective.

Mr. KAMPSCHROER. Correct. And the existing buildings are a large component of Executive Order 13514 as well as some previous Executive orders. The current goal is to have a minimum of 15 percent of our inventory certified by 2015. We are actually looking at accelerating that. We will not have the schedule for acceleration probably for several months yet, but we believe that we can do more in the short run with existing buildings, especially based on the work that we are doing with the Environmental Protection Agency to use the Energy Star portfolio manager as a screening. So what we will be doing is looking at how many of the buildings today are capable—but we just don't happen to know it—of achieving such a rating.

We currently are on track to meet that 15 percent goal. We do not expect that the cost of achieving those ratings will be an incremental change to our budget request because we have seen that, as we move these buildings to greater energy performance, that those kinds of improvements that we make to achieve the ratings actually pay for themselves in relatively short order.

In yesterday's meeting that was hosted by the White House on related topics of high performance green buildings, Ken Hubbard from the Hines Corp. stated that his company, when they take over a new building from another owner, can typically reduce the energy consumption by 20 percent solely through the imposition of better management practices and better measurement metrics combined with their preexisting high quality labor force. So we are hoping to emulate some of those practices in our existing buildings and accelerate that. And I would ask that, as we get that plan closer, that we could submit it to you.

Ms. WATSON. Great.

Ms. Hogan, would you like to comment?

Ms. HOGAN. We at the Department of Energy are also looking to see what we can do with our existing buildings. As you just heard, there are important requirements for the new buildings which we

are of course on target to meet. So a big part of the question is how you address the existing building stock.

What we are doing somewhat similarly to GSA is undertaking sort of an information collection effort to really better understand the state of these buildings, figure out what we can do, and implementing a number of initiatives to see how we can improve them, you know, quickly and in a way that will get the savings that is there to be gotten, as well as to train the people that are out there that need to be trained to maintain that continued improvement. So really investing in the infrastructure so we can get these low-cost savings.

Ms. WATSON. And Mr. Bushta, would you like to comment?

Mr. BUSHTA. Yes. Thank you.

EPA's real Federal property inventory primarily consists of laboratories, which tend to be a bit more energy intensive, environmentally intensive, and a bit more complex. And because of that inventory, we are able to, or we have applied a number of different approaches, first starting with commissioning and recommissioning of the mechanical systems, updating technologies, and making some renovations.

And on the new construction and major construction, we believe we are in line with meeting those requirements. In some of our older structures, we are currently working on upgrading those and plan to hit those targets in a timely fashion.

Ms. WATSON. Thank you.

I would like now to yield to the ranking member, Mr. Bilbray.

Mr. BILBRAY. Thank you very much, Madam Chair.

And Madam Chair, I know I was pointing out some of the things that we are not doing. We talk a lot about what we are not doing.

I would like to point out an example that today there is 155 applications for siting renewable energy facilities on Bureau of Land Management property in California alone, 155. Been there for years. Not one permit has been issued. It is easier to say no than it is to try to move forward because there is risk.

I would like to sort of back up and start where it all starts, and that is when energy enters our Federal facilities. Where is the electricity coming from that is lighting these light bulbs?

Mr. KAMPSCHROER. It is coming from the PJM grid with a series of different production facilities contracted for by PEPCO, generally speaking.

Mr. BILBRAY. And what are their major energy sources?

Mr. KAMPSCHROER. PEPCO I believe has a portfolio that is predominantly coal-fired plants but with some renewable energy mixed in there. We can certainly look up that information as it is recorded in the Energy Information Agency of the Department of Energy.

Mr. BILBRAY. Well, let me tell you, as a Californian, when I came here, I was appalled to see the coal plants here. In California, you go to prison for burning coal. OK?

And for the Federal Government to be so punitive at those of us in California while we struggle to clean up our environment, then to come here and see what appears to be a total lack of standards really concerned me about we, ourselves, at the Federal Government.

Now I know one thing about energy, the ability to wheel. Are you here today saying that this is the cleanest portfolio that we can legally purchase, that we are forced in the Capitol of the United States, to have to buy dirty coal energy to generate our light bulbs? Have you had anybody look at the possibility of wheeling and specifically purchasing zero-emission electricity?

Mr. KAMPSCHROER. Today, GSA purchases zero emission electricity at about 10 percent of its total electricity purchases across the board, and we have committed to reach 30 percent within—by year 2020.

Mr. BILBRAY. Why 10 percent? Why don't we tell—basically say, look, we are in the market, we will go buy zero emission electricity and wheel it into the region? Why—because are we worried about the price of buying clean energy? Is that the problem? I only say this because I know in California, and I think that Madam Chair will know that, consumers have the ability to go shop, purchase clean technology, even if it is paid at a premium. But that is a consumer decision that individuals make. We are not allowed to make that? We can't make that as the Federal Government sitting in the Capitol of the United States?

Mr. KAMPSCHROER. I am not aware of any law that would prevent us from making that decision. I am certain that there would be a cost impact of that decision.

Mr. BILBRAY. I wonder if the cost impact would be as much as $90,000 or whatever. Frankly, we see the history that we try to make this effort of playing the offset game, trying to play, you know, do a smoke-and-mirror game rather than saying specifically, we want to buy it from these locations, and we will not buy—the Federal Government will not buy coal, unless—basically anything that has that emissions, especially when the fact that we have facilities that are zero-emission generators. And I would like to open that up for a conversation.

Think about what we are doing here. We ought to do conservation. It is not just environmentally responsible; it is economically responsible.

But if you have the ability to make sure that you have zero greenhouse emissions caused by your electricity use, when do we stand up and say, we are willing to do the right thing and set an example for the rest of the country? I guess the argument is, how do I face off with the people in Ohio and tell them they have to do without if those of us in Washington, DC, won't do without?

Go for it, EPA.

Ms. HOGAN. I think you are asking some very important questions. I think what the Federal Government is doing is getting organized to make important progress in all of the areas that you are mentioning. And I think what is important when you think about renewable energy, when you think about greenhouse gas emissions is you put together a strategy from how to get from where you are today to where you need to get tomorrow.

Mr. BILBRAY. Where are we today? What is the total emissions of the electricity that we are using on Capitol Hill today? What is the total emissions annually of the electricity we are using today on this Hill?

Ms. HOGAN. We can get you the numbers of what the greenhouse gas inventory is for the Federal Government. That is what the agencies are working to put together as a result of Executive order that we have been talking about. As part of that Executive order, each agency has been asked to put together an aggressive greenhouse gas reduction target and then put together a strategy for how to meet that target.

For the Department of Energy, we have put together a goal of reducing our greenhouse gas emissions by 28 percent by the year 2020. And to do that, we will be investing more in renewable energy. We will be doing more with energy efficiency, and we will be addressing our fleet issues, and we will be doing it across that full portfolio in as cost-effective a means as possible.

Mr. BILBRAY. Thank you, Madam Chair.

And, Madam Chair, I will just say, I grew up working on pollution problems, and the one thing I realize it is a lot easier not to dump the sewage into the environment than it is to try to clean it up later. So I would like us to go be proactive and eliminate the emissions rather than mitigate them. Thank you.

Ms. WATSON. I think that you are addressing one of the missions of this subcommittee. And obviously, we are going to be holding more hearings, looking at the reports that we get from your various agencies.

It is important that we have this discussion, and we definitely will allow time to continue this discussion until we hit on something.

I can concur with our distinguished ranking member. I also am from California. I worked in Sacramento, and I remember flying down into this gunky kind of airspace.

Do you remember that?

And so I remind, Former Governor Jerry Brown that he talked about the environment before most people could spell it. That was in the 1970's. And so we took it on. And now I happily fly into my city of Los Angeles, and I can see the water. But I tell you, it was really bad. So we are going to continue.

Mr. BILBRAY. For the record, L.A. basin has twice as many people and twice as clean air.

Ms. WATSON. We have worked on it over the years.

I will now yield to Mr. Quigley.

Mr. QUIGLEY. Thank you, Madam Chairman. I appreciate this meeting and the panelists.

My thoughts and questions are a variation of what the ranking member is talking about in the building that is far from green, to talk about these issues, and parked in front of this meeting and every committee meeting we have in this building, and the Energy Committee meets in this building as well, are SUVs the size of Detroit. I don't know why people in this town feel the need that the only way they can get around is in a vehicle that large, with a perfectly good subway system. Several of us ride bikes.

But I think the point the ranking member was getting to is it is up to us. And I am there as the sponsor of a LEED-certified building ordinance which passed in Cook County, the third largest in the country. We actually have new courthouses that are being built that are LEED certified. It is up to us.

What we learned there was we were creating markets. Government is such a large purchaser, not just the Federal, but State and local. We can change things. Which gets to the point the ranking member is, we have to look beyond the point we are trying to do here.

The variation of that I would like you to comment on, if you would, is the standards you are talking about. When we started, we were just happy to pass a bill. We thought any standards are fine. Now we have heard of concerns perhaps beyond that with Energy Star standards as it relates to the consumer level at least, but also occasionally with LEED.

Who is deciding where we can go? As technology changes, as our needs change, as the needs change to do this, you know, is LEED where we need to be? Are there others that we are looking at? Are we pushing the envelope in other manners?

Mr. KAMPSCHRODER. Thank you for that question. At the moment, I think LEED is the—I know LEED is the best rating system that is in the market in the United States today. We did a study in 2006 with Pacific Northwest National Laboratories to ascertain that. The Energy Independence and Security Act asks us to repeat that study once every 5 years, and we will be commencing the follow on study next year.

It is not, on the other hand, a standard. The most recent standard which GSA and the Department of Energy and EPA have all been working on, together with a variety of other public-State-private entities, is the ASHRAE Standard 189.1 for sustainable buildings. It is a comprehensive standard language, standard for green buildings. And it, for example, the law currently requires us to be 30 percent better than the ASHRAE Energy Code, and this particular green building standard achieves that within the code standard language.

If I were predicting, I would say that the decision we make 5 years from now may be different. I would expect the standards to increase. I know that the Energy Code itself and the ASHRAE Committee is getting more stringent as technology and adoption of that technology has gotten greater throughout the industry, and I would expect the subsequent revisions of the Energy Code to become much, much closer to what the government is trying to do today.

Mr. BUSHTA. I would agree with GSA. However, I think there are a number of folks that feel that while LEED provides a good application, there is a considerable variability in the LEED approach, which as one is using as the point system, that two buildings that may receive the same LEED rating may have a considerable variability, for example, in energy consumption, so the focus on specific applications may not be the same. So there is a considerable interest, and EPA would support that in raising the bar on some of those applications. I think that is going to happen over time. We would agree that LEED is a very usable across-the-board application at this time and one that we should focus on.

Ms. HOGAN. And I think these are the types of discussions that the agencies do engage in as part of their interagency working groups, and as a result of some of these discussions, what you will see reflected in the notice of proposed rulemaking that the Depart-

ment of Energy has out on sustainability principles is sort of a framework for how to approach green rating programs.

What you will see in that notice of proposed rulemaking is that we are not selecting one green building rating system. We are putting forth a set of criteria that we think a green building system ought to meet to be a green building certification system the Federal Government would use.

So what you want are performance-based metrics, so that you can sort of measure and strive for high performance. You also want there to be a strong verification system so that when you get a certification for the building's design, that down the road you go back and check to make sure the building was designed to meet those levels and sort of maintains that level of performance.

But we have taken that path. That notice of proposed rulemaking is currently out for public comment, and we are holding a public meeting I believe next week, and we will be happy to come back and share what the outcome of that process is.

Mr. QUIGLEY. Thank you.

Ms. WATSON. We will now go to Mr. Connolly.

Mr. CONNOLLY. Thank you, Madam Chairwoman.

Let me begin first of all by saying I concur with our friend from San Diego, the ranking member, on the need to shift the Federal energy supply from coal to renewable sources. That is why I and so many others in this Congress supported the energy legislation we passed in the House last year which creates alternative and new and renewable energy markets. Frankly, without that kind of legislative framework, we will be stuck where we are today. So it is a laudable goal, but we all got to be willing to do the tough lifting to make sure that we can reach that goal.

Let me ask Mr. Kampschroder, does GSA have different standards, parking standards, for Federal facilities, transit versus non-transit?

Mr. KAMPSCHRODER. We do not today. However, the Executive order has asked us to work with other Federal agencies to develop different policies than exist today that are around transit-oriented development in siting of Federal locations. The initial recommendations of the working group have now been made public, and the next step is to make them actual.

So today our parking policies are fairly uniform without regard to the existence of transportation. However, our procurements take the location next to leases and new buildings, requiring where they exist, that we locate those facilities near public transit, whether it is bus or subject wail or the like.

Mr. CONNOLLY. If the chair does not object, I would ask that the subcommittee formally request the GSA respond back to us within the next month on what steps it is taking formally to change that policy, because it makes no sense whatsoever to have one uniform standard of parking when you may have a building in the middle of a wheat field in Kansas versus a building in a very congested urban area next to a transit station. Furthermore, frankly, it pits the Federal Government, not intentionally, against the intentions of the localities.

My locality, for example, we have moved Heaven and Earth to get rail to Dulles. We want to redevelop the Dulles Corridor as a

transit-oriented development corridor. That means we want to change parking requirements on normal office buildings, so that we are encouraging people to get out of the single occupancy vehicles and to use alternative methods of transportation, transit, to wit.

We need the Federal Government as a partner if it has facilities in that corridor, not as something that stands alone and has its own uniform policies irrespective of those changes.

So if it helps a little bit as a prod, Madam Chairwoman, I would make that request and urge you to on our behalf make that request.

Ms. WATSON. Without objection, that will be the order.

Mr. CONNOLLY. I thank the chairwoman so much.

What about transportation demand management plans, TDMs? Does the GSA have such programs for its Federal facilities? And, again, does it differentiate between congested urban and suburban and other?

Mr. KAMPSCHRODER. Our experience with those is principally in the Washington, DC, area, where we have used for them. For example, we did a rather extensive transit study at the commencement of the development of the White Oak campus in suburban Maryland to make sure that we did not overburden the existing road system.

We have provided a lot of—in that context we have provided encouragement to people through transit subsidies. For example, GSA today provides transit subsidies for nearly half of its employees around the country, a lot of those in Washington, DC. There are a number of programs that are very community-specific to not just GSA employees but all Federal employees in finding and using ride sharing and other methods of reducing the transportation impact of the facilities.

The Executive order also directs us to go further than we have in the past in ensuring that in all of our planning, that we not only consult with, but plan together with local planning entities. So the States and the counties and the localities with planning goals and zoning rules, and so on, are reemphasized in this Executive order, that it is an important part of what we should be doing as good citizens of the neighborhoods within which we live.

Mr. CONNOLLY. You know, our colleague from San Diego began by saying he was cynical about the gap between goals and reality, and one can understand. But I guess I see the glass as half full, not half empty. I think the Federal Government has an incredible opportunity here to actually go from being what it is today, or has been in the past, to actually being the cutting edge model.

Let me just say, nothing can be more exciting to me than actually see us, the Federal Government, leading the way in green certification, in predevelopment hydrology standards, in saving $6 billion a year in energy costs. If we are committed to the goal of energy independence, we have to take the lead.

So I applaud what you are doing and I hope you will be seized with this mission, because here is an opportunity really for us to strike a blow for energy independence and for the environment at the same time.

Thank you, Madam Chairwoman.

Ms. WATSON. Thank you very much.

I would like to thank this panel for your information provided to us. Know that we will expect to hear from you as mentioned to you. I would like to say to all of you, we appreciate the testimony you have raised. You have raised issues that will guide this subcommittee in the very near future. As I said, we will have several hearings. We are just beginning this debate.

So I will now adjourn the first panel and ask for Panel II. Thank you. You may take your seats.

I would now like to take a moment to introduce our second panel of distinguished members. First, Mr. Henry Green is the president of the National Institute of Building Sciences. Prior to this appointment, Mr. Green served as executive director of the Bureau of Construction Code in the Michigan Department of Labor for more than 19 years. He was a founding member of the International Code Council Board of Directors where he served as president.

Ms. Helen Vaughan is the policy director for high performance green buildings in the Environmental and Energy Study Institute, where she leads the High Performance Green Building Initiative. She has authored or coauthored several articles, including Beyond Green: High Performance Buildings, which was part of the fall 2009 edition of the MIT press journal called Innovations.

Ms. Lynn Bellenger is president of the American Society of Heating, Refrigeration, and Air-Conditioning Engineers. Ms. Bellenger is a partner with Pathfinders Engineers and Architects, LLP, in Rochester, NY, and is ASHRAE's first female president in the society's 116 year history.

Mr. Bertrand is vice president of Delphi, where he also serves as president of Delphi's Automotive Holdings Group and Delphi Thermal Systems.

Thank you so much for being here this morning. As you know, it is required of us to ask you to stand and to take the oath.

[Witnesses sworn.]

Ms. WATSON. Let the record reflect that the witnesses answered in the affirmative.

I would like now to proceed first to Mr. Henry Green for your testimony.

STATEMENTS OF HENRY GREEN, PRESIDENT, NATIONAL INSTITUTE OF BUILDING SCIENCES; ELLEN VAUGHAN, POLICY DIRECTOR, HIGH PERFORMANCE GREEN BUILDINGS, ENVIRONMENTAL AND ENERGY STUDY INSTITUTE; LYNN BELLENGER, PRESIDENT, AMERICAN SOCIETY FOR HEATING, REFRIGERATION, AND AIR-CONDITIONING ENGINEERS [ASHRAE]; AND JAMES BERTRAND, VICE PRESIDENT, DELPHI, PRESIDENT, DELPHI AUTOMOTIVE HOLDINGS GROUP AND DELPHI THERMAL SYSTEMS

STATEMENT OF HENRY GREEN

Mr. GREEN. Thank you, Chairwoman Watson and Ranking Member Bilbray, and members of this committee, for this opportunity to speak to you on high performance green buildings within the Federal Government.

Congress established the National Institute of Building Sciences in 1974 as an authoritative national source to make findings and to advise the public——

Ms. WATSON. Excuse me, would you check your mic, please.

Mr. GREEN. There we go. I apologize. Someone left the sign that says it is on. OK.

Starting over I guess, thank you very much this morning for allowing me to come in and testify on the state of high performance in green buildings in the Federal sector.

Congress established the National Institute of Building Sciences in 1974 as an authoritative national source to make findings and to advise the public and private sector on the use of building sciences and technology. The Institute's enabling legislation calls upon Federal agencies to work with the Institute when appropriate. Through this engagement with public and private sectors, the Institute provides an unbiased focus on building science.

The Energy Policy Act of 2005 called for the establishment of a high performance building council within the Institute to look at the diversity of codes and standards and to determine the need for implementation of high performance buildings. The Council, with 70-plus private sector organizations, public agencies, produced a report in 2008 based on the eight attributes of a high performance building. These are sustainability, cost effectiveness, accessibility, productivity, historic preservation, aesthetics, functionality, and safety and security. These attributes reflects the definition of high performance building and high performance green building within the Energy Independence and Security Act of 2007. The definition also includes sustainability, or green, as one of the aspects of high performance buildings.

Federal agencies also have requirements that relate to high performance buildings and attributes beyond energy, water, and sustainability. A sampling of such laws and Executive orders includes the Americans With Disabilities Act, the National Historic Preservation Act, Public Buildings Act, National Environmental Policy Act, Executive Orders 13006, historic properties, 12977, security standards, and 12941 and 12699 on seismic safety.

With numerous requirements impacting how Federal buildings are designed, constructed and maintained, achieving high performance is challenging, particularly given the complex interactions among these and other requirements.

As the High Performance Council reported, common metrics are needed to provide consistent comparable measurements for the individual attributes and to understand and address the interactions across attributes. No single organization or profession has the knowledge or expertise to fully integrate the attributes into a clear path to high performance. But the High Performance Building Council with its broad-based membership can facilitate the coordination and cooperation needed to achieve delivery of high performance buildings. However, since the completion of the initial report, resources have not been available to continue this effort.

Once the metrics are identified and performance levels to reach high performance must be agreed upon, the underlying standards as well as research and development in both the societal and building sciences must be supported.

Agencies have significant resident expertise on the individual aspects of high performance, but there is no single focal point for integration. The lack of integration should not be attributed to the agencies themselves, but to the fundamentals of the agency structure. Agencies generally focus on their key missions.

Achieving high performance will require an integrated design, construction and operation process that engages key professionals early on and throughout design and construction. The current budget process with separate capital and operational budgets is not conducive to this approach.

The procurement process also tends to hamper collaboration. Most contractors and subcontractors are engaged after the initial building design is completed, so components and systems addressing high performance attributes have been selected without their input and expertise.

Some agencies have identified best practices and technologies and contribute to achieving high performance. These should also be shared and expanded. The whole building design guide, supported by 11 Federal agencies, can serve as a repository for such case studies and validations.

Several concepts will assist in achieving Federal high performance buildings; education and training of Federal personnel engaged in the procurement, design, construction and operation of Federal buildings; building information modeling to facilitate a holistic approach to building design, construction and operation, and indeed construction through the building's life cycle; total building commissioning upon completion of the building, retro-commissioning and periodic recommissioning; utilization of integrated processes resulting in holistic and efficient approaches to meeting the numerous requirements placed on Federal buildings.

The Department of Homeland Security's high performance based design project within the Science and Technology Infrastructure and Geophysical Division illustrates how the range of attributes can be used in developing high performance buildings. This project integrates blast protection, chemical, biological and radiological protection, along with energy, sustainability, durability, air and water protection, and other major building requirements.

With an integrated approach, high performance buildings can be achieved. The structure to achieve this goal is partially in place, but there needs to be a sustained effort to bring about the collaboration and consistency essential to bring high performance Federal buildings to fruition.

Thank you very much for this opportunity, and I look forward to your questions.

[The prepared statement of Mr. Green follows:]

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TESTIMONY OF

HENRY L. GREEN, HON. AIA

PRESIDENT, NATIONAL INSITUTE OF BUILDING SCIENCES

BEFORE THE

U.S. HOUSE OF REPRESENTATIVES

COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

SUBCOMMITTEE ON GOVERNMENT MANAGEMENT, ORGANIZATION, AND PROCUREMENT

JULY 21, 2010

Chairwoman Watson, Ranking Member Bilbray, and members of the Subcommittee, thank you for the opportunity to speak with you today regarding the state of high-performance and green buildings within the federal government.

The National Institute of Building Sciences (Institute) was established by Congress in 1974 upon recognition of a lack of an authoritative national source to make findings and to advise both the public and private sectors on the use of building sciences and technology to achieve recognized goals (12 USC 1701j-2).

In achieving its mission to support advances in building science and technology to improve the built environment, the Institute has the opportunity to work with federal agencies on their real property programs and within agency mission programs—in fact, agencies are encouraged to work with the Institute when appropriate. Through its engagement with both the public and private sector, and its unbiased focus on building science, the Institute is in the ideal position to evaluate the current state of high-performance buildings and the needs for widespread adoption.

In recognition of the unique position of the Institute, the Energy Policy Act of 2005 (EPAct) called for the establishment of a High-Performance Building Council within the Institute tasked to look at the diversity of codes and standards for buildings and determine the needs necessary for implementation of high-performance buildings. The Council produced its report in 2008 with the participation of representatives from over 70 private sector organizations and public agencies.

As its initial task, the Council identified the eight attributes that define a high-performance building. They are:

- Sustainability
- Cost Effectiveness
- Accessibility
- Productivity
- Historic Preservation
- Aesthetics
- Functionality
- Safety and Security

These attributes are reflected in the definitions of *High-Performance Building* and *High-Performance Green Building* as defined in the Energy Independence and Security Act of 2007 (EISA) which defines high performance as "the integration and optimization on a life cycle basis of all major high performance attributes, including energy conservation, environment, safety, security, durability, accessibility, cost-benefit, productivity, sustainability, functionality, and operational considerations."

As the Subcommittee will note, sustainability or "green" is just one aspect of a high-performance building. Federal agencies have numerous requirements related to these high-performance attributes beyond the energy, water and sustainability requirements in EPAct, EISA, and Executive Orders 13423 and 13514. Additionally, these requirements are likely to expand and change due to emerging issues impacting building occupancy and use including those tied to our aging population (e.g., addressing low vision) and to increased interest in technology and sustainability (e.g., flexibility for new technologies and new work environments). A sample of relevant laws and Executive Orders appear below:

- Americans with Disabilities Act
- National Historic Preservation Act
- Public Buildings Act
- National Environmental Policy Act
- E.O. 13006: Historic Properties
- E.O. 12977: Security Standards
- E.O. 12941/12699: Seismic Safety
- Presidential Memorandum on Disposing of Unneeded Federal Real-Estate (June 10, 2010)

With these numerous requirements impacting how federal buildings are designed, constructed, and maintained, achieving a high-performance building can be challenging. This is particularly difficult when we consider the complexities surrounding the interactions among such requirements. While the attributes of a high-performance building are well defined, the tools and criteria to demonstrate achievement of high-performance attributes are not.

As the High-Performance Building Council reported, common metrics are needed to measure and compare achievement of individual attributes and then to understand the interactions across attributes. How do you measure aesthetics and what impact do aesthetics have on accessibility? Further, what level of aesthetics, accessibility or the other attributes are necessary to consider a building high-performance?

Because of the numerous attributes required for high-performance, no one organization or profession alone has the knowledge or expertise to fully integrate the attributes into a clear path to high-

performance. Coordination and cooperation is necessary. The High-Performance Building Council, with the cooperation of the entire building community, serves this coordinating function, but has not had the resources to continue its work following completion of the report under EPAct.

In addition to the fundamental need for metrics and agreed upon performance levels, the underlying standards and research and development—in both the social sciences and building sciences—must be supported.

Federal agencies have additional challenges in meeting the various requirements placed on them. While there is significant resident expertise within agencies on individual aspects of high-performance, there is no single focal point for integrated expertise. For energy related regulation, agencies contact the Federal Energy Management Program (FEMP) within the Department of Energy. For historic preservation regulations, agencies contact the National Park Service. The interaction between these regulations is largely unknown.

This lack of integration cannot be attributed to the agencies themselves, but it reflects the underlying fundamentals of an agency structure—agencies are generally focused on their key mission areas, and resources are focused on areas with current interest by Congress, the President, and the American people. A concerted effort to look at buildings holistically is necessary. Such an effort should coordinate and evaluate how existing policies interact and how new policies can consider the impacts on all high-performance attributes.

Beyond difficulties with integrating existing and future requirements, additional challenges can hinder the achievement of federal high-performance buildings. As indicated above, achieving high-performance will require an integrated design, construction, and operation process that engages key professionals early on in the process and throughout the design and construction. The current budget process where capital and operations budgets are separate and savings in one account cannot be transferred to cover related expenses in the other is not conducive to an integrated and holistic approach to buildings.

The procurement process itself also tends to hamper collaboration—many contractors and sub-contractors are engaged once the initial design of the building is complete and many of the components and systems that address the high-performance attributes are already decided without their input and expertise. While a change in this process is likely to result in increased design costs, design goals can be achieved with greater efficiency and decreased need for changes once construction begins—thus, saving funds in the end.

Some agencies have identified best practices and technologies that contribute to achieving high-performance. These practices and technologies must be shared across federal agencies and with the private sector. Some agencies, including the Department of Defense, are testing and validating products and technologies. The results should be shared across agencies to make procurement officers aware of such results, and to assure consistency and avoid duplication. The Institute's Whole Building Design

Guide (www.wbdg.org), which is supported by 11 federal agencies, could serve as a repository for such case studies and validations.

Some agencies already are using the WBDG to share information across agencies. The "Sustainable Federal Buildings Database," a compilation of federal (and some state and local) agency policies and guidelines on energy efficient, sustainable government facilities, was recently posted by FEMP. The Environmental Protection Agency (EPA) provided an updated Federal Green Construction Guide and the U.S. Army Corp of Engineers (USACE) published the Energy and Water Conservation Design Guide. As FEMP, EPA, USACE and other agencies continue to contribute content to the WBDG, synthesis of the available information to arrive at a coherent set of best practices will be necessary to facilitate widespread utilization.

One Federal program attempting to integrate the range of attributes in buildings is the Department of Homeland Security's High Performance Based Design project within the Science & Technology's Infrastructure and Geophysical Division which is developing high performance requirements for blast resistance, CBR protection along with energy, environmental sustainability, durability, air and water protection and other major building requirements.

The Department of Veterans Affairs (VA) also is focusing its building activities on a more holistic and multi-faceted approach. Their guides and facility manuals are being updated to include integrated design and construction processes including Building Information Modeling (BIM) and commissioning. Secretary Shinseki has begun the VA facility management transformation initiative to address the lifecycle performance of facilities. Facility performance will be maximized through implementation of an enterprise facilities management operation for a new generation of high-performance, sustainable healthcare environments for the changing population of Veterans.

Education and training of all federal personnel engaged in the procurement, design, construction and operation of federal buildings will be critical to realizing the design intent of high-performance buildings. As buildings become increasingly complex to fulfill myriad requirements, a savvy operations and maintenance team is important to assure the buildings operate as intended. Building occupants also must be informed about how their actions impact the overall performance of the building. Procurement officers must have a broad knowledge of potential financing opportunities and available technologies.

Despite the numerous challenges federal agencies face in achieving high-performance buildings, several technologies and practices are currently available to support agency efforts. BIM is a valuable tool that can facilitate a holistic approach to building design, construction, operation, and deconstruction and lead to significant improvements in efficiency. While the General Services Administration is making use of BIM in the design and construction of its new buildings, the model should be expanded for use throughout the building's life-cycle. The Institute, through one of its councils, the buildingSMART alliance, is working on the underlying standards and criteria necessary to expand the applicability of BIM.

Upon completion of a building, total building commissioning is necessary to assure that the design intent is met when the government takes ownership. Ideally, the commissioning agent should be engaged throughout the design and construction process to identify potential issues early on. Existing buildings should undergo retro-commissioning to assure they are operating correctly. Periodic re-commissioning is essential to assure that buildings continue to perform at the desired levels.

Utilizing integrated design processes will result in a holistic approach to meeting the numerous requirements placed on federal buildings, but the acquisition process must be sufficiently flexible to allow shifts in when and how members of the design and construction team are selected and compensated.

Agencies must be encouraged to engage in the collaboration and coordination necessary to achieve high-performance (similar encouragement is needed in the private sector as well). As private sector organizations develop the standards and practices to achieve high-performance, the expertise of federal agencies will be an invaluable resource.

Through increased focus on a holistic approach to high-performance buildings, the federal government can have a significant positive impact on the building community. The availability of high-performing products and systems will grow as agencies stimulate demand. By establishing performance-based criteria for such products and systems, manufacturers will be able to tailor their products to meet expressed needs and they will be given a level of certainty as to how future needs will be expressed. Ultimately, through the federal government's leadership in specification of high-performance buildings, private sector experience and the demand for high-performance buildings will grow.

As the entity charged by Congress to provide an authoritative source for findings and advice to the public and private sector on the use of building science and technology to achieve national goals, the Institute is pleased to offer its expertise to the Subcommittee, Congress at-large and federal agencies.

Ms. WATSON. Thank you.
Ms. Vaughan.

STATEMENT OF ELLEN VAUGHAN

Ms. VAUGHAN. Good morning, and thank you, Chairwoman Watson, Ranking Member Bilbray, members of the subcommittee and staff, for this opportunity to present our views on Federal green building progress and practices.

I have a written statement for the record that I would like to summarize in the slides that I hope you can see. My name is Ellen Vaughan, and I lead the Buildings Initiative at the Environmental and Energy Study Institute. It is a nonprofit policy education group here in Washington.

High performance green buildings are an essential part of EESI's mission to advance sustainable solutions to climate change and other critical issues.

Slide two shows what we mean by a high performance building. It is energy efficient at its core. It is green. It is energy efficient, green, and maybe at the VA hospital that must deliver high performance in accessibility for disabled vets, lots of natural light and good indoor air quality to promote healing and well-being, and maybe it is in an historic building that must be preserved.

Henry mentioned seismic standards. Certainly a green building destroyed by an earthquake is not sustainable.

So all these things are achievable, but it requires a holistic approach to planning, designing, and retrofitting. If these goals were considered separately as an afterthought, or not at all, they would not likely be achieved.

Slide three shows the evolution of the legal framework and resources for creating energy efficient green high performance buildings in the public and private sectors. We are grateful to this committee for your leadership in putting the definition of high performance buildings in the 2007 energy bill. This lays the foundation for the important work ahead in achieving high performance buildings.

Slide four discusses the shades of green again in that Federal agencies have been leading in every shade of green for years, and they can't continue to break the mold. A GSA border station for port of entry, for example, can it provide superior indoor air quality despite the exhaust from idling vehicles; can it provide lots of view glass; can it be energy efficient; can it protect against security threats, and come in on budget? Yes. GSA has accomplished this by setting these and other performance goals at the beginning and throughout the project with each member of the team.

In slide five, this shows further evolution in Federal building performance, and this requires governmentwide performance targets and standards, consistent guidance, holistic planning, life cycle budgeting, a nonlinear integrated approach to design, and simple design tools. New capabilities for training with 3-D virtual buildings make this possible like never before.

Slide six, Congress has shown leadership by requiring performance targets such as reduced energy consumption and the statutory authority for high performance buildings. Congress can further enable Federal buildings to lead by example by funding training,

standards development, R&D, testing, demonstration and information dissemination that is focused on high performance.

Finally, in slide seven, Federal agencies can rise to the challenge with the right resources. They already are making amazing progress in spite of stacks of requirements and FEMP's elimination of whole building training courses. We question who the ombudsman is or the coordinator for high performance. Is it FEMP or is it GSA?

DOE's proposed rulemaking on sustainable design is a great thing to see. It folds in the Executive order and the MOU on sustainable building principles. So why doesn't it address fossil fuel reduction requirements at the same time? They are connected. Renewable energy supply needs must be determined. Federal procurement will help drive the market for renewable energy production in this country.

International high performance building standards such as German Passive House and Swiss Menergy should be studied and utilized. Federal procurement of high performance green materials, innovative technologies, and best practices and design services will stimulate the market for better buildings nationwide.

What green building pioneers have started, Federal agencies can propel toward a revolution in the building industry like we have seen in electronics and communications.

Thank you, and I am happy to answer any questions.

[The prepared statement of Ms. Vaughan follows:]

Testimony of Ellen Larson Vaughan
Policy Director, Environmental and Energy Study Institute

before the U.S. House Committee on Oversight and Government Reform,
Subcommittee on Government Management, Organization, and Procurement

July 21, 2010

Good morning. I am Ellen Vaughan, Policy Director for the Environmental and Energy Study Institute (EESI) in Washington, DC. I would like to thank Chairwoman Watson, Ranking Member Bilbray, and members of the Subcommittee for the opportunity to present our views on the state of high performance green buildings within the federal government.

EESI is a nonprofit policy-education organization dedicated to developing innovative solutions to climate change and other critical energy and environmental challenges. We bring sound science and technology information to policymakers through briefings, publications and other activities. Founded by members of a bi-partisan Congressional study conference, EESI has been an independent organization since 1984 and is funded primarily through foundation grants and charitable contributions.

I lead EESI's High Performance/Green Building Initiative, which helps to educate policymakers and stakeholders about the enormous impact of building construction and operation on our environment, economy, and quality of life. Accounting for more than 40 percent of our energy consumption and greenhouse gas emissions, the building sector can either be our worst enemy or our best ally in the battle for a sustainable future. We bring together building science expertise, policy development, and stakeholder outreach in a way that allows decision makers—whether policymakers, building owners or mayors—to articulate what they want their buildings to achieve. We are developing connections among a variety of stakeholders, including building scientists, policymakers, advocates for energy efficiency and renewable energy, industry practitioners, affordable

housing advocates, and others to increase their understanding of high performance building principles and benefits.

Lead by Example

The federal government owns and operates nearly 500,000 facilities and can establish its own performance goals, above and beyond what Congress has already required. With about 3 billion square feet of floor space, federal buildings have a substantial environmental footprint, consuming 1.6 percent of the nation's total energy use at an annual cost of $24.5 billion, according to the Federal Energy Management Program (FEMP). How these buildings are constructed, renovated, and operated also has considerable impact on the environment, on the health and safety of building occupants, on access by disabled individuals, and on the ability of the federal workforce to function at a high level. Fortunately, we are rapidly attaining the ability to balance all of these building attributes in an optimal way. The federal government has the authority and opportunity to set high-performance goals and requirements for its own portfolio of buildings, the responsibility to demonstrate and disseminate best practices and cost effectiveness, and the ability to stimulate a market for high performance buildings through its procurement specifications. There is no single technology, rating system, or magic bullet that achieves high performance buildings; rather, it is a holistic approach from project planning to building operation that can provide measurably better performance for a range of metrics. To achieve high-performing buildings, federal agencies must have clear and consistent performance goals and metrics, adequate funding, and policies that enable them to provide buildings that perform over their lifetimes.

Shades of Green

The terms *high performance* and *green* have evolved substantially over the years. We are grateful that your committee in Section 401 of the Energy Independence and Security Act of 2007 (EISA) defined high performance green buildings for the purposes of the activities of the Department of Energy and General Services Administration in a way that captures best current thinking. These definitions challenge the government to design, construct, and operate its buildings at the state of the art and pave the way for these agencies to show leadership over the next two decades, a period during which we will need higher performance from federal and other buildings than ever before.

In the 1970s, the era of our first energy crisis, public and private sector building programs focused on energy and water efficiency. The Federal Energy Management Program (FEMP) originated in this era. The Passive Solar Industries Council (PSIC) was promoting the interdependence of building systems, components and design strategies and energy modeling to integrate and optimize "whole building" energy performance. Forward-thinking building professionals were creating homes and buildings that used far less fossil fuel energy than conventional buildings by integrating passive design

strategies, energy efficient appliances and equipment, and renewable energy technologies.

Unfortunately, the majority of builders and consumers continued traditional, wasteful building and energy-use practices while countries such as Switzerland and Germany learned from our experiment, perfected ways to further "design out" inefficiency and now are building thousands of structures that are 60 to 90 percent more energy efficient than conventional buildings.

Sustainability and our understanding of what is possible in buildings took a leap forward in the early 1990s when practitioners and groups like PSIC (then evolving into the Sustainable Buildings Industry Council) began to add other values on top of energy efficiency, including healthful indoor air quality, low environmental impact development, nontoxic/recycled/recyclable building materials, and waste reduction. This forward momentum continued with the establishment of green building rating and certification systems such as LEED and Green Globes that provided a much-needed framework for building green.

Federal agencies have been improving the energy and water efficiency of their buildings for years and have embraced green building design enthusiastically in spite of multiple directives, process inefficiency, and inadequate training opportunities and technical tools. They have evolved as the green, high performance building industry has evolved. The contributions of passive-solar design pioneers and energy efficiency advocates, manufacturers of energy efficient products and innovative technologies, creators of materials assessment criteria, and green rating systems that have made green understandable and marketable, are substantial—and they also are evolving. The federal government often has been an early adopter of these advances.

In more recent times, there has been a strong emphasis on whole building design, which statutorily is known as high performance green buildings. Over the years, safety, security, accessibility, and other values became statutory requirements for federal buildings, and life cycle costs of buildings have received stronger emphasis. All of these values are important, but can be costly if not incorporated into the original building planning and design process. Fortunately, your definition in EISA sets the stage for us to think of buildings holistically and to begin to reap the savings and the increased utility that countries like Switzerland have already shown to be possible.

The evolution of information and computer technology is a major reason that we are finally reaching the point where high performance green buildings make economic as well as environmental sense. It is now possible to design the software to help us find the win-win situations in building design *and* to display the results in three dimensions. Education, design standards, and interactive design and educational tools will make it possible to go from evolution to revolution. GSA has focused on the intersection of sustainability and security in federal projects from ports of entry to the Alfred R. Murrah building replacement in Oklahoma City. And other departments with mission-critical criteria for security and energy independence understand the value of whole building

design. Like many others, EESI believes that our goal for a sustainable energy future is more likely to be embraced and achieved if it is considered in context with other critical goals. A green building that is destroyed by hurricane-force winds is not sustainable. Fortunately, we now are developing green buildings that are durable, that can withstand severe weather, and that are likely to cost less than conventional buildings over their long lifetimes, due to reduced utility and maintenance costs. Clearly, holistic planning across government agencies that considers multiple performance goals simultaneously and shows project managers how best to achieve them is a much more efficient use of taxpayer dollars.

The legal framework for buildings has evolved over the years and much of it has not evolved to the high performance green level. The model codes, which are the technical basis for most local building codes, are a lowest common denominator that functions well below what we are capable of doing in terms of energy efficiency and environmental protection. In fact, in much of the country, the local building codes, if they exist at all, are based on outdated versions of the model code. This would be largely rectified in terms of energy efficiency by the building code provisions contained in the House-passed American Clean Energy and Security Act of 2009 (H.R. 2454). Even this bill, however, would not bring us to the high performance level that requires the **integration** of requirements for energy efficiency, sustainability, accessibility, safety, security, and others.

There is an important web site, the Whole Building Design Guide, which is used by federal agencies as a source of information on these topics, but as Henry Green of NIBS has testified, there are not yet **integrated** standards or a design tool to aid in the design and construction of high performance green buildings. The knowledge clearly exists to create them, and I hope that a way can be found to accelerate the work that NIBS and its many public and private sector partners have begun.

Raise the Floor, Raise the Ceiling

EESI believes there is a full spectrum of opportunities for the building industry to shrink its environmental impact and become stewards of the natural systems on which we all depend, while enhancing comfort, saving money, and achieving multiple goals through good design. The persistence of entrenched barriers and resistance to change have made it difficult but not impossible: It demands both incremental progress and bold innovation. We must "raise the floor" with building codes and appliance standards and "raise the ceiling" through R&D, innovation, testing, demonstration, performance measurement and verification, and procurement. We applaud the many public and private sector initiatives and steady progress in improving building energy efficiency over the last four decades and the more recent explosion of interest in "building green" to ensure minimal impact on the environment and support of occupant health and productivity. We believe that the threat of climate change and irreversible damage to ecosystems and biodiversity demands a measured approach to development and constant intention to sustain our environment for future generations. Low-energy design strategies and technologies, use of renewable

energy, water-efficient systems and environmentally preferable, nontoxic materials must become the benchmark for all building construction and renovation, and be maximized in retrofits.

The federal building stock largely reflects the era in which it was built, in addition to some retrofit encouraged by FEMP. More recent buildings are often built to achieve LEED or other green certifications, but only recently has there been an attempt to bring commissioning and operations up to comparable levels. The High Performance Green Building Office at GSA and DOE's zero-energy buildings initiatives now are faced with the challenge of moving federal buildings the next step forward.

Retrofit is very important because new construction adds only a very small percentage to our national building inventory each year. Therefore, if we are to have a significant number of high performance green buildings in our lifetimes, much of the work will have to be retrofits of existing buildings.

Action Opportunities

Congress and the White House, over several administrations, have recognized and acted on the critical need to make federal buildings better environmental citizens and provide healthy, comfortable, safe and secure places to work by setting performance targets through statutes and Executive Orders. Federal agencies have worked hard implement these requirements through rulemakings, "memoranda of understanding" (MOUs), interagency meetings and conferences, procurement specifications for energy- and water-saving technologies, and progressive contracting and financing instruments.

Another bold step forward is the Notice of Proposed Rulemaking published by the Department of Energy on May 28, 2010, which seeks to implement the sustainable building design provisions of EISA. We were pleased to see that the proposed rule utilized the Guiding Principles originally adopted in the Federal Leadership in High Performance and Sustainable Building MOU signed by most federal agencies what Executive Order 13514 already requires in order to minimize the regulatory burden on agencies. In addition to streamlining multiple requirements, this also is a positive step toward holistic planning and design. Congress and the federal agencies have the opportunity to address various performance goals at the same time (in a holistic manner) and thereby take advantage of synergies that 1) ensure important goals are not left out and 2) improve efficiency and reduce costs.

We were disappointed that DOE, in the May rulemaking, decided to defer action to implement Section 433 of EISA, which requires agencies to reduce their use of fossil-fuel generated energy. Again, we believe that greenhouse gas emission reduction is a critical goal for high performance buildings and central to helping meet the global carbon-reduction goals called for by scientists to avoid catastrophic climate change. And again, we believe that building performance goals should be addressed holistically. Moreover, the federal government needs to understand what will be required in terms of renewable

energy supply in order to meet its goals for net-zero energy buildings or a Zero Environmental Footprint.

The tools to move to high performance green buildings are not all in place. There is a strong need for design tools that permit architects and engineers to make the tradeoffs that optimize the buildings for a variety of performance goals throughout their useful life and permit them to easily be modified as the needs of the building occupants change. Building operators and the behavior of occupants also are central to building performance. There is a rule of thumb that 25 percent of energy savings are directly related to the way the building is used. Therefore, it is imperative to involve building operators and users in the planning, design, or retrofit process and provide user-friendly educational tools.

Federal buildings also are potentially a powerful educational tool in and of themselves, because they may well be the only way that many people experience a high performance green building first hand.

Unfortunately, the United States no longer is the most advanced country in building design or energy savings. We have much to learn from others around the world, especially in Europe. It is very important that those who will be responsible for the Offices of High Performance Green Buildings and for updating federal building regulations and Executive Orders take time to learn from the experience of others. In some countries, such as Germany and Switzerland, the process of optimizing buildings has been going on for 20 years or more and continues to improve.

Energy remains first among equals in high performance building values, but optimization of overall high performance is the way to obtain the most value for each dollar spent on federal buildings and to ensure buildings are durable and fit for their intended purposes. This is a long-term process requiring continuous improvement, a process crucial to achieving our climate and energy goals, and a process that will succeed only if it receives appropriate resources.

The federal government has an opportunity and responsibility to lead by example, and this will allow the revolution in the buildings industry to truly get underway.

EESI applauds the leadership of this Subcommittee in advancing the design and performance of federal buildings, and we appreciate the opportunity to contribute our ideas.

Ms. WATSON. Thank you.
Ms. Bellenger.

STATEMENT OF LYNN BELLENGER

Ms. BELLENGER. Chairwoman Watson, Ranking Member Bilbray, and members of the subcommittee, thank you for the opportunity to speak to you today about standards and opportunities for the Federal Government to optimize building efficiency.

My name is Lynn Bellenger and I am president of ASHRAE, an international engineering society of over 52,000 members in more than 140 countries. Our members represent the breadth of professionals involved in the building environment, from consulting engineers and architects to manufacturers' representatives and academics.

ASHRAE fulfills its mission to serve humanity and promote a sustainable world through research, standards writing, publishing, and continuing education. We are the acknowledged experts on energy and buildings and indoor environmental quality.

The purpose of today's hearing is to examine the Federal Government's role in greening buildings. ASHRAE has long partnered with the Federal Government on this very issue, working to reduce energy waste while developing and consistently improving energy efficiency standards and advanced design guidance.

In the 1970's, during this Nation's first modern energy crisis, the Federal Government approached ASHRAE to develop a standard to address the energy use by buildings. This standard became ASHRAE Standard 90.1, which now serves as a Federal building standard.

Through the High Performance Building Congressional Caucus Coalition, ASHRAE has taken the lead role in raising the awareness of high performance buildings in Congress. Over the past 2 years, the coalition has held 27 briefings for Federal policymakers on a wide range of building-related issues.

My presidential theme is modeling a sustainable world. Building modeling represents one of the most powerful tools for optimizing building performance, and to exploit the full capability of modeling tools, we must transform our design approach from a sequential process where one discipline completes its work and hands off the design to the next, to an integrated building design process, where all of the disciplines involved in the building design and construction work as a team from the beginning to evaluate options and optimize building design.

Our biggest challenge is implementing integrated design in daily practice. It is going to require a cultural shift in our industry to transform the design process, and it is a shift that has to occur if we are going to reach our goal of net zero energy buildings. To accelerate this cultural shift, we recommend creating a new demonstration program with selected geographically diverse Federal buildings.

Earlier this year, in partnership with USGBC and the Illuminating Engineering Society, ASHRAE published Standard 189.1, the first code-intended commercial green building standard in the United States. Standard 189.1 serves as a compliance path of the

International Green Construction Code published by the International Code Council.

Standard 189.1 is a game changer in building standards, and ASHRAE recommends authorizing a pilot program with a select group of geographically diverse Federal buildings to examine the effects of requiring all new Federal buildings to meet the IGCC by 2020, and include ASHRAE Standard 189.1 as a compliance path. This will help the Federal Government meet the objectives of Executive Order 13514 of ensuring that beginning in 2020 all new Federal buildings are designed to achieve zero net energy by 2030.

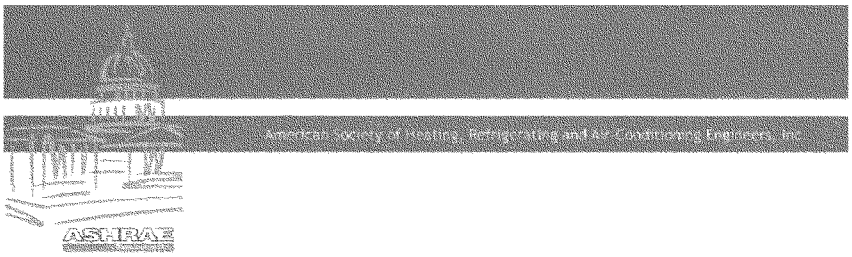
In addition to Standards 90.1 and 189.1, ASHRAE has designed tools and initiatives targeted for enhanced building performance, including certification programs and advanced energies design guides. ASHRAE also has developed a building energy labeling program which clearly shows tenants, building owners and others the difference between as-designed and in-operation building energy used and includes an energy assessment with recommendations for increasing energy efficiency.

Congress can help close the gap between the designed and operational energy use of Federal buildings by requiring all new and existing Federal buildings to put in place within 3 years an energy performance information program that identifies both designed and in-operation performance. Understanding where energy is used in a building is the first step in reducing energy consumption.

In closing, significant progress has been made over the years in the Federal, commercial, and residential sectors, and we are poised to embark on a new era of energy efficiency and taxpayer dollar stewardship that will lead us to net zero energy buildings. Much work remains to achieve that goal, and as a national and world leader in developing building standards, ASHRAE looks forward to opportunities for working with Congress and the executive agencies as we all move toward a more sustainable tomorrow.

Thank you again for the opportunity to address this subcommittee, and feel free to contact me or our D.C. office if you have any additional questions.

[The prepared statement of Ms. Bellenger follows:]



Testimony of
Lynn G. Bellenger, P.E., FASHRAE
President, American Society of Heating, Refrigerating and Air-Conditioning Engineers
(ASHRAE)

To the
U.S. House of Representatives
Subcommittee on Government Management, Organization, and Procurement
Committee on Oversight and Government Reform
July 21, 2010
Washington, DC

Hearing on: "Green Building Practices in the Federal Sector: Progress and Challenges"

Chairwoman Watson, Ranking Member Bilbray, and members of the Subcommittee, thank you for the opportunity to speak to you today about standards and opportunities for the federal government to optimize building efficiency. My name is Lynn Bellenger, and this year I am president of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, better known as ASHRAE.

Founded in 1894, ASHRAE is an international nonprofit technical engineering society of over 52,000 members in more than 140 countries. Our members represent the breadth of professionals involved in the built environment from consulting engineers and architects to manufacturer's representatives and academics.

ASHRAE fulfills its mission of advancing heating, ventilation, air conditioning and refrigeration (HVAC&R) to serve humanity and promote a sustainable world through research, standards writing, publishing and continuing education. We are acknowledged experts on energy in buildings and indoor air quality.

The purpose of today's hearing is to examine the federal government's role in greening buildings. ASHRAE has long-partnered with the federal government on this very issue, working to reduce energy waste, while developing and constantly improving energy-efficiency standards and advanced guidance. In the 1970s during this nation's first modern energy crisis, the federal government approached ASHRAE to develop a standard to address the energy use of buildings.

This standard became ANSI/ASHRAE/IESNA Standard 90.1--Energy Standard for Buildings Except Low-Rise Residential Buildings.

Standard 90.1 now serves as both the federal building standard, and the national reference for state adopted commercial building codes through the Energy Independence and Security Act (EISA), the Energy Conservation and Production Act (ECPA), and the Energy Policy Act of 2005 (EPAct).

In our efforts to help the federal government and private sector find innovative solutions that will optimize building performance, through the High-Performance Building Congressional Caucus Coalition (HPBCCC), ASHRAE has taken the lead role in raising awareness in Congress, breaking down the barriers that have so often divided the building professions, bringing the building community together, and increasing awareness about the major impact that buildings have on our health, safety, and welfare. Over the past two years the HPBCCC has held 27 briefings for federal policymakers on a wide range of building-related issues, and it is one of the most active caucuses on the Hill.

As we enter a new era of economic awareness and energy sensitivity, many factors draw attention to energy use—concerns about our energy sources, rising energy costs, and the impacts of climate change. It is important, now as ever, to ensure that the funds the federal government spends go to projects that will improve energy efficiency, preserve the delicate environment, and save taxpayer dollars.

The impact of our nation's buildings is surprisingly large. Our nation's buildings account for 40 percent of our primary energy use—more than either transportation or industry. Buildings are responsible for 72 percent of the electricity consumption and 39 percent of the total U.S. carbon dioxide emissions. The CO_2 emissions from US buildings alone approximately equal the combined emissions of Japan, France, and the United Kingdom for transportation, industry, and buildings.

The federal government is the nation's largest energy consumer and greenhouse gas emitter. This position gives the government both a great opportunity and a great responsibility. By incorporating high-performance building practices into new and existing buildings, the federal government can save taxpayer dollars and reduce its environmental footprint.

Going forward, maximizing building efficiency and sustainability will require a fundamental shift in how buildings have been approached – from design to operation. Working together toward a whole building approach that fully considers how each system and building component will interact--instead of each discipline focusing on their own area of expertise – will be an essential element of ensuring that taxpayer dollars are well-spent.

Building Modeling
My presidential theme is "Modeling a Sustainable World." Building modeling represents one of the most powerful tools for optimizing building performance, and it is an area worthy of increased support from Congress. Today, we have the tools to create a virtual model to consider options in size, shape and appearance. But more than just a visual representation, our models can simulate energy performance, assess daylighting options and predict thermal comfort.

Integrated Building Design
To exploit the full capability of modeling tools, we must transform our design approach from a sequential process — where one discipline completes its work and hands off the design to the next — to a collaborative integrated building design process — where all of the disciplines involved in the building design and construction work as team from the beginning to evaluate options and optimize the design.

Our biggest challenge is implementing integrated design into daily practice. The traditional sequential approach misses the rich opportunities for optimizing building performance through a collaborative approach throughout the design process. It is going to require a cultural shift in our industry to transform the design process, and it's a shift that has to occur if we are going to reach our goal of net zero energy buildings.

To help expand awareness throughout the federal government of the potential benefits of increased energy savings that can be achieved through integrated, whole building design, we recommend creating a new demonstration program with selected, geographically diverse federal buildings. A report on the success and challenges of such a demonstration program would yield useful lessons learned that could be applied and expanded to other federal buildings, as well as buildings in the private sector.

In addition, Congress can help improve the use and implementation of integrated design in federal buildings by supporting the development of a core curriculum for federal personnel performing operations and maintenance, energy management, safety, and design functions through the Federal Buildings Personnel Training Act (H.R.5112).

Standard 189.1: A New Foundation for Green Building Standards
Earlier this year, in our continuing efforts to push the envelope on building efficiency, and in collaboration with the Illuminating Engineering Society of North America (IES) and the U.S. Green Building Council (USGBC), ASHRAE published Standard 189.1 – the first code-intended commercial green building standard in the United States. Standard 189.1 also serves as a compliance path of the International Green Construction Code (IGCC), published by the International Code Council.

Standard 189.1 represents a revolutionary new step for building standards, as it provides a long-needed green building foundation for those who strive to design, build and operate green

buildings. From site location to energy use to recycling, this standard will set the foundation for green buildings through its adoption into local codes. It covers key topic areas similar to green building rating systems, including site sustainability, water use efficiency, energy efficiency, indoor environmental quality and the building's impact on the atmosphere, materials and resources.

The energy efficiency goal of Standard 189.1 is to provide significant energy reduction over that in ANSI/ASHRAE/IESNA Standard 90.1-2007. It offers a broader scope than Standard 90.1 and is intended to provide minimum requirements for the siting, design and construction of high performance, green buildings. For this reason, ASHRAE recommends authorizing a pilot program with a select group of geographically diverse federal buildings to examine the effects of requiring all new federal buildings, by 2020, to meet the IGCC, and include ASHRAE Standard 189.1 as a compliance path of the IGCC. This will help the federal government meet the objectives of Executive Order 13514 of ensuring that beginning in 2020, all new federal buildings are designed to achieve zero-net-energy by 2030. A report on the success and challenges of such a demonstration program would also yield useful lessons learned that could be applied and expanded to other federal buildings, as well as buildings in the private sector.

Advanced Energy Design Guides: Going Beyond the Minimum

In addition to Standard 189.1 and 90.1, ASHRAE currently has several initiatives in place to provide guidance to those who wish to go beyond the minimum requirements and to encourage greater development and deployment of technologies and best practices that can move the market toward increasingly more energy efficient buildings.

These tools include the Advanced Energy Design Guides (AEDGs) which provide prescriptive means for achieving 30 percent savings over Standard 90.1-1999. These guides are developed in partnership with the Department of Energy and other members of the building community.

AEDGs are available for a wide variety of buildings, including small office buildings, small retail buildings, K-12 school buildings, small warehouses, highway lodging, and small hospitals and healthcare facilities. Over 250,000 copies have been downloaded and provided to practitioners and decision makers.

A recent market assessment of the AEDGs, conducted by the Energy Center of Wisconsin, found that the guides are in line with ASHRAE's objective of achieving 30 percent energy savings over the minimum requirements of Standard 90.1-1999.

The assessment also found that more than 70 percent of ASHRAE members who have used the guides view them as credible and useful design resources, and that the recommendations by climate zone and how-to tips are particularly useful. Almost all participants in the assessment agree that they would use the guides on future projects. The assessment found that users feel the guides serve as independent and credible third-party sources of information, are easy to understand and provide practical, application-oriented recommendations for reducing building energy use.

Development is currently underway on AEDGs that achieve 50 percent savings, and are targeted for completion in 2012. Following the 50 percent guides, AEDGs for achieving net zero energy consumption will be produced.

Congress can help federal buildings move beyond the minimum energy efficiency requirements by encouraging federal buildings to use ASHRAE's forthcoming AEDGs for achieving 50 percent energy savings over Standard 90.1, and the subsequent zero-net-energy guides.

Certification

In partnership with the APPA and GSA, ASHRAE has also developed an operations and performance management professional certification program to recognize practitioners who have demonstrated a well-rounded understanding of the knowledge of the management of facility operations and maintenance and their impact on HVAC&R systems' performance. Recommissioning and retrocommissioning are important tools to ensure buildings and equipment are operating as they were designed. ASHRAE has several guidelines that lay out the methodologies for completing the commissioning process.

In addition to commissioning, ASHRAE's credential programs also include certification for high-performance building design, building energy modeling, and healthcare facility design professionals.

To help improve the energy efficiency of federal buildings, ASHRAE recommends that those hired to design federal buildings be encouraged or required to hold ASHRAE certifications.

Revealing Building Energy Use: ASHRAE's Building Energy Quotient Label

Studies have shown that a building designed and constructed to be energy efficient, may still be wasteful if not used or managed properly. Alternatively, even buildings that are not designed for optimum efficiency may actually exceed their designed savings if tenants and operators are aware of energy use and how to reduce their energy consumption.

For this reason, it is important to educate building tenants, owners, and operators on how their building is performing, and Congress can help in this regard.

Seeking to fill the critical information gap between the design and operation of buildings, ASHRAE has developed the Building Energy Quotient (Building EQ) labeling program.

The Building EQ program includes both As Designed (asset) and In Operation (operational) ratings for all building types, except residential. The most visible component of the program is the label itself, which allows the general public, tenants, building owners, prospective owners, and operations and maintenance personnel to quickly and easily view how energy efficient a building is in operation compared to its design through an easily understood letter grade and color scale.

The operational rating is determined through an on-site assessment, during which the building owner is provided with building-specific information that can be used to improve his/her building. Documentation on previous energy efficiency upgrades and commissioned systems is also included. With information on both the asset and operational rating, building owners can make side-by-side comparisons which could further reconcile differences between designed and measured energy use.

Congress can help close the gap between the designed and operational energy use of federal buildings by requiring all new and existing federal buildings to put in place, within three years, an energy performance information program that measures both designed and in operation performance. The information yielded from this program would be used to reconcile differences between designed and in operation building energy use, and help optimize federal building performance. Such a requirement and program may be modeled after section 281 of the American Clean Energy Leadership Act in the Senate (S.1462).

Summary and Recommendations for Optimizing Building Efficiency and Meeting Future Needs

In closing, I offer the following comments and recommendations for Congress to consider in its efforts to optimize the performance of the federal building stock.

As the nation's largest energy consumer and greenhouse gas emitter, the federal government is in a unique position to both improve building performance and save taxpayer dollars, while preserving the environment. Over the years significant progress has been made in the federal, commercial, and residential sectors, and we are poised to embark on a new era of energy efficiency and taxpayer dollar stewardship that will lead us to net-zero energy buildings.

The recommendations below represent a starting point in this endeavor. Much work remains, and as a national and world leader in developing cutting-edge building standards, ASHRAE looks forward to opportunities for working with Congress and the Executive Agencies as we all move toward a more sustainable tomorrow.

I offer the following recommendations to assure that we meet the future demands placed on federal buildings:

- Adequately fund the federal agencies that advance the development and enforcement of energy standards and guidelines, including the Department of Energy, National Institute of Standards and Technology, Environmental Protection Agency, and the General Services Administration which serves as a leader in the implementation of leading edge technologies and practices.
    - Specifically, help improve federal, commercial, and home building efficiency by continuing support for funding increases for the Building Technologies, and the Federal Energy Management programs.

- Support the research and development necessary to develop and deploy cost effective technologies necessary to achieve our nation's energy goals. This includes the technologies envisioned under the Net-Zero Energy Commercial Building Initiative established in EISA. Additionally, sufficient investment must be made in R&D for renewable energy technologies such as solar, wind, water, biomass, and geothermal. These renewable energy technologies will be critical components of the design and construction of net zero energy buildings—funding for their development must parallel their importance to their role in net zero energy buildings.

- Continue to support the utilization of voluntary consensus standards in regulation and codes as recognized by The National Technology Transfer and Advancement Act of 1995 (P.L. 104-113) (NTTAA) and OMB Circular A-119.

- Support integrated design and whole-building systems thinking by supporting the development of a core curriculum for federal personnel performing building operations and maintenance, energy management, safety, and design functions through the Federal Buildings Personnel Training Act (H.R.5112).

- To help improve the energy efficiency of federal buildings, ASHRAE recommends that those hired to design federal buildings be encouraged or required to hold ASHRAE certifications.

- Require all new federal buildings and all existing federal buildings to put in place, within three years, an energy performance information program that measures both designed and achieved (in operation) performance. The information yielded from this program would be used to reconcile differences between designed and in operation building energy use, and help optimize federal building performance. Such a requirement and program may be modeled after section 281 of the American Clean Energy Leadership Act in the Senate (S.1462).

- Encourage federal buildings to use ASHRAE's forthcoming AEDGs for achieving 50 percent energy savings over Standard 90.1, and the subsequent net zero energy guides to help federal buildings move beyond the minimum energy efficiency requirements.

- Authorize a pilot program with a select group of geographically diverse federal buildings to examine the effects of requiring all new federal buildings, by 2020, to meet the IGCC, and include ASHRAE Standard 189.1 as a compliance path of the IGCC. This will help the federal government meet the objectives of Executive Order 13514 of ensuring that beginning in 2020, all new federal buildings are designed to achieve zero-net-energy by 2030. A report on the success and challenges of such a demonstration program would also yield useful lessons learned that could be applied and expanded to other federal buildings, as well as buildings in the private sector.

- Examine the potential benefits and increased energy savings from integrated whole building design through a new demonstration program with selected, geographically diverse federal buildings. A report on the success and challenges of such a demonstration program would yield useful lessons learned that could be applied and expanded to other federal buildings, as well as buildings in the private sector.

Thank you again for the opportunity to address the Subcommittee. Please feel free to contact me or ASHRAE's Washington, DC Office should you require any additional information on buildings related issues.

Attachment 1

ASHRAE Standard 90.1: Its Development and Its Future
Another opportunity for improving the energy efficiency of federal buildings is continuing support for ASHRAE Standard 90.1.

ASHRAE is celebrating 35 years of Standard 90.1, and as I noted earlier, now serves as both the federal building standard, and the national reference for state adopted commercial building codes through the Energy Independence and Security Act (EISA), the Energy Conservation and Production Act (ECPA), and the Energy Policy Act of 2005 (EPAct).

As an American National Standards Institute (ANSI) approved standard, the development of Standard 90.1 adheres to rigorous principles based on consensus, openness, balance, transparency, and due process. In fact, ASHRAE is one of the very few ANSI Audited Designators which means we have established and maintain a consistent record of successful voluntary standards development.

The Standard is developed by a committee made up of technical experts representing different aspects of the building community including product manufacturers, energy efficiency advocates, academics, government, building owners, utilities, and consulting (or design) engineers and architects. Once the committee reaches consensus on a draft of the standard, it is open for a period of public comment. Once comments are received, the committee must attempt to resolve all comments before presenting the standard to the ASHRAE Board of Directors for publication. Both within the ASHRAE structure and the ANSI structure there are opportunities for appeal for anyone who feels that their comments regarding the standard are not adequately addressed.

Both Congress and the Executive branch have recognized the value of voluntary consensus standards by requiring their use in regulations when consistent with agency policy and appropriate for agency purposes (National Technology Transfer and Advancement Act of 1995 (P.L. 104-113) (NTTAA) and OMB Circular A-119).

Standard 90.1 addresses many aspects of buildings that contribute to the overall energy use attributable to a building. These include:

- Building envelope or shell: includes required insulation values, window characteristics and allowable air leakage
- Heating, ventilation and air-conditioning: includes equipment efficiency requirements
- Service water heating: includes equipment efficiency requirements
- Lighting: includes allowable power use by lighting for particular space uses

Congress can help improve federal, commercial, and home building efficiency by continuing support for funding increases for the Building Technologies, and the Federal Energy Management programs.

Ms. WATSON. Thank you, Ms. Bellenger.

Mr. Bertrand, you may proceed.

STATEMENT OF JAMES BERTRAND

Mr. BERTRAND. Good morning, Chairwoman and Ranking Member Bilbray. I am Jim Bertrand, and as president of Delphi Thermal Systems, I am pleased to be a part of this panel raising awareness and creating focus on the great opportunities for energy savings in our Federal buildings and installations.

I recognize that implementing the policies and regulations that will govern these reforms presents a significant challenge. We at Delphi want to be part of that dialog that is used to resolve these questions, because we think that we have technology that can solve some of the problems. We are also pleased to share our experiences and present our technology to the Federal Government. We hope we can provide insights to help improve regulations and policies.

Delphi is widely known as an auto parts manufacturer, but the reality is that we are a technology company. We hold over 7,000 patents, and while most of our intellectual property is utilized by automotive manufacturers, there are many non-automotive applications for our technology.

One example is our micro-channel heat exchanger technology which has proven successful in both automotive and non-automotive markets. The micro-channel heat exchanger has the potential to provide improved energy efficiency and reduce the impact on the environment because it is smaller, lighter, uses less refrigerant, and is able to achieve higher energy efficient ratings.

If we replaced one aging heat exchanger in each of the 500,000 Federal buildings, there would be four immediate benefits. First, 5 to 10 million less pounds of refrigerant in the atmosphere; 10 million fewer pounds of materials, mostly imported copper; more energy efficient optimized heating and cooling systems in reduced spaces; and, last, energy savings of up to 25 to 30 percent over traditional AC units with lower ratings.

Delphi has sought to offer this solution to the Federal Government. However, our experience is that the Federal effort is focused on achieving building-wide reductions in efficiencies. We applaud this focus. But at the same time, this focus should not come at the cost of incremental but significant gains in efficiency. Better focusing on building components could result in some dramatic results. But from our view, the efforts to date have not yielded powerful enough incentives to accelerate the adoption of innovative green components in Federal buildings.

Despite these challenges, there are some things that can be done to improve the situation. First, establish incentives for the implementation of energy efficient components. For example, Delphi is supportive of a provision of the Home Star legislation that establishes powerful additional incentives for homeowners who choose to implement available SEER standards, 18 SEER. Is there an opportunity to create comparable incentives for buildings that are owned or leased by the Federal Government? The U.S. Green Building Council has also identified existing authority for DOE and the GSA to improve performance standards applicable to Federal buildings and leases.

Second, examine opportunities for Federal procurement reform. Delphi is supportive of elements of legislation that improves Federal procurement of energy efficient building technology, such as Senator Carper's Improving Federal Use of Renewable Energy and Energy Efficiency Act of 2010. Delphi supports better measurement and data collection to assist in Federal energy efforts.

We also believe greater flexibility is needed in procurement requirements for Federal buildings projects facing long delays. Technology is changing quickly, and this flexibility allows for the adoption of the best and newest technologies.

Third, consider pilot programs to test and analyze retrofit performance. We believe that a pilot program examining implementation cost of retrofits, as well as the short-term and long-term efficiencies in savings of technology upgrades, would be helpful in guiding Federal efforts to select energy efficient technologies. We respectfully recommend that the pilot program should examine technology components.

In conclusion, we have already stated that reducing energy consumption is an extremely hard challenge and we are no experts in creating guidelines like organizations such as the U.S. Green Building Council. But we do believe that the tools that are at the government's disposal have not been used in a way to encourage rapid adoption of components like our technology that can help the government achieve its goal of greener Federal buildings.

We are honored to be on this panel and look forward to being part of the continuing dialog. Thank you. We look forward to taking any questions you may have.

[The prepared statement of Mr. Bertrand follows:]

DELPHI

Testimony of James Bertrand
President, Delphi Thermal Systems

House Oversight and Government Reform Subcommittee on Government Management, Organization and Procurement

Wednesday, July 21, 2010

"Green Building Practices in the Federal Sector: Progress and Challenges to Date"

James A. Bertrand
Vice President, Delphi
President, Delphi Thermal Systems

Good morning Chairwoman Watson and Ranking Member Bilbray. My name is Jim Bertrand, and I am the President of Delphi Thermal Systems.

I am pleased to offer testimony on behalf of Delphi Corporation for today's hearing to discuss the progress and challenges confronting the federal government in adopting green building practices. I will also offer a look at some of the technology solutions that Delphi can provide to address the energy issues driving these efforts.

At Delphi, we are committed to a vision of "safe, green, and connected". We are working to develop innovative technologies that reduce environmental impact, lower emissions, and encourage sustainability. We deliver innovation for the real world, which means anticipating the needs of tomorrow and developing the right solutions today.

Delphi has a long and distinguished history of providing technology solutions to the automotive industry to make our vehicles cleaner, smarter and more energy efficient, while lessening the impact on the environment. As one example, with gas prices at a premium, Delphi has partnered with its customers to deliver hybrid electric vehicle technologies to make vehicles more energy efficient.

And now, Delphi is taking its proven automotive technologies - that have been engineered to withstand the most rigorous testing requirements - and is applying them to the residential and commercial heating and cooling markets.

Specifically within our thermal management portfolio, we continue to anticipate the energy needs of tomorrow with our Micro Channel Heat Exchangers (MCHX®), which are used in air conditioning and refrigeration products and can provide more energy-efficient cooling than traditional AC units.

Energy Consumption on the Rise

Today, air conditioning use alone represents nearly *13%* of all U.S. electricity consumption! On the residential air conditioning side, the consumption rate is already at 17% and will grow to 19% by 2030. Furthermore, the Electric Power Research Institute (EPRI) is forecasting that consumers in the United States will increase their use of electricity by 1.4% annually through 2030. This data already accounts for the energy-efficiency legislation enacted that will impact future consumption. With energy consumption on the rise and the associated implications the increases will bring, it's an issue both government and industry can not afford to ignore.

For its part, the Federal Government is the largest consumer of energy in the U.S. economy, operating nearly 500,000 buildings. In an effort to slow the growth in its own energy consumption, the federal government has set out to achieve an ambitious series of initiatives that are dedicated to reducing emissions, increasing energy efficiency and utilizing environmentally-responsible products and technologies. As a responsible corporation with similar interests, we applaud the government's efforts on these very important initiatives.

Delphi has sought opportunities to partner with the federal government and provide its MCHX® technologies as a solution to the federal effort to reduce energy usage in federal buildings. We believe that Delphi's MCHX® heat exchanger technology can reduce refrigerant emissions, increase energy efficiency, promote 100% recyclability, and save the federal government millions of dollars in energy costs.

Surprisingly, however, as a component manufacturer we have discovered there are few direct incentives to install component technologies like Delphi's micro channel heat exchangers, and few programs that incentivize managers of federally-leased space to consider energy-efficient retrofits. The programs and incentives currently deployed are not being felt at the component level.

As the federal government focuses on making its buildings more green and energy efficient, Delphi stands ready to serve as a partner in achieving this goal. Our portfolio of MCHX® heat exchangers, using micro channel technology, can help 'green' our federal buildings.

Delphi Corporation and Delphi Thermal Systems Overview

Headquartered in Troy, Michigan, Delphi is a leading global supplier of mobile electronics and transportation systems, including powertrain, safety, steering, thermal, and controls & security systems, electrical/electronic architecture, and in-car entertainment technologies. Applying our automotive expertise into adjacent markets, Delphi technology is also found in computing, communications, consumer accessories, and energy applications. Delphi has approximately 100,000 employees in 30 countries.

Our focus on providing "safe, green and connected" technologies to the marketplace is consistent with the goals of the Committee in protecting the environment, and we are developing and advancing technologies that can help the federal government achieve its goals of making its buildings more energy efficient, without compromising comfort.

Delphi Thermal Systems, a division of Delphi Corporation, delivers energy-efficient heating and cooling solutions while providing world-class comfort to our customers in the U.S. and around the world. Our division manufactures technologies within our four major product lines: Powertrain Cooling Systems, Heating Ventilation & Air Conditioning Systems, Compressors; and Residential and Commercial Heat Exchangers, which our micro channel technologies fall under.

Delphi Technology Solution: Micro Channel Heat Exchangers (MCHX®)

We are excited to share with this Committee the benefits of Delphi's MCHX® heat exchanger technology that we believe can help this Committee achieve its goal of increasing the energy efficiency of federal buildings and reducing emissions in a cost-effective manner.

Delphi's state-of-the-art MCHX® heat exchangers are brazed aluminum heat exchangers used in stationary and transport air conditioning/refrigeration products that provide more energy-efficient cooling than traditional tube and fin heat exchangers. Its unique design enhances product efficiency by joining its components together in a single coil – ultimately helping meet demands for less storage space, easier installation, and enhanced aesthetics.

Delphi's MCHX® heat exchanger products have demonstrated success in every market we serve, including: transportation (refrigerated trucks); residential air conditioning and heating; retail food storage and bottle cooling; and commercial cooling and heating (chillers and rooftop units).

Today, Delphi manufactures 3 million micro channel heat exchangers annually for the automotive, residential and commercial markets – accounting for the largest number of units in the field. Delphi has shipped more than 50 million MCHX® parts globally. Also of note, of the Delphi MCHX® heat exchangers that we manufacture for the residential and commercial markets, 70% of our total supply chain cost comes from within the U.S. Conversely, our North American competitors are increasingly off-shoring traditional HVAC technology for this market. As this technology gains momentum in the marketplace, Delphi has the opportunity to bring organic growth to the U.S. with potential jobs and through our supply chain spend.

Our product, in combination with increased federal standards and incentives, will give consumers the opportunity to save money, space and energy while lessening the impact on the environment. The Delphi unit has the potential to provide improved energy efficiency and reduce the impact on the environment because it is smaller and lighter than traditional units; uses less refrigerant; and is able to achieve higher energy-efficient ratings.

Delphi's MCHX® heat exchangers weigh 10-40% less than traditional AC units, contain up to 40% less ozone-depleting refrigerant and are 100% recyclable due to its all-aluminum construction. To date, Delphi has saved approximately 6 million pounds of refrigerant emissions due to the technology's smaller size. In addition, we have achieved weight reductions of imported copper tubing of 20 to 23 million pounds. These mass, size and refrigerant reductions allow our customers to easily meet the mandated 13 SEER energy efficiency ratio while achieving higher energy savings of approximately 25 to 30 percent, and reduced environmental impact. In addition, these benefits translate to lower shipping costs; lower warehousing costs; lower cost of packaging materials; lower cost of structural materials; and lower cost of refrigerants.

The U.S. automotive industry successfully made the switch to micro channel heat exchanger technology more than 15 years ago because of the same benefits described above. We now have an opportunity to bring those energy and cost savings to our federal government buildings.

Seasonal Energy Efficiency Ratios (SEER) – Illustration of Delphi Capabilities/Efficiencies

Examining changes in the Seasonal Energy Efficiency Ratio (SEER) – a rating on comfort equipment - illustrates the benefits of Delphi's technology to both the economy and the environment compared to associated costs with traditional AC technology.

The Energy Policy Act of 2002 increased the SEER rating from 10 to 13 in order to enhance energy conservation and provide for security and diversity in the energy supply. When enacted, the 13 SEER was predicted to save the nation **4.2** quads of energy over the next 25 years (equivalent to the energy consumed by nearly *26 million U.S. households* annually). The standard is expected to save consumers **$1 billion** over the same period.

The benefits of the transition from SEER 10 to 13 include significant energy savings, reduced energy bills for homeowners (an estimated 23% energy savings); and reduced greenhouse emissions and air pollutants, saving an estimated 7.2 million metric tons of carbon in 2020. However, there were some associated costs with the increased SEER rating. For traditional AC manufacturers, the size of their units had to increase in order to achieve the higher efficiency, thus increasing shipping costs, product cost, refrigerant use (estimated 40% more) and the environmental impact.

In contrast – Delphi's MCHX® heat exchanger technology is able to provide the increased SEER without the costs involved in a traditional unit. Our product is smaller, lighter, more efficient, requires less packaging, and uses less energy in shipping. The recyclability and significant refrigerant reduction also make it the much more environmentally-friendly choice. Going one step further, if Delphi were to use the same size unit as a traditional 13 SEER, in many cases we would actually be able to achieve a 16 SEER level instead.

Federal Buildings: Opportunities and Challenges

The federal agencies have been directed by Congress and the Administration to undertake an ambitious effort to reduce energy consumption. The Agencies, with guidance from the Department of Energy, the General Services Administration, the Office of Management and Budget, and the Environmental Protection Agency, are taking steps to make federal buildings more "green" and energy efficient.

While these Agencies have a great opportunity to achieve cost and energy savings, Delphi also recognizes that successfully implementing these ambitious goals carry great challenges. There are literally thousands of factors that must be considered in coming up with standards and guidelines to advance this goal.

We at Delphi want to be part of the dialogue that is used to resolve these questions because we think that we have technology that can solve some of the problems. We also believe that sharing our experiences with Congress can help to ensure that the proper policies, regulations and incentives are in place to allow the federal government to capitalize on efficient new technologies.

If every federal building were to replace even just one aging tube and fin heat exchanger with a Delphi MCHX® condenser, the results would be dramatic, providing approximately:

- 5-10 million lbs of less refrigerant in the atmosphere
- 10 million lbs in material savings (mostly imported copper)
- More energy-efficient, optimized heating/cooling systems in reduced spaces
- Energy savings of 25 to 30 percent over traditional AC units

Delphi has sought to share MCHX technology with the federal government, and has found that there are two key limitations that impede opportunities for partnership.

First, Delphi has found that existing regulations, processes and programs are largely focused on "whole building" efficiencies and don't accurately account for innovation at the component level. Delphi is offering a technology solution that could dramatically reduce the energy costs

and increase the efficiency of federal buildings. But current efforts to achieve building-wide efficiencies don't properly incentivize components.

Second, federal regulations and standards for heat exchangers have limitations that don't account for life-cycle efficiencies. Delphi believes that it is important to provide efficiency over the life of a product, not just measure increased efficiency on the day that we take a new product out of the box. Traditional HVAC technologies lose their efficiency over time. For example, a traditional air conditioning unit cools air by drawing it across metal coils. Over time, those coils corrode, and the units become less efficient. They have to run longer and work harder in order to maintain a comfortable temperature, which requires increased energy use. There are multiple technologies on the market, including the Delphi MCHX® heat exchangers, which do not lose efficiency over time. The Delphi MCHX® heat exchangers incorporate an all-aluminum coil that is reliable and does not corrode over time (corrosion contributes to efficiency reduction). *This product will be as efficient in 10 years as it is on the day it is installed.* In our experience, the federal government doesn't fully examine the life cycle of energy-efficient products as it considers energy-efficient improvements.

These are two specific problems that Delphi has recognized in our effort to offer our product as a solution to the federal agencies. Having already stated that government-wide energy efficiency is an extremely difficult challenge, we recognize that we are no experts in creating guidelines for federal procurement of green technologies. But we note that there are a number of credible proposals being discussed that would improve the implementation of green standards in federal buildings.

Delphi believes that there are tools at the government's disposal that could be used to incent rapid adoption of energy-efficient components, like our technology, and help the government achieve its goal of greening federal buildings. We do not believe that the federal agencies should abandon efforts to achieve whole building efficiencies. But we also advise against overlooking incremental – yet significant -- opportunities for gains in efficiency. Delphi respectfully submits the following three recommendations.

1. ***Establish incentives for implementation of energy-efficient components.*** Federal agencies should not sacrifice the efficiencies that can be gained by replacement and retrofit of building components. Congress could consider legislation that establishes incentives for the implementation of such components. For example, Delphi is supportive of provisions of the HomeStar legislation, which establishes incentives for home owners to retrofit their homes with efficient components and technologies in order to reduce energy consumption. Specifically, Delphi supports a provision of this legislation which establishes powerful extra incentives for homeowners who choose to implement the highest available SEER standards (18 SEER). Is there an opportunity to create comparable incentives for buildings that are owned or leased by the federal government? It is also possible that these incentives could be created without requiring new legislation or regulation. The US Green Building Council has identified existing authority for the Department of Energy and the General Services Administration to improve performance standards applicable to federal buildings and leases. This is an area where the Department of Energy and General Services Administration have existing authority that could be used to issue stronger standards, and establish incentives for improved performance that addresses components.

2. ***Examine opportunities for federal procurement reform.*** A number of pieces of legislation, such as the "Improving Federal Use of Renewable Energy and Energy Efficiency Act of 2010" introduced by Senator Tom Carper, make recommendations for improving federal procurement of energy-efficient building technologies. Delphi is supportive of elements of these various pieces of technology. Section seven of the Carper bill addresses the lack of a single energy management and data collection standard for federal energy-efficiency efforts. This provision would require the Administrator of General Services, Secretary of Defense, and Secretary of Energy to develop a plan and guidance for a single, universal standard. This section would also require them to submit a plan to publish energy consumption data, for each individual facility, on the Internet. Such measurement would be an important step toward allowing for comparisons of life cycle energy efficiency, and analysis and comparison of the efficiency of specific technologies. Delphi also supports Section nine of this legislation which would allow federal buildings projects that face long delays in construction to update the project design to meet applicable Federal building energy efficiency standards.

3. ***Consider pilot programs to test and analyze retrofit performance.*** Finally, Delphi would like to recommend that this Committee consider creation of a series of pilot programs that examine the cost savings and energy efficiency of specific green upgrades to federal buildings. Pilot programs should examine the implementation costs of retrofits, as well as the short term AND longer term efficiencies and savings of technology upgrades. We respectfully recommend that the pilot program should examine technology components.

Conclusion

Delphi is proud of its nearly 100-year history of providing innovative solutions to automotive technology challenges. Now it's time to turn that expertise to another, even more pressing challenge, and leverage our expertise in the residential and commercial HVAC industry to drive increased efficiency at a lower cost. We are committed to helping the federal government in its effort to achieve our mutual goal of protecting our environment and preserving our energy sources for the future.

Delphi would like to offer its MCHX® heat exchanger technologies to the federal government as a solution and an option for reducing growth in energy consumption. But we have faced challenges in presenting this option to the federal agencies and to managers of federal office space. Currently, there are no ongoing programs or incentives for implementing energy-efficient appliance components, and little interest in examining the long-term/life cycle efficiency of the technologies installed in federal buildings.

We look forward to working with this Committee as it continues to examine the progress of making federal buildings more green and energy efficient.

Thank you again for the opportunity to present testimony to this Committee.

# # #

Ms. WATSON. Thank you. I would like to thank all the members of the panel for your testimony today.

We are now going to move to the question period and proceed under the 5-minute rule, but I want to remark on the testimony, Ms. Vaughan, that you made.

I was thinking, and you had your slides up, and you said green buildings and so on, and I thought about airports. California was the first State in the Union to ban smoking on airlines, and now it is global. But you come out of the airports, and the first breath of air is all of that smoke that gets captured under the eaves because people are taking their last smoke before going in or their first coming out.

So I would hope that when we talk about green buildings that we would attach "and adjacent environment," because I think you are tremendously at risk when the first breath outside is filled with toxic smoke and the last breath going in, you have it in your lungs and it settles there for the whole time you are inside.

So I just had to throw that out, and it occurred to me when you made your testimony. All of you are offering us valuable input as to how we need to proceed from here, and we are talking about perspectively but we are talking about retrofitting what we have now, and we are keeping in mind the cost.

We have this huge deficit that people are harking at all the time, but there are certain things we need to do now to guarantee the health of people in this country and those coming into this country. So we are trying to balance between that. But I just wanted to reflect on the testimony that was made.

So I am going to ask all of you, would you please define "zero net energy" and to what extent has the physical comfort of human beings been considered in the movement toward zero net energy usage?

I will start with you, Mr. Green, please.

Mr. GREEN. Thank you, Madam Chairwoman.

As I noted in my testimony, the work to do this or to accomplish this is very broad-based. There are a whole number of attributes that have to be looked at in that respect. So when we start looking at the indoor air quality, for example, how we look at achieving zero energy, there is a balance between all the components that are there. So it is going to take not only both the scientific research to get there, but it is also going to talk about human behavior and how we in fact achieve better human behavior in the buildings we are in.

As you noted, once we stop people smoking in the buildings, the first thing they do is go outside of the building and start smoking. So what we have to do is we have to talk about how do we affect that behavior as well. How do we impact how we use our buildings? How do we impact the future of our buildings by achieving greater utilization today, even in existing buildings? I think that is part of the difficulty.

So your question is what do we define as zero energy. Zero energy can take on a whole number of different definitions, and I think that the industry, as very broad-based as it is, must come together and also help define what zero energy is. Does it start at the supply? Does it start at the building? Where does it start ini-

tially and then where does it end, and how can we gather all the data necessary that we can make that achievement known? The metrics to get there have to be defined and also the level of performance.

So what we have to do, there is a very long path to follow to get there. So I know I am not answering your question specifically. I am just trying to lay the groundwork that there is more work that needs to be done to say how do we achieve zero.

Ms. WATSON. Get us thinking.

Ms. Vaughan.

Ms. VAUGHAN. Thank you. Yes, there are several different definitions. One of the working definitions of net zero energy is first you reduce the energy load as much as possible so your building, it is a low energy building and it uses only as much energy per year as it can produce onsite from renewable sources. That is one working definition, but there are others as well.

And how to balance energy efficiency and indoor air quality, we have some fine engineers in the room who are working on these things. We have standards like ASHRAE 62.

And one of the things that we learned, I think, it is a very good question, back after the seventies when there was a focus on really tightening up buildings, some people forgot there was an indoor air quality issue if we did that. So there has been a lot of learning and adjusting, and I think a lot of progress in balancing the two, and it is that tradeoff that is so key.

I would just refer quickly to Passive House. If we can learn, study these best practices and these examples, Passive House in Germany, it is a standard that can reduce energy use to the point where they don't even need a furnace, or improve the building envelope. It is focused on high insulation levels. But they have this constant air exchange. There are different concerns about how that could work in a hot, humid climate. But people are working on this, so I am hopeful.

Ms. WATSON. Thank you.

Ms. Bellenger.

Ms. BELLENGER. Before I address the current question, I want to respond to your first question about smoking outside airports and public buildings. One of the provisions in ASHRAE Standard 189.1 is prohibiting smoking within 25 feet of an entrance, and there needs to be signage on the building to indicate that. So that is a recognized problem, that you don't want people jumping outside the building and smoking immediately, and that is addressed in that standard.

The definition Ms. Vaughan gave for net zero energy buildings is really what we have been using. As Henry noted, there are a lot of different ways to define it. The building owner sees the utility bill, so we are looking at site energy and using a definition of net zero buildings as those that use no more energy on an annual basis than they can produce onsite. So that is consistent with what Ms. Vaughan just said.

Within Standard 189.1 there is a requirement to comply with two other ASHRAE standards. ASHRAE has Standard 62.1, which is a ventilation standard, and you must comply with the ventilation rates that are required within that standard for the various types

of building occupancy in order to comply with 189.1. So you can't avoid bringing in the outside air or the proper amount of ventilation.

Another standard we have is Standard 55, which is a standard for thermal comfort, and 189.1 also requires that you comply with Standard 55. So it is very much looking at the indoor environmental quality as part of doing a high performance green building.

Ms. WATSON. Thank you.

Mr. Bertrand.

Mr. BERTRAND. Chairwoman Watson, Delphi is an eight-track component supplier. Our efforts relative to zero net energy have really focused at the component level and are very much geared toward the development of devices that have minimal impact on the environment.

The micro-channel technology that I had in my testimony that I referred to is a good example of that, a device that obviously minimizes to the maximum extent possible energy consumption and minimizes environmental impact. So that is really the field of play that we have in the debate.

Ms. WATSON. Thank you.

I now recognize Mr. Bilbray, our ranking member.

Mr. BILBRAY. Thank you. Just for the record, I want to assure everybody, but California will not have the problem with people smoking outside. The way it is going, we are going to outlaw all public smoking in the State of California, at least public smoking of tobacco.

Why do people think I am joking when I say that? I will put you on an airplane and send you back to Sacramento.

It is interesting to hear in this discussion, because we all know that indoor air is a major air pollution issue down the line. And not to make you think I am some kind of seventies hippie, but I actually own an adobe house. My wife, who is from New Orleans, said she came all the way across the country to live in a mud house. Now, I imagine what our radon numbers are, but it is a good thing southern California is not a high radon area.

You remember how we did that. We sealed up in the seventies, and by the eighties the one crisis on energy was curtailed, and then we had the radon exposure was the next crisis, and so we kind of go through these series. I want to sort of get around to how we get to this practical application.

Mr. Bertrand, you are talking about sub-components which really could add up. A good example I guess, what you are doing is with the electronic aspect on reducing energy consumption. What I need to do more of in my adobe house is go around and seal up all those little cracks that over 100 years have steadily widened. But you are doing it from an electron point of view, the component.

It seems like though that our system, and I will say this, go back and forth, our system would not be able to accommodate your improvement, because we are looking more at the total refrigeration unit or air conditioning unit, not a component that could be plugged in to it.

Have you run into that problem with our Federal process?

Mr. BERTRAND. I think to be fair, we could use more clarity on directing our efforts. What we have encountered, as I mentioned,

is there is an emphasis on the total building system. There is a lot of energy around obviously the new standards for new buildings. But the question of how do we bring innovation to the existing fleet of buildings that we have is one that we think deserves more attention and one where maybe we don't need to paint such grandiose pictures.

We should go after implementation—there was earlier testimony around how many off-the-shelf technologies there are. Certainly we have some. Other companies have them. There are many opportunities out there for us to make a significant improvement in the efficiency of the structures.

Mr. BILBRAY. Small steps make a lot of difference. And to paraphrase the Democratic Party, the way you eat an elephant is one small bite at a time.

Ms. Bellenger, do we have the ability, see that we are not going over to Home Depot and pulling an air conditioner off-the-shelf and sticking it in, as much as some people might think. We are actually designing engineering, not just the building, but even the electronic components, the refrigeration. Anybody here want to comment on that, and about the ability for us to integrate and get the expertise?

Do we have the ability to tap into the expertise to know that these improved components may be out there and may be incorporated into our next big building that we look at? Do we have that capability in-house or do we have the ability to contract that capability to make sure that the finished product—is that part contracts we do when we go to the engineering side, we go to the design side?

Mr. GREEN. Mr. Bilbray, you certainly have the capability of doing it. The difficulty I think today in the way buildings are procured don't facilitate that kind of collaboration. The problem today is that on the one hand you have a design component that designs a building. There are design engineers that are engaged in the design of the subsystems and the total building system, architectural, engineering, which includes mechanical, pumping, etc. They design a building based upon their best practice or their understanding. They may not reach out as broadly as going to a manufacturer of components to determine exactly what is new in the marketplace.

Now, once the building is designed and it has been approved and started construction, you can't go back and change when you find there is something new or innovative that you could include in the building, because now we have a set of design documents that you have a bid process that says here is what you are going to build and here is what you are going to get.

The capability of doing this is to go back to a systems approach and then doing what we would call an approach to design that is by not specification, but performance, allowing the performance factors to determine how the building is designed and making it—incentivizing during the construction process if in fact there is a way to change the project from its design in the construction process that would yield additional savings and/or better performance, and, again, based upon performance, not specifications.

Mr. BILBRAY. Right. Outcome based—let me tell you something. All the time I have been frustrated with environmental strategies

or whatever is when the Federal Government goes to process-based instead outcome-based.

One of the things I am very, very proud of as a Californian is so much of our environmental programs are successful, like our clean air, like our clean ocean plan, is that unlike the Feds, like the Clean Water Act, which are process-based, outcome-based is truly the environmental step. It is an evolutionary step beyond that.

But before I leave, let me just ask for your indulgence. I would like to get down to one issue that we need to address. We may talk about these components, but one thing I learned at the Air Resources Board in California was before we allowed somebody to transfer a component into an automobile, even selling after-market, we prove longevity.

Before I leave that analogy, I want to say one thing. Just as we forced the auto industry to go from carburetors to injectors, though they didn't want to, but to come up to the efficiency of clean and mileage, they had to go to a different technology. We need to put the same pressures on ourself to kind of force us to be on our game.

But when it comes down to longevity, you take one of these components, let's just say you do have an efficient one. How are we doing the testing and how do we make sure that a unit is not just effective the day you buy it, but over 5, 10, 15 years? Because there is where you will find marked differences in certain types of technologies.

We have run into that in the air emissions issues with automobiles, where we literally had to outlaw products that looked good when you first bought them but became major environmental problems later. Do we have that strategy when it comes to this kind of efficiency, like the Star program?

Mr. BERTRAND. The other panel members may want to comment further on the details on the procurement process. The nature of our products do though, some of them can decay in terms of performance over time. So, Congressman, you are on to a very real issue, which is the efficiency of the component level at the start of the life versus later on. And looking at that total life cycle cost development I believe is a very important aspect and should be, if it isn't, strongly featured in the entire government procurement process as you would look to put precious taxpayer dollars to work to make sure the components we are putting in have the sustainability and will hold up over time and still deliver that performance level.

Mr. BILBRAY. Madam Chair, I appreciate you giving me the time. I would like to make a statement, and I sure hope somebody is listening about this.

Of all the years working on environmental oversight stuff, I will bring a little street knowledge to you. I believe the E-Star program needs to move on, needs to become more effective. I believe that there should be an E-Star standard that starts off with the initial efficiency that we use today. But there ought to be longer term ratings, to where we have two or three or four numbers so people understand that this product is very effective today, it will be effective in 2 years, it will be effective in 10, but at 12 there is going

to be major problems, and that the consumer knows that because we have done the testing.

That may seem like a whole big drawn out thing, but let me tell you something. Every after-market product that is sold in this country goes through that for automobiles. It is time we take a look at the same thing when we talk about efficiency.

So those numbers, that ESTAR really means something beyond just what—how well something works today. And that means that we have to do the research, because I think all of us agree we are doing things to try to save this planet and trying to do it quickly and effectively. But where it is really going to pay off is the accumulative impact as long as the technology continues to operate. If it doesn't, everything we are doing is really for show.

Thank you very much.

Ms. WATSON. I want to thank all the witnesses today. As you have just heard in the ranking member's comments, this is a burgeoning area of concern to our Federal Government, and those of us who have worked at local government and State government have been challenged by these issues, particularly those of us on the West Coast. So this is just the beginning of this dialog that we will be having. And technologies are being invented every single day that must be taken into consideration as we go for green buildings.

So thanks to all of the witnesses. Your input goes into the record.

And, Mr. Ranking Member, without objection—I would like to also thank the other Members that were here—but, without objection, we will adjourn this meeting.

[Whereupon, at 12:03 p.m., the subcommittee was adjourned.]

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