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WHAT IS THE PRICE OF ENERGY SECURITY: FROM BATTLEFIELDS TO BASES

HEARING

BEFORE THE

SUBCOMMITTEE ON READINESS

OF THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES

ONE HUNDRED TWELFTH CONGRESS

SECOND SESSION

HEARING HELD
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WHAT IS THE PRICE OF ENERGY SECURITY: FROM BATTLEFIELDS TO BASES

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
SUBCOMMITTEE ON READINESS,
Washington, DC, Thursday, March 29, 2012.

The subcommittee met, pursuant to call, at 12:07 p.m. in room 2212, Rayburn House Office Building, Hon. J. Randy Forbes (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. J. RANDY FORBES, A REPRESENTATIVE FROM VIRGINIA, CHAIRMAN, SUBCOMMITTEE ON READINESS

Mr. FORBES. We are going to get started. And I want to, first of all, thank you for your patience in putting up with us through this vote series that we just had, and also any that may come up as we go through today. It is a necessary part of the process here, and you all are well aware of it.

I am going to do something a little bit different today. Instead of some prepared remarks, I want to start off by introducing our panel members.

We have with us the Honorable Sharon Burke, the first Assistant Secretary of Defense for Operational Energy Plans and Programs. We also have Dr. Dorothy Robyn, the Deputy Under Secretary of Defense for Installations and Environment; the Honorable Katherine Hammack, Assistant Secretary of the Army for Installations, Energy and the Environment; the Honorable Jackalyne Pfannenstiel, Assistant Secretary of the Navy for Energy, Installations and Environment; and the Honorable Terry Yonkers, Assistant Secretary of the Air Force for Installations, Environment and Logistics; Commander, Naval Air Systems Command.

I want to say at the outset, Terry, you are going to have to hold up your end because you have got a lot of ladies here today that outnumber you on that panel in there.

But I want to start by thanking each of you, not just for being here, but for the service that you give to our country. And also something even more. You know, a few years ago it seemed like when we would look over at the Department of Defense it looked like they had kind of pulled the drapes shut, they had disconnected the phones and locked the doors, and we couldn't get any information on so many issues.

And to the person, you all have been so wonderful in being willing to come over and talk to us about some very difficult, sometime controversial, issues. And I want to just tell you how much we appreciate you doing that. And also we know how much you have on

your plate. You have got a lot to carry. And all of you have a great deal to brag about in what you have done in terms of energy. And we want to hear some of that from you today.

I told many of you personally I wish that we could have a hearing on nothing but all the good things that we could have each of you tell because it is a wonderful story. But, you know, we don't have that in the amount of time that we have.

One of the things that I also would like to tell you is this. Privately, all of you have shared with us the importance of bringing the private sector in as partners in everything that you are doing, and I think that is exciting. I think we also realize that is important to do.

We realize also that your biggest investors are the taxpayers across the Commonwealth of Virginia. And like it or not—or not Virginia, but the country—for me it is Virginia, for Madeleine it is Guam, and other different localities—but corporately, the country.

And one of the things that we try to do in this hearing is, like any other good investor, we try to justify why we are investing in the things that we do. And sometimes it is just a matter of scratching our head and say, "What are the facts, and how we can get those facts?"

And just because one investment is good doesn't mean they are all good. And so we have to constantly do that due diligence role, and we appreciate you helping us do that today.

The other thing I realize is that a lot of these things you just happen to be the card holder. You didn't get to dictate the cards you have to play with. You come in here and you have got a lot on your plate to have to deal with.

So I want to, if I can, also put up a couple of charts and kind of tell you where I think we are today.

And, Nicholas, can we get those put up, when you can?

[Start slideshow.]

Mr. FORBES. The first thing is, why are we here? A lot of different reasons. But the big thing are these two gaps. And the only thing these numbers represent, it shows how volatile energy prices are. We see back in I think it is 2005, you know, what a gallon of gas was. We know it spiked up in June of 2008, and we see where they are today. And also what electricity costs are. And you guys have to live with that.

And, you know, that is a big thing. And that is something that anybody watching this hearing at home understands and knows.

And Nicholas, if we could go to the next chart.

This is the other big reason we are here. You guys jointly sit on a lot of expenditures for energy, about $19.4 billion. Seventy-nine percent of that, or $15.3 billion of it, is operational; and 21 percent of it, 4.1 percent of it, is facilities energy. We tend to sometimes blend them all together. We know they are two different stacks. We want to look at them. But corporately, they come together. That is the big-picture item that we are looking at.

Then if we could flip to this next chart. As I mentioned earlier, we are representatives of the investors across America, hard-working taxpayers. And our role is to do due diligence. And when we look across the spectrum of not what we are consuming, but what we are investing in, in the Department of Energy, that chart

looks a little confusing to anybody that looks at it. It is confusing. It is so many different things we are investing in.

And it is very difficult for us, as a Congress, to get our hands around how much we are investing in all these programs and where they are. So part of what we have to do—we won't do all that today—but through our written questions to you and your continued dialogue with us, is finding out what that dollar amount is so that we can justify that to the true investors, the taxpayers across America.

And then one last chart. When we talk about energy, we sometimes tend to be like a "Casablanca" movie, where at the end we say, "Round up all the usual suspects."

We bring in a number of different things, and it is kind of rotational. If you say, "Why are we doing this investment?" first thing we do is round up all the usual suspects. But if one of those don't justify the investment, we kind of spin off to the other one.

But as I have listed to you and pulled off these justifications, they normally come down to about four. And if you want to add another one to it, you are the experts. We would love to hear from you.

[End slideshow.]

But the first one and the top one of all them is this volatility of fuel prices. I mean, they are going up and down and all over. And somehow or other we have to get a peg on that. The second one is the safety of the warfighter. And by that we mean—and I think some of you have correctly said that—if we are having to logistically carry fuel, that puts somebody at risk. And Secretary Hammack, you have talked about that quite a bit.

And so one of the things we look at is safety to the warfighter by having less fuel consumption so they have less that they have to distribute. Third thing is being just good environmental stewards, and we all certainly want to do that. And then the final thing is the flexibility of the warfighter. And by that, I mean can they fight an extra month with the resources they have, can they fight an extra hour in the air. All that is important.

And so today, as we look at these investments, one of the things we will try to do is peg which one of these categories we are trying to accomplish by the investment and what is the premium we are willing to pay to get that.

I would like to ask unanimous consent for me to put my written comments in the record. And without objection, we will so order that. In addition to that, we had a request by Senator John Warner, former Senator John Warner, a member of the Senate, chairman of the Senate Armed Services Committee.

[The information referred to can be found in the Appendix on page 130.]

Mr. FORBES. And one of the things, Senator Warner has always been a great friend of mine. He is an icon. We all respect him tremendously. And when Senator Warner wants anything put in the record, I am willing to put it in the record. So I just want to make sure we have no objection to that and, without objection, we are going to put that in the record, as well.

And now I would like to turn to my good friend, Ms. Bordallo from Guam, for any comments that she might have.

[The prepared statement of Mr. Forbes can be found in the Appendix on page 47.]

STATEMENT OF HON. MADELEINE Z. BORDALLO, A DELEGATE FROM GUAM, RANKING MEMBER, SUBCOMMITTEE ON READINESS

Ms. BORDALLO. Thank you very much, Mr. Chairman, and to all our witnesses I thank you for your testimony. And welcome back, Ms. Burke—a special welcome—as I think this is the first time you have testified before our committee. And Mr. Chairman, I think we are in good shape with all the women as witnesses today. Of course, I know that the Honorable Yonkers will hold his own. Yes.

I appreciate that Chairman Forbes has called the hearing on this important topic. Energy security is critical to the future of our military and our economy in the long run. Over the next three decades, the United States Department of Energy expects energy consumption to increase by 53 percent, which will create additional challenges and concerns to our economy and especially to our military.

The Department of Defense accounts for approximately 80 percent of all Federal energy consumption, including both installation and operational energy needs. For example, energy costs increased about 25 percent from fiscal year 2010 to fiscal year 2011, yet consumption has declined. A significant factor in this increase was due to fuel costs.

At a time of austere budgets, we need to make important investments in energy so that we can stabilize energy costs within the Department of Defense and allow those savings to be put back to supporting our warfighter in modernization, training, or other priorities.

It is important that we manage this endeavor for energy security wisely. We must be careful in how and where we invest the taxpayers dollars to ensure that our investments in energy security pay dividends in the long run. I do appreciate that in this fiscally constrained time that the Department of Defense is going to rely heavily on third-party financing for a lot of these energy investments over the coming years.

Over the next 5 years, there will be $2.4 billion in third-party investments for facility energy programs. Without significant third-party investment, it would be difficult for the Department of Defense to achieve the fiscal year 2015 goal of a 30-percent reduction in energy intensity. So I do hope our witnesses today will elaborate on the nature of these third-party investments and outline what authorities may be necessary to ensure the third-party investments are successful.

The Department of Defense recently issued an operational energy implementation plan. The plan will focus on three core priorities. And part of achieving these core priorities will require better measurement of consumption. Further, meeting these core priorities will also require tremendous coordination within the Department of Defense.

While I appreciate that each individual Service has unique requirements and different ways of supporting the warfight, it is imperative that implementation of this operational energy plan is done so effectively. Unlike operational energy, there is no com-

prehensive plan for reducing energy intensity to meet statutory requirements in a reduction of energy consumption by 30 percent in 2015 from the baseline energy consumption in 2003.

However, I do hope our witnesses can elaborate on how installation energy demand will be reduced across the Department of Defense in a coordinated fashion. While the goals are clear, the most efficient way to reach that goal is through a coordinated effort amongst all of the Services and installation commands.

In particular, I would like to highlight the Navy's approach to these energy matters. In approaching energy investments, the Navy looks at the full spectrum of potential benefits from energy programs, to include meeting certain other regulatory requirements or the sale of energy to the civilian power grid. I believe this type of holistic approach is the type of out-of-the-box thinking that will help the Department in a variety of ways in the long run.

In assessing where to put investment in energy, it is important to look at the matter as more than just a simple equation. While it is important to quantify the monetary benefit of certain investments, there are also other tangible benefits of certain investments. For example, if a certain energy project helps the Navy meet EPA [U.S. Environmental Protection Agency] regulations, the monetary benefit may be hard to quantify. But compliance is a significant value added to the project. So I do hope that this type of thinking can be looked at as a model for implementation Department-wide.

This hearing comes at an important time. We must continue to make smart investments to reduce our energy consumption because it is a matter of national security. Stabilizing energy costs will help us invest in necessary modernization, training and sustainment of assets. We must have a coordinated strategy so we make smart investments. But these investments must be made, or we will fall behind in this important endeavor.

So, Mr. Chairman, I again thank you for holding this hearing. And I look forward to our witnesses' testimony and to our question-and-answer period. Thank you.

Mr. FORBES. Well, thank you, Madeleine. Thank you for your hard work and those remarks.

And as we discussed prior to the hearing, I ask unanimous consent that it be made an order to depart from regular order so that members may ask questions that follow train of thought from the proceeding member. I think this will provide a roundtable-type forum and will enhance the dialogue on these very important issues. So without objection, that is so ordered.

As we turn to the witnesses for their opening remarks, I would like to ask each of you to take this opportunity to highlight the good things you have done in the energy arena. And as I mentioned, you can't do that in a few minutes. We know that. So that is why we say highlight.

But I also welcome you to put anything else in the record you want, and certainly your written statements will be made a part of the record. So I want you to realize that is going to happen.

And also to talk about any of the good work that needs to be done in the future. But then we look forward into delving into some of the more detailed discussions and specific areas we would like

to scrutinize for the proposed investments the Department of Energy seeks to make.

Ms. Burke, I would ask that you lead and follow in the order that you are in, but if you have any additional order that is up to you. And as I have mentioned to each of you outside of the hearing, if you need to clarify any of your comments, statements, just let me know. We want to give you time to do that. In the end, I am going to come back and ask if there is anything you want to get into the record.

Final thing I am going to tell you as we start, oftentimes we will submit written questions that members have. This is one of those hearings. Those written questions are very important because we just don't have the time to get all the questions in. We will be submitting those to you, and if you don't mind try to get back to us so we can make those a part of the record.

And with that, Ms. Burke, we will look forward to your comments.

STATEMENT OF HON. SHARON BURKE, ASSISTANT SECRETARY OF DEFENSE FOR OPERATIONAL ENERGY, U.S. DEPARTMENT OF DEFENSE

Secretary BURKE. Well, thank you, Chairman Forbes and Ranking Member Bordallo, members of the subcommittee. I really appreciate the opportunity to discuss the President's fiscal year 2013 request for operational energy initiatives for the Department of Defense, and to be here with my colleagues to discuss all the energy initiatives in the Department.

And I can assure you that Secretary Yonkers does hold his own, and he is not a token male.

[Laughter.]

Now, you have my statement for the record, so I am not going to read it to you. But you are correct, Representative Bordallo, this is the first time I have appeared before you, but it is also the first time an assistant secretary of defense for operational energy has appeared before this committee. So I do want to spend a few minutes talking about the office, since Congress created it, and what we have accomplished to date.

Just recently, I traveled to Pacific Command for a workshop on how to implement the Department's operational energy strategy. And while I was there, they took me to see Red Hill. And I don't know if you are familiar with that facility, but it is an extraordinary engineering feat. It is a 242-million gallon fuel storage facility that has been tunneled into solid volcanic rock. It is an amazing thing to see.

And if you have questions about why we would do that, all you need to know is when we did that. It was completed in 1943, so it was initiated even before Pearl Harbor. And that was because we had to have a steady, reliable source of energy for our planes, our ships, and our troops on the ground who were so far away from home in order to prevail in the Second World War.

And that is true today, too. Every military mission today requires a steady, reliable supply of energy. And, in fact, General Petraeus, when he was still commanding in Afghanistan, wrote that energy is the lifeblood of our warfighting capability. That is

why the Department of Defense in fiscal year 2013 is requesting $16.3 billion for petroleum to support military operations around the world.

Now, in World War II, our ability to protect those supply lines and to interdict those of our foes was an important comparative advantage in that war that contributed to our victory. Today, however, our operational energy posture is imposing costs at all levels—strategic, operational and tactical and, of course, financial. And that is why Congress created this office in the first place in the 2009 Defense Authorization Act.

It is also why the Department is requesting $1.4 billion for fiscal year 2013 for initiatives to improve the Department's operational energy use. We want to recapture that strategic advantage.

Now, my written statement details how I built up the office and our progress to date, especially on rapid fielding of energy innovations to deployed forces. And my colleagues here have been instrumental in those efforts, so I expect that they will tell you more about some of those efforts and what they have done.

For this morning, what I would like to focus on is one specific area of activity for my office—and that is the release you mentioned, Congresswoman—the operational energy strategy and also the implementation plan that Secretary Panetta released earlier this month. Because this is the framework that we have established for improving operational energy use across the Department.

Now, the goal of that strategy is to improve energy security for the warfighter, meaning we want to ensure that U.S. military forces have that steady, reliable supply of energy for that full range of 21st century military missions.

And there are three ways the Department is going to meet this goal. First and foremost, by reducing our demand for energy. Second, we want to diversify and secure our supplies of energy. And finally, we want to build energy security into the future force.

So about 90 percent of our fiscal year 2013 budget request is for initiatives that reduce our demand for energy. And that is very important because we have seen in Iraq and Afghanistan that with distributed operations, asymmetric threats and attacks, and modern military capabilities that are terrific—but also very fuel-intensive, very energy-intensive—that we need a great deal of fuel, and our supply line has been vulnerable. It is in the battle space, and the opportunity cost in lives and in dollars and in capability has been much too high.

We believe that will continue to be a concern going forward as we project presence and power elsewhere in the world, particularly in a time when there is an increasing prevalence of precision-guided missions.

Now, the other 10 percent of our budget request for fiscal year 2013 is for supply diversification, and that is the second objective of the strategy. So this means we want better energy options that serve the mission. So, for example, we have been using solar in Afghanistan for our forces who are out at the tactical edge. This gives them better range, endurance, resilience, independence from the supply line. It helps them do their jobs.

Now, of course, the Department also has a significant reliance on liquid fuels, and that will continue for the foreseeable future. And

you have directed my office to take a lead role in setting a coherent and consistent policy for the Department on the use of alternative fuels. We are doing that now.

But I do want to clarify that the Department of Defense's investments to date have been in research, development, testing and evaluation. And also that all of the Services currently have a policy that they will only purchase operational quantities of alternative fuels at a time when they become price-competitive.

So the final element of the operational energy strategy is to build energy security into the future force. And we are doing that by incorporating energy into the Department's planning, into our strategic documents, our war-gaming, our requirements generation, and our acquisition process. And, in fact, that is why I was at Pacific Command. We were looking at how to bring the lessons of the past, from Red Hill, to the Northern Distribution Network into our future capabilities and our future missions.

And in my mission, Congress, and this committee in particular, have been very supportive of our work—and I would like to single out your staffs as well who have been very supportive of establishing this new office and this new function—and supportive of our efforts to harness better energy performance and better energy technologies for the warfighter to make them more agile, lethal and adaptable.

So on behalf of the men and women in uniform, thank you very much for that support and I look forward to your questions.

[The prepared statement of Secretary Burke can be found in the Appendix on page 54.]

Mr. FORBES. Thank you.

STATEMENT OF DR. DOROTHY ROBYN, DEPUTY UNDER SECRETARY OF DEFENSE FOR INSTALLATIONS AND ENVIRONMENT, U.S. DEPARTMENT OF DEFENSE

Dr. ROBYN. Good morning. Thank you, Chairman Forbes, Ranking Member Bordallo, distinguished members of the subcommittee. Thank you for the opportunity to testify about what the Department of Defense is doing to promote energy security in the area of facility energy.

I want to address three questions this morning. First, why does the Department of Defense care about facility energy? "Why are we here?" to use your question, Chairman Forbes. Second, what are we doing about it? What is our facility energy strategy? And third, what are the major challenges we face?

First of all, why are we here? We care about facility energy for two key reasons. The first is cost—your second chart. With over 300,000 buildings, 2.2 billion square feet of space, we have a footprint six times that of the General Services Administration and three times that of Wal-Mart. Our energy bills are correspondingly large—$4 billion a year.

The second reason we care about facility energy is mission assurance. Our installations support combat operations more directly than ever before. We pilot UAVs [Unmanned Aerial Vehicles]. We fly long-range bombers from our installations here at home. These bases, in turn, rely almost entirely on a commercial power grid that is increasingly fragile and vulnerable to disruption.

With an eye to lowering that $4 billion a year energy bill and to improving the energy security of our fixed installations, we have been pursuing a three-part strategy. The first and most important, reduce demand. We are using our MILCON [Military Construction] and our sustainment budget, supplemented by third-party financing, to make our buildings more energy efficient.

Specifically, we have, in the fiscal year 2013 budget, $1.1 billion direct funding, largely for, almost entirely for, energy efficiency retrofits of existing buildings. In addition, we have a commitment outside of the budget, a commitment to do more than $1 billion over the next 2 years of performance contracts—energy savings, performance contracts, utility energy-savings contracts—so the third-party financing of similar energy efficiency retrofits of our buildings.

We address new construction through requirements; requirements for LEED [Leadership in Energy and Environmental Design] Silver, 30 percent above ASHRAE [American Society of Heating, Refrigerating and Air-Conditioning Engineers]. And my office will be issuing a new code, a unified facilities code, for sustainable high-performance buildings later this year.

And then finally, an absolutely critical piece—and I will return to this later—is metering and measurement. And my office will be issuing an updated policy, a more ambitious policy, on which and how many buildings we need to meter, and laying the framework for an enterprise energy information system that allows us to more systematically collect and analyze data.

Second element of the strategy, expand the supply of renewable and other forms of distributed, or on-site, energy. Together with microgrid and storage technologies, on-base energy generation can make our installations more secure in the event of a major disruption to the electric grid. Many of our bases are well suited for renewable energy. And the Services are all pursuing this aggressively, and largely with third-party financing.

The key issue that I want to flag here has to do with withdrawn lands. Many of the best sites on our installations for solar, wind, and geothermal are on land that we have withdrawn from the Department of Interior for military use. There are some impediments to us using these withdrawn lands for large-scale renewable energy products. We are working closely with the Department of Interior to overcome those impediments. That is a key issue.

The third element of our strategy, facility energy strategy, is to leverage advanced technology coming out of industry and Department of Energy labs, principally by using our installations as a distributed test bed to do demonstration and validation of next-generation energy technologies that have the potential to reduce our energy consumption or improve our energy security significantly.

Emerging technologies offer a way to significantly improve our performance and reduce our costs, but there are significant impediments to the commercialization of these technologies; primarily the fact that the first user bears significant costs and risks, but does not gain any additional benefit from those that follow.

As the owner of 300,000 buildings, we look at risk differently. It is in our direct self-interest to help firms overcome the barriers that inhibit innovative technologies from being commercialized and/

or deployed on our installations. And we do this by using our installations as a distributed test bed to demonstrate and validate the technologies in a real world.

A major focus of this demonstration and validation effort—or Dem/Val, as we call it—is advanced microgrid technology. Microgrids are small-scale versions of the commercial power grid that allow for local control of supply and demand. Combined with on-site distribution and storage technology, an advanced microgrid system will allow an installation to maintain critical functions on a base if the commercial power grid goes down and stays down for some length of time.

Another major focus of our test bed activity is emerging technologies that will significantly reduce the consumption of energy in our buildings. And I will just give one example. At Watervliet Arsenal in New York, the Army is testing an advanced control system, developed by United Technologies, that could increase boiler efficiency by 5 percent. Only 5 percent, but when you think about how many thousands of boilers that we have on which we could deploy this technology the savings are meaningful.

I love to go through examples of what we are doing on our test bed. I will refrain from doing that, but I will just say that yesterday Sharon and I went to the rollout of a report by two nonprofit groups called Energy Innovation at the Department of Defense. And we were on a panel with Norm Augustine and retired general Ron Keys.

And this report is a wonderful report. And it focuses, it really focuses, on what this installation energy test bed is doing. There is a chapter, a paper by the guy who runs that program. And they flag this model as being one of the most innovative approaches that the Department has, certainly in the energy space.

Finally, what are the major challenges we face? Let me just point out two. First, we do a lousy job of measuring the energy performance of our buildings. Most of our buildings aren't metered, and we don't have a standardized way of collecting and analyzing the data. I will be, as I say, putting out a more ambitious policy on metering and data collection analysis. But we need to implement it more aggressively. The Navy is showing us the way, in that regard.

Second, although, as I have said, our strategy calls for heavy reliance on private financing both to retrofit our buildings and to develop renewable energy on our bases, our acquisition process is extremely cumbersome. We need to improve that if we want to attract the best private firms. And here, I would say Army is showing us the way, having taken the first steps toward streamlining the process for energy savings performance contracts.

In sum, facility energy is a very important issue. We have a good strategy for improving it. We face some challenges. I look forward to working with you in the months ahead to tackle these and other challenges so that our investments in facility energy are as productive and high-leverage as possible.

Thank you.

[The prepared statement of Dr. Robyn can be found in the Appendix on page 62.]

Mr. FORBES. Thank you, Dr. Robyn.

Secretary Hammack.

STATEMENT OF HON. KATHERINE HAMMACK, ASSISTANT SECRETARY OF THE ARMY, INSTALLATIONS, ENERGY AND ENVIRONMENT

Secretary HAMMACK. Thank you, Chairman Forbes, Ranking Member Bordallo and distinguished members of the subcommittee. On behalf of Army soldiers, families, and civilians, I want to thank you for your support of Army programs overall and Army energy programs.

In fiscal year 2013 our energy budget is $4.5 billion. And of that, $2.5 billion is for operational energy. And that is the energy we use in war, like in Afghanistan. There is a lot that we are doing in energy to improve. We have energy efficiency programs. That is a billion dollars of the budget. Another billion is for our installation energy.

So overall it is a large budget. We have a lot of programs, though, to work to manage our costs and reduce our consumption. But what I want to talk about here is a little bit of show and tell. But you said brag, so I am bragging about the great things that our teams are doing in the Army.

First of all, our energy strategy is broken into three parts. The first part is soldier power, the second is basing power, and the third is vehicle power. For the Army, soldiers are our platform. Soldiers are what we are about. We are a ground force, and our soldiers carry power with them.

A soldier on patrol can carry as many as—a 3-day patrol—as many as 70 batteries weighing about 16 pounds. And so one of our focuses has been to reduce that. One of the ways is through rechargeable batteries, which I can't unplug from this recharging device. But we have rechargeable batteries. But if you have rechargeable batteries, then you have charging devices.

So a soldier who might have multiple kinds of batteries might have multiple recharging devices. So we came up with a universal charger that you can plug different kinds of batteries into.

We followed that by having the charger able to be powered from multiple sources, whether it is solar power, whether it is vehicle power, or whether it is plugging into an electric outlet. So we are empowering the soldier, increasing their capability so that they are able to fight longer and go further.

Our second pillar is basing power. And in basing power, again, operational energy and installation energy. Operational energy, what we use in theater, 40 percent of that is in generators to generate electricity. So one of our focuses is to have more efficient generators.

Another focus is microgrids, like Dr. Robyn talked about. We have installed, in the last 12 months, 28 microgrids that are saving 50 million gallons of fuel a year. That means convoys not on the road. And we are finding one in every 46 convoys suffers a casualty, whether it is a wounded in action or killed in action.

If our soldiers, instead of guarding convoys, are out fighting, then we have increased the capabilities of our warfighting force. And that is what energy security means to the Army.

In our basing energy, as Dr. Robyn talked about, again we have a focus on energy-saving performance contracts. And in fiscal year 2012, we are quadrupling the number of energy-saving perform-

ance contracts. In all of fiscal year 2011, we executed $73 million. In just the first quarter of fiscal year 2012 we executed $93 million in contracts, and are on the path to execute at least $400 million in energy-saving performance contracts in fiscal year 2012.

We believe that partnering with the private sector is the appropriate way to steward the installations that we have and reduce our installation energy consumption. And since 2003 we have reduced our energy consumption on installations by 13 percent where, at the same time, we have increased the size of our force and those using Army installations.

We are leveraging the private sector in using alternative energy on Army installations by standing up an Energy Initiatives Task Force to work on partnering with the private sector to bring alternative energy projects onto Army installations, and to reduce our consumption and increase our energy security.

Our third pillar is vehicle power, and on that we are taking a look at vehicles. This is a fuel-efficient demonstrator. I could have brought a big one in, but it would take up the whole hearing room here. So I brought a small model instead.

But what we did on the FEDs [Fuel-Efficient Demonstrators] is, we took a look at how energy is used throughout the vehicle and where heat is generated. You have heat in braking, you have heat in engine systems, you have heat generated by the various equipment on it. And heat is energy. And by studying the various systems in the vehicle, we are able to make the vehicles more efficient so that we can reduce the operational energy in-theater.

I will challenge you, though, on measuring operational energy because we always say the enemy has a vote. The amount of operational energy we use is dependent upon the fight that we are in.

So although I can look at systems—whether they are battery systems, whether they are power systems, or vehicle systems—and make those systems more efficient, I cannot guarantee to you the amount of fuel I will use because it depends upon the warfight. And I do not want the warfighter hampered by restricting their access to and availability of energy.

What I want to say, in conclusion, is that I invite you to come visit our installations where we are working on these systems—whether it is the tank and automotive division that is out in Detroit, where they are working on vehicles and they are opening up a ground systems power and energy development lab next month which is focused on hybrid technologies, thermal technologies and battery technologies, and acts as a resource to the entire design community in the Detroit area—or Fort Devens, Massachusetts, where we are working on basing power for contingency operations, where our base camps are testing technologies, whether it is solar, whether it is microgrids or other systems that are more efficient.

Or even out at Fort Leonard Wood, where our engineers are working on how you put together those technologies that have proven themselves out into a deployable force; out at Fort Bliss, where we have the network integration event where our soldiers are testing and training on these systems prior to deployment.

So in conclusion, I want to thank you for your support of the Army. I want to thank you for everything you are doing for the

Army. And I want to tell you that the Army is onboard with energy because it increases capabilities for the warfighter.

[The prepared statement of Secretary Hammack can be found in the Appendix on page 79.]

Mr. FORBES. Thank you, Secretary Hammack.

Secretary Pfannenstiel.

STATEMENT OF HON. JACKALYNE PFANNENSTIEL, ASSISTANT SECRETARY OF THE NAVY, ENERGY, INSTALLATIONS AND ENVIRONMENT

Secretary PFANNENSTIEL. Thank you, Mr. Chairman, Congresswoman Bordallo, distinguished members of this committee. I appreciate the opportunity to appear before you today to describe the Department of the Navy's energy programs.

The fundamental premise of our programs is that our energy investment will improve our combat capabilities, increase our mission effectiveness, reduce our vulnerability to foreign sources of fossil fuel, and stabilize energy costs. This is not part of an environmental or green agenda. Rather, its purpose is to impose improvements, investments, to maintain America's military leadership.

Without investments in alternative fuels—without investments in alternatives to conventional fuels—the Navy will continue to be subject to market volatility. The volatility is caused by threats of conflict and rapid demands from other countries. Since the beginning of this fiscal year, political unrest has increased the per price of a barrel of oil by $38. That is an increase of the Navy's fuel bill of a billion dollars.

So our budget request in fiscal year 2013 is for a billion dollars for energy investments. This will promote energy independence and security, provide tactical benefits, and provide for facility maintenance. Of that $1 billion, about $600 million will go into the shore investments, which will provide savings back to the Department through efficiencies.

It will be, as Dr. Robyn mentioned, 27,000 advanced meters, such that we are moving towards a day when almost of all our usage in both the Navy and Marine Corps will be metered on advance meters. We will provide for energy audits, which then give back a stream off of efficient investments that we can be making in energy. And it will support less sexy kinds of features as improved HVAC [heating, ventilation, and air conditioning] systems and lighting, and energy management systems.

Of the $1 billion, $400 million will go to operational investments, which will directly enhance combat capabilities through increasing the range, reducing down times, improving the resilience of the forces. Such improvements will be the propeller coatings on the ships and shelter liners for the Marines, more hybrid electric drives for our destroyers, and tests and certification of alternative fuels.

We are on track to meet our shore goals that were set by Congress and the Department. We are applying new and existing technologies to our shore installations, of which there are about 100. We are increasing the diversity of power sources. We are improving the security of the grid. And we are looking for cost stability.

We are developing a strategy such that 50 percent of our energy onshore will come from alternative sources, and that will be about

a gigawatt of power. This will be done through third-party investments, and over the life of these contracts it will be less expensive than buying conventional sources of power.

Some examples of how we are doing this, we have done at Twentynine Palms, China Lake and Barstow. Those three examples will save $20 million over the life of those contracts.

We are also developing regional smart grids. And we are having a pilot in the San Diego area which will combine some bases so that we have the ability to use power most efficiently among the bases that use power there such that we can reduce our costs and provide for more secure installations.

Our operational goals will be supporting both advanced technologies and alternative fuels. The expeditionary forward operating bases that the Marines have been developing have used advanced technologies in-theater already; solar generators, LED [light-emitting diode] lights, tent liners. They have cut the cost of fuel on base by 25 percent, and at the combat outposts by 90 percent.

There are fewer vulnerabilities. I think Katherine mentioned the vulnerability of transporting fuel and water. Our figures say that for every 50 fuel-water convoys we have one Marine casualty. That is much too high a price to pay for moving fuel in-theater.

The Marines have recently modeled what they might be able to achieve from using these advanced technologies, and they have determined that by 2017 they would be able to go an additional month of operations with no additional fuel. Our investments in biofuels will reduce our dependence on foreign oil and will help stabilize our energy costs. We have, so far, tested all of our aircraft and most of our surface ships on alternate fuels.

So I will summarize by saying that these goals—our goals, your goals—reflect energy as a strategic and tactical capability. We can't wait until fuel is unaffordable or not available to pursue these alternatives.

Thank you for your support, and I look forward to your questions.

[The prepared statement of Secretary Pfannenstiel can be found in the Appendix on page 97.]

Mr. FORBES. Thank you for your comments. Secretary Yonkers.

STATEMENT OF HON. TERRY YONKERS, ASSISTANT SECRETARY OF THE AIR FORCE, INSTALLATIONS, ENVIRONMENT AND LOGISTICS

Secretary YONKERS. Well, good afternoon, Chairman Forbes, Congresswoman Bordallo, and the members of the committee.

First of all, let me say thank you for your service to our country and to the tremendous support that I know you give our Air Force, our airmen, civilian military, and their families every day. It is very important to us.

And I want to say that it is a pleasure to be here today and talk about what the Air Force is doing to reduce our energy demand, increase the energy supply, and create that energy security that, as all of my colleagues have talked about, enables us to do our mission. And that is, first and foremost, in our Air Force, fly, fight, win—air, space and cyberspace. And we are not going to deviate from that goal.

Let me give you some statistics to kind of set the stage here, if I may. Unfortunately—or perhaps fortunately, I am not sure which—the Air Force is the biggest consumer of energy in the Department of Defense, clearly 60 percent of everything that the DOD [Department of Defense] uses. Most of that comes in the form of jet fuel. It is more expensive to fly aircraft than it is to run tanks or ships.

Last year—excuse me, in fiscal year 2011—we spent $9.7 billion, with a "B," for fuel and electricity. And that is $1.5 billion from what we spent in 2010. And, Mr. Chairman, you showed some statistics in your first chart and that is exactly what is happening here. These cost growths are a direct result of the fluctuation of price in the marketplace for jet fuel and aviation fuel.

And over that period of time, between 2010 and 2011, that was a 90-cent per gallon increase. And ironically, during the same period of time, we saved—through operational efficiencies and other methods—nearly 75 million gallons of fuel. So in contrast to the aviation side of the Air Force, our installation energy expenditures are relatively stable at about $1.1 billion a year.

A lot of that has to do with the investments that we have made over the years in the kinds of things that my colleagues have talked about. And that is, upgrading our HVAC systems and these other high-energy use systems, putting in more efficient lighting, insulation, roofs, et cetera, et cetera that help drive down the costs of our energy expenses on our installations. And we made an $800 million investment over the course of the last few years in doing these kinds of things.

Concurrently with that, in our demolition program we have demolished almost 17 million square feet of old buildings and replaced those buildings with new facilities that are 30 percent more energy-efficient. As my colleagues have talked about, we are also aggressively pursuing things like energy-savings performance contracts and energy conservation investment programs, or ECIPs.

And we have invested $143 million over the last 5 years on 70 ECIP [Energy Conservation Investment Program] projects that are now returning $27 million a year on an annual basis.

Moreover, we are aggressively pursuing the public-private partnerships that we have already talking about. And that is to take, truly, advantage of these third-party investors to construct primarily renewable energy projects such as solar, wind and waste-to-energy to reduce the costs of grid-provided electricity. So far we have 131 of these ECIPs in place, generating about 80 megawatts of energy.

And we continue to look at the future, and have Air Force goals to reduce total consumption of our jet fuel and our facility energy. For 2013, we are focusing investments to reduce our consumption in jet fuel by 10 percent. And when you look at what we spend, that equates to about $2.5 billion. So it is real money. And to, of course, hit our installation energy objectives of 30 percent.

And specifically in 2013, we are requesting, as I think both Dr. Robyn and Ms. Burke have talked about, specific investments in reducing energy operationally—primarily, $530 million—invest in solutions to reduce energy demand, improve energy efficiency, diversify the supply, and improve our mission effectiveness.

That includes $215 million in the kinds of things that we have talked about; on energy upgrades and HVAC systems and so forth. Thirty-two million dollars million is going to go into aviation efficiencies, particularly KC–135 engine upgrades and some drag reduction on our KC–10s. And the remainder of that money, about $330 million, will go into ADVENT [Adaptive Versatile Engine Technology], or those things that are going to give us much greater longevity and efficiency and sustainability in the jet engines of the future.

And some of these kinds of investments are looking at energy efficiency and new jet engines, or upgraded jet engines of 30 percent. So again, monumental if we achieve those objectives. And just like the Navy, by the end of this year we will have all our aircraft certified to fly on alternative fuels, particularly the Fischer-Tropsch and HRJs [Hydrotreated Renewable Jet fuel].

Later this year, we are also going to introduce a net zero policy, similar to what the Army has put into place, to change the way we think and the way that we use energy. This is really part of our cultural change in the Air Force. And our expectations are to create as much energy as we use, manage our waste resources and the way we work our water resources, and reduce the amount of waste that we generate to near zero, as well as benefit from reduction in greenhouse gases.

So, Mr. Chairman, across the board—and if I can leave you with one thought today—we are looking at energy as a multi-dimensional program. We are trying to take advantage of third-party financing. We are making strategic investments from the appropriated dollars that you give us. And we are doing this in a business arrangement.

As Jackie mentioned, this is not about being green, it is not about pursuing goals for the sake of pursuing goals. These are business-driven decisions for us.

And I look forward to the debate and the discussions.

[The prepared statement of Secretary Yonkers can be found in the Appendix on page 108.]

Mr. FORBES. Thank you, Mr. Secretary. And all of you have heard the bells going off. If you will bear with us, we are going to go over. I don't know if we have one or two votes.

We just have one vote, so it won't take us very long. We will be right back and start some questions and discussion. Thank you.

[Recess.]

Mr. FORBES. Once again I want to thank you all for your comments, thank you for your service, thank you for putting up with us today and being a little bit flexible. As I alluded to in my opening comments, we want this to be a good dialogue. We view most of what we are doing here as trying to do due diligence to make sure that we are representing your largest investors, the taxpayers of the United States.

And sometimes, when we do that with a limited amount of time, it looks like we are emphasizing one thing over another. We are really not. It is just a matter of they are the things we are trying to delve into that particular point and time. And secondly, because we don't talk more about particular things sometimes it would lead one to conclude that we don't appreciate the great work that is

being done in those areas. But I want to assure you that is not the case either.

I want to start, Secretary Hammack, with telling you how much we appreciate all that the Army has done. I mean they really are making differences in protecting our warfighters. We understand that, and we know that. And thank you for your toys that you brought in to show us today because we enjoy seeing that. A picture is worth a thousand words and a model is, too.

And Secretary Yonkers, you did a good job in balancing this show out okay. And also we appreciate what the Air Force is doing, especially when it comes to some discussions you and I have had outside of here, with the possibility of at least looking into maybe some longer-term contracts for fuel purchases which would help stabilize, I think, some of that volatility.

And we want to try, as a committee, to try to help you and support you in that because I think that makes really good sense. Also, I am excited because we have got a great team here today. I don't say that just to lift you up, but it is true. So much talent sitting over there, and one of the things that is great is we are trying to move to a coordinated effort when we are dealing with energy and looking at our goals and our policies.

And so we have got experts in operations and in facilities in each of our Services. And what we tried to do today, or at least I did, is to look back not at what I thought was a priority, but what some of the folks that might be associated with you look at as a priority.

And Secretary Pfannenstiel, I look at the Department of the Navy's goals that the Secretary has picked; not me, but the one that he has picked and highlighted and put most of his time and effort towards. And so I thought I would ask some questions about that if it is okay with you guys, and begin by saying we really support alternative energy, we support biofuels. It is just we want to make sure we have got the right business model and business case for doing it.

On the questions that I am going to offer today, though, I don't want to put any one person on the spot. So with this great talented team, I want to tell you you can use a team effort. You know, anybody that wants to answer it can answer it. You can get together, you know, on your answers. And you can look back at the talented people behind you and get the answers.

We just want to get the answers. But I start with what the Secretary has put out in the Department of Navy, and I look at one of the goals he has put out. He says by 2020, 50 percent of the total Department of Navy energy consumption will come from alternative sources.

And I am sure all of you are familiar with that goal. The President emphasized it in the State of the Union address. And so my first question to you is this. How do we get 50 percent? Why not 60 percent, why not 30 percent, why not 20 percent? Where did the 50 percent come from? How did we get that?

And anybody that has that can give it to us. All eyes are looking at you, of course, Secretary.

Secretary PFANNENSTIEL. Well let me start, Mr. Chairman, by suggesting that 50 percent is both enormously aggressive and, in

our view, is achievable. It it recognizes the amount of alternative fuel that we need to obtain by that time, the time being 2020.

We have set ourselves strict criteria for what this alternative fuel—certain criteria it must need. And those criteria are it must be domestically produced. It must be drop-in fuel. In other words, it needs to be a fuel that doesn't require us changing the platforms in which it will be used. And it must meet a price threshold. In other words, it must be at a price that is competitive with the more conventional fuels.

Fuels that meet that—and in addition, we do not want a fuel that is going to interfere with the food chain. So the question really is, can we get to there? Can we achieve enough fuel, sufficient quantity, at that price, in this timeframe? And our way of achieving that is through the process that we have laid out and we have worked with Congress on.

And using two parts of what we have going for us. One is the ability, as a consumer, to offer to the marketplace the quantity that we would offtake of the fuel that is available. And then how do we get the fuel available? Well our second strategy is using the Defense Production Act, which allows us with partners in this case. But it is an act that allows us to help create the market, to help start the market.

To put in some funding from the public side to be matched by private business funding, such that those businesses out there, those businesses around America that believe that they can provide the fuel that meets our criteria at the price that we need, can get a start in funding their refineries, their businesses, their business models. And then bring to the market the quantity of product that we need.

Mr. FORBES. And bear with me if you would. I normally defer all my questions until the end, but today is a little different because this is an important hearing to get this, I believe, at the outset. And I want to make sure that I am very patient in making sure we get to the answers, but I want to try to keep coming back to the questions.

And the question is not what we are doing to get there, but how did we get the goal of 50 percent, as opposed to 60 percent, 25 percent, 10 percent?

Secretary PFANNENSTIEL. And I will have to indicate that when that goal was laid out, my understanding—and I wasn't part of the team that developed that goal, but my understanding of the goal—was that, in fact, it was as I said. It was a number that was thought to be, and estimated to be, achievable, but truly a stretch call.

We knew how many gallons, how many barrels of alternative fuel we would need, and can we get there. Yes. Could it have been 55 percent or 45 percent or 60 percent or 40 percent? I suppose it could have been, but it would have been, again, along the path that would force us to look at things differently, to develop this new technology differently, to be able to reach out there and have, at the end of the day, a product that was going to help us protect price stability, to balance and diversify our fuel resource, and those criteria.

Mr. FORBES. And all of you helped. So I am—this is open-ended questions, but this is hugely important.

Help me with that concept of stretch goal that you just said. What exactly is a stretch goal? And here is why I am asking. Because, you know, I view this kind of like a prospectus. I am coming back to the people I represent and people that all my committee people represent. And we have to say, "Here are our goals. We are going to attain it, we are not going to attain it." And it is like a prospectus that you have.

What is a stretch goal? I heard that concept used by the Department, but what is it?

Secretary PFANNENSTIEL. Well, I have used the concept in a corporation. And in a corporation, it would be a goal that is not easily attainable but is reasonably attainable.

Mr. FORBES. So it is not easily attainable. Do we have any independently verifiable analysis that I could take to the full committee that would say that 50 percent is the right number for the stretch goal, one? And two, any independently verifiable data that would say we have a ghost of a chance of reaching that?

Secretary PFANNENSTIEL. Yes, Mr. Chairman. There is, in fact, a report by LMI [Logistics Management Institute], a nonprofit organization, within the last year—I don't know exactly the publication date—which looks at the feasibility of providing alternative fuels, in quantity, at a price that is competitive with conventional fuels. And determines that without any public sector intervention, that would probably take a decade for something like that to happen.

But with public sector intervention, and it specifically calls out like the DPA [Defense Production Act] authority, that could be accelerated into the timeframe, into this decade.

Mr. FORBES. Okay. Thank you for your patience. It says that it could be, but is there any independently verifiable study that says 50 percent is the amount we should have, and that we will attain that by 2020?

Secretary PFANNENSTIEL. I have to say I don't know of any study that would say 50 percent is the amount that is absolutely needed. I do go back to the LMI study in terms of the viability of attaining that, though.

Mr. FORBES. Can you tell me from your information—or anybody else on the panel—who came up with the 50 percent? Was there analysis done? And if so, can we see the metrics that were used in that analysis to show that 50 percent was the right figure?

Secretary PFANNENSTIEL. Well, I can certainly offer to get back to you, Mr. Chairman, on any analysis that led to the 50 percent.

[The information referred to can be found in the Appendix on page 135.]

Mr. FORBES. As the current assistant secretary for energy policy for the Navy, are you aware of any such analysis?

Secretary PFANNENSTIEL. I believe the question on analysis—I know I have been involved in many such analytical discussions of how much fuel do we need to achieve the 50 percent and where are we going to get it. So yes, I have taken part in many discussions of that——

Mr. FORBES. But there is a difference——

Secretary PFANNENSTIEL [continuing]. In the analytical sense.

Mr. FORBES. In all due respect, there is a difference between discussions and between reading an analysis that shows a), this is the right percentage, and b) that it is attainable. And I don't argue that you have been in a lot of discussions, but have you read any such analysis that shows that 50 percent was the right figure, or that it is attainable by 2020?

Secretary PFANNENSTIEL. Well, the attainability, I again refer back to the LMI study that would point out that it would be attainable. Whether 50 percent as a point number, I have not seen anything that said it had to be exactly 50 percent, and not 45 percent and not 55 percent or not 40 percent or 60 percent.

But 50 percent, that number of barrels of oil at that point, is, you know, really what we are working off of. And——

Mr. FORBES. Can you tell me, on that study, how much it would cost? What was the estimated cost of reaching that goal, whether it was the LMI study or any other study that you might not be aware of now? When we put those kind of studies, if we are looking at shipbuilding costs, there are goals that we have. We always look not just at the goal, but at the price tag of achieving that goal.

Can you tell me what the analysis says the price tag is of achieving that goal would be?

Secretary PFANNENSTIEL. The price tag that we have put towards achieving that goal——

Mr. FORBES. No, I am sorry. What I would like to know is the price tag that the analysis says we would have to put forward to reach that goal.

Secretary PFANNENSTIEL. Well, the LMI analysis said that using our DPA, our Defense Production Act authority, can get us to that goal.

Mr. FORBES. Again, and please, thank you for your patience with me because I don't want to interrogate you. Just the problem is—we put up the chart earlier—we have got to get our hands around facts. And if I set a goal of building 10 ships, I have got to come in and say, "This is what it costs to build 10 ships."

We are looking at a goal that the Department of Navy, the Secretary of Navy has said, "This is my big flagship." I mean, he is the one that has put this up, and we don't know where he came up with 50 percent. If he did it on the way to work one day, if he did it talking around the water fountain. Or if there is a study, if there is an independently verifiable study, I need to see it.

Secondly, he says this is a goal. But it may not be a realistic goal. It might be a stretch goal, whatever that goal would be. And then the third thing is, we as a committee have no idea what that will cost. In other words, saying that is a goal without knowing the price tag for the taxpayers of the United States doesn't make sense to me.

So my question, as humbly as I can ask it, is do we have any independently-verified analysis, LMI or any other, that says this is the price tag it would take to achieve that goal by 2020?

Secretary PFANNENSTIEL. Mr. Chairman, if I might, it seems like there are three questions there. One is whether there is any analysis that said 50 percent is the exact——

Mr. FORBES. And I understand you have said you are not aware of that.

Secretary PFANNENSTIEL. But I will certainly get you any analysis that led to the number of 50 percent. The second is whether this is, in fact, an achievable goal. And that, again, is the LMI analysis which I will provide to you, which says that.

And then the third part is, well, what would it cost to get there. And what we have put forward here, and it is part of our statement, is that it will cost the Department of the Navy $170 million. And because that $170 million will be leveraged six times——

Mr. FORBES. But do you have for us to review—I don't doubt your word, I am just saying do you have an independently verifiable metric analysis that shows that that investment will get us to that goal by 2020?

Secretary PFANNENSTIEL. The LMI analysis said that by using the DPA——

Mr. FORBES. No, no. But you said it didn't say the dollar figure. And what I am looking at is, how do we know that this investment gets us to that goal by 2020 versus being a down payment on more that we are going to have to expend?

Secretary PFANNENSTIEL. I think, from the committee's standpoint, there is a wait-and-see, that is perfectly legitimate, of saying the $170 million investment that we are making, watching how that is leveraged with other departments and then private sector money, and that, then, pool of dollars——

Mr. FORBES. But let me—if I can, again, respectfully—just say we are not in the business of spending that kind of money and just waiting and seeing. You know, I don't think it is unreasonable that we would ask could you just give us some sort of independently verifiable study that says if we pay these millions of dollars out of the taxpayers' money, we are going to reach the goal.

And what I am hearing you say is that, at least to your knowledge as the person that would know that, you are not aware of any such study right now that would show if we spend this money we are going to attain this goal.

Secretary PFANNENSTIEL. I am sorry. I must not have been clear. I do believe that the LMI study does say that.

Mr. FORBES. It says that if we spend this amount of money we are going to reach that goal?

Secretary PFANNENSTIEL. It says if we use our abilities under the Defense Production Act——

Mr. FORBES. No, no. No, that is not what I am asking. And again, thank you for being patient with me. I don't want to be argumentative, and I may just not be understanding. You may be articulating it very well.

What I am trying to say is—from what I heard you say with the LMI study—it says if we come together we might be able to attain this goal. But there was nothing in the study that said X number of dollars needs to be invested by the Department of Defense or by the Government to reach this goal. And if it does say that, how much money does it say needs to be invested.

Secretary PFANNENSTIEL. Well, to the extent we were relying on the information in that study that would lead us to the $170 million. I would suggest that perhaps we will share the study with you, and if there are further questions——

Mr. FORBES. But as assistant secretary for energy for the Navy, are you aware of the dollar figure that that study says we would have to invest on behalf of the Government to reach that goal?

Secretary PFANNENSTIEL. Mr. Chairman, other than the $170 million that we have put forward, I am not sure how else to answer the question.

Mr. FORBES. And thank you for that.

Secretary Burke, could I ask you something? You said in your statement, "We will only purchase alternative energy when it becomes price competitive." Did I misinterpret that, or was that a fair——

Secretary BURKE. At operational quantities, yes.

Mr. FORBES. In operational quantities. Have you seen—because, again, I come back to what the Secretary of the Navy has put out, and I know that you have looked at his goals and all, too, and especially in relationship to his concern with biofuels—have you seen an independently verifiable study that shows the time period when biofuels will become price competitive with non-biofuels?

Secretary BURKE. Sir, the LMI study that Secretary Pfannenstiel was referencing was, of course, a study that you required us to submit. And additionally, you required us to submit two different studies; one that was authored by the RAND [Research and Development] Corporation and one by LMI. And LMI looked at a variety of possibilities and questions.

And, of course, it is very difficult to speculate in this area what is going to become available when. There are a lot of open questions. And I think one of the things that we are looking at, you know, all the Services have a variety of targets and goals. And my office is looking to build a better baseline and to collect better data so that we can have overarching goals that are more data- and analytically-based. And we will certainly be looking at this as we establish our——

Mr. FORBES. And I give you a compliment. I have bragged about you for all that you have done. And I know you are looking at that going forward. That is not my question.

Secretary BURKE. I think you know the answer.

Mr. FORBES. But I need to get it on the record. And if I am wrong on that—because I am not the one testifying—my concern is this. We are asking the taxpayers of the United States of America to pay millions of dollars. Now, that may be small in terms of $19 billion, but it is still important.

And my question is not whether we are going to develop metrics that may later sustain——

Secretary BURKE. No, you are right, sir. The LMI study——

Mr. FORBES. My question is, do we have any independently verifiable studies that say if we spend this money we are going to attain this goal? And if so, when do those curves cross?

Secretary BURKE. The LMI study did have a dollar figure in there, and I believe it was $2.2 billion. So they made some estimates about what they thought would be required as far as public investment. And it did not look specifically at what kind of dollar investment would be required through the Defense Production Act, which is DOD—but also Department of Agriculture, DOE [Department of Energy]—and private sector match. So——

Mr. FORBES. Did, in that study, it say when it would become competitive with non-biofuels?

Secretary BURKE. I believe—and it has been awhile since I have read their study—but I believe that was the basis for that number, was meeting the targets of both the Air Force and the Navy by date certain that that is what——

Mr. FORBES. So then it is your understanding that it will be 2020 before the biofuels become a competitive price point with non——

Secretary BURKE. Sir, I don't know at this time. And I have seen a lot of studies in this area, and I don't think anybody knows exactly since we are still in a research, development and demonstration phase with these alternative fuels. I think there are a lot of very promising technologies.

And I do believe that the Defense Production Act Investment, which is run out of Acquisition, Technology and Logistics, will give us an opportunity to get a better feel for these promising technologies and what their potential trajectory——

Mr. FORBES. And if I can just tell you why this is so important and why I am taking this time, I come back to the concept of a stretch goal, whatever that might be. You know, but I take it that is a huge goal and you may not be able to get to it.

But we are willing to take a stretch goal that we cannot justify where we come up with the figure 50 percent. I am not saying it is not the right figure. I am saying we don't have any independently verifiably analysis that this is the right figure. We can't come up with the total dollar outlay it is going to take to get there by any metrics that proves it. We can't come up with any pricelines.

And yet when I look at shipbuilding, I see the Secretary coming over here with a shipbuilding plan. And he won't take a stretch goal on shipbuilding, you know, but we are coming down, and cutting down the goal that we have had of 313 ships and saying, "No, 300 is enough."

And I am just looking at the Navy and saying why in the world, if we are going to have a stretch goal on alternative energy, shouldn't we have a stretch goal on shipbuilding. But let me then come back to this point. I want to come back to the biofuels thing. Why the Navy?

I mean, the Air Force—and I am not going to get you in this, Mr. Secretary. You can say it, but I think the Air Force has taken a pretty good stand. They have said, "We are going to sit back, and if this is there we are going to be a customer and we are going to buy it. Week are going to buy lots of it," you know.

Why the Navy? What makes the Navy in a better role to spend this money than the Air Force? After all, the Air Force is the biggest consumer of energy we have.

Secretary BURKE. Well, I think the Navy should, Secretary Pfannenstiel, should speak specifically to that. But I would like to say that all of the Services have different roles and missions, and they all calculate how to meet them differently. And I would say that in my space a stretch goal is in terms of capability, and that the Department last year used 5 billion gallons of petroleum. And we are going to be depending on liquid fuels for the foreseeable future.

And that in the timeframe of many of the platforms and the capabilities that the Navy has, and that the Air Force has and the Army has, we are going to have a problem with the petroleum, with the volatility of the price——

Mr. FORBES. Okay, let me take you there, then. Let us look up at this chart on volatility.

Secretary BURKE. Right.

Mr. FORBES. And if we wanted to look at volatility, and we really were concerned about that, why not do fixed-price contracts like the Air Force has talked about? That would have locked it in and you would have known right there. Why not do that?

Secretary BURKE. Are you talking about fixed-price contracts for petroleum, or for——

Mr. FORBES. For fuel. Yes, for petroleum.

Secretary BURKE. Actually, I would like to take that question for the record because I have been talking to the comptroller and to DLA [Defense Logistics Agency] Energy about the way they manage fuels contracts. And we do try to follow industry best practices, and it is not an industry best practice to set a price more than, you know, 5 years in advance, which——

[The information referred to can be found in the Appendix on page 135.]

Mr. FORBES. But if you were talking about volatility, that would do a better job.

Secretary BURKE. Not necessarily. So that is what we are—we are looking at that now.

Mr. FORBES. If I have a fixed contract for $4 a gallon and it is for 5 years, why wouldn't that lock it into $4 a gallon?

Secretary BURKE. When you have a fixed price on something as volatile as fuel markets you can win or lose. And also suppliers have a vote in that in whether or not they will take those kinds of contracts. As I said, I would like to take that question for the record because the comptroller and DLA Energy are the experts in how we manage those contracts, so I would like to get you a better answer on that.

Mr. FORBES. That is good.

Secretary Pfannenstiel, why Navy? Why are they better off spending this money than one of the other Services?

Secretary PFANNENSTIEL. I wouldn't say we are better off spending this money than the other Services, but it is our very firm belief that by spending this money we will provide the advantages that I have talked about in terms of reducing the price volatility and——

Mr. FORBES. Okay, just a couple more questions, then I want to go to other members. But let me come back to your volatility issue. Because it is fair to say that with the biofuels aspect we are not doing anything with the safety of the warfighter differently. I mean, a gallon of biofuels is a gallon—it is the same as a gallon of non-biofuels, correct?

Secretary PFANNENSTIEL. In terms of delivering fuel——

Mr. FORBES. In terms of delivery. And we are not necessarily doing anything with flexibility. Could be, but we don't have the studies to really verify that right now, do we? We might find that to be the case. We don't know now.

Secretary PFANNENSTIEL. Flexibility for the warfighter.

Mr. FORBES. So we are really looking primarily at volatility. Ninety percent of all the fuel consumed by the Navy, with its ships and its planes in a deployed status, is purchased overseas. Is that correct?

Secretary PFANNENSTIEL. Ninety percent that is used overseas, is purchased overseas?

Mr. FORBES. No, no. All of our deployed ships and planes, 90 percent of it is purchased in foreign markets.

Secretary PFANNENSTIEL. I don't know that the number is 90 percent, but I will certainly take that for the record.

[The information referred to can be found in the Appendix on page 135.]

Mr. FORBES. What do you think the number is?

Secretary PFANNENSTIEL. Ninety percent could be fine, but I just don't know that personally so I have to take that for the record.

Secretary BURKE. Sir, I can tell you that a little more than 50 percent of the fuel we consume is OCONUS [Outside of Contiguous United States]. But——

Mr. FORBES. So that is 50 percent of——

Secretary BURKE. Right.

Mr. FORBES [continuing]. All of our fuel across the board. I am talking about deployed ships and planes.

Secretary BURKE. Right. But we do consume a considerable fuel at home for readiness——

Mr. FORBES. I understand. But of the deployed ships, because we are talking about warfighters now——

Secretary BURKE. Absolutely.

Mr. FORBES. Of deployed ships and planes, isn't it true that 90 percent of our fuel is purchased overseas?

Secretary BURKE. Yes, sir, we fuel where we fight.

Mr. FORBES. Okay. Now if that is the case, what kind of investments are we going to make in biofuels overseas? Because we are talking about, really, 10 percent of the fuel that we are buying here on deployed vessels. So we are really not talking about having much of a measurable impact on our warfighter, are we?

Secretary PFANNENSTIEL. Well, we are. In fact, we will be able to move a large chunk. And again, once we are buying in operational quantities——

Mr. FORBES. No, no. I am saying, let us say you hit home runs on everything you are talking about in the Navy. You fill up your ship here, that is it. Because once that ship leaves, 90 percent of everything it is going to buy is going to be overseas. Are we going to make any investment in biofuels overseas?

Secretary PFANNENSTIEL. I am not suggesting that we are. I would suggest two things. One is that once the biofuels market has developed and has demonstrated itself through not just our purchases, but through our purchases and commercial purchases, there is no reason that there would not be biofuels overseas. So that would be one——

Mr. FORBES. But we are not trying to build up biofuel markets overseas, are we?

Secretary PFANNENSTIEL. We are not in that——

Mr. FORBES. Okay. And then when we talk—let me ask you this last question. For our biofuels, we are talking about cutting our costs down. But if biofuels are competitive at some particular point in time, what lock-ins do you have to the industry? Why won't the people who are producing the biofuels raise their price if the competitive fossil fuels go up, as well? How are you going to stop them from raising their prices?

Secretary PFANNENSTIEL. Those prices may track fuel prices but, in fact, if we have a domestic supply——

Mr. FORBES. But couldn't we have a domestic supply equally by having the Keystone pipeline, having additional drilling that would take place? Or maybe changing 526 so we can use—there are a lot of other ways we can get supply, I guess is what I am saying. And all this is another method of supply.

Secretary BURKE. Look, sir. If I may add, I would just like to say I think we all agree. I think there is a very strong bipartisan consensus that we need alternatives to foreign oil. And the Department is certainly looking for our long-term interests here as a major user of liquid fuels.

So we are looking to see, to develop the alternatives, and to have an insurance policy to be ready. Most of our investments have been in testing and certifying to be able to use alternative fuels. There are plenty of studies in the commercial sector about biofuels—not specific to the Navy's goals, but generally—that predict the possibility of competitiveness in 8 to 10 years. It is very difficult to say how you are going to get there from here.

What we are looking for at a departmental level and OSD [Office of the Secretary of Defense] level is an insurance policy, and making sure that everyone here wants to make sure that we have alternatives when we need them. So that is our departmental priority that you will see reflected in the policy that we are developing, that you directed us to develop.

Mr. FORBES. And just in my response on that, I absolutely agree. But an insurance policy requires that we be able to come back and say, we are going to get A when we need A. And basically, what I am hearing at this hearing is this. We came up with a 50 percent goal that the Secretary of the Navy developed and there is no independent analysis, at least that anybody can give to me today that says 50 percent was the right number. I would like to see that if you have it.

The second thing is that we don't have a clue right now of how much it is going to cost to reach that 50 percent goal. And taxpayers at least need to know because there are other options out on the table and they need to explore both. When we are talking about capacity, I want to know is it going to cost me a submarine, is it going to cost me a carrier. What is it going to cost me to get there? And we don't know that.

Third is, that insurance policy is going to tell us if particular thing happens we know we are going to get paid. But in this particular situation, there is no independent analysis that tells us, at this point, this is where we project these curves to come. And then the final thing I would just share with you, there are a lot of options for increasing supply. Why not put all those options on the table?

And in addition to that, the bottom line is if we increase it over here we shouldn't be kidding ourselves. Ninety percent of what we are going to be buying is going to be overseas that we are not going to be controlling anyway.

And so with that, I want to yield to the ranking member for any questions she might have.

Ms. BORDALLO. Thank you very much, Mr. Chairman. Again, thank all of our witnesses.

Dr. Robyn, as you know, the President's budget anticipates utilizing $2.4 billion in third-party energy investments over the next 5 years to meet the mandated 30 percent decrease in energy intensity for 2015. Now, what type of third-party investments are we looking at, and does the Department of Defense need authority to achieve this goal?

Dr. ROBYN. Thank you for the question. And let me just start by saying achieving a 30-percent reduction in energy intensity by 2015 and 37.5 percent by 2020, that is a stretch goal. So we don't have to look at biofuels to find it is a stretch goal. And we need third-party financing to get there.

I will let Katherine talk about what the Army is doing because they have really gotten out ahead on this. I will say a couple of things. As I said in my opening statement, the acquisition process is way too cumbersome. We can't get there unless we do streamlining. Army has done a better job than anybody—including FEMP [Federal Energy Management Program], the DOE's Federal Energy Management Program—of streamlining the process. But we have a ways to go.

Internally, we need to resolve some minor issues between the Services over what can be done through an ESPC [Energy Savings Performance Contracts]. Can you use appropriated funds? OMB [Office of Management and Budget], I think, will give us good guidance. We haven't seen it yet, but in terms—for example, Army is using ESPCs to do small-scale renewable projects, in addition to O&M [Operations and Maintenance] kinds of retrofits.

I don't believe we need any additional authority at this point. I think, a year from now, I may give you a different answer. But I think it is helpful that the President made a commitment on this because you now have OMB engaged in giving us guidance. And they will be giving us a stoplight chart, they will be tracking our performance on this.

So I think we are good. I think we have just got to fix the acquisition process so companies will work with us.

Ms. BORDALLO. Okay.

Could we hear from the Army how you have streamlined it, sort of?

Secretary HAMMACK. Absolutely. Taking a look at the processes, first of all there is an acquisition process that Congress has given us as to how to appropriately contract. And so we have to follow that, which is more lengthy than that in the private sector.

That being said, working with our own terms and conditions—having what we call MATOCs [Multiple Award Task Order Contracts], which are master contracts where someone bids in and we get them qualified like a multiple award task order contract—and then by working to educate and train our installations on how to

use the contracts. What kind of projects are appropriate for that versus going and asking for MILCON dollars?

It is an educational process. It is an educational process from the installation level, through contracting, through attorneys, and through our own agency to ensure that we are all appropriately tracking, monitoring, supervising, and we don't let something linger on our desk.

We are hosting a forum next week with all of the MATOC orders—I think there are 18 of them that are on the Army contract—to ask them where they see challenges in working with the Federal Government, how can we be a better partner in the acquisition process, where they see challenges, and if they see need for changes.

Again, by looking at ourselves and how we are managing the process and ensuring we are educating people, we can improve the process.

Ms. BORDALLO. Great. I have a follow-up along these same lines, and this is for any of our witnesses. Over the past several years, to what extent has your office used appropriated monies versus energy savings performance contracts for funding energy efficiency projects to reduce installation energy consumption?

And what changes in funding sources do you anticipate in future years? To what extent is the expedited contractor selection process being used? And what is the average length of time for DOD's contractor selection process?

Anybody can jump in.

Secretary HAMMACK. There are about six questions there, so I am going to try and——

Ms. BORDALLO. Well, yes.

Secretary HAMMACK. Right now, it is taking us 12 to 15 months in the contracting process. It used to take 2 to 3 years. So that is an improvement in the process.

We use the multiple award task order process. We feel that that helps to streamline things so we feel that that is appropriate. When we do a MILCON project and use appropriated funds for a MILCON project, quite often there is more than just energy in that project. Energy efficiency might be part of it. It could be part of a new building. It could be part of replacing a failing infrastructure and putting in one that is more energy efficient.

We are not doing it for energy efficiency reasons only. We are doing it because we need that new infrastructure to support current operations and potential expansions.

What we look at ESPCs for are those efforts that are truly focused on energy efficiency as the primary driver. And it is the ability to do things without having to go to appropriated funds, that we have the resources in the local community. That can be anywhere from lighting to boiler replacement to controls technology that help us better manage our installations and reduce our consumption.

One of the challenges, I will tell you, is that as we reduce our consumption our focus is on reducing costs at the same time. But we are finding that, at best, we are reducing consumption as the cost of energy goes up. So if we are able to maintain our utility costs, that is a good news story as we reduce our consumption.

Ms. BORDALLO. Very good. Anybody else want to jump in on that? Pretty much you all agree? All right.

For Secretary Pfannenstiel, I know that Secretary Mabus has set forth very aggressive energy goals and the intent to sail the Great Green Fleet. However, can you talk about the payback and the long-term benefits of this upfront investment? What is the risk to the Navy and the Department broadly if we don't make these investments now? And also how critical is biofuel in these investments?

Secretary PFANNENSTIEL. Thank you, Congresswoman Bordallo. Let me start with the end, and biofuels are critical. And they are critical because they are an opportunity to pursue a domestic industry with domestic American jobs and investment. And they are also a new source, if you will, of supply that will enable us to move forward, that will help us mitigate some of the price volatility of the dependence that we have on imported fuels.

The great green fleet is, in fact, a symbol. It is the opportunity to demonstrate that, in fact, these fuels are operationally capable. The full sailing of it is not intended to be a commercialization, but rather it is part of our evaluation and certification program to demonstrate that these fuels are, in fact, capable of being operational.

And let me just point out, because I think there is some misunderstanding about the Great Green Fleet, it is called the Great Green Fleet to denote, to compare it to, the Great White Fleet, which President Roosevelt sent around the world in the early part of the 20th century to demonstrate America's achievements and technological prowess. And that is sort of how we are thinking about that. That is where that came from.

Did that answer all of your questions?

Ms. BORDALLO. I think so. I think so, yes. And I have one for Secretary Burke.

Can you discuss how your office and the Department is going to ensure the operational energy plan is executed uniformly throughout the Department? And further, how is the Department incentivizing contractors in contingency operations to find innovative technological solutions to reduce demand for energy in forward locations?

Secretary BURKE. Thank you, Congresswoman. First, the operational energy strategy and the implementation plan are both required by law. They are both new instruments. And they do give, at the Department level, guidance and direction and targets for the Department to meet. So they are in of themselves one way to streamline how the Department, at the departmental level, is making these investments.

Also, the Secretary of Defense has established the Defense Operational Energy Board, which is co-chaired by me and also by the Joint Staff director of logistics. The chairman put him in charge for the Joint Staff. And we will be overseeing the implementation of the strategy and the plan, and with all of my colleagues here participating in that board. So that will give us a way to improve the coordination and the tracking of the implementation of that plan.

And then finally, I have an unusual legal authority that you gave me, which is I have budget certification authority. I do, every year, provide a report to the Secretary of Defense on whether or not I

can certify how well the Department, how well the Services, are programming and budgeting to the operational energy strategy. And so that also gives me a powerful tool for keeping on track with those goals.

Ms. BORDALLO. Yes.

Secretary BURKE. As for the incentivization, I would actually like to turn this over to my Army colleague, but I just want to say that the Army has taken the lead in their logistics civil augmentation—is the right plan—for logistics. It is the LOGCAP [Logistics Civil Augmentation Program], LOGCAP contracts in Afghanistan, in changing the incentive structure in those contracts so that the contractors are looking at energy efficiency and at better energy performance for military operations.

So it changes the bias against energy performance. And we are looking at that and watching the progress on that as the potential for important precedent for the Department.

Ms. BORDALLO. Thank you.

Secretary Hammack.

Secretary HAMMACK. Certainly. And it is an incentive for the LOGCAP contractors to bring us ideas in their day-to-day operations, ideas to reduce the amount of energy that they are using, whether it is electricity, whether it is water or whether it is straight fuel consumption.

And since we implemented it in the last 6 months, we have seen 133 proposals come forward. We have implemented 40 of those proposals. Eighteen of them were not approved because of payback, or they were asking for improvement on a base that we had in closing status. And we have 75 in process of evaluation.

Last summer I was over in Afghanistan. I met with them, and we walked around and we talked about what they are doing. And they are setting up teams with a focus on energy efficiency in their contracting operations.

Ms. BORDALLO. Are you referring to the Net Zero policy?

Secretary HAMMACK. No, ma'am, I am not. This is LOGCAP contracts in-theater.

Ms. BORDALLO. Can you talk on that a minute? Just how does the Net Zero water contribute to energy security?

Secretary HAMMACK. Certainly. The Net Zero program is focusing on using the amount of energy on the base that you are able to produce on the base, and also reducing the amount of water consumption and returning that back to the local aquifer so that you are not depleting your groundwater aquifers.

Our primary net zero focus is in the United States on our permanent installations, to ensure we are managing the resources that are available. But we also have a net zero at the edge, and that is for our forward operating bases. Some of it is utilization of this kind of technology that you see before here, whether it is solar or other renewable energy.

But on water security, if you think of a forward operating base we have to get water to them. We have to pump the water, we have to treat the water. Water uses energy in everything that it does. We are working with technologies, one of which is water from air. And you might find that difficult to think about, but in the D.C.

[District of Columbia] area, we have dehumidifiers, which is water from air.

So if you take that and purify it, you can go for a period of time without having another water supply.

We are also looking at water from vehicles. I mean, again, you park a vehicle and you can see water running out from underneath it, and that is condensation. There is water that is available, and we can empower our force to fight longer or go out further if we have alternate ways of finding water and we use less water in our operations.

And so that is a critical focus for empowering the warfighter.

Ms. BORDALLO. Thank you. I just have one question more, Mr. Chairman.

I don't want to leave Secretary Yonkers out of this. He has been so silent here. No questions for him, but now I have one. The Air Force aviation accounts for half of the U.S. Government's total fuel consumption. Now, what steps is the Air Force taking to reduce this demand and to look toward alternative sources of energy?

I understand that, in the fuel market, it is a major factor driving increased costs. So what could Congress do, or what further can the Department do, to provide greater stability to the market?

Secretary YONKERS. Well, again, several questions, ma'am. And let me see if I can kind of answer them. First of all, I think Congress as well as this president and past presidents have done quite a lot in terms of setting the goals and expectations.

So, right off the top of my head, I am not sure what more could be done. We are driving towards achieving those kinds of objectives right now for the reasons that I talked about in my opening statement. It is the right thing to do, it enables our mission, and it is, you know, looking at the business case analysis and these things.

So what are we doing in the Air Force to try and reduce that cost? And again, I sort of addressed that in the opening remarks. But we have established a goal—and again, it is one of those stretch goals—10 percent of reducing our jet aviation use over the course of the next 6 or 8 years will give us about—well, it will give us about $2 billion worth of cost savings, based on today's fuel prices.

So what are we doing and how are we going to get there? Well, we are looking at it from a number of different ways. We are looking at some of our research and development dollars going into those kinds of engines that I talked about, where we can, you know, create a better engine, a more sustainable engine, that gives us not only fuel efficiency on the order of 30 percent, another stretch goal, but also looking at how long those engines might last.

So we get sort of a double bang for the buck. If we don't have to sustain engines because they are more effective and efficient, if we don't have to sustain them as often, we are also looking at cost savings in our maintenance and sustainability costs.

We are also looking at simple things like how we optimize weight on aircraft. And right now, just from the last few months, we have been able to achieve greater ton mile per gallon efficiencies, on the order of 27 percent, by optimizing how we load and the kind of things that we put on aircraft, with only a 3 percent cost growth in that arena.

So we are looking at it from research and development, we are looking at it from a pragmatic how do we fly differently and better and be more conscious about the way we use energy, and we are developing these independent stretch goals to help us get there.

Ms. BORDALLO. Thank you, Secretary.

Mr. Chairman, I yield back.

Mr. FORBES. Thank you, Madeleine. Dr. Heck is recognized for 5 minutes.

Dr. HECK. Thank you, Mr. Chair. I want to thank all of you for being here today and for providing the information that you did. And at the installation level, what you are doing to make the lives of our service men and women better at the operational and tactical level, making our war fighters safer. And at the strategic level, increasing our national security from an energy perspective.

Now, Dr. Robyn, you mentioned the importance of alternative fuels to facility security, especially in continuity of operations and grid disruptions. And so in that regard, I want to give a shout-out to Secretary Yonkers and the Air Force, for Nellis Air Force Base, that has a 70,000-panel photovoltaic, 14-megawatt solar field that provides 25 percent of their base power. I think it is a prime example of what can be done if we put our minds to it.

Secretaries Hammack and Pfannenstiel, you both mentioned the casualties associated with convoys and moving fuel. And I can tell you firsthand, when I was chief of emergency services in aeromedical evacuation at Al Asad I took care of more than my fair share of casualties from convoy operations, specifically moving fuel. So I appreciate that point.

Yet we know that as we continue to move technology out to the forward edge of the battlefield there are going to be increasing demands for more power, and with that more fuel. So, Secretary Burke, you talked about supply diversification. We use solar as an example in Afghanistan.

What is the penetration of alternative fuels out at the FOB [forward operating base] and COP [combat outpost] level currently, and how much of the budget? And what are the plans for increased research and development for more man-portable alternative generators?

Secretary BURKE. Thank you, Congressman.

The penetration right now, we do have a number of efforts to try to rapidly field. But as you know, when you are talking about an ongoing operation, those things, you have to be careful about how you are folding in new capabilities.

And they are not all innovations in materiel means, in technology. There are also a lot of process innovations. And the Army's rapid equipping force has done some very interesting work in this area, in that they have gone out to some of the farthest-flung patrol bases and forward points and looked more carefully at how they are using energy and where there are opportunities to improve.

And one of the things they found is that a lot of the service members at those remote bases don't actually know how to use their generators very well and don't have a good laydown for the distribution. So the rapid equipping force has been rapidly fielding in-

formation and also just distribution. And that, in of itself, is taking a lot of fuel out of the equation.

So we are looking for where the opportunities are. And I think what has really been helpful in that is that General Petraeus, and now General Allen, have both put out memos to the forces that this is an important area of activity. They have set up an office in U.S. Forces Afghanistan to manage it and to look for what are the best ways to effect change in this area.

And they have begun to put into place a number of things, including centralized power, better distribution. And, you know, I think that the Army can talk to that. And also the Marine Corps did a great job. They did their experimental forward operating base, figured out what was going to work best to give soldiers, to give marines, at the tactical edge a capability. And then they made a program of record, and we are fielding it to 25 battalions.

Of course, they are coming down now in their force levels in the southwestern part of Afghanistan. So they won't be fielding it as much as they had planned because they are coming out. So there have been a variety of ways that we have addressed this, and we are seeing it increasingly brought into training.

So that is some of the ways that we are getting that done right now in the field. And going forward, what we really want to do is get into the requirements and acquisition process. So not so much having projects that are put on afterwards, but rather that are built into the system and how we actually create a demand signal for energy.

Because you mentioned that the power and the fuel requirements are going up. We need to get in early into how we actually require and acquire systems, equipment, platforms, and put these kinds of considerations in up front. So that is what we are really aiming at here is how to make this part of how we do business and not projects that we have to retrofit or figure out how to get into the field.

Dr. HECK. Great. Thank you.

Thank you all very much. And again, I appreciate what you are trying to do and I thank you for being here and bearing with us during this hearing process.

I yield back, Mr. Chair.

Mr. FORBES. Jack, we thank you. And thank you for your service to our country.

And the gentleman from North Carolina is now recognized for 5 minutes.

Mr. KISSELL. Thank you, Mr. Chairman. And I appreciate our witnesses being here today, so it is an opportunity to say welcome ladies and gentleman. So we don't get that opportunity very often.

And we know we have got votes coming up again in just a couple minutes. So rather than ask a lot of questions, I really just want to make a couple statements and maybe finish up with a question. The chairman mentioned early on that Senator Warner was adding something to our record. I know that Senator Warner took a tour of a lot of our bases, with energy being specifically what he was looking at.

I had the opportunity to join him down at Fort Bragg, and I would like to say specifically—and I forgot to mention this—Sec-

retary Burke, we appreciate the position you are in. This is a position I supported very strongly. And, Dr. Robyn and Secretary Hammack, I appreciate the opportunity to see you guys again, and appreciate the work that you all do and the interaction that our offices have had.

When Secretary Warner came, we got the usual suspects together down at Fort Bragg to talk about energy. And it started out being one of those usual tours, where you get, you know, the slides being shown and talking about the number of this and number of that. And fairly quickly, the senator and I said, "That is not what we are here for. We want to talk about energy. We don't want a base tour. We want to know what is going on."

And so we quickly got into conversations. And a young lady there who was really heading up the energy plan, doing a great job, got down to two things. She said it is not sexy, but retrofitting is the best way to save energy. Even to the percentages of, like, 30 percent of the energy can be saved. And the best energy, we don't have to worry about new ways of generating if we don't use it.

The other thing that was brought up that really caught me a little bit by surprise was building maintenance. That while we are going out and building new buildings, it was suggested that we are not putting the amount of money into maintenance of our buildings that we should to keep those buildings in as good a shape as they should be. And we have seen evidence of that from time to time in different places.

So I would encourage us to make sure that, as we are building, that we maintain those buildings so that the energy advantages we build in we can keep. The metering that was mentioned. I know in one hearing once before it said about the Navy, when they bring their ships into port they are now putting meters on the energy being brought in. And it has reduced the amount of energy for a ship at dock as versus not being measured.

So I think that is very important. We talked about that at Fort Bragg quite a bit, too, the importance of putting a meter on.

Now, I also had some soldiers suggest to me that soldiers like nothing better than to work around a meter. So I have an idea that as we do this we will have to keep an eye out to make sure that the ingenuity of our troops is kept, you know, in the right ways.

But these are very important areas. And once again, I have sent letters about this trip and about these concerns. And this is an ongoing conversation we are having so I am really not looking for an answer to this.

But one thing I want to bring up, I know at Fort Bragg they just recently set up a third source of energy coming into the base. We had a tornado last year that temporarily knocked the power out to Fort Bragg. And I think at that point in time we only had two ways in, and now a third one has been set up.

But what about cybersecurity? That is one thing that, you know, I know that we are hearing a lot more about, you know, not only on our base, but the surrounding sources of energy. How well are outreach utility grids prepared to handle a cyber attack, and how well are our bases prepared to handle a cyber attack in terms of energy?

Obviously, other things are important, too, but specifically today about energy. And I would leave that for whoever would like to answer.

Dr. ROBYN. I will start, and then maybe Katherine will pick up. I think there are a lot of threats to the grid, to the commercial power grid. And you can put a lot of them in one category, and then cyber is in another category because it is a harder problem. And I think there is a lot of effort going into it. And I can't really speak to—I don't want to try to characterize how vulnerable our grid is to cyber attack.

I think we, as a department, have concluded that there are a number of vulnerabilities to the grid and that it is desirable for us to gain the capability to go off the grid if the grid goes down for a prolonged period of time. We don't envision operating off the grid permanently. We envision continuing to use the local commercial power grid, but we want the ability to be able to go off the grid and maintain critical operations off the grid if the grid goes down.

Mr. KISSELL. And Dr. Robyn, my time is out. And I can appreciate your not wanting to talk some specifics. I guess I rest assured knowing you guys are aware of it and working on it.

And I yield back, Mr. Chairman. Thank you so much. Good to see you all.

Mr. FORBES. Thank you, Larry.

The gentleman from Georgia is recognized for 5 minutes.

Mr. SCOTT. Dr. Robyn, in a recent hearing with Secretary Mabus I asked him some very specific questions with regard to the one gigabyte of power that the Navy was going to deliver for shore power. He assured me that that was going to be a public-private sector initiative and that there was going to be no taxpayer dollar initiatives in that.

Yet as I read some of the other testimony, it says that it may be a joint venture or enhanced-use leases. Can you explain to me the difference in what I was told and what I am reading?

Dr. ROBYN. Did you mean to direct that to me or to Jackalyne Pfannenstiel?

Mr. SCOTT. I meant to direct it to you. I know what—I have met with her already.

Dr. ROBYN. Oh, okay. Okay. Well, Navy, my understanding of their plan and what they have done so far is to use third-party financing to achieve the large-scale renewable energy projects. And the Navy has been the first to use what we call 2922(a) authority. That is a power purchase agreement authority that we have. That is different than an enhanced-use lease.

Mr. SCOTT. Just to make it clear, it is not going to be an enhanced-use lease and it is not going to be a joint venture by the Navy.

Dr. ROBYN. Well, the term "joint venture" can mean a lot of different things.

Mr. SCOTT. Yes, ma'am. It can.

Dr. ROBYN. But a power purchase agreement is basically an arrangement where an outside entity, a private entity, finances a project. We provide the land, and we say we will be a customer for the power that is produced. And in exchange, they pay to build it. They can take advantage of tax incentives that are not available

to the Federal Government. So it is the logical way for all of the Services to do large-scale renewable energy projects.

Mr. SCOTT. Okay. So they will be taking advantage, then, of tax incentives that would be taxpayer funds.

Dr. ROBYN. Developers will. The developers will, sure. I mean, we——

Mr. SCOTT. So the taxpayers will have paid——

Dr. ROBYN. Well, these are decisions by the Federal Government and by the Congress to provide tax incentives to develop alternative forms of energy. The Federal Government, Federal agencies, are doing power-purchase agreements that take advantage of that. We would be crazy not to.

Mr. SCOTT. We are getting very short on time. Can you tell me, though, as I looked through all the things that you have presented to us it is very apparent, very apparent that there is an anti-fossil fuel attitude with the Department of Defense. We have abundant supplies of natural gas and many other reserves that we could tap that this Administration will not allow us to tap.

But with all of the cuts that are coming to the military, 132,000 uniformed personnel, why is the DOD taking an anti-fossil fuel position when you could clearly, clearly save a tremendous amount cost on the energy if you used things that were readily available, the technology was already there like natural gas.

Can you explain that to me?

Dr. ROBYN. Let me start by saying I don't agree with the premise. One of the first things that I did when I got there——

Mr. SCOTT. Ma'am, I asked you a question, so it is my turn to ask the questions.

Dr. ROBYN. Okay, but I——

Mr. SCOTT. What are you doing to expand the use of natural gas in your——

Dr. ROBYN. Okay, let me—great, I will. I will tell you what we are doing to expand offshore drilling. We had historically—the Department of Defense, every 5 years, would tell the Department of Interior where drilling was compatible and where it was not with Department of Defense activities. And it was either yes or no, and most of the land was off the table.

When we came in, we took another look at it. We did a more sophisticated analysis. That is what allowed President Obama to announce, on March 31, 2010, drilling in the eastern Gulf of Mexico. That was not a popular decision with some members of Congress, but this was drilling in the eastern Gulf of Mexico where we have operations, conditional on certain things.

We are all for drilling in the outer continental shelf if it is compatible with our activities. We are all for—we have peaking plants at Robins. Well, you know. You are familiar with—you represent Robins, so you are familiar with that.

Mr. SCOTT. Absolutely.

Dr. ROBYN. That is a terrific solution. We would like to——

Mr. SCOTT. I am familiar with what your energy mandates are doing with increasing the cost of operating the bases. And I am just saying that right now, in the budget times that we are in, when you are going to eliminate 132,000 soldiers from having a position—a position that they and their families have paid a very dear

price for—why are you embarking on such extremely costly measures which you have no guarantee of a return?

Secretary BURKE. Congressman, if I may say, the Department, over the future-year defense program, will be purchasing $52 billion worth of petroleum, and it is absolutely essential to our military operations. We are not anti-fossil fuel. We can't operate without it. Ninety percent of our investment over that time in energy initiatives in the operational space is to reduce our consumption of fuel so that we have tactical benefits for it.

So I would disagree with your characterization. That that is not why we are investing in efficiency measures and performance improvements, or in alternatives. We are looking for operational benefits and mission capabilities.

Mr. SCOTT. Ma'am, you can disagree with it all you want. But people testified here that you all were working to help create another domestic energy through the Department; that if you go back and listen to the tape, that was mentioned. And if you read some of the testimony, every time the cost of a barrel of oil goes up a dollar it costs the Department, the U.S. taxpayer, an additional $30 million in fuel cost.

There are things that we could be doing right now, like the Keystone pipeline, that would help reduce the cost of a barrel of oil——

Secretary BURKE. Congressman, most of our energy——

Mr. SCOTT. We could be drilling in ANWR [Arctic National Wildlife Refuge], we could be drilling in——

Secretary BURKE. In most of our—operations, that won't help us. So we are looking for tactical benefits——

Mr. SCOTT. Ma'am, you are wrong.

Secretary BURKE [continuing]. And for military capabilities.

Mr. SCOTT. You are wrong. Reducing the price of a barrel of oil will help every American out there.

Secretary BURKE. Absolutely. And the President has put a high premium on that. So the Department of Defense, we are particularly interested in capabilities——

Mr. SCOTT. Ma'am, that is simply not true. This President has done absolutely nothing to reduce the cost of a barrel of oil or the cost of a gallon of gasoline. And I would challenge you to go fill up your tank this weekend and feel the pain that every American is feeling that they were not feeling before he became the President.

Secretary BURKE. Sir. I was going to say that for the first time in 13 years we are importing less energy, under 50 percent. We have seen our production rise. These are all important. But for the Department of Defense, what we are looking at is defense capabilities and defense missions, and how energy supports them or undermines them. That is our concern. That is what we are going for. That is what we are looking to enforce.

So for me, you know, when the President says "all of the above," for the Department of Defense that really is true. Our number one criteria in the operational energy space, which is where most of our energy consumption is, is the mission and the capability. And anything that gets us mission and capability is what we are investing in. And you will see that when you get the budget certification report.

Mr. SCOTT. I look forward to you investing in fossil fuels.

Mr. FORBES. Let me say this. I appreciate all of you being here. Thank you for what you have done. And as I began at the beginning, or said at the beginning, I want to thank you for all the wonderful things you are doing. And you have done a lot of great things, and we certainly appreciate them.

I think the basic thing we want to do is to make sure that we are doing what you said, Secretary Burke. And that is that we are looking at capability. The bottom line, it is not the great green fleet that matters to us, it is the great fleet that matters. And what we don't want to do is to be making investments that are coming out of the hide of numbers of ships or our capability in some other area.

And we simply need facts to get our hands around that. And so when we look at some of the goals, they are wonderful and you have done great jobs in them. But we have to also be good stewards of the taxpayer money, and it does bother us when we hear about stretch goals in this regard.

I understand the concept of stretch goals. But when we bring them to the taxpayer and say, "This is what you are going to get, so invest these millions of dollars," but then we don't have any independently verifiable matrix to really say, "this is how much it's going to cost, this is the timeline when it's going to happen," that does concern us, you know.

And so I want to do this. We have got a vote that is called now. Do any of you have anything else you would like to say on the record? If you do, then would you just sit here? I am going to go cast this one vote, I will come back. Think about what you want to say. I am going to give you all the time you need to say it.

Secretary BURKE. Congressman, we can enter it for the record.

[Recess.]

Mr. FORBES. First of all, I just want to make sure that everybody isn't mad at Secretary Burke for wanting to say a few more things.

Let me just emphasize something. The first chart that we put up, we are spending $19 billion, you know. And this is important. As tiring as it is, frustrating as it is, it is important we get these things right, you know, to do it. So I appreciate you wanting to say something else, and it is well worth it for us to stay in.

And as I told all of you, this is your time. If there is something that hasn't been clarified that you needed clarify, a question that was unfair, tell us now at this particular point in time. And if you don't think of it now, you can submit it later for the record, too, because we want to get it correct.

Secretary Burke?

Secretary BURKE. It was very short point. But now, yes, drinks are on me tonight. So I was doing fine before that, but it was actually about your last chart that you put up because you had asked us what we think. And, you know, I think it is a great chart, and an important one.

And I would just urge you to put one more flag on it at the top, which is that for us this is really about capability. It is about defense capability and the return on our capability, and whether or not we are giving our men and women in the field the best that they can have to get the job done.

And we believe really strongly that in doing that we are also going to save money. But our number one goal is to serve the mission and to advance our capabilities. So I just wanted to urge you to put that at the top, as a banner, that whether it is the security of our installations or the security of our operations that that is really what we are aiming for.

Mr. FORBES. And, Madam Secretary, let me just say that I agree with you. The one thing we emphasize, too, is just because 80 percent of our programs are good, that doesn't mean that all of them are. And the second thing is, saying it helps capability doesn't mean it always helps capability. Because for this reason—we always have to ask questions.

Everything here is a zero sum game. It is if we spend $10 million over here, it is less money we can spend over here. So we sometimes are making choices between an aircraft carrier, another submarine, helmets that we can get for our soldiers. Those kind of tradeoffs we have to make.

So when we are looking at capability, the thing that frustrates me, I have to say, is when I hear the Secretary of the Navy saying, "I am going to have a big stretch goal when it comes to creating a particular energy source that I might like," but then he can't document that with independently verifiable facts. And he comes in with a shipbuilding plan that says, "I am not only not going to have a stretch goal here, I am going to have a shrink goal here when it comes to ships. I am going to have a shrink goal when it comes to our planes."

And all we are saying is not that he is right or wrong. It is just the thing we need to do is ask the questions and get the facts out, you know. So I agree with you. And we will put that up there. We will change that chart and put it up there.

Secretary Robyn?.

Dr. ROBYN. Very quickly, while you are changing your charts——

Mr. FORBES. Are you going to mess up all of my charts or just the——

[Laughter.]

Dr. ROBYN. Just one.

Mr. FORBES. Okay.

Dr. ROBYN. Just this one. I would add cost. It isn't just fuel price——

Mr. FORBES. I was thinking that was in volatility of fuel prices——

Dr. ROBYN. Right. This is operational-oriented slide, so if you want to expand it to include facility energy you really need to say cost. That is——

Mr. FORBES. Can I ask you two questions? When you are talking talk about cost, you mean cost of the investment, cost of the fuel?

Dr. ROBYN. The amount of money we spend powering 300,000 buildings. We spend way too much. We are not investing enough to bring that cost around. The only other thing, just to end on a high note. I think you heard from all of us, what we are doing is infused with technology in an innovative approach——

Mr. FORBES. And, Doctor, I am going to ask you if you could say—because you made a comment to me about DOD and the role technology plays there—could you repeat that for us?

Dr. ROBYN. Yes. I mean, DOD is the most potent engine of technological innovation in human history. And that innovation has historically, and typically, focused on combat operations and the warfighter, as it should. But there is no reason that should not apply equally to our effort to improve our facility energy performance.

I think the key role there—300,000 buildings and millions of acres of land that are a phenomenal test bed, demonstration and validation of next generation technology—that is a classic role that the Department has played in the operational setting here is a natural. It is just a natural end.

You know, the president of MIT [Massachusetts Institute of Technology] talked about it at the ARPA–E [Advanced Research Projects Agency–Energy] conference. She said wow, you have got this amazing infrastructure. It is just made to be a test bed for next-generation energy technology. You can't underestimate the power of that for solving our problem, and then solving the country's problem more generally.

Mr. FORBES. Secretary Hammack, anything?

Secretary HAMMACK. Certainly. There are just three things I want to talk about. The first is partnerships, and I hope you have heard here today that the Services are working together. We are very closely working together. We share the same Army Corps of Engineer energy-saving performance contracting methodology.

Although it is led by the Army, we share that and we use it together. So the military services are working very closely in lock step. Secondarily, we work with other Federal agencies. We work closely with the Department of Energy, we work closely with the EPA [Environmental Protection Agency], we work closely with the GSA [General Services Administration] to share ideas, to share technologies.

We have memorandums on understanding on how we can work closer together to better leverage limited taxpayer dollars that are coming to the Federal Government. And third, we have talked about the private sector and leveraging the private sector, whether it is power purchase agreements, energy-saving performance contracting, or other mechanisms.

One of those which the Army used is ASHRAE standard 189.1, which is development of an energy proficiency high-performance building standard in the private sector. That instead of the Federal Government developing our own high-performance building standard, we are utilizing that. That was developed by the private sector, and it is guidelines and directions on how to make a LEED building when prioritizing energy and water efficiency.

So our goal is still to LEED-certify our buildings at the Silver level or higher. And what we are finding is that as we incorporate technology and strategies, as we learn better, as the private sector learns better, we are able to get LEED Gold or even LEED Platinum at no incremental cost because we planned well up front.

And by integrating technologies and strategies, you can have a very high-performance building in new construction.

Mr. FORBES. Well, we applaud you for working so closely together. And I just want to say the Army is doing good. So when

Secretary Burke takes you out to dinner tonight do not let her get you off track of what you are doing.

Secretary Pfannenstiel.

Secretary PFANNENSTIEL. Thank you Mr. Chairman. I just wanted to make sure that in our discussion about biofuels we didn't lose sight of two things. One is, first of all, why the Navy is investing as it is in energy. And it is about our combat effectiveness. Fundamentally, that is what we are trying to improve. That is where I started today, and I just wanted to reinforce that.

Second thing I would say on our energy programs themselves is that most of the dollars—at least 75 percent, maybe 90 percent of the dollars—that we are budgeting for energy really are directed toward reducing our demand, reducing the amount of energy we are going to need in the future. And again, some of those are building retrofits and improving the kind of facilities that we use.

Some are shipboard, some are on planes. But we are trying to reduce our need to buy more energy. I would also highlight—and I think I didn't get a chance to do it, and I like to brag on the Marines—their ability to take the kinds of new technologies into theater and make a real difference is very important. I think it is important for the Marines, for the Army. We have worked together on this, and for current operations and for future operations we have a lot of technologies being applied.

And the last point that I would make is where we are looking at new supplies of energy. And again, whether it is renewable energy for our bases or future alternative fuels, we are very conscious of making sure that, in long run, that we will do so at prices that will be competitive with what is available out in the marketplace.

So with that, I kind of go back to Dorothy Robyn's comment—which I heartily endorse and think is a theme for this—which is that DOD is the most potent engine for technological innovation. I think we are implying that both to demand reductions and to future supply capability.

Mr. FORBES. And we wholeheartedly agree with you on that and thank you for the good work you are doing. The only thing we will say is that when we need to spend millions of dollars of taxpayers' money we just need some facts. You know, just a few facts. And so if you get back to the office tonight, and you find a study or any metrics that justify, you know, some of what the Secretary—send it to us and we will put it in the record and we will review it.

Secretary Yonkers, you get cleanup.

Secretary YONKERS. Well first, let me say how humble I am by being here with all of these ladies.

Mr. FORBES. You are a good politician.

Secretary YONKERS. They really are great. And it has been a lot of fun these last couple years to be working with them, and we are moving around some pretty big rocks.

I would just make an observation. You know, when you look at this from the 375 million of us that are make up the constituency of this entire Nation, I don't think we are too far apart. Certainly we are not too far apart on where we want to try to get to and what the end game is going to be.

We can debate forever, perhaps, how we can get there. But we are looking for energy security, we are looking for national secu-

rity, we are looking for economic security. And frankly, we are looking at environmental security. They are not necessarily mutually exclusive.

In fact, they tie together in my mind. So as we move down that path, I think there are tremendous opportunities here for us to pull these things together and integrate them in a multidimensional point of view, that I talked a little bit about, in our specific energy arenas to hit all of those high notes and move down that path collectively.

The one thing I want to say about, I think, all of our energy programs is that we are approaching this pretty pragmatically, in my view. We are looking at third-party investments. Because we know that the dollars aren't going to be there to hit renewable energy, and why not develop that win-win with the private sector? We can do that, we are committed to it, and we are going to move aggressively in that direction.

And one final point—and I think, Mr. Chairman, it gets right to you and the discussions we have had here today—efficiency does equal effectiveness. So the more that we can become efficient in our operations, and reduce our energy footprint and reduce our energy costs by the research and development and the other kinds of strategic investments that we are looking at, the more dollars are available to become effective; to buy more airplanes, to buy more bullets, to buy whatever it is that we need that really gets to the heart of the national security mission of the Department of Defense.

Mr. FORBES. And, Mr. Secretary, I agree with you. The only little caveat I will put there is, every time I hear that statement made, when they cut out the Joint Forces Command, they use the same rationale. They say, "We are going to use this to buy more ships and do more repairs. That's why we are saving it." It didn't happen. Four months later that money was gone.

And then we have to go again by the facts. And when I see a shipbuilding plan that comes in that doesn't increase our ships, that reduces it, you start saying, "Well, where is that money going?" You know, that is the only thing. We agree with the premise. We just want to make sure that we are making that in the implementation stage, too.

Let me look at my partner in all of this and see if she has any additional questions that she has.

Ms. BORDALLO. Mr. Chairman, I couldn't possibly have any further questions. But I want to thank the witnesses again. I think they did extremely well. And I think it has been a very interesting public hearing, and I thank you for calling it.

Mr. FORBES. Well, thank you all. And, Secretary Burke, we will let you know where dinner is going to be tonight. You guys have a great day. We are adjourned.

[Whereupon, at 2:50 p.m., the subcommittee was adjourned.]

A P P E N D I X

March 29, 2012

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

MARCH 29, 2012

Statement of Hon. J. Randy Forbes

Chairman, House Subcommittee on Readiness

Hearing on

What Is the Price of Energy Security:

From Battlefields to Bases

March 29, 2012

I want to welcome all of our members and our distinguished panel of experts to today's hearing that will focus on "What Is the Price of Energy Security: From Battlefields to Bases."

I welcome this discussion and the opportunity to dive into the details across some of the Department of Defense's energy priorities and investments.

Energy security is one of my top priorities, and while one of the greatest challenges for the Department of Defense, it is also an area for enormous potential. The term "energy security" as defined in the FY12 National Defense Authorization Act means "having assured access to reliable supplies of energy and the ability to protect and deliver sufficient energy to meet mission essential requirements."

DOD is the single largest consumer of energy in the Nation at a cost of $19.4 billion in FY11. Approximately 79% of this cost, which equates to roughly $15.3 billion, is for operational energy, that is, the energy required to train, move, and sustain military operations. The remaining 21% or $4.1 billion is for installation energy which is the energy required to run the installations predominantly comprised of electricity, natural gas, fuel, steam, and coal.

In an era of declining budgets and increased costs, I want to take a moment to reflect on two graphs—historical petroleum prices and electricity prices. These charts are from the U.S. Energy Information Administration, the DOE's statistical and analytical agency, from February 2012. This is why we are here today. No one can debate the fact that costs are increasing. The question is, What are we doing to reduce consumption, and make wise choices with taxpayer investments without compromising warfighter capability?

I am deeply concerned by fuel price fluctuations. In FY12, the current execution year, there have already been two price adjustments that have resulted in a DOD shortfall of $3.5 billion. I would like to discuss what options are available to mitigate this in the future. And, why has DOD not considered longer term contracting with the private sector to lock in rates similar to the commercial aviation industry?

I fully support any initiatives that will help diversify the options for fuel supply and reduce the DOD's consumption. This includes

offshore drilling, oil sands, and biofuels among others. And, I believe that all of these tools should be available to the DOD, and that Section 526 of the Energy Independence and Security Act currently precludes the full availability of all options for the DOD. However, I want to clearly state that I have serious concerns about DOD investments that seek to advance markets and develop technologies that are not a core defense competency and may not demonstrate a reasonable rate of return. Specifically, I am referring to the Navy's proposed $70 million investment for biofuel through the Defense Production Act. And, while I do not disagree with the promise of biofuel and the industrial innovation, DOD has not adequately justified the budget request, especially in an era where DOD does not have sufficient funds to support the size of its fleet let alone make money available to promote an energy industry which should otherwise be the focus of the Department of Energy. I look forward to discussing this in the context of the hearing.

There are many great accomplishments the DOD has made with its investments. We have an operational energy strategy and the fully burdened cost of energy has become central to the acquisition and requirements process. The Army has reduced demand through modifications to contingency contracts and rapid fielding of more efficient technologies. The Air Force and Navy are looking at route optimization and platform modifications to reduce demand for fuel. And, the Marine Corps is deploying capabilities through its Experimental Forward Operating Base that will extend combat reach by one additional month in a 365-day period. These are huge wins in an area of greatest demand, which represents almost $15.3 billion of consumption in FY11.

On the installation energy side, all of the Services are forging ahead to meet the targets and goals for energy reductions and renewable energy generation. There is a lot of innovative work being done, and while the DOD is being proactive about meeting its goals, I want to be sure that it is not moving too quickly.

There are multiple different policies driving the installations to improve their energy efficiency and sustainable design standards. I am troubled by the diversity of guidance and the incongruous standards across the Services. I want to fully understand the analysis that was conducted that demonstrates the savings associated with those decisions. Of note, I want to understand why the Navy would elect LEED Gold as its standard, and the Army has determined that Net Zero Waste, Water, and Energy is the best way to go. How do you reconcile this? If there are savings associated with particular policies, why are all of the Services not adopting them consistently? And, how much are we paying to get a plaque, or to reach that final target of Net Zero? Does it make sense and where is the Return on Investment—or the cost curve—that demonstrates that we are saving money by becoming fully net zero?

I would be remiss if I did not mention energy encroachment issues on military installations and their potential to impact military readiness. The renewable energy market continues to rapidly expand and provide an alternative means for domestic energy generation. I am fully supportive of renewable energy and the value it provides to the DOD and to the Nation. However, let me be very

clear—I do not support renewable energy development at the expense of military readiness.

I believe there is a lot of merit in many of the investments that are being made. The level of sustained leadership attention on the issue, the progress that has been made, the innovation that is reflected, and the hard work being done across the DOD to reduce consumption is all commendable. That being said, I want to ensure that we as Congress receive an accurate assessment of how the DOD is currently investing in energy, and the analysis that underpins some of the decisions that have been made to date in order that we can exercise our role in an oversight capacity. I would like to reflect on the graphs that I projected at the start, coupled with the $3.5 billion shortfall for fuel and use those as the basis for why we are having this discussion today.

Joining us today to discuss the DOD's Energy Security investments are five distinguished witnesses:

- The Honorable Sharon Burke, the first Assistant Secretary of Defense for Operational Energy Plans and Programs;
- Dr. Dorothy Robyn, Deputy Under Secretary of Defense for Installations and Environment;
- The Honorable Katherine Hammack, Assistant Secretary of the Army for Installations, Energy, and the Environment;
- The Honorable Jackalyne Pfannestiel, Assistant Secretary of the Navy for Energy, Installations and Environment; and
- The Honorable Terry Yonkers, Assistant Secretary of the Air Force for Installations, Environment and Logistics and Commander, Naval Air Systems Command.

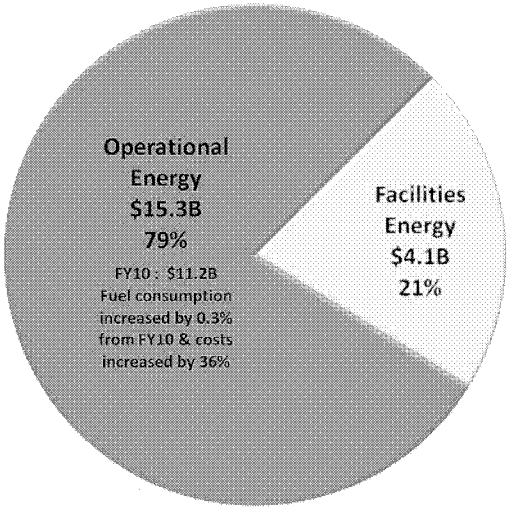
Ladies and Gentleman, thank you all for being here.

Energy Prices

	US Retail Price of Gas (per gallon)	US Residential Electricity Price (per kwh)
February 2005:	$2.15	8.74 ¢
June 2008:	$4.15	11.75 ¢
March 2012:	$3.71	11.45 ¢

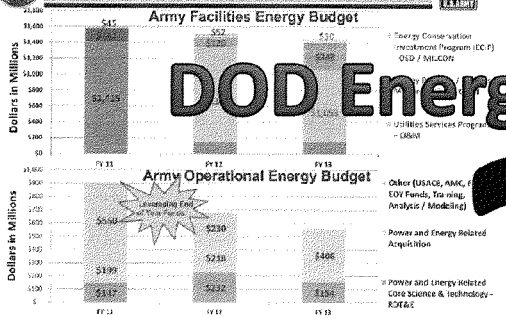
Source: U.S. Energy Information Administration Independent Statistics & Analysis
March 2012

DoD Energy Consumption
FY11: $19.4B



DOD Energy Investments

Army Energy Budget Snapshot



FY13 Air Force Energy Investments

U.S. AIR FORCE

Category	FY13 ($M)	FY14 ($M)	FY15 ($M)	FY16 ($M)	FY17 ($M)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	232.7
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	232.7
Other RDT&E	42.1	13.8	0	0	0
Aviation Energy	31.9	42.7	45.9	36.8	34.3
[illegible] Energy	288.7	297.3	264.8	266.4	47.2
[illegible] Conservation	270.3	271.1	241.8	240.6	24.7
[illegible] Energy	18.4	26.2	23.0	25.8	22.5
TO[illegible] Investments:	654.9	609.5	506.1	517.8	314.2

USN Shore Energy: PB-13 Investment and Planned Progress

DEPARTMENT OF THE NAVY
MILITARY CONSTRUCTION

CONGRESSIONAL REVIEW
FY-2013 MILCON PROGRAM

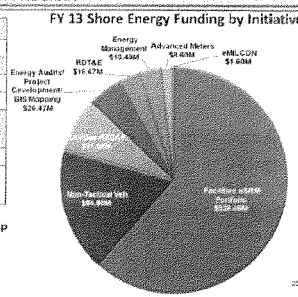
FY12	FY13	FYDP
$485.6M	$534.2M*	$2,172.5M

TBTU Saved/yr	
2013	2026
9.3 TBTU	24.1 TBTU

APPN	Investment	Yearly Cost Avoidance
eSRM	$328.0M	$65.4M
Utility Recapitalization (eMMRP)	$41.0M	$4.0M

Cost Avoidance Reinvested into Energy Program to decrease FYDP Requirement

FY 13 Shore Energy Funding by Initiative



*FY13 includes $64.9M for non-tactical vehicles

20

FY-13 Investment

Marine Corps

CONGRESSIONAL REVIEW
FY-2013 MILCON PROGRAM

FY12 ($K)	FY13 ($K)	FYDP ($K)
22,711	64,479	352,147

FY13 ($K) by Appropriation		
OMMC	PMC	RDTE
14,052	31,049	19,378

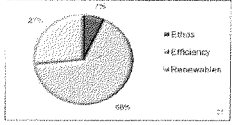
Qualitative Assessment of Progress Towards Goals

SECNAV
50% Consumption from Alternatives by 2020
2012 / 2016 Green Fleet Demo / Sail

CMC
50% Increase in Efficiency by 2025

POM-13 Investment by Appropriation

POM-13 Investment by Category



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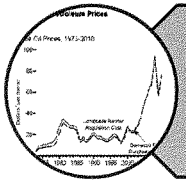
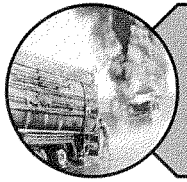
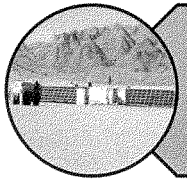


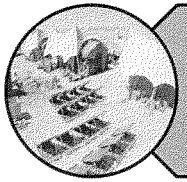
Volatility of fuel prices



Safety of the warfighter



Environmental stewardship



Flexibility of the Warfighter

NOT FOR PUBLICATION UNTIL RELEASED BY THE SUBCOMMITTEE

Statement by

Ms. Sharon Burke

Assistant Secretary of Defense for
Operational Energy Plans and Programs

Submitted to the

Subcommittee on Readiness
House Armed Services Committee
United States House of Representatives

March 29th, 2012

NOT FOR PUBLICATION UNTIL RELEASED BY THE SUBCOMMITTEE

INTRODUCTION

Chairman Forbes, Representative Bordallo, and distinguished members of the Subcommittee: thank you for the opportunity to discuss the President's Fiscal Year (FY) 2013 budget request for the Department of Defense (DoD) programs to support the Office of the Assistant Secretary of Defense for Operational Energy Plans and Programs (OEPP).

For FY13, DoD anticipates spending over $16 billion on energy for military operations, which will provide more than 4 billion gallons of fuel for military operations and exercises. DoD will also invest $1.4 billion on initiatives to improve operational energy security, about 90% of which are aimed at reducing DoD's demand for operational energy.

President Obama initiated the OEPP in June 2010, both to reflect his commitment to national and energy security and to honor the intent of Congress in calling for the establishment of an operational energy office at DoD. By statute, the purpose of the office is to transform the way DoD uses energy through guidance, policy, oversight, and coordination, as well as to serve as the primary advisor to the Secretary and Deputy Secretary of Defense on operational energy.

The mission of OEPP is to improve military effectiveness while lowering risks and costs to warfighters. In its first two years of operation, OEPP has achieved considerable progress by:

- Promoting institutional change within DoD.
- Supporting current operations with energy innovations.
- Building operational energy considerations into the future force.

For FY13, the office will continue to focus on these priorities. In doing so, OEPP has the opportunity to help transform DoD's energy use from a vulnerability to a strategic advantage. By reducing the Armed Forces' reliance on fuel, we aim to improve warfighting capabilities, such as range, endurance, signature, and loiter time. We aim to reduce the risk to fielded forces as they move fuel through contested territory. In the process, we believe we will lower costs for the taxpayer, promote good stewardship of natural resources, and contribute to national energy goals.

THE DEFENSE ENERGY CHALLENGE

DoD is the single largest consumer of energy in the nation, accounting for approximately 1% of national demand. In FY11, that added up to a $20 billion bill, with 75% (approximately $15 billion) going to support military operations. Indeed, a steady and reliable supply of energy is essential to every military capability and every mission, and for today's U.S. forces, that means a steady and reliable supply of petroleum fuels. Petroleum is the fuel of choice for military operations because of its high energy density, fungibility, and global availability. At the same time, DoD's high demand for petroleum, given its volume, weight, and geostrategic constraints, is raising costs and risks for U.S. forces.

Until the FY 2009 National Defense Authorization Act (NDAA), which called on DoD to establish the OEPP, "operational energy" was not a commonly used term at DoD. The Act defined operational energy as the energy required to train, move, and sustain military operations. The 2010 Quadrennial Defense Review and FY 2011 NDAA augmented this definition, noting that defense energy security means having "assured access to reliable supplies of energy and the ability to protect and deliver sufficient energy to meet operational needs."

While the term "operational energy" may be new to U.S. armed forces, the concept is not new. From the extraordinary WWII-era Red Hill fuel storage facility in Hawaii to today's Northern Distribution Network in Central Asia, energy security has long been a priority for American military operations. Today's conflicts have brought new challenges to military energy security given our distributed operations and increased energy demand – mostly for liquid fuel, but also for batteries. Today, U.S. forces in Afghanistan are consuming about 1.8 million gallons of fuel every day, which is conveyed over poor and sometimes contested roads. The Army and Marine Corps have documented thousands of casualties related to fuel movements in Afghanistan and Iraq, with U.S. Transportation Command tracking a thousand attacks on logistics convoys in Afghanistan alone last year. U.S. forces are fully capable of protecting these supply lines, but the opportunity cost in lives, resources, and diverted combat force at the tactical level is higher than it should be.

Going forward, the 2012 Department of Defense Strategic Guidance calls for a military force that is "agile, flexible, and ready for the full range of contingencies," one that is prepared and postured for a complex, global security environment. This will require new and diverse capabilities and –with the current trends in major acquisitions–a large and growing supply of fuel. In an era of precision weapons, asymmetric threats, and area denial strategies, the volume of that energy requirement will continue to impose tactical, operational, and strategic challenges.

At the same time, there will be geostrategic challenges for DoD's energy supplies, particularly when it comes to petroleum. Worldwide demand for petroleum continues to rise, even as supplies are concentrating into fewer nations. As long as the United States depends on oil, the price we all pay at the pump will be driven by a volatile, global market. For DoD, that means unpredictable fuel bills that crowd out other investment – every dollar hike in the price of oil per barrel raises our bill by $130 million. More to the point, DoD must take into account the destabilizing effects of global energy wealth and poverty, the resource competition resulting from rising demand in growing economies, and with 89% of oil exports moving by sea, the need to secure the global commons. The President's Blueprint for a Secure Energy Future seeks to change that calculus by taking steps to stabilize today's energy economy while investing in the innovation that will allow us to displace the primacy of oil in our national and military energy security.

PROMOTING INSTITUTIONAL CHANGE

DoD has a long history of excellence in managing energy use at fixed installations and supplying fuel to military operations. Until Congress created the OEPP, however, there was no dedicated effort or office for managing the demand for energy in military operations. My initial priority as the inaugural ASD (OEPP) was, therefore, to establish the institutional means to manage

operational energy, including by improving awareness of energy as a warfighting capability or enabler.

The first step was standing up OEPP itself, which is now fully staffed and working closely with operational energy offices or leads across the Office of the Secretary of Defense (OSD), Office of the Chairman of the Joint Chiefs of Staff (CJCS) and the Joint Staff, Combatant Commands, Military Departments, and Defense Agencies ("DoD Components"). The Chairman of the Joint Chiefs of Staff designated the Director of Logistics (J-4) as his lead on operational energy, and together we have initiated the Defense Operational Energy Board, an advisory council charged with overseeing DoD's execution of the Operational Energy Strategy and Implementation Plan, promoting coordination, and advising the ASD (OEPP) and J-4. OEPP is now represented in other key internal processes as well, such as the Defense Acquisition Board, the Joint Capabilities Integration and Development System, and the Energy and Power Community of Interest.

As required by law, DoD released "Energy for the Warfighter: The Department of Defense Operational Energy Strategy" in June 2011. 90 days later, OEPP internally distributed an implementation plan, which the DoD Components then reviewed and approved. Secretary of Defense Leon Panetta signed and released the plan to the public earlier this month.

The strategy sets the overall direction for operational energy security for DoD, with the goal of assuring reliable supplies of energy for 21st century military operations. The strategy outlines three principal ways to meet that goal: reducing the demand for energy, expanding and securing the supply of energy, and building energy security into the future force. The implementation plan includes seven targets:

- Measure operational energy consumption.
- Improve energy performance and efficiency in operations and training.
- Promote operational energy innovation.
- Improve operational energy security at fixed installations.
- Promote the development of alternative fuels.
- Incorporate energy security considerations into requirements and acquisition.
- Adapt policy, doctrine, professional military education, and Combatant Command activities.

Various offices will report their progress in meeting the targets to the Defense Operational Energy Board in FY12 and FY13. In addition, OEPP has already been working with our counterparts in DoD to meet these targets. The first target, measuring operational energy consumption, has been established as a DoD Priority Goal on Performance.gov.

Our chartering legislation calls on OEPP to review the DoD budget for adequacy in operational energy funding and programming. OEPP submitted its first budget certification report to the Secretary of Defense in March 2011 and is now finalizing its second – the FY13 certification. In keeping with an interim memo submitted to Secretary Panetta in January 2012, I expect to certify the DoD budget as adequate to implement the Operational Energy Strategy in FY13 and plan to make the certification report available to Congress and the public.

In addition to establishing institutions and key policies, OEPP leadership and staff have promoted Departmental awareness of the importance of operational energy to military mission effectiveness. These efforts have included collecting and analyzing data on operational energy and engaging in extensive outreach, such as meetings with key leaders, public speaking, publishing articles, and supporting a website and social media.

SUPPORTING CURRENT OPERATIONS

Secretary Panetta's top priority for DoD today is to support current operations. OEPP has, therefore, focused on identifying and promoting the technologies, techniques, tactics, and procedures that can best support deployed men and women, especially in Afghanistan.

OEPP engaged with representatives from DoD components and reviewed and commissioned studies on energy use in Afghanistan and Iraq in order to identify key areas for energy improvements in Afghanistan. The Marine Corps, in particular, has led the way for energy efforts in Afghanistan with the Experimental Forward Operating Base, which has resulted in fielded capabilities in the southwestern part of Afghanistan.

In May 2011, OEPP partnered with U.S. Central Command (CENTCOM) and DoD energy leaders to discuss the main lines of effort for rapid fielding, with the understanding that no effort could create a tactical distraction for deployed forces. In keeping with the Operational Energy Strategy, the summit identified the best near-term opportunities to reduce battlefield fuel demand, including improved power generation and distribution, improved shelter systems, and mature alternative energy technologies for the tactical edge, such as solar. Participants also identified key non-materiel improvements, such as leadership support, education and awareness, changes to contingency contracts, and management of air operations. Outcomes of the CENTCOM conference include the establishment of an Operational Energy Division at U.S. Forces-Afghanistan, clear statements on the importance of operational energy to all U.S. Forces in Afghanistan from Generals Petraeus and Allen, changes in Logistics Civil Augmentation Program (LOGCAP) contracts, accelerated deployment of the Army's centralized power and high-efficiency generators, accelerated deployment of improved shelter insulation by both the Army and Air Force, and support to the Army's Rapid Equipping Force Energy to the Edge program, which focuses on technical support and equipment to patrol bases at the tactical edge.

OEPP has also engaged with other Combatant Commands, including an Operational Energy Summit with U.S. Pacific Command (PACOM) earlier this month. For FY13, OEPP will continue to focus on supporting current operations, including by documenting lessons learned in Afghanistan. The office will also continue to support efforts at PACOM to integrate operational energy into command priorities, plans, and programs.

BUILDING THE FUTURE FORCE

In addition to promoting institutional change and support for current operations, OEPP has worked to build operational energy security into the future force. Main lines of effort have included promoting innovation and bringing new or improved tools to the requirements and

acquisition processes. OEPP will continue these efforts in FY13, including an emphasis on energy performance upgrades in reset or refit of legacy platforms and equipment.

OEPP's efforts to promote innovation include extensive collaboration with the office of Assistant Secretary of Defense for Research and Engineering, as well as with the Department of Energy (DOE). Moreover, DoD and DOE signed a Memorandum of Understanding (MOU) on energy security in July 2010, which has strengthened and broadened the already significant partnership between the two Agencies. Projects started under the MOU to date focus on improved energy efficiency, supply, and storage for dismounted troops, contingency bases, and platforms.

In addition, OEPP is promoting innovation through the Operational Energy Capabilities Improvement Fund. The fund incentivizes innovation that will support the Operational Energy Strategy. Our goal is twofold: to develop and rapidly transition technologies and practices that will improve capabilities and reduce costs, while establishing within the Services a sustainable capacity for such innovations. In its inaugural year, the fund focused on reducing the energy load or demand of expeditionary outposts. We encouraged joint programs, and as a result the Army and the Navy are working together on expeditionary air-conditioning, the Army and Air Force are working together on shelters, the Navy teamed up with DOE's Advanced Research Projects Agency – Energy on advanced heating and cooling, and PACOM and DOE are working together on energy efficient expeditionary outposts for tropical environments. We are also funding two complementary efforts, one to establish a quantitative baseline for energy use in Afghanistan and the other to develop efficient and deployable waste to energy systems.

Alternative fuels will be important for the future force, and DoD is currently engaging in a variety of research, development, testing, and evaluation efforts in this area. The FY 2012 NDAA gave ASD (OEPP), in consultation with the heads of the Military Departments and the Assistant Secretary of Defense for Research and Engineering, the authority to guide and oversee the alternative fuel activities of DoD. My office is in the process of drafting a DoD-wide alternative fuels policy, in collaboration with the relevant DoD Components, and will present the draft to the Defense Operational Energy Board for their revisions and recommendations. This policy will promote the development of alternative fuels as one element of a broad energy strategy to diversify our supply.

OEPP has focused considerable effort on integrating operational energy considerations into the requirements and acquisition processes, largely by supporting improvements in contracting and analysis and exercising oversight. One of the ways in which we are integrating energy considerations into the acquisition process is by including requirements for energy performance in contracts. OEPP is looking to more broadly apply the precedent set by the recent revisions to LOGCAP contracts and provisions in the KC-X tanker competition. The latter included energy in the life cycle cost calculations, assessing fuel usage against the aircraft's proposed missions. This methodology not only identified the cost of fuel usage for each offering, but also how that fuel usage would impact mission effectiveness. In FY12 and FY13, we also will look at how to ensure that improved energy performance will be incorporated into refit and upgrades of legacy platforms and equipment, whether through contracting or other methods.

OEPP has been working to help the DoD Components improve the energy analysis that informs requirements and acquisition decisions. For example, we are engaging the Army on modifying their scenario-based analysis for the Ground Combat Vehicle program to understand the increased fuel logistics demand and its impact on mission effectiveness. Our intent is that this work will serve as a model that can be used for most combat system development programs. The 2009 NDAA directed DoD to develop other analytical tools, specifically the energy efficiency key performance parameter (KPP) and the fully burdened cost of energy (FBCE). This past January, the Chairman of the Joint Chiefs of Staff Instruction elevated the energy KPP to the same level of consideration as other DoD KPPs. As a result, all programs under consideration by the Joint Requirements Oversight Council must explain how they will address the energy KPP or justify why the KPP is not applicable. OEPP is supporting the Joint Staff and Services in implementing this KPP by developing criteria that will be credible and focused on capabilities. Further, the Office of the Director of Cost Assessment and Program Evaluation and OEPP will soon release non-binding methodological guidance for calculating the Fully Burdened Cost of Fuel for acquisition programs in the Defense Acquisition Guidebook. The office is also engaged in the Defense Acquisition Board and the Overarching Integrated Product Teams, providing oversight on major defense acquisition programs. I have participated in both Defense Acquisition Board decision meetings as well as in-progress reviews.

In addition to our work in the acquisition and requirements processes, OEPP will also fulfill the other implementation plan targets for the future force. We will work to incorporate operational energy into modeling and simulation; policy, doctrine, and professional military education; and Combatant Command activities, including improving relationships with partner nations.

CONCLUSION

In June of 2011, General Petraeus released a memo to U.S. Forces in Afghanistan calling for better management of operational energy, which he called the "lifeblood" of warfighting capabilities. In December of 2011, General Allen renewed General Petraeus's call for action, equating operational energy to operational capability in a follow-up memo. General Allen's memo highlighted the nature of the challenge, noting: "Operational Energy in the battlespace is about improving combat effectiveness. It's about increasing our forces' endurance, being more lethal, and reducing the number of men and women risking their lives moving fuel."

OEPP is committed to achieving the vision of these leaders. We have made good progress this past year and have aggressive goals for the way ahead. Ultimately, our intention is to successfully integrate operational energy considerations into existing policies, plans, programs and processes. This type of large-scale institutional change will require considerable time, effort, and persistence, so I deeply appreciate the Congress's continued support for the mission and the Office of Operational Energy Plans and Programs.

Sharon E. Burke

Assistant Secretary of Defense for Operational Energy Plans and Programs

Sharon E. Burke was sworn in as the Assistant Secretary of Defense for Operational Energy Plans and Programs on June 25, 2010.

As the Assistant Secretary, Ms. Burke is the principal advisor to the Secretary and Deputy Secretary of Defense on operational energy security and reports to the Under Secretary of Defense for Acquisition, Technology, and Logistics. She is the inaugural Assistant Secretary for the office, which was created to strengthen the energy security of U.S. military operations. The mission of the office is to help the military services and combatant commands improve military capabilities, cut costs, and lower operational and strategic risk through better energy accounting, planning, management, and innovation. Operational energy, or the energy required to train, move, and sustain forces, weapons, and equipment for military operations, accounted for 75 percent of all energy used by the Department of Defense in 2009.

Prior to her appointment at the Department of Defense, Ms. Burke was a Vice President and Senior Fellow at the non-partisan and independent Center for a New American Security (CNAS), a defense policy think tank. At CNAS, Ms. Burke directed research on energy security and initiated the Natural Security Program, which looked at the national security implications of global natural resources challenges.

Ms. Burke has extensive previous U.S. government service. She served as a member of the Policy Planning Staff at the Department of State, a Country Director in the Department of Defense's Office of Near Eastern and South Asian Affairs, and a speechwriter to Deputy Secretary of State Richard Armitage and Secretary of Defense William Cohen. She started her career in the Energy and Materials program of the U.S. Office of Technology Assessment, contributing to a multi-year study of energy in developing countries.

First joining the Department of Defense as a Presidential Management Fellow, Ms. Burke has received medals for Exceptional Public Service from the Department of Defense and the Superior Honor Award from the Department of State. She has served on the Leadership Team of the American Assembly's Next Generation Project, as the Director of the National Security Project at Third Way, as the Middle East Advocacy Director at Amnesty International USA, and is the author of numerous reports, including *A Strategy for American Power: Energy, Climate, and National Security.*

Ms. Burke graduated from Williams College and Columbia University's School of International and Public Affairs, where she focused on international energy policy and earned a Certificate of Middle Eastern Studies. At Columbia, she also was a Zuckerman Fellow, an International Fellow, and a recipient of a Foreign Language and Areas Studies grant for Arabic.

HOLD UNTIL RELEASED

BY THE COMMITTEE

Statement of

Dr. Dorothy Robyn

Deputy Under Secretary Of Defense

(Installations and Environment)

Before the House Armed Services Committee

Subcommittee on Readiness

March 29, 2012

Chairman Forbes, Representative Bordallo and distinguished Members of the Subcommittee: Thank you for the opportunity to testify on what the Department of Defense is doing to promote energy security. The bulk of my testimony is devoted to a discussion of the Department's facility energy strategy, which is designed to reduce the costs and improve the security of the energy used on our fixed installations. In addition, I summarize the Department's performance with respect to the major statutory and regulatory goals related to energy and water. Finally, I describe the Department's efforts to ensure that the siting of transmission and renewable energy projects on and around DoD facilities is compatible with mission activities.

I. DoD's Facility Energy Strategy

Facility energy is important to the Department of Defense for two reasons.[1] The first is cost. With more than 300,000 buildings and 2.2 billion square feet of building space, DoD has a footprint three times that of Walmart and six times that of the General Services Administration. Our corresponding energy bill is $4 billion annually—roughly 10 percent of what DoD spends to operate and maintain its installation infrastructure. There are non-monetary costs as well: although facility energy represents only 20-25 percent of DoD's energy costs, it accounts for nearly 40 percent of our greenhouse gas emissions.

Second, facilities energy is critical to mission assurance. Our fixed installations support combat operations more directly than ever before, and they serve as staging platforms for humanitarian and homeland defense missions. These installations are largely dependent on a commercial power grid that is vulnerable to disruption due to aging infrastructure, weather-related events and a potential kinetic or cyber attack. The Defense Science Board has warned that DoD's reliance on a fragile power grid to deliver electricity to its bases places critical missions at risk.[2]

The Department's facility energy strategy, designed to reduce the energy costs and improve the energy security of our fixed installations, has four inter-related elements:

- Reduce the demand for traditional energy through conservation and energy efficiency;
- Expand the supply of renewable energy and other forms of distributed (on-site) energy;
- Enhance the energy security of our installations directly (as well as indirectly, through the first two elements); and
- Leverage advanced technology.

Below I discuss our actions in each area. I pay particular attention to the last one. Although clean energy is a new focus for DoD, the U.S. military has a long history of developing, demonstrating and acquiring new technology to achieve mission goals. Technological innovation has been the military's comparative advantage when it comes to combat operations for more than 200 years, and it should be central to our facility energy strategy as well.

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[1] Facility energy refers to the energy (largely electricity) used to operate the buildings on the Department's 500+ fixed military installations in the United States and overseas. It also includes the fuel used by DoD's 200,000 non-tactical vehicles. Facility energy is distinct from operational energy—largely fuel used for mobility (military aircraft, ships and tanks) and by the generators that produce power on our forward operating bases.

[2] "More Fight-Less Fuel," Report of the Defense Science Board Task Force on DoD Energy Strategy, February 2008.

A. Reduce Demand

First and most important, the Department is reducing its demand for traditional forms of facility energy through conservation and improved energy efficiency. We share Energy Secretary Chu's view that "Energy efficiency is not just the low-hanging fruit—it's the fruit laying on the ground." The Department's FY13 budget includes more than $1.1 billion for investments in conservation and energy efficiency, and almost all of that is directed to existing buildings. The lion's share ($968 million) is in the Military Components' operations and maintenance accounts, to be used for sustainment and recapitalization projects. Such projects typically involve retrofits to incorporate improved lighting, high-efficiency HVAC systems, double-pane windows, energy management control systems and new roofs.

The remainder ($150 million) is for the Energy Conservation Investment Program (ECIP), a flexible military construction account that my office allocates to the Services for specific projects.[3] ECIP traditionally funded small projects that promised a significant payback in reduced energy costs, and the Services relied on it to achieve their energy goals. In keeping with DoD's increased focus on energy, last year we began to reshape the role that ECIP plays—from one of funding the Services' routine energy projects to one of leveraging their now-larger investments in ways that will produce game-changing improvements in energy consumption, costs and/or security.

Two other changes in ECIP are worth noting. First, to encourage long-term planning, my office is requiring the Services to identify the set of projects that they want ECIP to fund over the next five years. Second, to encourage them to put forward their best ideas, we are replacing formula-funding with inter-Service competition. In FY13, we incorporated some competition but still guaranteed each Service a minimum level of funding. Beginning in FY14, we will award the funds based purely on competitive merit.

In addition to direct funding (their own and that provided by ECIP), the Services are using performance based contracts to improve the energy efficiency of existing buildings. In response to the President's memo calling on the federal government to initiate $2 billion worth of these performance-based contracts over the next two years, the Department has established its own goal to meet at least half of that commitment. Moreover, the Army has kicked off three ESPC projects that incorporate the development of solar energy to be used by the installation. (See the discussion below on our desire to have ESPCs incorporate more advanced technology.)

In addition to retrofitting existing buildings, the Department is taking advantage of new construction to incorporate more energy-efficient designs, material and equipment into our inventory—with the goal of producing new buildings that are less expensive to own and operate, improve employee productivity and leave a smaller environmental footprint. Currently, all new construction must meet the LEED (Leadership in Energy and Environmental Design) Silver (or an equivalent) standard and/or comply with the five principles of High Performance Sustainable

[3] Roughly three-quarters of ECIP's FY13 budget will go for investments in energy efficiency and water conservation; the rest will go for investments in renewable or other on-site sources of energy.

Buildings. It also must exceed the energy efficiency standard set by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) by at least 30 percent.

My office is developing a new code for the construction of high-performance, sustainable buildings which we will issue later this year. Based to some extent on ASHRAE 189.1, it will govern all new construction and major renovations as well as contracts for leased space. The goal is to improve building energy performance cost-effectively by prescribing the most attractive features of existing commercial codes and by requiring that the building be designed so as to reduce life-cycle costs. To assist us in developing this code, we have asked the National Research Council (NRC) to evaluate the major third-party "green building" rating systems and standards. In addition, the NRC is looking at alternative ways to incorporate analysis of life-cycle costs and return on investment into capital investment decisions.

As DoD strives to improve its energy efficiency, accurate, real-time facility energy information is becoming essential. The Department does a poor job of measuring its energy consumption. A large fraction of our buildings are not metered, and we lack the standardized processes and integrated systems needed to systematically track, analyze and benchmark our facility energy and water use and the related costs. The absence of usage and cost data reduces the efficiency of our existing facility operations, and it limits our ability to make the right investments in new, efficiency-enhancing technology and tools.

This Spring I will issue an updated policy on the metering of DoD facilities. In addition to lowering the threshold for buildings that must be metered, the policy will address the types of meters that can be used and establish guidelines for determining when advanced meters make financial sense. No less important, the policy will help ensure that installed meters can securely deliver data to the energy professionals in the field. As an example, Naval District Washington has developed an innovative approach that uses a secure network to integrate data on energy usage with information on building management so as to allow for active management of facility energy. We want to see this approach or one like it deployed throughout the Department.

In addition, my office has been leading the development of an Enterprise Energy Information Management (EEIM) system that will facilitate the automated collection of standardized facility energy and cost data. Automation will reduce the time it now takes for energy managers to input and analyze data manually, and standardization will allow for data to be aggregated and analyzed on a Service-wide and Department-wide basis. The EEIM will also provide advanced analytical tools that will allow energy professionals at all levels of the Department both to improve their existing operations and identify cost-effective investments. Although the Services will continue to use their individual energy information management systems for the time being, the EEIM will allow us gradually to expand and connect them to create an enterprise-wide system. This Spring, I will release the EEIM vision statement and "capability requirements," so that industry can adapt its commercial off-the-shelf solutions to meet the Department's needs.

B. Expand Supply of On-Site Energy

In addition to reducing the demand for traditional forms of facility energy, DoD is increasing the supply of renewable and other forms of distributed (on-site) energy on our installations. On-site

energy is critical to making our bases more energy secure. Together with the kind of smart microgrid and storage technologies discussed below, it will allow a military base to maintain its critical operations "off-grid" for weeks or months if necessary.

DoD's installations are well situated to support solar, wind, geothermal and other forms of distributed energy. In response to a congressional directive, my office commissioned a study of the potential for solar energy development on military installations in the Mojave and Colorado Deserts in California and Nevada. The year-long study looked at seven military bases in California and two in Nevada. It found that, even though 96 percent of the surface area of the nine bases was unsuited for solar development because of military activities, the presence of endangered species and other factors, the solar-compatible area on four of the California bases was nevertheless large enough to support the generation of 7000 megawatts (MW) of solar energy—equivalent to the output of seven nuclear power plants.[4]

The study also confirmed the logic of the Department's plan to rely on third-party financing for large-scale renewable energy projects. Third-party financing makes sense because private developers can take advantage of tax incentives that are not available to federal agencies. The Services have been active in pursuing privately financed projects using existing authorities:

- In September, the Army established its Energy Initiatives Task Force to work with the private sector to execute 10+ MW projects at Army installations. The Army hopes to develop around one gigawatt of renewable energy on its installations by 2020, and it has solar energy projects underway at Fort Bliss, TX (1 MW); White Sands Missile Range, NM (4.5 MW); and Fort Carson, CO (2 MW).

- The Navy has used the Title 10 authority in Section 2922a, which allows Power Purchase Agreements (PPA) to extend beyond the usual ten years, to issue a multiple award contract in the Southwest. Using this contract, the Navy has awarded three PPA projects in California, including a 14 MW solar photovoltaic (PV) array at Naval Air Weapons Station China Lake and a 1 MW solar PV array at Marine Corps Air Ground Combat Center Twentynine Palms. The Navy is finalizing a similar contract for Hawaii, which will be used to award projects to install 28 MW of solar PV arrays on Navy facilities, including one on historic Ford Island runway that will look like a runway from the air.

- The Air Force is using the Title 10 authority in Section 2667 to lease non-excess land for the development of large-scale renewable projects, the first of which is under negotiation at Edwards Air Force Base, CA. The Air Force recently completed a 6 MW solar PV project at the Air Force Academy in Colorado Springs, CO, and it plans to double the size of its 14 MW solar PV array at Nellis Air Force Base, NV. Luke Air Force Base, AZ, is partnering with a local company to build an array of 52,000 high-efficiency solar panels. Once complete, the solar project will meet half of the base's electricity needs.

[4] ICF International, *Solar Energy Development on Department of Defense Installations in the Mojave and Colorado Deserts* (January 2012). http://www.serdp.org/News-and-Events/News-Announcements/Program-News/DoD-study-finds-7-000-megawatts-of-solar-energy-potential-on-DoD-installations-in-Mojave-Desert

Many of the DoD sites best suited for renewable energy development are on Department of Interior (DOI) lands that were withdrawn from public use for defense purposes. My office is working closely with DOI to identify and overcome impediments to the development of renewable energy projects on these "withdrawn lands."

To elaborate, since 1958 Congressional approval has been required for a withdrawal of DOI land aggregating more than 5000 acres for defense purposes, and the terms of each such withdrawal, including its duration and purpose(s), are set in statute. Smaller withdrawals, as well as withdrawals made before 1958, have also been made administratively. The key impediment is the issue as to whether, absent explicit authorization in an individual withdrawal, the development of renewable energy on withdrawn lands in excess of the direct energy needs of the military installation concerned is consistent with the purposes of the particular withdrawal. A second impediment is the uncertainty about the continued availability of the land. Developers prefer to know that they can keep their solar arrays or wind turbines on the land for the 20-25 year life of the equipment. Even in a case where DoD has the authority to approve development on withdrawn lands, if the withdrawal period specified in statute expires before the anticipated end of life for the project, the developer can't be certain that Congress will renew the withdrawal (or renew it with the same terms) for a time sufficient to earn an acceptable return on the developer's investment. We are working with DOI to identify those areas where development can proceed unimpeded even as we discuss ways to deal with these impediments.

C. Enhance Security

The first two elements of the Department's facility energy strategy contribute indirectly to installation energy security, by reducing the installation's need for traditional forms of energy and by expanding the supply of on-site energy generation. In addition, we are addressing the need for greater energy security directly.

Next Generation Microgrids

A major focus of my office is advanced, or "smart," microgrid technology. Smart microgrids and energy storage offer a more robust and cost effective approach to ensuring installation energy security than the current one—namely, back-up generators and (limited) supplies of on-site fuel. Although microgrid systems are in use today, they are relatively unsophisticated, with limited ability to integrate renewable and other distributed energy sources, little or no energy storage capability, uncontrolled load demands, and "dumb" distribution that is subject to excessive losses. By contrast, we envision microgrids as local power networks that can utilize distributed energy, manage local energy supply and demand, and operate seamlessly both in parallel to the grid and in "island" mode.

Advanced microgrids are a "triple play" for DoD's installations. First, they will facilitate the incorporation of renewable and other on-site energy generation. Second, they will reduce installation energy costs on a day-to-day basis by allowing for load balancing and demand response—i.e., the ability to curtail load or increase on-site generation in response to a request from the grid operator. Most important, the combination of on-site energy and storage, together

with the microgrid's ability to manage local energy supply and demand, will allow an installation to shed non-essential loads and maintain mission-critical loads if the grid goes down.

The Installation Energy Test Bed, discussed below, has funded ten demonstrations of microgrid and storage technologies to evaluate the benefits and risks of alternative approaches and configurations. We are working with multiple vendors so as to ensure that we can capture the benefits of competition. Demonstrations are underway at Twentynine Palms, CA (General Electric's advanced microgrid system); Fort Bliss, TX (Lockheed Martin); Joint Base McGuire-Dix-Lakehurst, NJ (United Technologies); Fort Sill, OK (Eaton); and several other installations.

In addition to funding technology demonstrations, my office has commissioned three studies from outside experts. First, Massachusetts Institute of Technology's Lincoln Laboratory is reviewing all of the Department's work on microgrids from a technical standpoint, and its report will be completed in May. In addition to helping us understand the range of ongoing activity, Lincoln Lab's work will serve to classify different microgrid architectures and characteristics and compare their relative cost-effectiveness. Second, a private organization is just beginning a financial analysis of the opportunities for installations to use smart microgrids and other energy security technologies (on-site generation, load management, stationary energy storage and electric vehicle-to-grid) to generate revenue. Although some installations engage in demand response even with their existing energy systems (typically, a base agrees to use backup generators on a few peak demand days in return for a payment from the local utility), advanced microgrid and storage systems will create opportunities for much more sophisticated and lucrative transactions. Third, Business Executives for National Security (BENS), a non-profit, is analyzing alternative business models for the deployment of microgrids on military installations. As part of that analysis, which will be completed this summer, BENS is looking at the appropriate scale and scope for an installation microgrid (e.g., Should it stop at the fence or include critical activities in the adjacent community?) and at the impediments to widespread deployment.

Addressing Near-Term Concerns

Although microgrids will address the grid security problem over time, we are taking steps to address near-term concerns. DoD is participating in interagency discussions on the magnitude of the threat to the grid and how best to mitigate it. Closer to home, we are looking at how to ensure that we have the energy needed to maintain critical operations in the face of a major disruption. Together with the Assistant Secretary of Defense for Homeland Defense and Americas' Security Affairs, I co-chair DoD's Electric Grid Security Executive Council (EGSEC), which works to improve the security, adequacy and reliability of electricity supplies and related infrastructure key to the continuity of critical defense missions. As required by Section 335 of the National Defense Authorization Act (NDAA), and as a result of work by the EGSEC, the Department last year gave Congress a preliminary plan for identifying and addressing areas in which electricity needed to carry out critical military missions on DoD installations is vulnerable to disruption.

In addition to working across DoD, the EGSEC works closely with the Departments of Energy (DOE) and Homeland Security. The three agencies recently created an Energy Surety Public

Private Partnership (ES3P) to work with the North American Electric Reliability Corporation (NERC), whose mission is to ensure the reliability of the bulk power system, and with other private sector entities. As an initial focus, the ES3P is collaborating with four utilities in the National Capital Region to improve energy security at mission-critical facilities.

Finally, my office is updating the DoD Instruction on "Installation Energy Management" (DoDI 4170.11), which provides guidance to installation commanders and energy managers on a range of energy security and energy efficiency matters. For example, we are updating the requirements for fuel distribution plans to ensure that emergency generators can operate for a sufficient time.

D. Leverage Advanced Technology

As the discussion of microgrids illustrates, one of the ways DoD can lower its energy costs and improve its energy security is by leveraging advanced technology. Technological innovation has been DoD's comparative advantage for 200 years, as evidenced by the military's leadership in the development of everything from interchangeable machine made parts for musket production to the Internet. Technological innovation is no less important when it comes to facility energy.

ESTCP's Installation Energy Test Bed

To leverage advanced technology relevant to facility energy, three years ago my office created the Installation Energy Test Bed, as part of the Environmental Security Technology Certification Program (ESTCP). The approach is similar to one ESTCP has used since 1995 to demonstrate innovative environmental technologies on DoD sites so as to help them transition to the commercial market. ESTCP and its sister program, the Strategic Environmental Research & Development Program (SERDP), have a strong track record of reducing DoD's environmental costs.

The rationale for the Installation Energy Test Bed is straightforward. Emerging technologies offer a way to cost effectively reduce DoD's facility energy demand by a dramatic amount (50 percent in existing buildings and 70 percent in new construction) and provide distributed generation to improve energy security. Absent outside validation, however, these new technologies will not be widely deployed in time for us to meet our energy requirements. Among other problems, the first user bears significant costs but gets the same return as followers. These barriers are particularly problematic for new technologies intended to improve energy efficiency in the retrofit market, which is where DoD has the greatest interest.

As the owner of 300,000 buildings, it is in DoD's direct self-interest to help firms overcome the barriers that inhibit innovative technologies from being commercialized and/or deployed on military installations.[5] We do this by using our installations as a distributed test bed to

[5] The key is scale. If we demonstrate 10 new technologies and three of them don't work out, we can deploy the other seven and still get a large return on our investment given the size of our inventory. Thus, we accept risk on individual projects in order to achieve a return across the program as a whole. For the same reason, Walmart, the largest private sector energy consumer in the United States, operates its own test bed, systematically testing innovative energy technologies at designated stores to assess their performance and cost effectiveness. For technologies that prove out (not all of them do, which is itself a valuable finding), Walmart deploys them in its thousands of stores. This approach has helped Walmart dramatically reduce its energy consumption. But whereas

demonstrate and validate the technologies in a real-world, integrated building environment. Projects conduct operational testing and assessment of the performance and life cycle costs of new technology while addressing DoD-unique security issues. They also provide guidance and design information for future deployment of the technology across installations. By centralizing the risk and distributing the benefits of new technology to all military installations, the Test Bed will provide a significant return on DoD's investment.

For example:

- Watervliet Arsenal, NY, is demonstrating an advanced control system developed by United Technologies Research Center (UTRC) that could increase boiler efficiency by 5 percent. If the system proves out, DoD can deploy it on thousands of boilers and see a meaningful energy savings.
- Fort Benning, GA, is testing a micro-turbine developed by a small start-up firm, FlexEnergy, that can produce electricity from the low BTU-content waste gas characteristic of old landfills. DoD has dozens of old landfills that can use the technology, and there is a potential commercial market as well.
- Great Lakes Naval Training Center, IL, is demonstrating UTRC's "continuous commissioning" technology, which uses automated sensors and advanced modeling to adjust the building controls in real time so as to maintain a building's optimal energy performance. This technology has been used in high-profile buildings to reduce energy use by a third. Our goal is to make it cost effective for deployment at scale.
- Fort Irwin, CA, is demonstrating advanced lighting controls developed by Philips Research North America that can reduce indoor lighting costs in DoD buildings by nearly half through sensors, intelligent controls and networking (remote monitoring and control of multiple sites and connection to the smart grid).
- The Air Force, at one of its facilities in the humid Southeast, will test an HVAC system that incorporates a patented nanotechnology membrane developed with funding from DOE's Advanced Research Projects Agency-Energy (ARPA-E) program. Made by Dais Analytic, the "NanoAir" technology can de-humidify outdoor air without cooling it, thus lowering energy consumption by as much as half and reducing the size of the HVAC equipment needed.
- Marine Corps Air Station Miramar in San Diego, CA, will demonstrate electrochromic windows, which tint electronically to reduce solar heat gain, thus allowing a building to get by with a smaller cooling system and eliminating the need for window shades.[6] We

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Walmart's focus is narrow because all of its stores are identical (big-box design), the military needs solutions for a diverse mix of building types and sizes—everything from barracks to aircraft repair depots.

[6] Electrochromic windows illustrate the impediments to commercialization of technologies for building energy efficiency. The major benefit of these windows will be the capital equipment savings from using a smaller HVAC system. Architecture and engineering (A&E) typically are responsible for sizing the HVAC system for a new building. No A&E firm will take the risk of installing a smaller chiller, however, without compelling evidence that these windows will work as promised. Although DOE has helped fund the development of the technology and venture capitalists have invested in it, the cost remains high and the demand limited. Our large-scale demonstration can help reduce the impediments to widespread commercialization by providing rigorous data on technical and economic performance as well as qualitative information on occupant comfort and productivity. If DoD in turn becomes an early customer for electrochromic windows, that will further help jumpstart the market.

will install the windows, made by the start-up firm, Soladigm, on three sides of a building to validate the technology at scale and to see whether the building occupants like it.

(See http://serdp-estcp.org/Program-Areas/Energy-and-Water/Energy for additional examples.)

The Test Bed, which selects projects based on a rigorous competition, has more than 70 demonstrations underway in five broad areas:

- Advanced microgrid and storage technologies, such as the projects at Twentynine Palms and Fort Bliss;
- Advanced components to improve building energy efficiency, such as advanced lighting controls, high performance cooling systems and technologies for waste heat recovery;
- Advanced building energy management and control technologies;
- Tools and processes for design, assessment and decision-making on energy use and management; and
- On-site energy generation, including waste-to-energy and building integrated systems

The projects funded in FY10 will begin reporting results this year.

The timing for an Installation Energy Test Bed is ideal.[7] The federal government has invested significant resources in energy R&D, largely through DOE, and the private sector is making even larger investments as evidenced by the growth of venture capital backing for "cleantech." As a structured demonstration and validation ("dem-val") program linked to the large DoD market, the Test Bed can leverage these resources for the military's benefit.

In addition to leveraging DOE funding indirectly, ESTCP is partnering directly with DOE's SunShot Initiative, which aims to reduce the total cost of solar energy systems by 75 percent by 2020. SunShot will shortly announce the winner of its technology competition, and ESTCP has agreed to demonstrate the technology at the 1 MW scale on two separate bases as part of the Installation Energy Test Bed. DOE will provide the PV modules to the bases at no cost, and ESTCP will pay for the balance of system and its installation on the bases. The bases will get a cutting-edge solar array at a discount, and DOE will benefit from having its chosen technology tested at scale in a real-world setting with the prospect of the military as a major customer.

ESTCP is also exploring ways to partner with DOE's Building Technologies program, which funds R&D to improve the energy efficiency of commercial buildings. (A number of the technologies being demonstrated in our Test Bed received DOE funding at an earlier stage in their development.) Such a partnership is potentially powerful. DoD could take more direct advantage of the advanced technologies that DOE is funding, and DOE would get the lessons learned from real-world testing of its technologies. Moreover, the prospect of a demonstration on a military base may introduce more "demand-pull" into DOE's R&D process, which has been criticized for being too reliant on "technology push."

[7] One indication of that is the extraordinary response we have had from industry. ESTCP's FY12 solicitation for the Test Bed drew 600 proposals from leading companies in the building energy sector, small startups with venture capital funding and the major DOE labs. Although the Test Bed could afford to award funds to only 27 of the proposed projects, a number of the applicants were encouraged to reapply for FY13 funds.

Although the Installation Energy Test Bed represents a modest investment—DoD's FY13 budget includes $32 million for energy technology demonstrations under ESTCP[8]—it is a high-leverage program that the Department believes will produce major benefits. At last month's ARPA-E conference, Deputy Secretary Ash Carter and MIT President Susan Hockfield both underscored the importance of using DoD's 500+ installations and 300,000 buildings as a test bed for technologies the Department wants to see commercialized. And in a report released yesterday on "Energy Innovation at the Department of Defense," the authors highlighted "the proven effectiveness of two very different but highly effective innovation models: the widely extolled Defense Advanced Research Projects Agency [DARPA] and the Strategic Environmental R&D/Environmental Security Technology Certification programs [SERDP/ESTCP]."[9]

Other Steps Needed to Leverage Advanced Technology

There are other ways in which the Department is leveraging or could leverage advanced technology to further its facility energy strategy. Let me briefly describe two that require additional action to be effective.

Collection of High Quality Data on Building Energy Consumption: The lack of good data on building energy performance is the single biggest impediment to achieving the objectives of our facility energy strategy. Even new buildings do not perform in keeping with the design goals, and their energy performance degrades over time. Without near-continuous building-level energy consumption data, however, it is hard to identify the problems and assess the opportunities for investment. Detailed building audits can provide the needed information, but they represent only a snapshot at the time of the audit and are so expensive as to be prohibitive.

High quality data on building energy performance is the building block for investment and innovation. The biggest opportunity lies in coupling these data streams with advanced modeling technologies and emerging diagnostic tools that can both identify cost effective opportunities to retrofit our buildings and improve their use of energy during operation.

The actions my office will take this Spring—issuing an updated metering policy and releasing the vision and requirements for the EEIM system—represent an important next step. It is just that, however—more needs to be done. Most important, the Services need to budget for new meters and install them expeditiously in keeping with the new policy. Moreover, building on the Navy's innovative approach, the Department needs to settle on a cyber-secure way to connect its (smart) meters so that the information they provide can be monitored and analyzed centrally—whether by the installation commander or at the Service headquarters.

Reduction of Risk to Third-Party Financers of Advanced Technology: As discussed above, the Department plans to rely heavily on third parties to finance its investments in energy efficiency (ESPCs and UESCs) and renewable energy (PPAs, Enhanced Use Leases). Currently, these

[8] We are also requesting $43.9 million for ESTCP for *environmental* technology demonstrations. These two demonstration programs appear as separate lines under ESTCP in the FY13 budget.
[9] Consortium for Science, Policy and Outcomes and the Clean Air Task Force, "Energy Innovation at the Department of Defense: Assessing the Opportunities" (March 2012).

entities have an incentive to minimize risk on individual projects, which leads them to use older, well-proven technology. However, as the owner of 300,000 buildings and thousands of acres of solar-compatible land, the Department has an incentive to take advantage of newer, less-proven technology, which can dramatically reduce energy demand or generate renewable energy at significantly lower cost. Just as with the ESTCP Test Bed, new technology represents a risk at the individual project level, but at the program level—i.e., looked at across the entire Department—it can significantly increase the return on investment.[10]

This is a recognized issue with ESPCs and the Energy Savings Companies (ESCOs) that perform them. The clearest evidence comes from ESCOs that are part of larger companies which are themselves developing technologies to improve building energy efficiency. Rather than use the new technology that its parent company has developed, the ESCO will typically use an off-the-shelf solution so as to minimize financial risk. Renewable energy projects face the same issue: the entities funding power purchase agreements and enhanced use leases have no incentive to use advanced technology that, while offering superior performance, is not well-proven.

The challenge is to reduce the risk to third-party financed projects of incorporating advanced technology that will increase the return on ESPCs overall. We are exploring contractual mechanisms that would allow the Department to reduce the risk to, or share the risk with, the third party. We have had some preliminary discussions with energy financing experts in academia, among others, and we plan to bring in legal and contracting experts as well.

Potential Deployment of Plug-In Electric Vehicles. Over the past eighteen months, DoD has sought to determine whether the large-scale procurement of plug-in electric vehicles (PEV's) is financially viable. Led by the Air Force, in close collaboration with my office and the other Services, this effort set an ambitious goal: develop a PEV procurement strategy that meets our requirements at a total cost-of-ownership that does not exceed that for conventional vehicles.

The Air Force has done an extensive analysis of the market, focusing on those segments where DoD can potentially "tip" the market toward lower costs—namely, medium- and heavy-duty trucks. In addition to issuing requests for information and convening two "industry days," the Air Force worked with GSA to model the lifecycle cost and residual value of PEV's so as to assess the financial implications of fleet electrification. It also commissioned MIT's Lincoln Laboratory to do a detailed analysis of the requirements for and cost to install a charging infrastructure at 16 bases. In addition, Lincoln Lab is conducting a cost-benefit analysis of electric vehicle-to-grid (V2G) technologies, which would allow an installation to sell power from electric batteries back to the grid.

In addition to doing extensive analysis, the Air Force has announced plans to make Los Angeles Air Force Base the first federal facility to replace its entire general purpose fleet with PEV's. With funding from the ESTCP Installation Energy Test Bed, Lawrence Berkeley National Laboratory and others will demonstrate new fleet management and V2G software at the base.

The jury is still out—we are awaiting the conclusion of Lincoln Lab's research and some additional analysis. However, the preliminary results of the 18-month analysis suggest that there

[10] In fact, even for an individual ESPC hat said, the kinds of technologies that we would like to see ESPCs incorporate are typically lower risk than the ones we demonstrate as part of the Installation Energy Test Bed.

is a way to procure a large number of PEV's at cost parity with conventional vehicles, where "large" is defined as 1000-2000 vehicles per year at each of 20-30 installations. If those promising results hold up, we will issue an RFP (request for proposals) in the coming months.

II. Progress on Statutory and Regulatory Goals

There are four key statutory and regulatory goals related to installation energy and water:

- Reduce energy intensity (BTUs per square foot) by 3 percent per year, or 30 percent overall, by 2015 from the 2003 baseline [Energy Independence and Security Act of 2007]. Under DoD's High Priority Performance Goals, the interim target is a 21 percent reduction by the end of 2012.
- Increase use of renewable energy to 7.5 percent in 2013 and beyond [Energy Policy Act of 2005]; and produce or procure 25 percent of electricity consumed from renewable sources by the end of 2025 [2007 NDAA]. Under DoD's High Priority Performance Goals, the interim NDAA target is 12 percent by 2012.
- Reduce consumption of petroleum (gasoline and diesel) by non-tactical vehicles by 30 percent by 2020 [Executive Order 13514, October 2009].
- Reduce potable water consumption intensity by 2 percent per year, or 16 percent overall, by 2015 from the 2007 baseline [Executive Order 13514, October 2009].

In 2011, the Department made progress on all four goals but it fell short of its statutory and regulatory goals for energy intensity and renewable energy.

- DoD reduced its energy intensity by 2 percent—a meaningful improvement but less than the 3 percent needed to meet the annual goal. Overall, DoD has reduced its energy intensity by 13.3 percent since 2005, compared to the cumulative goal of 18 percent.
- With respect to the NDAA renewable energy goal (produce or procure 25 percent of all electricity from renewable sources by 2025), DoD lost ground, going from 9.6 percent to 8.5 percent. The drop was partly the result of a policy decision to buy fewer Renewable Energy Credits.[11] It also reflected a decline in the output of the 270 MW geothermal facility at the Navy's China Lake installation.
- DoD continued to reduce its consumption of petroleum, reaching a cumulative reduction of 11.8 percent since 2005—just shy of the 12 percent goal.
- DoD reduced its potable water intensity (measured as consumption per gross square foot) by 10.7 percent from 2007 to 2011—well above the goal of 8 percent.

[11] The purchase of renewable energy credits (RECs) is an alternative to the actual development of renewable energy; DoD has decided to meet the goals by adding supply on its installations as opposed to buying RECs.

III. Renewable Energy and Transmission Siting

Although most transmission and renewable energy projects are compatible with the military mission, some can interfere with test, training and operational activities. Until recently, the process by which DoD reviewed projects and handled disputes was opaque, time-consuming and ad hoc, resulting in costly delays. Spurred in part by Congress, the Office of the Secretary of Defense created the DoD Siting Clearinghouse to serve as a single point of contact within the Department on this issue and to establish a timely and transparent review process. The goal is to facilitate the siting of energy projects while protecting test, training and operational assets vital to the national defense.

The results are impressive: to date, the Clearinghouse has overseen the evaluation by technical experts of 506 proposed energy projects; 486 of these projects, or 96 percent, have been cleared, having been found to have little or no impact. These 486 projects—more than half of which were backlogged when the Clearinghouse was created—represent 24 gigawatts of potential energy from wind, solar and geothermal sources. The 20 projects that have not been cleared are undergoing further study, and we are working with industry, state and local governments, and federal permitting and regulatory agencies to identify and implement mitigation measures wherever possible.

In addition to reviewing projects, the Clearinghouse has conducted aggressive outreach to energy developers, environmental and conservation groups, state and local governments, and other federal agencies. By encouraging developers to share project information, we hope to avert potential problems early in the process. We are also engaged in Interior's efforts to open public lands and the Outer Continental Shelf to renewable energy generation—ensuring that we do this in a way that preserves military testing, training and homeland defense capabilities.

The Clearinghouse is being proactive in looking at regions where renewable energy projects could threaten valuable test and training ranges. For example, DoD has commissioned a study to identify areas of likely adverse mission impact around China Lake and Edwards Air Force Base in California, and Nellis Air Force Base and the Nevada Test and Training Range in Nevada. These installations are the Department's premier sites for test and evaluation and require a pristine environment clear of interference. The results of the study will be used to inform stakeholders of areas where DoD is likely to oppose the siting of wind turbines and solar towers.

The Clearinghouse is also working across the Department and with other federal agencies on R&D to promote mission compatible renewable energy, with an emphasis on technology to mitigate the impacts of wind turbines on radars. We have teamed with the Departments of Energy and Homeland Security and the Department of Transportation's Federal Aviation Administration to model the impact of turbines on surveillance radars, evaluate alternative mitigation technologies, and expedite the fielding of validated solutions.

Finally, the Clearinghouse is taking advantage of Section 358 of the FY11 NDAA, which allows DoD to accept voluntary contributions from developers to pay for mitigation. The Clearinghouse and the Navy recently negotiated an agreement that provides for the developer to pay the cost to mitigate the impact of wind turbines on the precision approach radar on a runway at Naval Air

Station (NAS) Kingsville, TX. The agreement facilitates the continued growth of wind energy generation along the Texas Coastal Plain while providing for the safety of student pilots at NAS Kingsville and NAS Corpus Christi. We believe there will be many other situations in which a developer is willing to pay the relatively small cost of mitigation in order to realize the much larger value of the project. Section 358 is an extremely useful, market-based tool that allows us to negotiate those win-win deals.

IV. Conclusion

Thank you for the opportunity to testify on the Department of Defense's strategy for reducing the energy costs and improving energy security on our fixed installations; DoD's performance with respect to the major statutory and regulatory goals related to energy and water; and our efforts to ensure that the siting of transmission and renewable energy projects on and around DoD facilities is compatible with mission activities. I look forward to working with you in the months ahead on these important initiatives.

Dorothy Robyn

Deputy Under Secretary of Defense for Installations and Environment

Dorothy Robyn became the Deputy Under Secretary of Defense for Installations and Environment in July 2009. In this position, she provides management and oversight of military installations worldwide and manages environmental, safety, and occupational health programs for the Department. The Department's installations cover some 29 million acres, with 539,000 buildings and structures valued at more than $700 billion. Her responsibilities include the development of installation capabilities, programs, and budgets; installation-energy programs and policy; base realignment and closure; privatization of military housing and utilities; and integration of environmental needs into the weapons acquisition process. She is also responsible for environmental management, safety and occupational health; environmental restoration at active and closing bases; conservation of natural and cultural resources; pollution prevention; environmental research and technology; fire protection; and explosives safety. Dr. Robyn also serves as the Department's designated Senior Real Property Officer and the DoD representative to the Advisory Council on Historic Preservation.

Before her appointment to the Department of Defense, Dr. Robyn was a principal with The Brattle Group, an economic consulting firm that specializes in competition and antitrust, energy and the environment. She focused principally on economic analysis of public policy issues related to the aviation and telecommunications sectors, including such issues as: proposed changes in the governance and financing of the U.S. air traffic control system; antitrust issues affecting international airline alliances; and mechanisms for FCC allocation of vacant radio spectrum. Prior to joining The Brattle Group in 2002, she was a Guest Scholar at the Brookings Institution.

From 1993 to 2001, Dr. Robyn served as Special Assistant to the President for Economic Policy and a senior staff member of the White House National Economic Council. She managed interagency coordination on high-priority issues in aviation and transportation, aerospace and defense, science and technology, and competition policy. Most relevant to her current job, she oversaw the development and implementation of the Clinton Administration's Defense Reinvestment and Transition Initiative, which encompassed adjustment programs for workers and communities hurt by defense downsizing; a comprehensive strategy to accelerate reuse of closing military bases; and efforts such as housing privatization, defense acquisition reform and "dual-use" R&D that were designed to allow for greater DoD reliance on commercial markets.

Prior to joining the White House staff, Dr. Robyn was with the Joint Economic Committee of Congress and the congressional Office of Technology Assessment (OTA). From 1983-1987, she was an assistant professor at Harvard's Kennedy School of Government, where she taught courses in public management, policy analysis and the business-government relationship.

She is co-author (with William Baumol) of *Toward an Evolutionary Regime for Spectrum Governance: Licensing or Unrestricted Entry?*(Brookings Press, 2006) and author of *Braking the Special Interests: Trucking Deregulation and the Politics of Policy Reform* (University of Chicago Press, 1987). Dr. Robyn has served as an

associate editor for the *Journal of Policy Analysis and Management*(1991-93) and as book editor for *Issues in Science and Technology* (1986-89). She wrote the 1995 White House report, *Second to None: Preserving America's Military Advantage through Dual-Use Technology* and co-authored the 1988 OTA report, *Commercializing High-Temperature Superconductivity*. She has a B.A. from Southern Illinois University and a Ph.D. and M.P.P. in public policy from the University of California at Berkeley. She is a native of St. Louis, Missouri.

RECORD VERSION

STATEMENT BY

THE HONORABLE KATHERINE HAMMACK
ASSISTANT SECRETARY OF THE ARMY FOR INSTALLATIONS,
ENERGY, AND ENVIRONMENT

BEFORE THE

HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON READINESS
UNITED STATES HOUSE OF REPRESENTATIVES

SECOND SESSION, 112TH CONGRESS

THE VALUE OF ENERGY SECURITY FROM BATTLEFIELD TO THE BASE

MARCH 29, 2012

NOT FOR PUBLICATION
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THE HOUSE ARMED SERVICES COMMITTEE

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INTRODUCTION

Mr. Chairman and members of the Subcommittee, it is a pleasure to appear before you to discuss the Army's Energy Security program. We are grateful for this Subcommittee's continued support for the Army's Energy program. The Subcommittee's ongoing support, coupled with the President's vision for Energy Security and Sustainability, is marked by increased energy efficiencies and investments in renewable energy. This will result in improved access to reliable supplies of energy, the ability to protect and deliver sufficient energy to meet operational needs and reduced energy costs for the Army.

The Army requires secure and uninterrupted access to energy. Over reliance on fossil fuels and connection to a vulnerable electric power grid jeopardize the security of Army installations and mission capabilities. Investment in energy capabilities, including renewable energy and energy efficient technologies will help ensure the Army can meet mission requirements today and into the future.

Army operations span a diverse range of environments and tasks, from base infrastructure under lesser threat, to expeditionary operations and sustained campaigns in hostile areas. Supplying energy to these diverse missions is increasingly challenging. Constraints and threats to the supply of energy, water and other resources are growing in scope and complexity both abroad and at home.

The Army recognizes there are limited resources and that investments must be based on clear returns, measured both in terms of future savings and added mission capability.

We are moving forward to address the challenge of Energy Security and Sustainability to ensure the Army of tomorrow has the same or greater access to energy, water, land, and natural resources as the Army of today. To maintain an effective readiness posture as energy costs escalate, the Army has implemented a comprehensive Energy and Sustainability program based on culture change, increased energy efficiency, and development of renewable and alternate sources of energy. We are focusing our energy efforts on Soldier Power, Basing Power and Vehicle Power. Reducing energy use across the Army is mission critical, operationally necessary and financially prudent.

OVERVIEW

The Army is addressing Energy Security through the development of a force-wide energy doctrine and operating principles. Technological investments, operational training, education and facilities management are all critical aspects of instilling a mindset of conservation, efficiency and sustainability.

To enable these transformational changes, the Army has integrated our energy strategies with an investment strategy that leverages both appropriated funding and private sector investments to accelerate the deployment of proven, viable technologies. The Army is using the authorities given us by the President and the Congress, namely power purchase agreements, enhanced use leases and energy performance contracting to attract outside investments geared toward long-term installation energy resource management that benefits both industry and

the Army.

The FY 2012 National Defense Authorization Act (NDAA) defines Energy Security as "having assured access to reliable supplies of energy and the ability to protect and deliver sufficient energy to meet mission essential requirements." The NDAA definition directs the Army to build energy security into its programs and requirements.

The Army has incorporated Energy Security into the Army Campaign Plan (ACP), the overall strategic management plan for the Army, along with the sustainable use of natural resources. Integrating Energy into the ACP provides the framework to imbed Energy Security into enterprise structures across the Army so energy is a factor in everything the Army does, from training, to managing our bases, to what we buy. Energy is also front and center in a range of Army policies, plans and governance structures – receiving constant attention from the senior most persons in the organization.

In FY11 the Army spent $5 billion to provide energy to our Soldiers, which includes $3.7 billion for liquid fuel and $1.3 billion for electricity and other commodities on our installations. In the FY13 budget request the Army plans to spend $4.5 billion on its energy program. This sum includes $2.5 billion for liquid fuel and $1.05 billion for utility services such as electricity and natural gas. The Army will also invest $960 million to reduce future energy consumption ($560 million in our operational forces and $400 million for installations). We also anticipate attracting well over $500 million in private sector investment through performance contracting and power purchase agreements. The Army evaluates all energy investment opportunities, regardless of funding source, to determine their long-term benefits for the Army. We examine projects based on return on investment and demonstrated cost savings over their lifetime. We also

expect projects to make positive contributions to mission success through reduced fuel demand on the battlefield, increased capability, reduced energy weight carried by a Soldier on patrol, and more energy-informed operations.

The Army recognizes the value of external collaboration and to this end we work closely with a variety of public and private organizations to include the Offices of the Secretary of Defense, other military Services, Department of Energy, Environmental Protection Agency, OMB, industry, and others to meet our energy security requirements.

OPERATIONAL ENERGY

The Army is designating the G-4 as the Army Staff proponent for Operational Energy. This designation ensures synchronization and integration of Operational Energy functions across the Army. The Army's FY 13 Operational Energy Investment Budget totals $560 million and includes $154 million for Science and Technology and $406 million for Acquisition. This funding will develop and procure energy efficient generators, improve battery and Soldier power systems, increase energy efficient systems for Army aircraft and tactical vehicles, and procure aviation simulators. Together, these investments will reduce the volume of petroleum used by the Army. For example, the new generators use 21% less fuel than the ones they are replacing and the new aircraft engine provides dramatic performance improvements while using 25% less fuel.

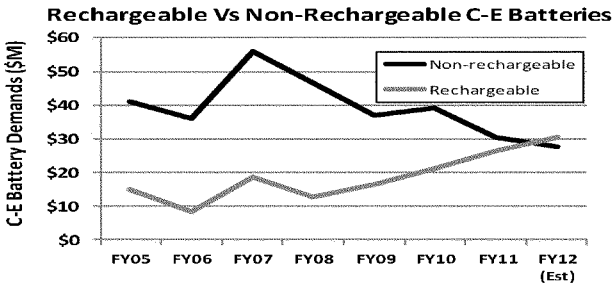
On the battlefield, energy is fundamental to Army capability and performance. The Army's energy requirements are driven by the military mission. The primary goal of the Army's Operational Energy efforts is to maximize effectiveness of Soldiers and leaders on the ground.

Power and water logistical requirements in combat theaters represent significant risks, from convoy supply operations to Soldier equipment weight. Fuel and water comprise seventy to eighty percent of ground resupply convoys (by weight). The fully burdened cost of fuel – the total cost per gallon of all activities needed to acquire, transport, distribute and secure fuel - ranges from $3.95 to as high as $56 per gallon in Afghanistan. We estimate the Army suffered one casualty for every forty-six convoys in Operation Enduring Freedom (OEF) in 2010. The Army is committed to easing the aggregate burden of powering the tactical edge while still providing the amount of power and resources needed by Soldiers. New technologies are being tested in combat theaters that will increase mission agility through better power management and flexible power sourcing. Further, forward operating base improvements are being developed to allow Soldiers to be more efficient and less energy intensive. Technologies including smart micro-power grids, advanced structure insulation and onsite water generation are just some of the concepts being explored to reduce the energy footprint of operations.

The Army is focusing on Soldier Power to lighten Soldier energy loads and help them become more agile and self-reliant. Current efforts include advanced portable power systems, lighter batteries, universal charging devices and water purifiers. A Soldier on a three-day patrol may carry seventy batteries weighing about sixteen pounds. This means that for a dismounted platoon to operate for 72 hours they must carry more than 400 pounds of batteries. Developing solutions to reduce this load will build flexibility and resilience. One way the Army is achieving this is by transitioning to the use of more rechargeable batteries. In FY12 the Army will spend about $60 million on Communication-Electronics batteries, 56% of which will be rechargeable batteries vs. 26% in FY05 (Figure 1). When such batteries are paired with portable solar power blanket recharging systems,

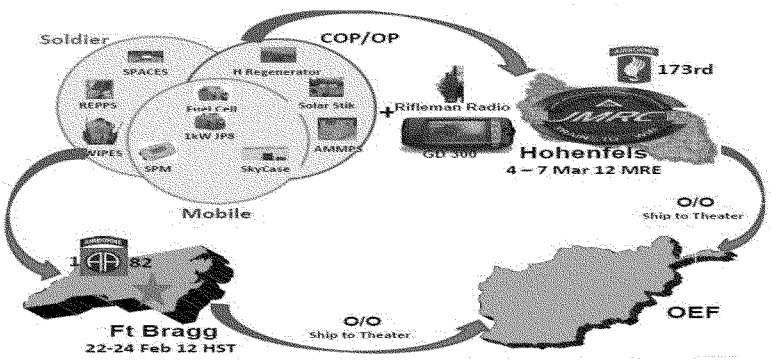
significant weight savings can be achieved and patrols can stay out longer without resupply.

Figure 1



The Army is so convinced of the value of energy solutions on the battlefield that we are currently equipping two Airborne Brigade Combat Teams (ABCT) in preparation for deployment to Afghanistan with a suite of new technologies. These technologies build upon the earlier deployment of the 1-16 infantry battalion. The 1-82nd and the 173rd ABCTs will deploy with capabilities such as power management devices, fuel cells, energy efficient generators, and alternative energy sources (Figure 2).

Figure 2: Suite of New Energy Technologies



The US Army Corps of Engineers has aggressively installed "mini-grids" throughout Afghanistan, consolidating point generators into fewer, larger and more efficient units. The increased efficiency from this effort will result in an annual fuel savings of more than 50 million gallons per year, the equivalent of removing nearly 20,000 fuel trucks from the road.

To drive energy security across all aspects of the Army, an Operational Energy (OE) Initial Capabilities Document (ICD) will be published within the next several months. The Army OE ICD relates energy requirements to operational capabilities and outlines the analytical framework to assess operational improvements against costs. It highlights the inherent need for energy networking and management functions, materiel solutions to reduce the energy footprint, and an increased operational focus on energy.

BASE / INSTALLATION ENERGY

The Installation Energy budget totals $1.45 billion and includes $50 million from the Department of Defense (DoD) "Defense-Wide" appropriation for the Energy Conservation Investment Program (ECIP), $343 million for Energy Program / Utilities Modernization program, $1.053 billion for Utilities Services, and $7.1 million for installation related Science and Technology research and development.

The Army is the largest facilities energy user in the Federal Government, using roughly one fifth or just over 20% of the Government's total. Investment in renewable energy and energy efficient technologies will help ensure the Army can meet mission requirements today and into the future.

Since FY 2003 the Army has reduced its installation energy consumption by 13.1 percent while its total number of active Soldiers and civilians has increased 20 percent.

Energy Security on our Installations aligns with the FY 12 NDAA definition of Energy Security: "having assured access to reliable supplies of energy and the ability to protect and deliver sufficient energy to meet mission essential requirements." It is clear that an energy secure installation must have: a) a very energy efficient set of buildings, b) on-site power generation and c) a secure micro-grid that can match power with key loads. The Army is making investments in each of these areas.

Over the past several years the Army has taken significant steps towards improving the energy efficiency of our installations. To meet our energy efficiency goals we have utilized appropriated funds, policy initiatives and third-party financing.

a. Energy Conservation Investment Program (ECIP)

The Army invests in efficiency, on-site energy production and grid security through the Department of Defense's (DoD) appropriation for the Energy Conservation Investment Program (ECIP). The Army's FY 2013 budget for the ECIP program, $50 million, includes seven renewable energy projects, six energy conservation projects, one water project, and two Energy Security projects. The Army is taking a strategic look at requirements, including a thorough project validation and prioritization process, to develop an ECIP Future Years Defense Program to fund additional requirements should such an opportunity arise.

b. Energy Program/Utilities Modernization (Energy Efficiency)

When developing energy projects to be funded with appropriated dollars, the Army subjects these projects to a Cost Benefit Analysis (CBA) process to ensure that the Army will receive a reasonable return on investment. When we developed our budget request for FY13-17, approximately 1800 projects were submitted to this process. Projects that did not have reasonable returns on investment were eliminated, ensuring that taxpayer funds will be used in the most effective manner possible. As a result the Army was able to identify approximately $343 million in its Energy Program / Utilities Modernization budget for FY13 for projects and initiatives that will have a cost effective return on investment for the Army while contributing significantly to the energy security of Army facilities.

Included in this total is $96.6 million for energy efficiency projects, $49.2 million for the development and construction of renewable energy projects, $43.8 million for the Army's metering program, $112.7 million to modernize the Army's utilities, $13.2 million for energy security projects and $27.4 million for planning and studies.

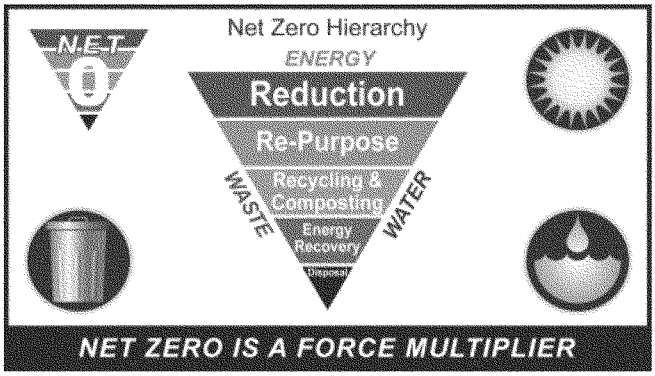
The Army is placing considerable emphasis on energy efficiency in its facilities. Energy efficiency improvements provide a significant opportunity for the Army to reduce total energy usage while generating significant cost savings. The FY13 investment of approximately $343 million in Energy Program / Utilities Modernization initiatives is projected to avoid utility costs of $23 million dollars annually.

In addition, the Army has initiated several Energy policies to promote energy security. The Army has adopted the highest building code in the Federal Government, ASHRAE Standard 189.1 which will reduce energy and water consumption on average 40 percent annually in

our new construction program and in existing facilities that undergo major renovations. This policy decision was made only after extensive cost-benefit analysis by the US Army Corps of Engineers, the Department of Energy and an independent outside organization. For most buildings and most climate zones the Army will get these savings simply though better, more integrated design. In some locations for some facility types we may have to pay up to 5% additional costs at time of construction, a figure that will be recovered many times over in savings throughout the life of the building.

While internally the Army is focusing and prioritizing investments towards energy security, we are very mindful of and trying to achieve the goals for reduction in installation energy that Congress and the President have mandated. The Army energy goals include a 30% reduction in facilities energy intensity by 2015 from the 2003 baseline; generation of 25% of energy from renewable resources by 2025; reduction in petroleum use in non-tactical equipment by 20% by 2015; and elimination of the use of fossil fuel generated energy in newly constructed buildings by 2030.

Figure 3: Net Zero Initiative



Underpinning all efforts is culture change and a need to take a holistic integrated design approach to solutions that can be found in the

Net Zero Initiative. In FY11, the Army announced the Net Zero Initiative (Figure 3), which aims to provide significant security benefits to installations while helping to meet Congressional and Presidential goals. With an FY13 budget of $2.2 million, the Net Zero Installation initiative is advancing an integrated approach and will improve the management of energy, water, and waste. Net zero installations will move closer to the objective of consuming only as much energy or water as they produce and eliminate solid waste to landfills. When fully implemented, this will establish Army communities as models for energy security, sustainability, value, and quality of life. Seventeen installations have been identified for this effort, with plans to reach Net Zero by 2020.

The installations piloting this initiative have already had successes. In support of its Net Zero Water Installation goals, Tobyhanna Army Depot (TYAD) used Army Working Capital Fund (AWCF) resources for an in-house project that replaced potable water with process wastewater for foam reduction in two locations at its wastewater treatment plant. The project cost of $1,200 will result in savings of 300,000 gallons of potable water per month. The project paid for itself in just over one month.

Also using AWCF, TYAD installed a water chiller to replace a single-pass cooling system in an Industrial Operations Facility. This project saves over two million gallons of potable water per month. A payback period of 8 months is expected to cover project costs of $125,000.

Renewable Energy

The development of power production on Army installations to meet critical loads is a critical component of energy security. The FY 13 budget

allocates $49.2 million to support development of cost effective renewable energy projects and leverage private sector funding.

To streamline the process of developing large scale renewable energy projects on Army lands we have established the Energy Initiatives Task Force (EITF). The EITF is integral to the Army addressing rising energy security challenges and escalating fuel prices. Through the EITF the Army will secure renewable electricity on our installations at rates that are on par or below existing rates. The FY 13 budget includes $29 million for the EITF to serve as a one-stop shop and augment installation staff for the development of renewable energy projects greater than 10 MW on Army installations to obtain secure, sustainable, and affordable energy from a diversity of sources. The EITF is dedicated to working with the private sector to streamline the process to help speed overall project development timelines to ensure the best value to the Army and private sector. The EITF is currently evaluating 12 projects at eight installations to determine feasibility for further development and has identified further opportunities at 21 installations. The goal is 1 gigawatt of alternative energy by 2020.

Metering

The Army's FY13 budget includes $43.8 million for installing advanced meters on its facilities. The Army Meter Implementation Plan was developed in response to the Energy Policy Act of 2005 (EPAct 2005) which required metering of all federal facilities with advanced electric meters by 2012 where practicable, and the Energy Independence and Security Act of 2007 (EISA 2007) which established a 2016 deadline for natural gas and steam metering. A baseline was established for facilities to receive advanced metering as facilities with an estimated annual electric utility cost of $35,000 or more (generally buildings of 29,000

square feet or greater) or reimbursable tenant facilities. The Army will connect these meters to an enterprise level Meter Data Management System that will allow commanders to track energy consumption and integrate that information into command decisions resulting in improved performance.

Utilities Modernization

The projects in the Utilities Modernization Program (UMP) compete for funding resources from Sustainment, Restoration, and Modernization (SRM) programs and O&M funding. In FY13, the Army has allocated $112.7 million for UMP, whose primary focus is to invest in improvements of water and non-water utility systems infrastructures, HVAC efficiency performance, and electrical system improvements. Utilities Modernization projects in the FY13 budget will improve energy security by increasing the reliability and operational efficiency of Army utilities infrastructure.

Energy Security Projects

Energy security projects in the FY13 budget are specifically focused on assurance of electrical service. Among projects programmed for energy security are ones to upgrade electrical power distribution systems, harden transformers, and provide back-up power capability.

The Army is also working to develop "Smart" grid capabilities on its installations. The technology and processes in this area are still emerging. The Army is making investments in "Smart" grids to develop and acquire these technologies for use at our fixed installations and in contingency operations. The inter-agency Smart Power Infrastructure Demonstration for Energy Reliability and Security (SPIDERS) program will build the largest and cyber secure micro-grid in the Army at Fort Carson,

CO and an award is planned for late May 2012. The SPIDERS Joint Capability Technology Demonstration (JCTD) integrates infrastructure upgrades, renewable energy generation, bi-directional vehicle to grid and energy storage to provide a template other military installations may take in building energy security. Additionally, the Army is investing in micro-grid projects at Fort Bliss, Fort Sill and Fort Hunter-Liggett, as well as the in theater at the tactical edge with investments in the Afghan Micro-grid project at Bagram. While the Army can utilize alternative financing authorities to improve efficiency and install onsite energy generation, the financial return on investment from including "Smart" grids in these projects is an attribute asked for by Congress and valued by the Army, but is hard to monetize in private markets. Going forward we will build in "smart-grid ready" features in our buildings and, renewable energy projects. Smart grid features include security, economic metrics, and conservation and promote environmental and sustainable accounting. Bundling these capabilities into Army applications for Smart Grid technologies will accelerate the transition to commercial and community adoption.

c. Installation Related Science and Technology

The FY13 budget includes $7.1 million for Installation related Science and Technology Research. Installation Science and Technology programs investigate and evaluate technologies and techniques to ensure sustainable, cost efficient and effective facilities to achieve resilient and sustainable installation and base operations. Facility enhancement technologies contribute to cost reductions in the Army facility life cycle process and the supporting installation operations. Furthermore, technologies necessary for secure, energy efficient, sustainable military installations, emphasizing energy and utility systems protections are also investigated.

d. Utility Services

The FY 13 budget includes $1.053 billion for Utilities Services. The Utilities Services account pays all Army utility bills and is used to finance the repayment of Utilities Privatization, Energy Savings Performance Contracts (ESPCs) and Utilities Energy Service Contracts (UESCs). The Army is the largest user of ESPCs and second largest user of UESCs in the Federal Government. ESPCs and UESCs are contracts where private companies / servicing utilities provide initial private capital investment to execute projects, and are repaid from realized energy savings. These contracts guarantee energy savings so that the Army is assured that it receives the energy savings. To date the Army has implemented ESPCs at 72 installations, representing more than $1 billion in private sector investment, more than 5,860,000 million BTU Energy savings per year, and $8.5 million savings to Army over and above the $106 million of savings used to repay these long term contracts annually. The Army has also implemented UESCs at 43 installations representing more than $500 million in private sector investment, more than 3,590,000 million BTU energy savings per year, and $12 million savings to Army over and above the $49 million of savings used to repay these long term contracts annually. The Army plans to expand the use of these contracts with more than $500 million worth of projects in development.

Conclusion

In conclusion, the Army is working diligently to improve our energy security posture, both on our fixed installations and in our operations. The ability for the Army to produce, store, dispense and manage its own energy, with reduced reliance upon outside sources, will greatly enhance our performance goals. Reduced reliance means increased mobility by

not being tethered to supply lines, foreign suppliers and volatile energy markets. Investment in energy capabilities, including renewable energy and energy efficient technologies will help ensure the Army can meet mission requirements today and into the future. Not only is it the smart thing to do; it is the right thing to do from both an operational and financial stand point.

OASA (IE&E)
Office of the Assistant Secretary of the Army
Installations, Energy and Environment

Honorable Katherine Hammack
Assistant Secretary of the Army
(Installations & Environment)
Office of the Assistant Secretary of the Army
Washington, DC

Ms. Katherine Hammack was appointed as the Assistant Secretary of the Army for Installations and Environment (ASA I&E) by President Obama on 28 June 2010. She is the primary advisor to the Secretary of the Army and Chief of Staff of the Army on all Army matters related to Installation policy, oversight and coordination of energy security and management. She is also responsible for policy and oversight of sustainability and environmental initiatives; resource management including design, military construction, operations and maintenance; base realignment and closure (BRAC); privatization of Army family housing, lodging, real estate, utilities; and the Army's installations safety and occupational health programs.

Prior to her appointment, Ms. Hammack was a leader in Ernst & Young LLP's Climate Change and Sustainability Services practice. In that capacity she assisted clients with obtaining Leadership in Energy and Environmental Design (LEED) green building certification for their buildings and identification of sustainability strategies. She was the key LEED advisor to the largest LEED for new construction building in the world (8.3 million sq ft) which received LEED-NC Silver certification. She was also the key LEED advisor on the largest existing green building certification for building operation and maintenance (9.6 million sq ft) which received LEED-EB Gold level certification.

Ms. Hammack has over 30 years of experience in energy and sustainability advisory services. She has experience in the evaluation of energy conservation projects, including ventilation upgrades, air distribution, indoor air quality, lighting efficiency, cogeneration, sustainable design, solar energy and building operation.

Ms. Hammack has a bachelor's degree in mechanical engineering from Oregon State University and an M.B.A. from University of Hartford. She is a Certified Energy Manager, LEED Accredited Professional and a Certified Indoor Air Quality Manager. She has been an active member of ASHRAE, where she has been on the 90.1 Energy Efficiency Standard Committee and on the Standard 189 High Performance Green Buildings Standard Committee. Ms. Hammack is a founding member of U.S. Green Building Council in Washington, D.C.

NOT FOR PUBLICATION UNTIL
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COMMITTEE

STATEMENT OF

HONORABLE JACKALYNE PFANNENSTIEL
ASSISTANT SECRETARY OF THE NAVY
(ENERGY, INSTALLATIONS AND ENVIRONMENT)

Before the

READINESS SUBCOMMITTEE

Of the

UNITED STATES HOUSE ARMED SERVICES COMMITTEE

29 MARCH 2012

NOT FOR PUBLICATION UNTIL
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HOUSE ARMED SERVICES
COMMITTEE

Chairman Forbes, Representative Bordallo, and members of the Subcommittee, I am pleased to appear before you today to provide an overview of the Department of Navy's investment in its energy programs.

It is critically important that we reform how the Navy and Marine Corps use, produce, and procure energy, especially in this fiscally constrained environment. We must use energy more efficiently and we must lead in the development of alternative energy; otherwise, we allow our military readiness to remain at risk.

In theater, fuel is a tactical and operational vulnerability. Guarding fuel convoys puts our Sailors' and Marines' lives at risk and takes them away from what we sent them there to do: to fight and prevail, to engage and rebuild. For every 50 fuel convoys in theater, there is one Marine casualty. This is simply too high a price to pay.

President Obama's "All of the above" strategy toward sources of energy recognizes a fundamental math problem: while the United States consumes 22 percent of the world's oil, we possess just two percent of known oil reserves.

Oil prices are set on a global market often driven by speculation and rumor, leaving the Department exposed to price shocks in the global market.

Every time the cost of a barrel of oil goes up a dollar, it costs the Department an additional $30 million in fuel costs. In FY12, in large part due to political unrest in oil producing regions, the price per barrel of oil has risen $38 over what was budgeted, raising Navy's fuel bill by over $1 billion. These price spikes must be paid for out of operations, meaning our Sailors and Marines are forced to steam less, fly less, and train less.

Strategically, we are at risk because much of the fuel we use comes from volatile regions of the world. We would never buy aircraft or ships from many of the places that supply us oil because some are unstable and some do not necessarily have our best interests at heart.

The Department of the Navy is committed to implementing an energy program that enhances our national security and our military readiness by

reducing our dependence on imported fossil fuels. Energy security is national security. Our energy program is comprehensive – it involves both Services and contains initiatives to reduce energy demand and provide alternative forms of energy supplies on shore, afloat, in the air, and on the ground.

Navy's leadership on energy innovation is nothing new. It was the Navy that shifted from sail to steam in the middle of the 19th Century, steam to oil in the early 20th Century, and pioneered nuclear power in the middle of the 20th Century. At each of those transitions, there were those who questioned the need, challenged the cost or simply opposed change of any kind.

Department of Navy Goals and Initiatives

Congress and previous administrations have recognized the imperative of energy security as demonstrated in the Energy Independence and Security Act of 2007, Energy Policy Act of 2005, and the National Defense Authorization Act of 2007 and 2010, and several executive orders. This administration has built on those actions, but the program proposed for FY13 and beyond will exceed the goals set in those previous laws because we must.

The Secretary of the Navy set five aggressive department-wide goals to reduce the Department's overall consumption of energy, decrease its reliance on petroleum, and increase its use of alternative energy.

The goals are:

- By 2020, at least 50% of total DON energy will come from alternative energy resources,
- By 2020, DON will produce at least 50% of shore based energy requirements from alternative resources and 50% of Department installations will be net-zero,
- DON will demonstrate a Green Strike Group in local operations by 2012 and sail the Great Green Fleet by 2016,
- By 2015, DON will reduce petroleum use in non-tactical vehicles by 50%,
- Evaluation of energy factors will be used when awarding contracts for systems and buildings.

Meeting these goals requires that the Navy and Marine Corps value energy as a critical resource across maritime, aviation, expeditionary, and shore missions and myriad investments and activities. They will all foster behaviors that will reduce the Navy and Marine Corps' overall energy requirements and technologies that can provide adequate substitutes for fossil-based energy. Two significant initiatives that will be advanced in pursuit of the goals are :

- **The development of alternative liquid fuels for our ships and planes.** To meet the goal of 50% of total DON energy from alternative sources, the DON has partnered with the DOE and USDA to collectively pool $510M to jump start commercial development of the advanced alternative fuels industry. The DON intends to use the Defense Production Act (DPA) Title III for its contribution. This effort will help to obtain the 8 million barrels of biofuel needed by 2020 to sail the "Great Green Fleet." The alternative fuel that the DON will purchase must be available at prices competitive with the conventional petroleum fuels being replaced; it must not have negative consequences for the food supplies; and it must be a "drop-in", that is, not requiring infrastructure or operational changes.

- **Fostering the production of one gigawatt of renewable energy generation on DON installations.** To help meet the 50% shore alternative energy goal, the Department will, by the end of this year, design a strategy to facilitate the production and/or consumption of large-scale renewable power projects on or near Naval installations. These projects will be developed without added cost to taxpayers by using existing third-party financing mechanisms such as power purchase agreements, joint ventures and enhanced use leases. The energy from the projects will cost less or at least no more than that from conventional energy sources over their life.

Funding

The Department has budgeted $1.0 billion in FY13 and approximately $4.0 billion across the FDYP for operational and shore energy initiatives. The funding sources are almost entirely Navy and Marine Corps O&M funds and Research, Development, Test, and Evaluation (RDT&E) dollars.

Achievements

The Department is on track to meet its goals.

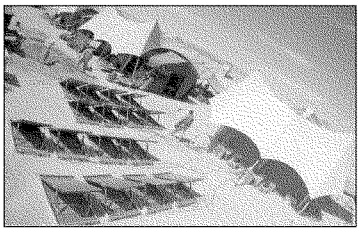
Since flying the F/A18, dubbed 'The Green Hornet', at MACH 1.7 in 2010 as part of the test and certification process using a 50-50 blend of Camelina based JP-5, the Department has successfully conducted test and certification on the MH-60 Seahawk helicopter, AV-8B Harrier, E-A6B Prowler, MQ-8B Fire Scout, T-45C Goshawk, MV-22 Osprey. We also ran a Riverine Command Boat, Landing Craft Air Cushion (LCAC), Landing Craft Utility (LCU), 7m Rigid Hull Inflatable Boat (RHIB), the ex-USS Paul F Foster, and an Allison 501K turbine generator. The DON partnered with Maersk to run a large merchant ship on renewable biofuel. These tests represent real milestones that are necessary to support the use of alternative fuels to meet the goal of sailing the Great Green Fleet in 2016.

Throughout 2011 we demonstrated progress through an assortment of programs, partnerships, and initiatives. Last summer, the Blue Angels flew all six planes on biofuels during their 2-day air-show at NAS Patuxent River. The USS *MAKIN ISLAND,* which is currently deployed to the Pacific region, can use its electric drive 75% of the time it is operating, needing its gas turbines only when it requires top speeds. On its maiden voyage she saved $2M over predecessor steam ships and is estimated to provide a cost avoidance of nearly $250M over her service life. The Navy is continuing to move forward with installation of a similar system on new construction DDGs and to look at the feasibility of retrofitting the entire non-nuclear fleet with these systems in the course of routine shipyard availabilities.

Additional energy initiatives, such as propeller and hull coatings, were undertaken to make the existing inventory of ships more energy efficient. Stern flaps will reduce energy consumption, as will some combustor modifications and systems to monitor ship-wide energy use. Energy conservation programs were put in place for both ships and aircraft to educate and incentivize the Fleets to reduce energy consumption and identify inefficient activities. The future Navy will use advanced materials on propellers, energy storage and power management systems, and advanced propulsion technology to make warships more efficient while allowing them to meet their combat capability.

Last year, the Marines tested equipment that could be deployed on battlefields at their Experimental Forward Operating Bases (ExFOB) at Twenty-Nine Palms. The Third Battalion, Fifth Marines (the 3/5), deployed in Afghanistan, managed to cut fuel use and logistical support requirements by 25 percent at main operating bases and up to 90 percent at combat outposts by relying on alternative energy sources such as solar power generators and hybrid power. One three-week patrol reduced weight by 700 lbs and saved $40,000 due to not requiring a battery resupply.

The PV-powered battery recharging technology has allowed Marine Patrols, which would normally require a battery re-supply every 2-3 days, to go three weeks without a battery re-supply, enhancing the expeditionary nature of their missions and reducing the number of dangerous re-supply missions needed.



Currently, the four most successful technologies used by the 3/5 are being deployed across all Marine Battalions in Afghanistan at a cost of $25 million. These technologies will save more than $50 million per year; paying for themselves in roughly six months and then continue to return a $50 million annual savings over what we had been doing. More importantly, this equates to a reduction in the number of resupply flights by 450 or taking a total of 180 trucks off the road, reducing the number of young men and young women put in harm's way. Again, because we lose one Marine for every 50 convoys, these energy measures are not just saving money, they are saving lives.

Recently, the next phase of ExFOB deployed with the Marines from 2nd Battalion, 4th Marines. They brought renewable and energy efficient equipment that was identified during the ExFOB conducted during August 2010. The equipment targets a major battlefield power user: battalion-level command and control systems. Its capabilities include hybrid power systems and efficient air conditioning, which demonstrated an 83% savings in fuel compared to the conventional capabilities.

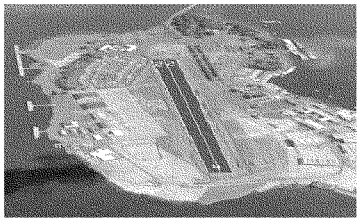
The Marine Corps continues to aggressively pursue technologies that will increase combat effectiveness and reduce the need for fuel, water, and battery logistics. The Marine Corps is committed to conducting two ExFOBs per year (one in 29 Palms and one in Camp Lejeune) for the foreseeable future. The upcoming ExFOB will concentrate on wearable electric power systems and lightweight man-portable water purification systems.

Through investments in expeditionary energy the Marine Corps will stay longer, go further, at reduced risk. In 2017 the Marines will be able to operate one month longer on the same amount of fuel they use today, and they will need 208 fewer fuel trucks, thereby saving seven million pounds of fuel per year. This translates into a lighter, more agile and capable Marine Corps

In addition to these tactical applications, the DON is pursuing energy efficiency and renewable energy projects at our facilities ashore. As noted above, we are on track to secure half of our shore energy from alternative sources. Effective programs to reduce overall consumption will be necessary to manage the denominator. But, in addition, we'll need about a gigawatt of renewable power at the bases.

Currently our bases support about 300 MW of renewable energy, 270 MW of which is from a geothermal power plant at China Lake. We are actively exploring for additional geothermal resources.

We have awarded three solar projects under our Solar Multiple Award Contracts (MAC) in the Southwest (SW) and are finalizing a similar solar MAC for Hawaii. The three solar power purchase agreements (PPAs) at China Lake, 29 Palms, and Barstow will save the Department $20 million in total over the 20 year life of those contracts. And, in all three of these cases, we'll be paying less per kW-hour than conventional power. These projects have the added benefit of providing a measure of security from electric grid outages. The Hawaii solar MAC will install 28 MW of solar PV on DON installations, including covering the runway on Ford Island with PV, recreating the look of the runway as seen from the air.



At Marine Corps bases in Albany, GA and Miramar, CA we have partnered with the local communities to harness landfill gas to power generators. This important technology is providing 25% of the electric load in Albany and will provide up to 50% of the electric load at Miramar when done. This is one of the most effective forms of waste-to-energy and we are exploring other applicable technologies.

Where the development of wind resources would be compatible with an installation's missions, we would favor that technology. We are watching with great interest the potential exploitation of the enormous wind resource off the Atlantic coastline. As long as the wind turbines can be placed at mission-compatible sites and the electricity can be delivered to our facilities at a price competitive with the local utility source, we could be a customer.

In order to support a wide range of facility energy efficiency measures, we are aggressively conducting facility energy audits and completing installation of "smart" electric metering. By the end of this year, the over 27,000 meters installed or under contract to be installed in our existing facilities will begin providing the capability to monitor and control the amount of energy we are consuming. This will allow our energy managers to provide real-time feedback to the users and the installations' commands.

The Department continues to promote behavior and culture change through education and training, to ensure that energy management is understood to be a priority in tactical, expeditionary, and shore missions. Awareness campaigns are used to encourage personal actions that show commitment to energy program goals. The Naval Postgraduate School has added an energy program to its curriculum targeting both the Navy's and Marine Corps' most promising young Sailors and Marines as well as an executive series targeting senior civilians and flag officers. We have collaborated with the National Defense University to pilot two culture change demonstrations -- at MCB Camp Lejeune and NAVSTA Mayport -- to focus on raising energy awareness in civilian and military personnel.

The Department will continue to cultivate strategic partnerships to leverage our energy opportunities. By partnering with federal agencies, such as

the Department of Energy, the Department of Interior, the Department of Agriculture, and the Small Business Administration, we are broadening the scope of our programs. In addition, we are working with academic institutions and private industry to bring innovative ideas and approaches to the forefront.

Conclusion

Our Nation's Sea Services continue to operate in an increasingly dispersed environment to support the maritime strategy and ensure the freedom of the seas. We must continue to transform the way we procure and consume energy.

Thank you for the opportunity to testify before you today. I look forward to working with you to sustain the war fighting readiness and quality of life for the most formidable expeditionary fighting force in the world.

For 236 years, from sail to steam to nuclear; from USS Constitution to USS Carl Vinson; from Tripoli to Tripoli; you have upheld a proud heritage, protected our nation, projected our power, and provided freedom of the seas. In the coming years, this new strategy and our plans to execute that strategy will ultimately depend on your skills, your talents and your well-being that will assure that our that our Navy and Marine Corps not only perseveres but continues to prevail.

THE ASSISTANT SECRETARY OF THE NAVY
ENERGY, INSTALLATIONS AND ENVIRONMENT

The Honorable Jackalyne Pfannenstiel

Ms. Jackalyne Pfannenstiel was appointed Assistant Secretary of the Navy (Energy, Installations and Environment) on March 5, 2010. In this position, Ms. Pfannenstiel develops Department-wide policies, procedures, advocacy and strategic plans. She also oversees all Department of Navy functions and programs related to installations, safety, energy, and environment.

Ms. Pfannenstiel has established herself as a champion of implementing the Secretary's energy goals, including producing 50 percent of the Department's energy consumption from alternative sources by 2020, through innovative energy strategies, policies, and guidance. She has become a critical liaison to the government and citizens of Guam, working to implement the U.S.–Japanese agreement that will relocate 8,000 Marines and their families from Okinawa. She also serves as the Secretary's Deputy on the National Ocean Council, working with other agencies to uphold the Nation's stewardship responsibilities for our oceans, coasts, and Great Lakes.

Ms. Pfannenstiel's other responsibilities include effective management of real property, housing, and other facilities; natural and cultural resource protection, planning, and compliance; safety and occupational health for both military and civilian personnel; and timely completion of closures and realignments of installations under base closure laws.

From 2004-2009, Ms. Pfannenstiel served as Governor Arnold Schwarzenegger's appointed Chairman of the California Energy Commission. Her responsibilities included licensing new energy-generating facilities and developing California's integrated energy policies. She worked on the creation of California's low carbon fuel standards and chaired the Governor's Climate Action Team subgroup on Energy and Land Use.

Prior to chairing the Energy Commission, Ms. Pfannenstiel was an independent energy consultant, providing assistance to wind energy development projects and helping local housing authorities manage energy costs in public housing facilities.

From 1980-2000, Ms. Pfannenstiel worked for Pacific Gas and Electric Company and its parent, PG&E Corporation. In 1987, she was promoted to Vice President of Corporate Planning—the first woman to become a corporate officer. At PG&E, she led the

company's participation in a multi-party collaborative proceeding, which produced many of California's innovative regulatory policies promoting energy efficiency. She also directed the development of PG&E's strategies for responding to electric industry restructuring.

Ms. Pfannenstiel is a former member of the Board of Trustees of Clark University and Board of Directors of the Alliance to Save Energy. She was also a Director of Energy Recovery, Inc., which manufactures components for seawater desalination.

Ms. Pfannenstiel graduated from Clark University with a B.A. in Economics and from the University of Hartford with an M.A. in Economics.

United States Air Force

Presentation

Before the House Committee on Armed Services, Subcommittee on Readiness

What is the Price of Energy Security: from Battlefields to Bases

Witness Statement of
Honorable Terry A. Yonkers
Assistant Secretary of the Air Force
(Installations, Environment, and Logistics)

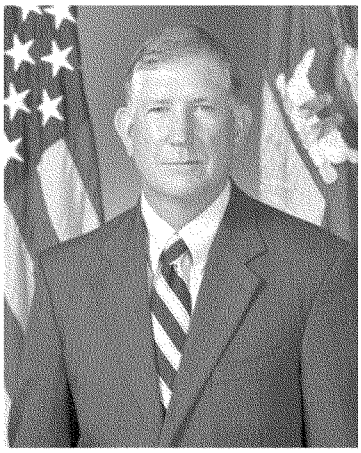
March 29, 2012

Not for publication until released by House Armed Services Committee, Subcommittee on Readiness

BIOGRAPHY

UNITED STATES AIR FORCE

TERRY A. YONKERS



Terry A. Yonkers is the Assistant Secretary of the Air Force for Installations, Environment and Logistics, Washington, D.C. Mr Yonkers is responsible for providing oversight for all matters pertaining to the formulation, review, and execution of plans, policies, programs, and budgets for installations, energy, environment, safety and occupational health as well as weapon systems logistics support.

Mr. Yonkers was born and raised in Hemet, Calif. He has more than 35 years experience developing and managing environmental, safety and occupational health programs. This includes 22 years in government and more than 16 years in private industry. Mr. Yonkers has worked extensively within the Department of Defense's planning, programming, budgeting and resource allocation as well as congressional budgeting processes. As the acting Deputy Assistant Secretary of the Air Force for Environment, Safety and Occupational Health, he developed strategic policies, guided and oversaw Air Force's ESOH programs worldwide and a $1.5 billion annual appropriation.

As Senior Vice President, Business Development, ARCADIS, Inc., Mr. Yonkers advised government clients on innovative and cost-saving environmental and energy security solutions as well as represented business interests in national forums seeking process improvements to environmental security, energy security, climate change, environmental cleanup/compliance and property redevelopment.

EDUCATION

1972 Bachelor of Science degree in biology, University of California, Riverside
1973 Advanced degree in education, University of California, Riverside
1993 Master's degree in national security studies, Industrial College of the Armed Forces, National Defense University, Fort Lesley J. McNair, Washington, D.C.
1999 Program for Executives, Carnegie Melon University
2000 Seminars in International Relations and National Security, Massachusetts Institute of Technology, Cambridge
2001 Master of Public Administration degree, George Mason University, Washington, D.C.

CAREER CHRONOLOGY

1. 1976 - 1980, biologist, Southern California Edison Company, Corporate Headquarters, Rosemead, Calif.
2. 1980 - 1984, environmental coordinator, Air Force Flight Test Center, Edwards Air Force Base, Calif.
3. 1984 - 1985, regulatory liaison and environmental engineer, Air Force Regional Civil Engineering Office, Dallas, Texas
4. 1986 - 1990, Deputy Director Environmental Programs, Air Force Systems Command, Andrews AFB, Md.
5. 1990 - 1996, Deputy Director and Chief of Environmental Programs, Air Force Base Conversion Agency, Arlington, Va.
6. 1996 - 2000, special assistant to the Assistant Secretary, Manpower, Reserve Affairs, Installations and Environment, the Pentagon, Washington, D.C.
7. 2000 - 2002, acting Deputy Assistant Secretary of the Air Force for Environment, Safety and Occupational Health, the Pentagon, Washington, D.C.
8. 2002 - 2010, Senior Vice President, Business Development, ARCADIS, Inc., Highlands Ranch, Colo.
9. 2010 - present, Assistant Secretary of the Air Force for Installations, Environment and Logistics, Washington, D.C.

AWARDS AND HONORS

2002 Air Force Outstanding Civilian Service Award
2002 Letter of Recognition from the Secretary of Air Force

(Current as of March 2010)

Energy is a common thread that runs through every mission in the Department of Defense and each of us brings different capabilities to this challenge, but our overarching mission is the same: *protect the security of our nation*. Each day, the Air Force flies to points around the globe, including over 900 mobility missions a day to provide the Nation with *Global Vigilance*, *Global Reach*, and *Global Power,* missions that require significant amounts of energy. To meet our energy needs, the Air Force is leveraging sound business practices and making prudent investments in energy conservation and alternative sources of energy to enable our warfighters and improve our energy security. These investments are crucial to ensure we have the energy where and when we need it to conduct the military missions that protect our core national interests.

The Air Force is requesting more than $530 million in Fiscal Year (FY) 2013 for aviation, infrastructure, and research, development, test and evaluation (RDT&E) energy initiatives to reduce demand, improve efficiency, diversify supply, and enhance mission effectiveness.

Energy Strategy

Energy is the cornerstones of the Air Force's ability to maintain global vigilance, reach, and power at home and abroad. Energy security is having assured access to reliable supplies of energy and the ability to protect and deliver sufficient energy to meet operational needs. To enhance energy security, we have developed a three-part strategy to:

1) Reduce energy demand through conservation and efficiency,
2) Assure and expand supply through alternative and resilient energy sources, and
3) Foster an Air Force culture to recognize the necessity and criticality of energy.

We have set a number of aggressive targets across our entire portfolio—targets that, if met, will help us avoid more than $1 billion a year (based on today's energy prices) and improve energy security for our critical assets.

Energy Consumption and Expenditures

The Air Force is the largest single consumer of energy in the federal government spending more than $9.7 billion on fuel and electricity for approximately 2.5 billion gallons of aviation fuel and more than 64 trillion British Thermal Units (BTUs) of installation energy in FY11. To put our energy costs into context, $9.7 billion is the equivalent of the procurement costs for approximately 79 F-35 Joint Strike Fighters

Despite our reductions in consumption, fuel costs have increased 225% over the past decade and we are expecting them to continue to rise in the future. Between FY10 and FY11, our energy costs increased by $1.5 billion, an increase that occurred even as fuel use went down by more than 50 million gallons and facility energy consumption was reduced by 2 trillion BTUs. Moreover, as energy costs increase and take up more and more of our budget, it is essential that we continue to reduce the amount we consume. Every dollar we don't spend on fuel frees up funds for reinvestment into capabilities for the warfighter.

Expenditures for aviation fuel drive our energy costs and are primarily responsible for that $1.5 billion increase, going from $6.8 billion to $8.3 billion in one year. We expect that to exceed $9 billion next year based on current prices and expected consumption rates. In contrast, there was little fluctuation in both our installation and ground vehicle energy expenditures from FY10 to FY11. We spent $1.1 billion on facility energy and $323 million for ground vehicle fuels in FY11.

With the austere fiscal environment before us, energy can also pose a financial risk to the Air Force's ability to plan, develop, and acquire the technologies and equipment necessary to maintain air superiority. Energy is consuming a larger share of the Air Force budget, going from 3% in FY03 to more than 8% in FY2011, and it is becoming more difficult to forecast and plan for volatile prices.

ENERGY SECURITY TO THE AIR FORCE

Price Volatility and Budget Impact

While long-term energy cost increases are a significant concern, short-term fluctuations in energy prices can critically impact the budget in the year of execution. For example, in June 2011, the price for a gallon of JP-8 jumped 30% from $3.03 to $3.93 a gallon, and today the price is at $3.82. When we began developing the FY11 budget submission in 2009, we were estimating a cost of $2.37 a gallon. That translated into a bill of more than $3.5 billion in FY11 – funds for which we did not budget and which became a year of execution bill.

In contrast to our aviation fuel costs, our installation expenditures have been relatively constant at approximately $1.1 billion per year since FY06. This consistency is achieved through improvements in efficiency and decreased overall facility energy consumption to overcome per unit energy costs that have nearly doubled since 2003. Without the consumption decrease, our facility energy bill would have been $257 million larger last year. Installation utility costs are different from fuel costs in that the Services procure fuel through the Defense Logistics Agency Energy (DLA Energy). Through the process established by DLA Energy, aviation fuel costs $3.82 per gallon today, regardless of where it is consumed.

However, electricity rates vary nationwide. These rates are often negotiated directly with utilities on a longer-term basis; as such, they are more stable than fuel prices. While this stability facilitates planning, it can impact development of renewable energy and energy conservation projects. The Air Force builds its business case analysis for an installation energy project on the utility rates at that particular installation, and a project that may generate a high return on investment in one part of the country, may not be cost effective in another. Additionally, beyond cost, there are also other, more intangible factors to consider such as energy security and the need to maintain missions and assets critical to our nation's national security.

Risk to Supply Lines

Beyond price volatility, there are risks from depending solely upon traditional energy supplies, as access and costs are impacted by natural disasters, accidents, terrorism, and political instability. In addition to petroleum-based fuels, our installations are heavily dependent on the commercial grid. These dependencies add risk to our core mission support functions and can jeopardize effectiveness. To address these, we are mitigating risks by identifying alternate sources of energy, building in redundancies, and identifying where and for how long we need to ensure we have the ability to operate. These challenges require an energy security posture – as described in FY12 National Defense Authorization Act – that is *robust*, *resilient*, and *ready*.

- A *Robust* posture means that the Air Force has sufficient supply when and where we need it regardless of external challenges.
- A *Resilient* posture means we have options – whether in terms of location or types of fuel or electricity.
- A *Ready* posture means we are prepared to respond at a moment's notice if energy supplies are compromised or our mission requires large amounts of additional fuel and electricity.

In short, energy security enables our warfighters, expands operational effectiveness, and enhances national security.

BUSINESS RULES

Our first priority is doing what is right to make sure we can achieve our mission. To achieve that, we are implementing no- or low-cost initiatives, such as policy changes, wherever possible, partnering with other federal agencies and private industry to share best practices, and investing in those materiel solutions that provide the best returns from both financial and energy security perspectives.

Appropriated dollars vs. Private Funding

The Air Force recognizes the value of the limited financial resources available for investments. To ensure we are making the best use of taxpayer dollars, our corporate structure requires strong evaluations based on sound business case analyses, with a particular focus on return on investment and payback periods. Every action taken by the Air Force to improve its energy security and efficiency is well researched and executed to provide the greatest impact in support of the Air Force mission.

The Air Force is also looking at private investment wherever possible, particularly with regards to developing renewable energy sources and reducing our facility energy consumption. By utilizing this approach, we can improve our energy security and take advantage of underutilized land with little or no additional costs to the taxpayer. Beyond our installations, we are looking to expand the concept of third party investment into other areas of our operations.

Total Ownership Cost

The Air Force considers total ownership costs when developing contingency plans or acquiring equipment, as opposed to a "stovepipe" view of just energy savings. For example, we are requesting $29 million in FY13 to begin upgrading the high-pressure components of the KC-135 tanker's engines, an effort that will improve each engine's efficiency, reliability, and maintainability. This initiative requires a total investment of $278 million through FY28, and is expected to yield a reduction of 1.5% in fuel consumption—approximately 56 million gallons through FY46. In addition to the fuel savings, the Air Force also expects to avoid an additional $1.3 billion due to decreased maintenance requirements. While this is not expected to occur until FY 2025, when the first maintenance overhauls would be avoided, they are significant and provide strong evidence for supporting the total ownership perspective.

AVIATION

The Air Force's aviation fleet is composed of more than 4,600 aircraft that consume nearly 2.5 billion gallons of jet fuel every year. Our fleet represents the largest category of energy consumption in the military, accounting for approximately 59% of the total DoD aviation fuel consumption. Aviation fuel costs represent a significant financial requirement for the Air Force. To help mitigate the impact of those costs, we have set a target to reduce aviation fuel consumption 10% by 2015 based on our 2006 consumption. While this 10% reduction target—which equates to 254 million gallons—is aggressive, if we can achieve it, there will be a big impact. Since 2006, the Air Force has reduced its aviation fuel consumption by 4%, which translated into a cost avoidance of $165 million in 2011. In 2015, if the price of fuel were at $4, the Air Force would avoid more than a billion dollars of energy costs.

Efficiencies

Efficiency is not just about aircraft improvements, but also changing how we fly. To address this, the Air Force is looking at policy changes across our mobility, combat, and training aircraft, in addition to investments in equipment. The Mobility Air Forces account for 64% of aviation fuel consumption within the Air Force, and as their mission lends itself to capturing lessons from industry, these aircraft have been our primary focus for energy savings.

For example, Air Mobility Command (AMC) updated their policies to eliminate any extra fuel carried, while still maintaining safety standards. Category 1 fuel requirements existed for decades as an added amount of reserve fuel equal to 10% of the time over water (outside of ground-based navigation systems) to account for inaccurate navigation systems. With technological advances and current on-board navigation systems requirements, this additional fuel is unnecessary, and by eliminating the requirement (and associated excess weight) we estimate an annual savings of 5 million gallons in fuel, or more than $19 million a year based on today's fuel prices. While each one of these policy changes is small, together they add up to 19.5 million gallons of fuel, or $75 million, in FY11, with an expected savings of $325 million over the Future Years Defense Program (FYDP). With these efficiencies put into practice, the cost for AMC to move 1 ton of cargo 1 mile by air is down by 21% and the Air Force was able to move 27% more cargo on just 3% more fuel last year.

Alternative Aviation Fuels

While we endeavor to reduce demand in our aviation fleet, we are also focused on increasing and diversifying the supply side of the equation to improve energy security. The Air Force views energy security as a strategic imperative and alternative fuels are key to addressing that imperative. To demonstrate our commitment to this effort, we set a very ambitious target to be

prepared by 2016 to meet half of our domestic jet fuel needs via an alternative fuel blend by ensuring our aircraft can fly on commercially available fuels. These blends must be drop-in fuels that are cost competitive with traditional petroleum-based jet fuels and meet our environmental and technical specifications.

To get there, we are certifying our aircraft to fly on three different alternative fuel blends, all of which are half-traditional petroleum-based JP-8 fuel and half-alternative fuel. The first blend the Air Force tested was synthetic fuel developed using the Fischer – Tropsch process. The Air Force has completed the testing and certification process for 100% of its fleet on a 50/50 blend of Fisher-Tropsch and JP-8. By applying lessons learned and experience from the extensive Fisher-Tropsch certification program, the Air Force conducted certification of the second alternative fuel effort, hydro-treated renewable jet (HRJ), using a "pathfinder" approach. Only the most challenging systems, such as the C-17 and F-15, were tested and the rest of the fleet will be "certified by similarity." The Air Force expects to complete certification of the entire fleet by the end of 2012. The Air Force is beginning to evaluate a third alternative fuel process called alcohol-to-jet (ATJ), which is produced using cellulosic materials. Depending on funding availability, the Air Force anticipates completing certification efforts by 2014 using the "certification by similarity" approached used for HRJ.

By preparing for a variety of alternatives, we are ensuring we will be ready for whatever private industry is able to bring to market, as well as having the flexibility to use those fuels in different areas of the world, depending on the availability of fuel stocks and refining capability. Since we started our certification initiative in 2006, we have purchased 1.1 million gallons of alternative fuels. Through our certification process, we are ensuring we will be ready to purchase a variety of different fuels by 2016 but we are just a purchaser, not a producer, of

alternative aviation fuels. The Air Force's core competency is understanding the fuel/engine interface, not producing fuel. We will need industry to produce those fuels in a manner that meets our criteria.

Promising market opportunities and testing of these fuels in the field are positive steps, however we recognize that to achieve our ambitious target, we need to be involved directly with the private sector to share lessons learned, establish standards, and support the development of these fuels as a consumer. While the Air Force consumes a large amount of fuel, we are relatively small compared to the commercial sector. Overall, the Air Force makes up just 11% of the aviation fuel market in the United States, about the same as American Airlines. This means that while we do have some market power, we are not large enough to drive the market.

To help move the market and provide the ability to exchange data and best practices, we are partnering with commercial industry through the Commercial Aviation Alternative Fuels Initiative (CAAFI). CAAFI includes other government entities like the Federal Aviation Administration, along with airlines, airports, aircraft and engine manufacturers, energy producers, researchers, and international participants. Together, we developed a repeatable process to certify fuels in a way that helps both commercial aviation and the military. Through CAAFI's efforts, ASTM International, which develops industry technical standards, approved the 50% HRJ blend for use in commercial aircraft in July 2011. As several of our aircraft are commercial derivates, we can apply the aircraft certifications directly to our fleet.

Role of RDT&E

Innovation is part of our DNA and the Air Force is on the lookout for ways to improve warfighter effectiveness. Led by Dr. Maybury, the Air Force Chief Scientist, a team from across the Air Force collaborated with other services and federal agencies to identify a framework for

thinking about new energy technologies that are being developing in the near, mid, and long terms. The report looks at all aspects of the Air Force mission—air, space and cyberspace—and evaluates many technologies, including aircraft engines, airframe design, energy storage, and best practices in planning and logistics. Energy Horizons identifies three priority categories for technology:

- Technology Leader – The Air Force is inventing novel technologies that are at the core of our mission. Aircraft engines and airframes fall into this category.
- Fast Follower – The Air Force is not at the forefront of research but looks to rapidly adopt, adapt, or accelerate technologies originating from external leading organizations.
- Technology Watcher – The Air Force stays aware of developments and is ready to adopt technology as it matures.

While some are unique, many of the challenges we face are similar to those of the Army and Navy, federal agencies, and private industry and we are actively partnering with them to leverage each entities unique expertise, resources, and experience. For the Air Force, we are focusing our RDT&E efforts primarily to meet our aviation, space, and cyberspace missions, as opposed to areas where there is significant overlap with our Sister Services or private industry. For example, in FY13 we are investing more than $300 million in energy RDT&E, which includes $214 million for the Adaptive Engine Technology Development (AETD) initiative. This initiative will build upon the Adaptive Versatile Engine Technology (ADVENT) effort to reduce energy consumption and improve efficiency and reliability of future and legacy aircraft, and current estimates are that it will be as much as 25% more fuel efficient than current technology.

INSTALLATIONS

Renewable Energy

The Air Force is looking to improve its energy security and diversify its energy supply through increased use of renewable energy. In FY11, more than 6% of the electrical energy used

by the Air Force was produced from renewable sources. Moving forward, our goal is to develop more than 1,000 megawatts (MW) of renewable power, including more than 600MW from solar. By making the most of private sector knowledge, technology, and financing, we plan to improve our energy security by capitalizing on underutilized land on our installations to develop those projects. Currently, the Air Force has 131 operational renewable energy projects and another 50 under construction across a wide variety of renewable energy sources, including 8.7MW from wind energy, 26.2MW from solar, and 2.4MW from waste-to-energy projects. In FY11, the Air Force had 46 projects funded through the MILCON appropriation with at least one renewable energy component, such as solar photovoltaic systems or cool roof attributes.

The Air Force is pursuing renewable energy on a cost effective basis through a three-tier priority order. The first priority is to develop renewable energy generation either on Air Force property or on adjacent federal property. There are three avenues to accomplish this. First, a renewable energy Power Purchase Agreements (PPA) may be developed with third parties under a utility purchase contract. This allows third party developers to obtain financing and build renewable generation with cost recovery through a long-term utility purchase agreement. Second, the Air Force can sign an agreement with a utility or other third party to provide renewable energy at a pre-negotiated rate. Third, a direct Air Force investment could be made to construct the renewable power generator.

Direct Air Force funding of renewable projects is very rarely cost-effective when compared to commercial utility rates, due to the inability of federal agencies, including the Air Force, to gain the benefit of renewable energy certificate (REC) sale value, tax rebates, and state or federal incentives. If the Air Force attempted to meet the renewable energy goal through

direct investment, the cost would be over $7 billion based on our history with recent renewable energy projects and the current cost of power.

To address this, the Air Force is using existing authorities, such as Enhanced Use Leases (EUL) and PPA, to attract private industry to develop renewable energy projects on underutilized land on Air Force installations. The Air Force is anticipating third-party investments could reach more than $1 billion over the next 5 years to construct on-base renewable projects, while we plan to invest only $5 to $8 million for renewable projects over the same period. The Air Force has set a goal to identify $5 billion worth of EULs and over half of this value will be energy EULs.

The second priority is to purchase renewable energy from a distant producer and have it delivered to us via the normal power grid. The third priority is to purchase RECs along with the renewable power from an off-base generator.

Energy Conservation

Overall, our focus is to reduce our energy footprint across all operations and we have made significant progress. We have reduced our overall facility energy consumption by nearly 20%, and reduced energy intensity by more than 16% since FY03. However, installation energy expenditures have increased 32% over that same period due to increased prices for electricity. Looking long term, the Air Force is on track to meet its installation energy goals by reducing energy intensity by 37.5% by 2020 and increasing renewable energy use to 25% by 2025.

Included in our FY13 budget request is $215 million for energy conservation projects on our installations, a continuation of the nearly $800 million we have invested in such projects over the last four years. As a result of those energy conservation efforts, we have cumulatively avoided $1.1 billion in facility energy costs since 2003, which is money that could be redirected to better

support our warfighters. Investments we are making in FY12 to improve our facility energy efficiency and reduce our energy requirement are expected to start generating savings in FY14, and the majority are expected to payback before or just shortly after the FYDP.

The Energy Conservation Investment Program (ECIP) is a critical element of the Air Force's strategy to improve the energy performance of its permanent installations. In FY11, we completed 17 ECIP projects at a cost of approximately $30 million. The Air Force estimates these projects will save more than 253 billion BTUs annually and nearly $54 million over the life of the projects. For FY12, we have submitted an additional six projects projected to save 213 billion BTUs to the Office of the Secretary of Defense (OSD), which manages ECIP.

The Air Force is also leveraging third-party financing to fund energy conservation projects through Energy Savings Performance Contracts (ESPC) and Utility Energy Service Contracts (UESC). The Air Force is targeting over $260 million in ESPCs and UESCs over the next two years. While the Air Force did not award any third-party financed projects in FY11, we anticipate awarding six such projects in FY12 that would save approximately 1.1 trillion BTUs, and are evaluating three projects for FY13. Based on current estimates, we anticipate reducing our energy consumption by 1.1% when these contracts reach full term.

The Air Force is also looking to reduce demand by building in smarter ways that maximize energy efficiency and use environmentally-friendly materials. We are also identifying and demolishing 20% of our old, unnecessary, and high-energy use facilities by 2020.

GROUND VEHICLES

In FY11, the Air Force spent $323 million on fuel for ground vehicles and equipment, or 96 million gallons, which equates to approximately 3% of the overall Air Force energy costs. This

is an increase of $13 million from FY10, even though consumption declined by 20 million gallons. The Air Force is committed to reducing the amount of petroleum products it utilizes for its ground vehicle fleet, and has targets to reduce fossil fuel consumption 2% annually through 2020 while increasing alternative fuel usage 10% compounded annually by 2015. The Air Force has made significant progress towards both targets, seeing a reduction in vehicle petroleum consumption by 8% and an increase in alternative fuel use by 70% since 2005 (in its CONUS based vehicle fleet applicable to executive orders and federal mandates). The Air Force's plan to meet its targets include: implementing an acquisition strategy to procure the right-sized, least cost vehicle option; maximizing the use of alternative fuels; and increasing the use of hybrid electric vehicles and explore the use of plug-in electric vehicles.

Right sizing

One effort that the Air Force is undertaking right now is right-sizing our motor vehicle fleet, which entails eliminating vacant authorizations, deleting underutilized authorizations, and using more fuel-efficient vehicles. To date, the Air Force has identified over 5,000 vacant or underutilized vehicle authorizations. The Air Force has also been working on a midsize and large vehicle burn down plan to reduce the number of high gas-consuming vehicles. Over 2,250 vehicles have been identified for down-sizing to smaller, more fuel efficient vehicles, and over 725 of those have already been down-sized.

Alternative Fueled Vehicles

In FY11, the Air Force consumed 1.7 million gallons of alternative fuel (E85 ethanol and biodiesel) and has 28 E85 stations and 63 B20 stations on Air Force installations. We now have over 10,000 E85 capable vehicles in the light duty fleet, compared to only 9,000 in FY10. The Air Force has also incorporated nearly 1,000 hybrid electric vehicles into its vehicle fleet.

The Air Force is not just limiting its efforts to incorporating alternative fueled ground vehicles into our fleet through acquisition, but is also working to ensure such vehicles as compatible with its mission. With the support of other private and public stakeholders, the Air Force is currently working to develop an all plug-in electric vehicle fleet at Los Angeles Air Force Base (AFB) in California. When the initiative is completed later this year, Los Angeles AFB will be the first federal facility to replace 100% of its general-purpose vehicle fleet with plug-in electric vehicles. By working with OSD and our Sister Services, we have identified 15 other potential locations where such vehicles will support the mission and improve our energy security. We will use the lessons learned at Los Angeles AFB to continue to refine the business case and operational analyses to determine where best to employ electric vehicles.

CONCLUSION

From aviation operations to installation infrastructure within the homeland and abroad, energy enables the dynamic and unique defense capabilities the Air Force requires to fly, fight and win...in air, space and cyberspace. Effective and efficient energy management is not only necessary, it is critical to assuring energy availability today and energy sustainability into the future to ensure the Air Force can execute these missions. We are making business-driven investments to reduce our energy demand and assure our supply to meet our mission needs. The Air Force is taking a coordinated, progressive, and comprehensive stance towards energy management through the integration of its three-part energy strategy to reduce demand, assure supply, and foster an energy aware culture. This approach will lead to enhanced energy security and reduced energy costs, and enables our warfighters, expands operational effectiveness, and enhances national security.

DOCUMENTS SUBMITTED FOR THE RECORD

MARCH 29, 2012

OPERATION ★ FREE

The Honorable Silvestre Reyes
United States House of Representatives
2210 Rayburn House Office Building
Washington, D.C. 20515-2006

Dear Rep. Reyes,

We, the undersigned veterans of the United States military, join security leaders of both parties in recognizing that America's reliance on oil is a serious threat to our national security. We call on Congress to support the military as it leads the way in developing the next generation of secure, clean energy sources.

AMERICA'S OIL DEPENDENCE LEAVES US DANGEROUSLY VULNERABLE.

America sends over $1 billion per day overseas for oil. Our voracious demand for this single source of fuel ensures high oil prices in a global market, draining our economy and enabling our enemies. Every time the price of a barrel of crude oil goes up five dollars, Iran makes an additional $7.9 billion annually.

We cannot drill our way out of the problem of energy security. Even if we flood the market with every drop of oil in both our proven and strategic reserves, it will not be enough to offset rising global demand. Gas prices would still remain high and OPEC would continue to set the international price of oil.

WE MUST CHANGE HOW WE USE ENERGY IN THIS COUNTRY -- AND THE MILITARY IS LEADING THE WAY

We have to find new sources of fuel. As long as the United States is beholden to global energy prices, our country is vulnerable. The Air Force and Army are increasing the fuel efficiency of the vehicles we use to fight, transport troops, and provide support. The Navy is investing in advanced biofuels programs that will enhance its power-projection capability. The Marines are operationalizing common assets like wind and solar power to decrease energy vulnerability. These initiatives have been undertaken in partnerships with American firms and are creating jobs for American workers.

Some Members of Congress, however, oppose these critical programs. They choose to waste time by advocating policies that have already proven to be failures and attack the military for investing in prudent measures that will save lives. Taking control of our energy future would mean preventing future conflicts around the world and protecting Americans here at home.

It is time to secure America with clean energy. All of our civilian leaders must match the military's commitment and stop putting partisan politics ahead of good policy. We call on Congress to support the Department of Defense as it invests in clean, domestic, alternative sources of energy for the sake of the security of the United States of America.

Lt. General Norman Seip, USAF (Ret.)	Rear Admiral Larry Baucom, US Navy (Ret.)
Lt. General John G Castellaw, USMC (Ret.)	Rear Admiral Leendert R. Hering, US Navy (Ret.)
Major General Roger Blunt, US Army (Ret.)	Brigadier General John Adams, US Army (Ret.)
Major General Paul Monroe, US Army (Ret.)	Brigadier General Keith Kerr, US Army (Ret.)

TRUMAN NATIONAL SECURITY PROJECT

Testimony for the Record of the Hearing
Submitted by Senator John Warner
House Armed Services Committee
Subcommittee on Readiness
March 29, 2012

I thank the Chairman and Members of the House Armed Services Committee for granting me the privilege of submitting this written testimony for their timely and important hearing. During my 30 years on the Senate Armed Services Committee I worked with many, many members of your Committee reconciling our respective annual bills and producing a conference report each year to further strengthen our national security.

At this hearing you will hear from a most distinguished panel of dedicated public servants pursuing energy innovations needed to meet the needs of our Armed Forces. Again, I have had the privilege of working with and learning from them in the context of energy conferences and other public forums.

When I completed my fifth Senate term in 2009 I wanted to look for ways to continue my support for the men and women of our Armed Forces. The Pew Charitable Trusts asked me to help establish a program to raise public awareness of the many ongoing and planned energy initiatives within the Army, Navy, Air Force and Marine Corps to strengthen America's energy security, a critical component of our overall national security. Pew's objective is just to highlight the important role the Department of Defense is playing to reduce our nation's level of dependence on imported oil, some of it originating in nations who do not share our basic values and interests.

As a public service, Pew has issued two reports to broaden public understanding about how DoD is helping to accelerate the development and deployment of clean energy technologies: "Reenergizing America's Defense", published in September 2009; and "From Barracks to the Battlefield, Clean Energy Innovation and America's Armed Forces", published in September 2011. Extensive research and travel by Pew to over 20 states, including military installations, provided the base of facts for the widely disseminated reports. Often we ask retired military members, associated with CNA's Military Advisory Board, to join and speak at public forums on our trips.

Last summer, I visited the historic Portsmouth Naval Shipyard, where uniformed and civilian personnel are working to increase the base's energy security by building LEED certified buildings, using cogeneration technology and using solar power as backup for communication systems. At a similar trip to Ft Bragg, we toured the actual implementation of the initiatives that are part of an Army-wide "Net Zero" goal to reduce energy consumption, increase energy efficiency, and increase the use of renewable and alternative energy sources. At Quantico, Virginia we witnessed demonstrations as to how solar panels can be folded and replace the heavy load of batteries in a backpack. Various initiatives across the four branches of the military are resulting in financial savings for taxpayers and serve as a model for other military bases and in some instances, adjacent civilian communities.

As this committee knows, under the strong leadership of former Secretary of Defense Robert Gates, and now Secretary Leon Panetta, the three Service Secretaries and the Service Chiefs of Staff, the Department of Defense is exercising effective internal policies and

practices especially setting aggressive energy efficiency goals to lessen our dependence on imported oil and to enhance our nations energy security.

The bottom line is that the four branches of the military need our nation's full support to continue to innovate. America's military preparation, for the present and future, is predicated on innovation.

I would like to note in particular that the Navy, under its civilian and uniformed leaders, is on the leading edge across all initiatives, especially the development and use of advanced biofuels. Navy scientists and engineers, working with the private sector, have developed expertise in addressing both the advantages - and even limitations - of biofuels. Their research and development has proven that "drop in fuels" can perform in aircraft and ships.

An issue of critical importance to the continued advancement of biofuels is allowing a Memorandum of Understanding (MOU) between the Navy, the Department of Energy and the U.S. department of Agriculture to go forward. With Congressional support under this MOU, DoE and USDA can co-invest with industry in the construction or retrofitting of commercial facilities in order to promote the private sector production of bio-based fuel at a viable commercial level. Such a partnership on biofuels between these Departments allows the strengths of each to be coordinated in an efficient and effective manner. This sends a strong market signal to other private investors and users that biofuels can be a contribution to our nation's energy security.

Esteemed Members of this Committee, I urge you to use your authorizing authority to allow this critical partnership to move forward. Our nation's energy security is linked to increasing domestic sources of energy - both conventional and alternative -to lessen the foreign sources we as a nation are so heavily dependent upon. The uncertain reliance on foreign oil-fluctuating in cost and availability directly impacts our readiness capabilities. As the price per barrel of oil creeps up, the budgetary impacts on DOD are severe.

As our Nation strives to keep our forces as the finest in the world each Congress faces new and more difficult challenges.

No requests to Congress are more thoroughly reviewed than ship building and aircraft procurements. Historically The White House, OMB, and the Secretary of Defense all provide guidance to the CNO who then have to balance and decide on the final priorities and make the Department's requests to Congress.

I have confidence in the integrity of the team making these decisions and budget requests.

I humbly submit my opinions, which are based upon the privilege of having learned from experience during five years in the Navy Secretariat and then 30 years of oversight responsibility in the Congress.

Again, I thank you for this opportunity.

John Warner

WITNESS RESPONSES TO QUESTIONS ASKED DURING THE HEARING

MARCH 29, 2012

RESPONSES TO QUESTIONS SUBMITTED BY MR. FORBES

Secretary BURKE. The primary means the Department currently uses for managing fuel price volatility is the Defense Working Capital Fund (DWCF). On February 1 of each year, the Office of Management and Budget, (OMB) in consultation with the Department, projects the per gallon fuel cost the Department will pay in the following fiscal year. When market prices increase during the fiscal year, funds are drawn from the DWCF to cover the increase and provide year-of-execution budget stability for the Services. Conversely, when market prices fall below the projection, customer payments in excess of the cost of the fuel are used to replenish the fund. Until 2004, the DWCF cash balance was sufficient to sustain budgeted fuel prices in the execution year. Since 2004, market conditions have driven price changes in every execution year, and the Department currently anticipates an unfunded requirement for fuel in FY12.

It is clear the Department could benefit from additional capacity to absorb short term fuel price volatility and there are a number of options that may be worth pursuing. In January, the Department submitted a congressionally-requested report describing the relationship of fuel volatility, cash balances, and price stabilization, and how that relationship affects the Services.

The report included three recommendations:

1. Increase the ceiling allowed in the DWCF: Allow the Department to reserve cash beyond current levels to mitigate the impact of market volatility.
2. Expand funding sources for DWCF: Allow the Department to transfer expiring unobligated balances from appropriated accounts to fund the DWCF.
3. The Department proposed legislation in previous years that would allow Treasury to provide the difference between the budgeted amount for fuel and the actual cost of fuel for a fiscal year, to be paid back in the budget year by the Department setting its standard price to generate the necessary funds.

The Defense Business Board (DBB) also recently recommended the Department utilize techniques that involve market-based financial instruments, which would be a departure from a long-standing Government policy of self insurance. I believe it is in the Department's best interests to consider a range of approaches to this challenge and that the best approach at this time is (3) above. [See page 24.]

Secretary PFANNENSTIEL. In consideration of the fact that 17% of DON's energy use is nuclear based, which DON considers alternative energy, and in consultation with the CNO and Commandant, the SECNAV established a challenging, but achievable goal that by 2020, 50% of DON's energy to power the Fleet would come from alternative sources. In light of the increasing volatility of conventional fossil fuels, which have resulted in a $1.2B additional bill in FY12 on top of a $300M additional bill in the last quarter of FY11, the need to secure more domestically produced, renewable sourced fuels is imperative. Without more domestically produced fuels, the DON will continue to be subjected to fuel price volatility and be compelled to trade training, facility sustainment, and needed programs to pay for unplanned bills. [See page 19.]

Secretary PFANNENSTIEL. Deployed U.S. Navy warships and aircraft receive fuel from two general sources, directly from barges and trucks in foreign ports and airfields and from Fleet Oilers operated by the Military Sealift Command (MSC). Deployed MSC Fleet Oilers obtain fuel from the following ports:

Seventh Fleet: Singapore, Guam, Sasebo
Fifth Fleet: Jebel Ali, Fujairah, Djibouti
Sixth Fleet: Rota, Souda Bay, Augusta Bay

With the exception of Guam, all could be characterized as "foreign sources" since they are delivered to the U.S. Navy in a foreign location, however fuel oil is a global commodity and the point of origin (extraction and/or refinement) is unknown.

U.S. Navy warships and tactical aircraft burn an average of 18 million barrels of fuel per year. 50% of that fuel is burned while deployed. 95% of the fuel burned while deployed is received from foreign fuel sources therefore 48% of all fuel burned by U.S. Navy warships and tactical aircraft is received from foreign fuel sources.

Deployed: 9,000,000 Bbls; Foreign Sourced 95%
Non-Deployed: 9,000,000 Bbls; Foreign Sourced 0%
Total Average Annual Fuel: 18,000,000 Bbls; Foreign Sourced 48% [See page 25.]

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

MARCH 29, 2012

QUESTIONS SUBMITTED BY MR. FORBES

Mr. FORBES. 1) What is DOD's position on supporting Lattice Assisted Nuclear Reactions as a fuel additive and alternative, safe nuclear reactor technology for solving DOD's energy challenges?

Secretary BURKE. I think the Department should be open to investigating a wide variety of technologies to address its energy challenges. The question in all cases should be, "What are the advantages and disadvantages, costs and benefits of a specific technology in specific circumstances?" While there has been scientific controversy around Lattice Assisted Nuclear Reactions, one of the reasons DOD has a large technical community is to help resolve such controversies over time. I trust they will do so, leveraging the expertise of the Department of Energy, which is the primary steward and arbiter of such technologies. And the idea of small modular reactors for use in deployed locations has been suggested—an idea that presents some interesting opportunities but also poses significant challenges and key questions, particularly given the large capital costs required. Before deciding to acquire or deploy any such reactors we'd need to take a close look at all the issues involved, but I don't think we should prejudge the answers.

Mr. FORBES. 2) How much are the DOD and each military service spending on energy in Fiscal Year 2013 and across the FYDP? How does the Department of Defense define and track its energy investments? And where are the investments made—across what funding lines and types of activities?

Secretary BURKE. In regards to operational energy, the Department's FY13 request includes $16.3B in FY13 and approximately $52B across the FYDP for petroleum for operational purposes. For the FY13 request, $11.9B is requested in the base budget and $4.4B is requested in Overseas Contingency Operations (OCO) funds. No OCO funding for petroleum is requested past FY 2013.

Operational energy investments reduce demand for energy in military operations and training, expand and secure energy supplies for military operations and training, and build energy security into the future force. DOD requests approximately $1.6B for FY13 and $9.0B over the FYDP for these initiatives. These investments include improvements that lessen weight, improve thermal dynamics, or decrease volume, all which result in energy efficiencies. Although there is no single operational energy program element, DOD tracks operational energy investments with a Select & Native Programming (SNaP) Operational Energy Resources exhibit. The soon to be published FY 2013 Operational Energy Budget Certification, which Congress assigned to my office in the FY 2009 NDAA, will provide detailed information on DOD's requested FY13 operational energy investments.

Mr. FORBES. 3) How will energy reductions in contingency operations lead to increased readiness? How does the Department plan to track the energy consumption to accurately account for reductions? What innovative technologies are being pursued, and how quickly can they be fielded in order to provide maximum impact?

Secretary BURKE. Energy demand reductions in military operations increase readiness through improved range, endurance, and reliability of air, ground and naval forces.

The Department of Defense has established the Defense Operational Energy Board (DOEB), which is co-chaired by the Assistant Secretary of Defense for Operational Energy Plans and Programs and the Joint Staff Director for Logistics. The DOEB has chartered a task group to develop a baseline of operational energy consumption to inform energy performance metrics. Once developed, DOD will apply these metrics to measure and manage improvements in energy security for the warfighter.

The Department's innovation efforts include technologies that improve power generation and distribution, batteries and battery charging, building materials and design, and shelter systems (lighting, heating, ventilation, air conditioning). To rapidly field these technologies, the Services have a variety of mechanisms, such as Army's Rapid Equipping Force (REF). The REF strives to field equipping solutions to operational commanders within 180 days of a validated requirement.

Mr. FORBES. 4) What action is the Department of Defense taking to reduce energy consumption at "Enduring Locations"?

Secretary BURKE. DOD is employing several different methods to reduce energy consumption at "Enduring Locations." The 2012 U.S. Global Defense Posture Report to Congress describes these installations as ones "where DOD intends to maintain access and/or use of that location for the foreseeable future." Because these locations will be used by U.S. military forces over a longer period of time, we are able to plan for and employ more effective energy solutions.

One of the most effective ways to reduce energy consumption is to improve the quality of facility construction. DOD is pursuing this at many of enduring locations, which in many cases is most effectively done by upgrading the structures from expeditionary tents to better-insulated modular or temporary buildings. DOD is also reducing fuel consumption by being more efficient in the way we generate electricity at these locations. This typically involves converting the electricity generation systems from individual spot generation to a more efficient centralized electrical generation and distribution grid.

Mr. FORBES. 5) How is the Department of Defense incentivizing contractors in contingency operations to employ innovative processes and technology solutions to reduce their demand for energy?

Secretary BURKE. In May 2011, my office partnered with U.S. Central Command to identify the best near-term opportunities to reduce battlefield fuel demand through changes in operational contract support. In June 2011, the Army launched the Logistics Civil Augmentation Program (LOGCAP) Energy Savings Initiative (ESI), which uses the prospect of increased award fees to incentivize power optimization assessments for over 6,500 spot generators located on more than 119 bases in Afghanistan. In response, LOGCAP contactors in Afghanistan have completed or started 78 initiatives to date, which are estimated to save over five million gallons of fuel through optimization of spot power generation and the use of centralized utilities power generators. The number and status of these contractor recommendations for optimized power generation will be tracked and subsequently used in contractor performance evaluation boards to determine award fees. The Department also is working to adapt its broader range of operational contract support agreements to employ similar incentives and initiatives.

Mr. FORBES. 6) In Section 2841 of the FY 2010 National Defense Authorization Act (NDAA), the Department of Defense (DOD) was directed to develop and adopt a "Unified Energy Monitoring and Utility Control System Specification for Military Construction and Military Family Housing Activities." What progress has been made in the past 2 years to develop and adopt a single, DOD unified specification for energy monitoring and utility control systems?

Dr. ROBYN. The Department of Defense has made significant progress in developing and adopting a single unified specification for energy monitoring and utility control systems. The Unified Facility Guide Specification (UFGS) 25–10–10, Utility Monitoring and Control System (UMCS) was sent for stakeholder review in late 2011. It is currently being revised to include an additional protocol, which will ensure that all Services have a total solution. The revised draft is expected to be released in late October 2012.

The protocol is being developed in conjunction with Unified Facilities Criteria (UFC) documents. The UFC's tells the designers what to do, and the UFGS tells them how they must do it. The first UFC (UFC 3–470–01) was issued in May 2012 and additional UFC's for the other protocols are in development. The UFC's and UFGS are being closely coordinated with National Institute of Standards and Department of Homeland Security to ensure the documents contain the most current guidance for cyber and operations security.

Mr. FORBES. 7) How much is the DOD and each military service spending on energy in Fiscal Year 2013 and across the FYDP? How does the Department of Defense define and track its energy investments? And where are the investments made—across what funding lines and types of activities?

Dr. ROBYN. With respect to facility energy, the Department's FY13 budget request includes more than $1.1 billion for investments in conservation and energy efficiency, and almost all of that is directed to existing buildings. The majority of this funding is in the Military Services operations and maintenance accounts, to be used for sustainment and recapitalization projects. Such projects typically involve retrofits to incorporate improved lighting, high-efficiency HVAC systems, double-pane windows, energy management control systems and new roofs. DOD tracks facility energy investments through budget exhibits required by the Department's Financial Management Regulation.

Mr. FORBES. 8) In Fiscal Year 2013, how much is the Department of Defense investing in installation energy programs, and what is the payback associated with

those investments? How are these savings manifested in the Fiscal Year 2013 budget request and in future years?

Dr. ROBYN. The Department is reducing its demand for traditional forms of facility energy through conservation and improved energy efficiency. The Department's FY13 budget includes more than $1.1 billion for investments in conservation and energy efficiency, and almost all of that is directed to existing buildings. The lion's share ($968 million) is in the Military Components' operations and maintenance accounts, to be used for sustainment and recapitalization projects. Such projects typically involve retrofits to incorporate improved lighting, high-efficiency HVAC systems, double-pane windows, energy management control systems and new roofs. The remainder ($150 million) is for the Energy Conservation Investment Program (ECIP), a flexible Military Construction account that my office allocates to the Services for energy infrastructure construction, improvements, and repairs.

Although the return on investment varies with the nature of the project, we estimate the average payback is 7–8 years. For ECIP-funded investments, for which we have the best historical record, every dollar invested typically saves about two dollars over the lifetime of the project. These savings take the form of reduced utility bills.

Mr. FORBES. 9) How does a fragile domestic electric grid impact decisions for energy investments in the Department of Defense?

Dr. ROBYN. Our entire strategy for facility energy is designed to reduce the vulnerability of military installations to potential outages of the commercial electric power grid. But we are addressing that problem most directly through our investments in advanced, or "smart," microgrid technology. Smart microgrids—combined with on-site energy generation—and energy storage offer a more robust and cost effective approach to ensuring installation energy security than the current one—namely, back-up generators and (limited) supplies of on-site fuel. Although microgrid systems are in use today, they are relatively unsophisticated, with limited ability to integrate renewable and other distributed energy sources, little or no energy storage capability, uncontrolled load demands, and "dumb" distribution that is subject to excessive losses. By contrast, we envision microgrids as local power networks that can utilize distributed energy, manage local energy supply and demand, and operate seamlessly both in parallel to the grid and in "island" mode.

Advanced microgrids are a "triple play" for DOD's installations. First, they will facilitate the incorporation of renewable and other on-site energy generation. Second, they will reduce installation energy costs on a day-to-day basis by allowing for load balancing and demand response—i.e., the ability to curtail load or increase on-site generation in response to a request from the grid operator. Most important, the combination of on-site energy and storage, together with the microgrid's ability to manage local energy supply and demand, will allow an installation to shed non-essential loads and maintain mission-critical loads if the grid goes down.

DOD's Installation Energy Test Bed has funded ten demonstrations of microgrid and storage technologies to evaluate the benefits and risks of alternative approaches and configurations. We are working with multiple vendors so as to ensure that we can capture the benefits of competition. Demonstrations are underway at Twentynine Palms, CA (General Electric's advanced microgrid system); Fort Bliss, TX (Lockheed Martin); Joint Base McGuire-Dix-Lakehurst, NJ (United Technologies); Fort Sill, OK (Eaton); and several other installations.

In addition to funding technology demonstrations, my office has commissioned two studies from outside experts. First, MIT's Lincoln Lab just completed a technical review of the Department's work on microgrids. In addition to describing the range of ongoing activity, the Lincoln Lab report classifies different microgrid architectures and characteristics and compares their relative cost-effectiveness. (For a summary of the study, see: http://www.serdp.org/News-and-Events/News-Announcements/Program-News/DOD-study-finds-microgrids-offer-improved-energy-security-for-DOD-installations.) Second, ICF, Inc. is just beginning a financial analysis of the opportunities for installations to use intelligent microgrids and other energy security technologies (on-site generation, load management, stationary energy storage and electric vehicle-to-grid) to generate revenue. In addition, Business Executives for National Security (BENS), a non-profit, is analyzing alternative business models for the deployment of microgrids on military installations. As part of that analysis, which will be completed this fall, BENS is looking at the appropriate scale and scope for an installation microgrid (e.g., Should it stop at the fence or include critical activities in the adjacent community?) and at the impediments to widespread deployment.

Mr. FORBES. 10) What is the impact of encroachment from renewable energy projects outside of installations, is encroachment a serious concern, and what is the Department doing to mitigate the impacts? Also, are there any specific locations/in-

stallations that are of particular concern based on possible degradation of military readiness?

Dr. ROBYN. Expanding renewable energy infrastructure can have an impact on DOD's use of air, land, and sea space for operations, readiness, training, and testing missions. DOD has multiple equities that must be considered with regard to site selection and the development of our national renewable energy infrastructure. Over the last 18 months, DOD has aggressively reformed its processes and increased outreach to the industry. We established a Siting Clearinghouse to evaluate new projects. When a new project appears to be incompatible with military missions, we work with industry to find possible mitigation solutions. To date, 657 proposed renewable energy projects have undergone evaluation, and 633 of those, or 96%, have resulted in no DOD objection.

The remaining 4% of projects with significant impact are clustered around a few critical, unique test and training facilities. To date, our most serious concerns involve the Nevada Test and Training Range; R–2508 (the airspace surrounding Edwards AFB and the Navy's China Lake facility); the White Sands Missile Range; Fort Huachuca's Buffalo Soldier Electronic Testing Range; the Boardman Range area; and Naval Air Station Patuxent River.

Mr. FORBES. 11) As offshore energy development continues to increase, are there any concerns for impact to military readiness? If so, what action is the Department of Defense taking to proactively engage on this issue? And, what leverage does the Department have, if any, to veto projects that would severely degrade military capability?

Dr. ROBYN. The Department of Defense uses extensive areas above the Outer Continental Shelf for military training, testing and operations, and there is significant potential for offshore energy development to have an impact on these activities. The DOD works closely with the Department of the Interior's Bureau of Ocean Energy Management (BOEM) on renewable and conventional energy issues and with BOEM led coastal state task forces on renewable energy to ensure that offshore energy development does not have an adverse impact on military activities in the OCS areas. DOD has no direct veto authority regarding energy development on the OCS, but BOEM can either deny a lease or place stipulations on it at DOD request. Our ongoing collaborative work with BOEM and the coastal state task forces is preventing any severe degradation to our military capabilities.

Mr. FORBES. 12) The Department of Defense has an increased emphasis on leveraging third-party investments for installation energy projects. What is the total value of private sector financing that the Department is leveraging? What liabilities does the Department assume by entering into these contracts, and what flexibility is there to terminate these contracts if conditions change?

Dr. ROBYN. In FY 2011, the Department entered into $405 million worth of facility energy efficiency performance contracts. These include both Energy Savings Performance Contracts (ESPCs) and Utility Energy Service Contracts (UESCs) and depend on private, third-party capital.

The Services are using these third-party financing tools to improve the energy efficiency of their existing buildings. In response to the President's memorandum of 2 December, 2011, calling on the Federal Government to initiate $2 billion worth of these performance-based contracts over the next two years, the Department has a goal to execute roughly $465 million in ESPCs and UESCs in FY12 and another $718 million in FY13.

The nature of the liabilities the Department assumes with a project will depend on the terms of the individual project. The consistent major requirement, a liability to some, is that the Department enters into a contract for a fixed term. This includes both the requirement to have land encumbered and to purchase power at set rates for a set period of time. The Department cannot cancel these obligations without assuming termination costs. A benefit of this is that it also means that the Department can reliably plan and lock in its energy rates for the same period of time as the contract.

To the extent that the Department is not actually purchasing any energy from the project but is simply a passive lessor, the liability is that the land is encumbered for the period of the lease. If the Department wants to take the property back before the lease has expired, it would have to pay the value of the leasehold plus improvements. There is generally no provision for changed economic or technological conditions. If the price of energy fluctuates, the Department will still pay the contract rate, whether higher or lower than the current commercial rate. If technological changes result in obsolescence of the equipment, as is likely given the nature of renewable energy, the Department would have no option to demand changes unless it was willing to pay for them. That, however, is the case with any contract that is not simply set at the market rate.

Mr. FORBES. 13) How does the Department of Defense apply and incorporate LEED silver, ASHRAE and other building standards into its Unified Facilities Criteria and policies to ensure maximum return on investment while precluding investments in unnecessary building features that provide no utility and result in no savings?

Dr. ROBYN. The current DOD sustainable buildings policy (Oct 2010) requires all Components to do four things with respect to new construction and major renovation projects:

Comply with the Guiding Principles for High Performance Sustainable Buildings referenced in E.O. 13514 and E.O. 13423; Achieve a LEED Silver (or equivalent) certification; Earn at least 40% of the points toward certification from energy and water savings measures; and Incorporate a life-cycle cost/benefit analysis.

In addition to the existing policy, the Department is developing a new Unified Facilities Criteria (UFC) document for high performance buildings that will establish the minimum requirements for all new buildings and renovations of existing buildings. The document, which has been through a rigorous technical review process, blends aspects of ASHRAE 189.1, references to other UFC documents, and new content to achieve the best balance of cost-effectiveness, safety, security, and mission harmony. In order to comply with the new UFC, projects will have to complete a whole building life-cycle cost analysis using the National Institute of Standards and Technology Handbook 135.

Mr. FORBES. 14) How much are the DOD and each military service spending on energy in Fiscal Year 2013 and across the FYDP? How does the Department of Defense define and track its energy investments? And where are the investments made—across what funding lines and types of activities?

Secretary HAMMACK. In the FY13 budget request the Army plans to spend $4.5 billion on its energy program. This sum includes $2.5 billion for liquid fuel and $1.05 billion for utility services such as electricity and natural gas. The Army will also invest $960 million to reduce future energy consumption ($560 million in our operational forces and $400 million for installations). We also anticipate attracting well over $500 million in private sector investment through performance contracting and power purchase agreements.

The $560 million in Operational Energy Investment includes $406 million in energy related acquisition programs and $154 million in science and technology research. The $400 million in Installation Energy Investment includes $343 million in the Army's Energy Program/Utilities Modernization account, $50 million in the Department of Defense (DOD) "Defense-Wide" appropriation for the Energy Conservation Investment Program (ECIP) and $7 million of installation related science and technology research.

Mr. FORBES. 15) What is the funding shortfall in Fiscal Year 2012 for the price of fuel, and how does each Service expect to pay for that shortfall?

Secretary HAMMACK. The Army has a potential FY 2012 Operation and Maintenance, Army (OMA) fuel shortfall of up to $630M, $219M in the base budget and $411M in Overseas Contingency Operations.

Since the FY 2012 President's Budget (PB) submission, the forecasted composite price increased from $131.04 per barrel in the FY 2012 PB to $161.70 per barrel, a 23% increase. The Army is closely monitoring execution and will address any issues during its Mid-year Review.

Mr. FORBES. 16) What is the cost savings associated with the Army's Net Zero program, and how will the Army reach its goals and in what timeframe?

Secretary HAMMACK. The Army anticipates that its Net Zero Initiative, by taking a holistic look at energy, water and waste systems, will result in significant savings as compared to examining each of the systems in isolation. The pilot installations aim to consume only as much energy as they produce, use as much water as they collect or treat on site, and eliminate solid waste disposal in landfills by the year 2020. While all Army installations are permitted and encouraged to strive to achieve Net Zero, the pilot installations are being studied to provide valuable information for other installations to follow.

The Army does not view Net Zero as a stand-alone program. The pilot installations will leverage existing resources and collaborations with the private sector to strive towards the energy, water, and waste reduction goals of Net Zero. Cost savings from Net Zero-associated projects and efforts at the 17 pilot installations will vary based on local utility rates, existing installation energy and water efficiencies, and the specific projects that the pilot installations identify. The Net Zero Initiative allows for lower installation and facility utilities costs because of increases in efficiency that reduce the amount of energy and water needed to provide the same level of service while also reducing waste streams.

Mr. FORBES. 17) The Army adopted a new sustainable building standard, ASHRAE 189.1 which prescribes standards for sustainability, water and energy efficiency among other attributes. What cost benefit analysis was undertaken before adopting that new standard? And, was that validated by a third party to ensure that there is a return on investment?

Secretary HAMMACK. Adoption of ASHRAE Standard 189.1 occurred following a rigorous and peer reviewed Energy and Sustainable Design study led by the U.S. Army Corps of Engineers to determine a life-cycle cost-effective path for the Energy Independence and Security Act (2007) compliance. The Department of Energy's Pacific Northwest National Laboratory, National Renewable Energy Laboratory and select industry leaders collaborated in the study, which the Rocky Mountain Institute peer reviewed. The study's results found that compliance with the ASHRAE Standard 189.1 yields an energy savings of approximately 30 percent without any additional cost.

Mr. FORBES. 18) What is DOD's position on supporting Lattice Assisted Nuclear Reactions as a fuel additive and alternative, safe nuclear reactor technology for solving DOD's energy challenges?

Secretary PFANNENSTIEL. The Department does not currently have a specific program supporting lattice assisted nuclear reactions but is open to investigating a wide variety of technologies that will address energy challenges. While there has been some scientific controversy around Lattice Assisted Nuclear Reactions, one of the reasons that DOD has a large technical community is to help resolve such controversies over time, leveraging the expertise of the Department of Energy. Additionally, the use of small modular reactors for use in deployed locations has been suggested but the idea presents some interesting opportunities and also poses significant challenges. One of the key concerns would be the large capital costs required. Before deciding to acquire or deploy any such reactors the Department would need to take a close look at all the issues involved.

Mr. FORBES. 19) How much is the DOD and each military service spending on energy in Fiscal Year 2013 and across the FYDP? How does the Department of Defense define and track its energy investments? And where are the investments made—across what funding lines and types of activities?

Secretary PFANNENSTIEL. The Department of Navy has budgeted $1B on energy for FY2013:

> $338M for Navy tactical energy requirements. $438M for Navy shore energy requirements. $64M for Marine Corps tactical energy requirements. $161M for Marine Corps shore energy requirements.

Across the FYDP the Department has budgeted:

> $1.9B for Navy tactical energy requirements. $1.7B for Navy shore energy requirements. $.4B for Marine Corps tactical energy requirements. $.4B for Marine Corps shore energy requirements.

Investments are made across all ship, aviation and shore procurement, O&M, and RDT&E accounts.

DON energy goals and statutory requirements define the Department's energy investments and are tracked using Navy systems Claimant Financial Management System (CFMS) and Program Budget Information System (PBIS).

Navy and Marine tactical energy initiatives include:

> Aviation simulator upgrades (to reduce aircraft flying hours needed). Advanced propulsion and power efforts, such as variable cycle engines, hybrid electric drives for destroyers, and alternative fuels testing and certification. Increased efficiency measures, including stern flaps on ships, propeller coatings, shipboard solid state lighting, waterwash of ships' gas turbines. Energy management systems such as the energy dashboard for ships. Cultural change efforts such as Air ENCON and i-ENCON. Advanced energy sources for ground troops, including solar energy devices to reduce the fuel reliance of deployed Marines and its logistical tail. More fuel efficient medium tactical vehicle replacement for ground troops.

Navy and Marine shore initiatives include:

> Efficiency upgrades such as lighting and HVAC improvements, roof retrofits, and efficient window film installation. Advanced metering and energy management. Non-tactical vehicle efforts, to include implementing relevant technologies and alternative fuel vehicles. Renewable energy projects such as landfill gas, solar, and wind energy projects.

Mr. FORBES. 20) What is the funding shortfall in Fiscal Year 2012 for the price of fuel, and how does each Service expect to pay for that shortfall?

Secretary PFANNENSTIEL. At PB12, the budgeted fuel rate was $131.04 per barrel, but this was subsequently increased to $165.90 on 1 October and reduced to $160.44 on 1 January. The result is an average fuel rate of $161.70 for FY12, and this creates an overall fuel price shortfall of $908 million for Operation & Maintenance, Navy (OMN) and $61 million for Operation & Maintenance, Navy Reserve (OMNR). This shortfall will be funded through anticipated reprogramming actions, below threshold realignments, or curtailment of operations.

Mr. FORBES. 21) How much will it cost the Navy to achieve the President's recently announced goal of one gigawatt of power by 2020?

Secretary PFANNENSTIEL. The Department of the Navy expects no new capital outlays to meet the President's renewable energy goal. The majority of projects undertaken will be executed using existing third-party mechanisms such as power purchase agreements, enhanced use leases, joint ventures, energy savings performance contracts and utility energy savings contracts wherein developers bear construction costs and risks for individual projects. The cost of energy from these projects must be equal to or less than, on a life cycle basis, the cost of conventional power. As an example, recently DON has executed three power purchase agreements: a 13.8 MW solar project at NAWS China Lake, a 1.5 MW solar project at MCLB Barstow, and a 1.2 MW solar project at MCAGCC Twentynine Palms. The power produced by each of these three projects will be cheaper than available conventional power and will save DON approximately $20M over the 20-year life of the contracts.

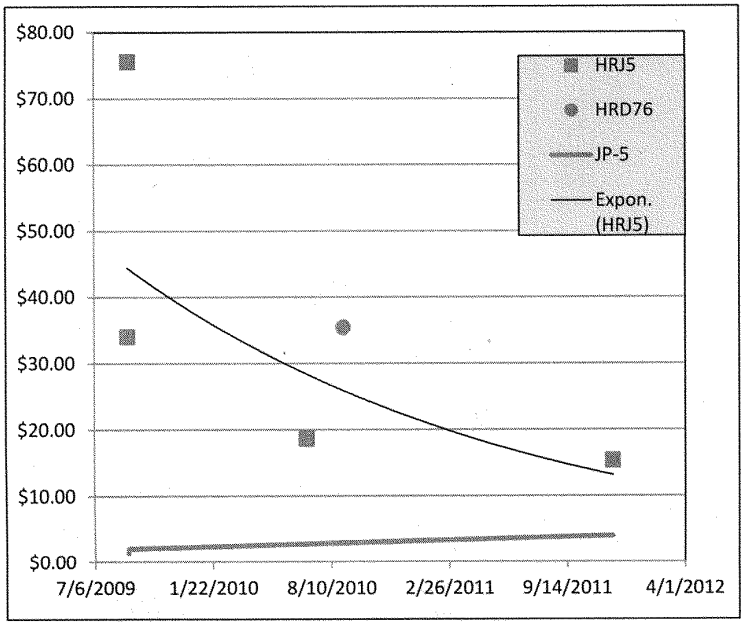
Administrative costs to develop DON's renewable energy strategy will include fees associated with hosting a small number of industry forums, soliciting studies, and possibly contractor/staff support. DON has funds available to cover these costs.

Mr. FORBES. 22) How much has the Navy spent on the purchase of biofuel to date? And, how has the price changed over that period? What are the biofuel requirements (in quantities and cost) in order for the Navy to sail the Great Green Fleet in 2016?

Secretary PFANNENSTIEL. The table below contains contracts awarded for hydrotreated renewable (HR) fuel that have been procured for use in Navy's alternative fuel test and certification program which amounts to a total of $30.37M.

Product	Date of Contract	50/50 Blended Biofuel Cost per Gallon	Quantity (gal)
HRJ5	8/31/2009	$34.03	80,000
HRJ5	9/1/2009	$75.58	3,000
HRJ5	6/29/2010	$18.65	300,000
HRD76	8/30/2010	$35.44	300,000
HRJ5	11/30/2011	$15.36	200,000
HRD76	11/30/2011	$15.35	700,000

In order to perform the test and evaluation event over a week's time period in the Great Green Fleet demonstration in July 2012, and gather the appropriate performance data, Navy determined that 700,000 gallons of 50/50 blended marine biofuel/petroleum and 200,000 gallons of 50/50 blended aviation biofuel/petroleum would provide the sufficient volumes for this process. For the Great Green Fleet deployment in 2016, Navy anticipates it will need approximately 3,360,000 gallons of 50/50 blended marine biofuel/petroleum and 3,360,000 gallons of 50/50 blended aviation biofuel/petroleum. For future operational purchases of advanced biofuels, the Navy anticipates buying those that are cost competitive with conventional fuels.



50/50 Blended Biofuels Cost per Gallon

As the above chart indicates, biofuel prices have decreased significantly from when Navy first started its test and certification process. Navy anticipates that as demand increases and the supply base expands further reductions in biofuel prices will occur.

Further, when looking at the alternative fuel purchases over the past three years, the Navy has spent approximately 0.17% of their entire fuel budget for those three years.

There are a number of studies that state the case that biofuels will be cost competitive in the 2018–2025 timeframe without Government investment. These studies are from LMI, MIT, and Bloomberg New Energy Finance. The LMI report also states that authorities like the Defense Production Act Title III, could accelerate the development of a mature alternative fuel market.

Mr. FORBES. 23) How will the market be affected with the Government's $1 billion proposed investment in biofuels through the Defense Production Act? And, what would be the implications if the Department of Defense does not make that investment? How does the Navy balance this proposed investment against shortfalls and decrements in other key accounts such as Operation & Maintenance and Procurement?

Secretary PFANNENSTIEL. The Navy does not plan to invest $1 billion into the Defense Production Act (DPA) Title III effort. The Navy plans only to invest $170 million, which is to be matched by $170 million from both the Department of Energy and the Department of Agriculture. This total planned investment is $510 million, which would be required to be matched at least 50:50 by private industry to make a minimum project value of in excess of $1 billion.

The uncertainty in fuel prices and their continued volatility makes this investment crucial to ensuring accounts such as O&M can pay for the activities for which they were programmed, rather than being forced to reprogram funds mid-year from O&M accounts to cover budget shortfalls due to unforecasted rises in fuel prices. Alternative fuels investment is a method for obtaining an assured, secure, domestic energy source that is not wholly subject to the vagaries of the international petroleum markets and thus will eventually allow for more certainty in budgetary planning.

Mr. FORBES. 24) How much is the DOD and each military service spending on energy in Fiscal Year 2013 and across the FYDP? How does the Department of De-

fense define and track its energy investments? And where are the investments made—across what funding lines and types of activities?

Secretary YONKERS. The Air Force expects to spend over $10 billion to purchase electricity and fuel in Fiscal Year 2013 (FY13), and anticipates that expenditure to increase in the future. To reduce its energy consumption, the Air Force is investing in both material and non-material solutions in infrastructure and aviation, as well as conducting RDT&E where appropriate. Given the critical role of energy in Air Force operations, the benefits of energy investments are carefully weighed against the initial and recurring costs, enabling energy initiatives to be evaluated and appropriately funded along with other Air Force priorities in order to maximize the use of Air Force resources. Energy investments, as well as all other initiatives, are evaluated by the Air Force Corporate Structure (AFCS), which makes decisions based on the needs of the Air Force with the support of business case analyses. The Air Force identifies projects that have significant impacts on energy use and tracks them throughout the AFCS process by assigning an energy tag to the appropriate line item.

The Air Force is requesting more than $530 million in Fiscal Year (FY) 2013 for aviation, infrastructure, and research, development, test and evaluation (RDT&E) energy initiatives to reduce demand, improve efficiency, diversify supply, and enhance mission effectiveness. The majority of these funds would be executed to improve the energy efficiency of Air Force installations and RDT&E projects.

Included in the FY13 budget request is $215 million for energy conservation projects on Air Force installations, a continuation of the nearly $800 million the Air Force has invested in such projects over the last four years. As a result of those energy conservation efforts, the Air Force has cumulatively avoided $1.1 billion in facility energy costs since 2003. FY12 investments to improve facility energy efficiency and reduce energy requirements are expected to start generating savings in FY14, and the majority is expected to payback before or just shortly after the FYDP.

From an RDT&E perspective, the Air Force is taking a lead, follow, and watch approach, where the Air Force is a lead investor and creates or invents novel technologies in areas that are critical enablers of Air Force core missions and associated platforms, such as aircraft engines. In the follower role, the Air Force rapidly adopts and/or, as needed, adapts or accelerates technologies originating from external organizations who are leaders and primary investors in focused S&T areas as part of their core mission, while in the watcher role, the Air Force uses and leverages others' S&T investments in areas that are not primary or core missions. In FY13, the Air Force is requesting more than $300 million in energy RDT&E.

Mr. FORBES. 25) What is the funding shortfall in Fiscal Year 2012 for the price of fuel, and how does each Service expect to pay for that shortfall?

Secretary YONKERS. The Air Force projects a shortfall of approximately $1.4 billion due to the increased price of fuel from the FY12 budgeted rate of $131.04 per barrel ($3.12 per gallon) to $161.70 per barrel ($3.82 per gallon). This shortfall will be funded through below threshold realignments, anticipated reprogramming actions, or curtailment of operations.

Mr. FORBES. 26) Since Air Force aviation accounts for half of the total U.S. Government's fuel consumption, what are you doing to become more efficient, change the culture, and integrate technology to reduce the demand for fuel, particularly with the volatility in the fuel market?

Secretary YONKERS. Broadly speaking, the Air Force is seeking to reduce aviation fuel demand and change the culture through material and non-material, or policy, solutions. This includes investing in research, development, test and evaluation (RDT&E) opportunities and include energy as a factor in the acquisition process.

From a material solutions perspective, the Air Force has several initiatives underway or in development that will reduce the demand for aviation fuel. For example, in the FY13 budget request, the Air Force is requesting funding for the KC–135 tanker CFM engine Propulsion Upgrade Program, which seeks to upgrade the engine's high-pressure components. These components improve each engine's efficiency, reliability, and maintainability. It requires a total investment of $278 million through FY28, starting with an investment in the President's budget of $29 million. The investment is expected to yield a reduction of 1.5% in fuel consumption, or around 56 million gallons ($150 million), through FY46. The maintenance savings are not expected until FY25 and should save an additional $1.3 billion.

Another example is the KC–10 drag cleanup initiative, which will modify wing and fuselage components to reduce their resistance to the airflow in flight. A total investment of $28.1 million, starting with $2.1 million in FY13, will buy the complete drag cleanup of all 59 KC–10s in the inventory. The investment yields a fuel reduction of 1.4% or about $5 million per year. This is a low risk venture as these

modifications have already been made in the commercial MD–11, a similar aircraft to the KC–10.

The Air Force is focusing its RDT&E efforts primarily to meet unique aviation, space, and cyberspace missions, as opposed to areas where there is significant overlap with its Sister Services or private industry. For example, in FY13 the Air Force is requesting more than $300 million in energy RDT&E, which includes $214 million for the Adaptive Engine Technology Development (AETD) initiative. This initiative will build upon the Adaptive Versatile Engine Technology (ADVENT) effort to reduce energy consumption and improve efficiency and reliability of future and legacy aircraft, and current estimates are that it will be as much as 25% more fuel efficient than current technology.

From a policy solutions perspective, the Air Force has introduced multiple no- or low-cost initiatives that helped avoid 54.5 million gallons in fuel consumption, or $208.1 million in fuel costs, in FY13 alone. For example, in October 2011, Air Mobility Command eliminated the extra fuel carried while still maintaining safety standards. Category 1 fuel requirements existed for decades as an added amount of reserve fuel equal to 10% of the time over water (outside of ground-based navigation systems) to account for inaccurate navigation systems. With technological advances and current on-board navigation systems requirements, this additional fuel is unnecessary, and by eliminating the requirement (and associated excess weight), the Air Force estimates it saves 5 million gallons in fuel annually.

Mr. FORBES. 27) If the Air Force is, in essence, taking a strategic pause in its Military Construction account in Fiscal Year 2013, why would there be continued investment in installation energy projects through both appropriated funds and commitments to leverage third-party financing?

Secretary YONKERS. The Air Force took a deliberate pause in MILCON to ensure the right capital investment decisions were made while adjusting force structure in line with the emerging defense strategy. 10 USC § 2915 requires the military services to consider renewable energy as a source of energy during the design phase of construction, repair, or renovation if the renewable energy is cost effective. There are no military construction projects exclusively for renewable energy. This funding pause does not impact facilities sustainment, restoration, and modernization (SRM) funding, which can be use to improve energy security and avoid future costs. The Air Force needs to continue to make the right investment, in the right asset, at the right time to meet the challenges of a complex global environment.

QUESTIONS SUBMITTED BY MS. BORDALLO

Ms. BORDALLO. 28) It is my understanding that among the biggest challenges we face in achieving greater energy security is the Department's procurement process, which may sometimes preclude or, at a minimum, doesn't consider better integration of energy saving equipment and products when procuring expeditionary infrastructure for deployed forces or forward operating bases that could ultimately achieve more significant savings and efficiencies. DOD's procurement officers lack any meaningful coordination or incentives to achieve better energy savings in their purchases or to consider how integration of a number of energy enhancing products can make a sizeable difference in a unit, battalion or forward operating base energy footprint.

Question: What efforts are you undertaking to encourage or even require that, in addition to procurement costs, energy efficiency and logistics efficiencies are factors when purchasing equipment and products that support the Department's and the warfighter's mission and operational readiness posture?

What can your offices and the services do to ensure that a systems-level procurement approach is taken to capitalize on the synergies of various energy-saving components and products, rather than procuring items separately?

Secretary BURKE. Formal revisions to DOD policy emphasizing the need to procure more energy efficient materiel for deployments are in coordination, but actions to deploy more energy efficient equipment are already underway. My office is supporting Army and Joint Staff efforts to reform requirements guidance on temporary base camp design and related policies including procurement of fuel for power-demanding equipment. The Army Operational Energy Initial Capability Document (ICD), which will be released imminently, will provide the first "military requirement" to help inform decision-making on the procurement of such items for operational forces. Similar efforts are underway with the U.S. Marine Corps and the Joint Chiefs of Staff.

My office is also supporting Army planning for improved modeling and simulation tools and data sets to assess the impact of different levels of energy demand and

logistics supply on the capability of a military unit or vehicle. This will help the Army take energy performance into account in force development.

Finally, under the Operational Energy Implementation Plan, a Department-wide working group is identifying key energy-related policies and guidelines that need updating, to include procurement policies.

Ms. BORDALLO. 29) Can you provide examples of Operational Energy programs which support the current fight?

Secretary BURKE. The Department has several operational programs that support the current fight. For example, the U.S. Marine Corps, through their Experimental Forward Operating Base (or ExFOB) program, has equipped several battalions in southern Afghanistan with improved tent insulation, LED lighting packages, and portable solar energy devices. In the Army, the Rapid Equipping Force's "Energy to the Edge" program is improving soldier power by fielding a range of materiel and non-materiel energy improvements, including the Soldier-Worn Integrated Power Equipment System, a system designed to reduce an infantry platoon's need for batteries while on patrol. The Rapid Equipping Force (REF), Project Manager Mobile Electric Power (PM MEP), and Project Manager Soldier Warrior (PM SWAR) are collaborating to train, equip, and sustain several Brigades deploying to Afghanistan with energy-improved equipment, techniques, tactics, and procedures, including more efficient generators. The U.S. Air Force has deployed energy improved equipment to Central Command (CENTCOM), including solar lighting, improved tent liners and flies, and LED (light-emitting diode) lighting. Lastly, the Army's Research, Development and Engineering Command's Field Assistance in Science and Technology Center has established an "Energy Initiatives Proving Ground" to assess performance and facilitate deployment of advanced shelter system technologies. Collectively these programs and others like them contribute to the Department's top mission priority today of supporting our current operations.

Ms. BORDALLO. 30) What are the Services doing to address fuel consumption in its tactical vehicle fleet?

Secretary BURKE. Tactical vehicles are clearly a key driver of operational energy use and we are making progress increasing efficiency in this area. To improve fuel efficiency of current combat vehicles, the Army is executing engineering change proposals to add an auxiliary power unit (APU) to the Abrams Main Battle Tank and a transmission which provides about a three percent fuel efficiency improvement to the Bradley Infantry Fighting Vehicle. For the on-going up-armor High Mobility Multipurpose Wheeled Vehicle (HMMWV) recapitalization, the Army has designed armor kits that can be removed during peacetime to improve fuel economy and reliability.

For the future fleet of combat vehicles, the Army's Tank Automotive Research Development and Engineering Center (TARDEC) has been quite active in this area. They have been working on improvements such as APUs to allow main engines to be turned off while not moving, hybrid engines, and fuel efficient demonstrators to identify key fuel efficiency technologies in HMMWV size vehicles. TARDEC's new Ground Systems Power and Energy Laboratory, which will open in April 2012, clearly demonstrates their strong commitment to this area.

Ms. BORDALLO. 31) What are the Services doing to address fuel consumption in its non-tactical vehicle fleet?

Dr. ROBYN. Tactical vehicles are clearly a key driver of operational energy use and we are making progress increasing efficiency in this area. To improve fuel efficiency of current combat vehicles, the Army is executing engineering change proposals to add an auxiliary power unit (APU) to the Abrams Main Battle Tank and a transmission which provides about a three percent fuel efficiency improvement to the Bradley Infantry Fighting Vehicle. For the on-going up-armor High Mobility Multipurpose Wheeled Vehicle (HMMWV) recapitalization, the Army has designed armor kits that can be removed during peacetime to improve fuel economy and reliability.

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Ms. BORDALLO. 32) How does LEED offer any concrete energy savings?

Dr. ROBYN. LEED provides an easily accessible, uniform, and commercially applied process for achieving the energy goals Congress has set for DOD facilities. The LEED rating system requires every building to meet the minimum statutory energy conservation requirements of the Energy Independence and Security Act (EISA) of

2007. This pre-requisite alone ensures the project will be designed to use 30% less energy than typical buildings. In addition to the energy pre-requisite, the mandatory integrated design process and optional credits of the LEED system incentivize multi-disciplinary teams to save even more energy by taking advantage of synergistic effects inherent in complementary building systems like the HVAC system, lighting system, and building envelope. For example, a tighter envelope that also offers more daylighting can, in some climates, allow the team to reduce the size of the HVAC system—a major cost driver in buildings.

Ms. BORDALLO. 33) Can you provide examples of Operational Energy programs which support the current fight?

Secretary HAMMACK. The Army has developed and deployed a range of energy-related solutions to support the current operations. These efforts are reducing fuel and water usage in theater as well as lightening soldier loads. One example is the Army Corps of Engineers work to replace individual spot generators with mini-grids to support USFOR–A. These mini-grids are expected to save 50 million gallons of fuel per year. Another example is the work of the Army Sustainment Command and its LOGCAP contractors which have identified solutions for USFOR–A bases that, when complete, will save 5 million gallons of fuel per year. Finally, the Army is developing and deploying alternative energy sources for dismounted Soldiers that reduce the numbers of batteries Soldiers must carry through rechargeable batteries and renewable energy recharging systems, thereby extending their mission endurance. For example, through the Rapid Equipping Force, two Brigade Combat Teams have received a suite of equipment such as the Rucksack Enhanced Portable Power System (REPPS), the Soldier Worn Integrated Power Equipment System (SWIPES) to increase unit endurance and flexibility while performing operations in Afghanistan.

Ms. BORDALLO. 34) The Army has a number of operational energy related activities ongoing and the number of these activities is likely to grow. Are there plans to synchronize these efforts?

Secretary HAMMACK. Yes. The Army designated the Office of the Deputy Chief of Staff, G–4, as the Army Staff lead for Operational Energy. That agency has the mission to integrate and synchronize Operational Energy related programs across the Army and other military services. It is currently drafting an annex to the Army Campaign Plan that will provide direction and guidance to the Army as it moves to achieve its operation energy goals.

Ms. BORDALLO. 35) What is the Army doing to address fuel consumption in its tactical and non-tactical vehicle fleet?

Secretary HAMMACK. The Army has the second largest fleet of Non-Tactical Vehicles (NTVs) in the Federal Government consisting of over 76,000 vehicles. In FY11 the Army reduced its petroleum consumption in its NTV fleet by more than 8 percent. The Army accomplished this reduction by downsizing the total number of vehicles, right-sizing vehicles with more fuel efficient models, aligning Alternative Fueled Vehicles (AFV) to alternative fuel sources, and converting to hybrid or electric vehicles wherever possible.

To address fuel consumption in its tactical vehicle fleet the Army is investing in research to improve fuel efficiency in a variety of ways. These efforts are being spearheaded by the United States Army Tank Automotive Research, Development and Engineering Center (TARDEC), which opened a new Ground Systems Power and Energy Laboratory in April. These efforts include hybrid technology and fuel cell research, low rolling resistance tires and more. In addition the Army is working to certify its engines to burn alternative fuels.

Ms. BORDALLO. 36) How do LEED and ASHRAE 189.1 offer any concrete energy savings?

Secretary HAMMACK. Both the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Standard 189.1 and elements of Leadership in Energy and Environmental Design (LEED) offer concrete energy savings. Energy savings are achieved by increased insulation values, improved window specifications, improved efficiency of building equipment, improved lighting and energy efficiency building system controls.

A study completed by the Pacific Northwest National Lab (PNNL) found that Federal LEED-certified buildings cost less to operate and used 25 percent less energy than the national average. Army analysis, verified by the Department of Energy and reviewed by an independent third party indicates that ASHRAE 189.1 can save up to 30 percent of energy costs compared to current designs with little to no additional upfront cost.

LEED is a rating tool that awards a level of certification based on achieving certain criteria. Achieving LEED Certification requires at least 10 percent energy sav-

ings over the baseline standard established in energy performance tables found in ASHRAE 90.1–2007. LEED offers additional credits for project performance when achieving higher levels of energy savings. For example, by designer choice, LEED Optimize Energy Performance credit (EA1), when achieved, may result in 25–30 percent energy savings over ASHRAE Standard 90.1–2007. Nearly all Army projects achieve this credit.

ASHRAE Standard 189.1 differs from LEED in that it is an industry building standard and compliance is achieved by meeting the minimum performance requirements of the Standard. Within ASHRAE 189.1 there is no requirement or credit given to exceed the specified criteria. The level of required energy savings in ASHRAE Standard 189.1 is approximately 30 percent below a baseline building meeting ASHRAE 90.1–2007. The energy savings of ASHRAE Standard 189.1 was confirmed by an independent evaluation conducted by the Pacific Northwest National Laboratory. Starting in fiscal year 2013, all Army project will meet the energy performance requirements of ASHRAE Standard 189.1.

Ms. BORDALLO. 37) Does the Army plan to continue certifying to LEED Silver standards?

Secretary HAMMACK. Yes. The Army requires certification to LEED Silver as a third-party verification, which is consistent with Energy Independence and Security Act of 2007 (EISA 2007) section 433. The Army also has adopted ASHRAE Standard 189.1 starting with the FY13 military construction programs as a minimum standard of building performance from which energy systems are adjusted, based on life cycle cost analysis to meet the energy efficiency requirements of EISA 2007. LEED is a rating tool that awards a level of certification based on achieving certain criteria. When the ASHRAE Standard 189.1 is met, the building energy requirement savings is approximately 30 percent below a baseline building meeting ASHRAE 90.1–2007. This equates to the credit under LEED Optimized Energy Performance credit (EA1). Nearly all Army projects achieve this credit from past experience as LEED Silver.

Ms. BORDALLO. 38) Can you provide examples of Operational Energy programs which support the current fight?

Secretary PFANNENSTIEL. The Experimental Forward Operating Base (ExFOB) capabilities we have evaluated in CONUS and Afghanistan have helped our Marines operate lighter, with less reliance on resupply. Our forces today are widely dispersed across the battle space: a Company today may cover an area of 50 square miles or more, manning multiple outposts, and executing extensive dismounted operations. Our Marines depend on communications gear and equipment, and rely on frequent resupply to support fuel and battery, as well as water and food needs. By providing a new source of power—solar and hybrid solar energy—and reducing the power demand of equipment, we have reduced mission risk, and increased our commanders' options. Ultimately, our goal is fewer Marines at risk on the road hauling fuel and protecting fuel convoys.

In less than a year, through our Experimental Forward Operating Base process, we have twice evaluated capabilities at Twenty-nine Palms and deployed them to Afghanistan. In 2010, while engaged in nearly constant combat, Marines of India Co. 3rd Battalion, 5th Marine Regiment used small scale solar power, man portable solar battery rechargers, hybrid-solar generators, plus energy efficient lighting and shelters, with positive results:

Two patrol bases operated entirely on expeditionary solar power generators.

Another patrol base reduced its fossil fuel need by approximately 90%—from 20 gallons of fuel a day to 2.5 gallons a day.

Using the SPACES back pack portable solar power system to recharge their radio batteries they were able to patrol for three weeks with no battery resupply. Typical battery resupply is every 2–3 days.

As a result of this feedback, four of these capabilities were acquired and 5 BN sets were accelerated to Marine units in Operation Enduring Freedom (OEF). This equipment is now Program of Record and part of the Marine Corps equipment kit.

In fall 2011 the Marine Corps deployed hybrid power systems and direct current powered air conditioners for evaluation at Patrol Base Boldak. The hybrid system demonstrated an 80% reduction in generator run time, and 55% reduction in fuel consumed. Insights from this evaluation are being used to inform the Marine Expeditionary Energy Hybrid Systems Analysis of Alternatives initiated in spring 2012.

The deployment of renewable energy on the battlefield has had benefits at small and remote patrol bases where power demands are low, usually where total power required is below 10kW. Specifically, the challenge of larger bases is the refrigeration required for food stores and environmental control for personnel comfort and sensitive electronic equipment. At these larger bases, today's renewable energy tech-

nology will have minimal impact. The Marine Corps is addressing these challenges by investigating new environmental control technologies.

Ms. BORDALLO. 39) What are the Services doing to address fuel consumption in its tactical and non-tactical vehicle fleet?

Secretary PFANNENSTIEL. The Navy and Marine Corps are pursuing near- and long-term solutions to reduce fuel consumption in the tactical vehicle fleet.

The Marine Corps and the Office of Naval Research are investigating efficiency improvements for the Medium Tactical Vehicle Replacement (MTVR) through a suite of affordable fuel efficiency enabling technologies estimated to provide 15% fuel efficiency improvement to the existing platform. This Future Naval Capability project is under development, and slated for transition in FY15.

Originally funded by the Navy as part of a Research & Development initiative for the 2009 ARRA, On-Board Vehicle Power (OBVP) is a key initiative to reduce fuel used by the Naval tactical fleet of HMMWVs and a select number of MTVRs. This Future Naval Capability product provides vehicle-integrated, utility quality, 60 Hz electric power for mobile command and control, radar, air defense sensors, and operations centers. It replaces towed systems and reduces the logistical footprint, improving power mobility and saving fuel. The Marine Corps Systems Command is currently conducting final testing of this product at the Aberdeen Test Center. The Initial Operational Capability is scheduled for FY12.

The Department of the Navy (DON) is also taking steps to reduce fuel consumption in the non-tactical vehicle fleet. From 2005 to 2010, by updating our non-tactical vehicle inventory, DON reduced its petroleum consumption by 14% and increased the percentage of alternative fuel vehicles in the fleet to 42%. DON's FY13 budget includes funding for the purchase of alternative fuel vehicles and construction of alternative fuel stations.

Ms. BORDALLO. 40) How does LEED offer any concrete energy savings?

Secretary PFANNENSTIEL. The LEED certification process provides an objective third-party method of ensuring design compliance over a range of factors such as energy efficiency, water efficiency, and indoor environmental quality. LEED certification alone is not sufficient to ensure compliance with energy saving goals. Navy facility energy savings are achieved through use of a combination of proper operation and maintenance, accepted building codes, industry standards, DOD criteria (incorporating lessons learned), Navy guidance, in conjunction with green building certification processes.

Ms. BORDALLO. 41) In this environment of increasingly constrained budgets, why is the Navy investing advanced biofuels? How much will the Government's investment, including the Navy's portion, accelerate the production and reduce the cost of biofuels?

Secretary PFANNENSTIEL. The volatility and rapidly increasing demand growth outside the U.S., primarily China and India, clearly illustrate the need for more domestic alternatives such as advanced drop in alternative fuels that enhances our energy security and energy independence. In this constrained budget environment, the uncertainty of petroleum prices has created a nearly $1B fuel budget shortfall in FY12 for the Navy. This ~$1B will largely be funded out of operational and maintenance activities, reducing flying hours, steaming hours, and sustainment. Assured domestic supplies of alternative fuels offer the potential to mitigate uncertainty around our fuel budgets.

The Government's planned investment in the DPA Title III Advanced Biofuels Production Project is intended to be the catalyst that allows first-in-kind commercial scale advanced biorefinery production chains to be constructed and become operational. The LMI study, "Opportunities for DOD Use of Alternative and Renewable Fuels: FY10 NDAA Section 334 Congressional Study," clearly stated that the DPA Title III authority was a potential method for accelerating development of the alternative fuels industry. As part of this DPA effort, alternative fuels will be required to be cost competitive with conventional fuels.

Ms. BORDALLO. 42) If the Navy investment in biofuels is successful, when will the Navy expect advanced biofuels for military use to start decreasing the Navy's fuel budget?

Secretary PFANNENSTIEL. If DPA Title III Advanced Biofuel Production Project efforts can be implemented on the planned timing and funding levels, commercial scale delivery at cost competitive prices could start as early as 2016, perhaps even earlier in limited circumstances. One of the objectives of this effort is to rapidly accelerate the cost competitiveness of alternative fuels as compared to conventional fuel. Thus, the Navy does not expect advanced biofuels to decrease Navy's fuel budget.

Ms. BORDALLO. 43) Can you provide examples of Operational Energy programs which support the current fight?

Secretary YONKERS. The Air Force's mission is to fly, fight, and win in air, space, and cyberspace, and decreasing fuel demand by maximizing efficiencies will increase Air Force combat capability and enhance energy security. Despite the Air Force's operational tempo over the last 21 years, the Air Force has emphasized and improved energy consumption and efficiency. Our primary goal for aviation energy has been to reduce fuel consumption 10% by 2015 against a 2006 baseline. To date, the Air Force has reduced fuel consumption 4% since FY06. Broadly speaking, the Air Force is seeking to reduce aviation fuel demand and change the culture through material and non-material, or policy, solutions. Examples include implementation of Mission Index Flying, an ongoing initiative to upgrade aircraft flight management systems to enable real-time route and altitude optimization based on temperatures, winds, aircraft weight, and other factors; replacing C–5Bs with the more fuel efficient C–5Ms; and implementing policy changes to reduce aircraft flying weights and optimize dip clearance routing.

The Air Force is also implementing initiatives to reduce energy consumption, help reduce energy logistics tail, and contribute to untethering operations from Forward Operating Bases, such as improving energy efficiency at bases in contingency environments. In partnership with the other Services, the Air Force is evaluating the Basic Expeditionary Airfield Resources (BEAR) System for Load and Installation Management, which will integrate renewable energy into the BEAR grid and enable centralized load management to reduce energy demands.

Ms. BORDALLO. 44) What are the Services doing to address fuel consumption in its tactical and non-tactical vehicle fleet?

Secretary YONKERS. The Air Force is leading an initiative to deploy Automated Inventory technology on our non-tactical vehicle fleet. The objective of this project is to upgrade radio frequency identification technology at Air Force sites worldwide using existing infrastructure to facilitate data collection and minimize costs for Air Force vehicle refueling. The Automated Inventory Manager automates the collection of fuel sales transaction data for Air Force owned and General Services Administration (GSA)/Commercially leased vehicles. The implementation plan is underway on 30,000 stateside vehicles. This new technology will provide more accurate odometer readings, and improved fuel consumption accountability and data integrity. It will also help monitor and enforce vehicle idling policy that was just recently approved to allow passive capture of current mileage, date, time, fuel quantity, fuel type and engine hours.

Additionally, the Air Force is pursuing conversion of its general purpose fleet at Los Angeles Air Force Base to all plug-in electric. This will be the first Federal facility with an all-electric vehicle fleet. The Air Force is working with the GSA to pilot plug-in electric vehicles at other stateside bases as well.

The Air Force is a strong proponent of alternative fuel and across its vehicle fleet has replaced more than 1.7 million gasoline gallon equivalents of petroleum with alternative fuel (E85, Biodiesel, and Compressed Natural Gas). To the greatest extent possible, the Air Force uses alternative fuels in non-tactical and tactical assets.

With regard to tactical vehicles, the Air Force has a limited number of military design vehicles, relying predominately on commercial-off-the-shelf vehicles to meet mission requirements across the globe. The Air Force reduced fuel consumption by more than 700,000 gasoline gallon equivalents of petroleum between fiscal years 2008–2012. Where commercial-off-the-shelf vehicles are used for tactical purposes, the Air Force adheres to the acquisition principle to procure the most fuel efficient and fit-for-purpose vehicles.

Ms. BORDALLO. 45) How does LEED offer any concrete energy savings?

Secretary YONKERS. Leadership in Energy and Environmental Design (LEED) is a tool used to verify that energy conservation goals have been met and does not replace the requirement to make sound energy and water conservation decisions. By setting sustainable goals based on Federal requirements and the LEED rating system, the Air Force Military Construction (MILCON) program was able to report in the FY11 Annual Energy Management Report 100% compliance with EPAct 05. Every project exceeded the 30% reduction in energy intensity set by the baseline in American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) standard 90.1. Also, 6% of the projects exceeded a 50% reduction in energy intensity, which translates into energy savings.

QUESTIONS SUBMITTED BY MR. PALAZZO

Mr. PALAZZO. 46) Over the past 4 years, to what extent has DOD used appropriated monies vs. ESPCs for funding energy efficiency projects to reduce installation energy consumption, and what changes in funding sources do you anticipate in future years? To what extent are all projects you fund by appropriations accompanied by performance guarantees, as is the case with ESPCs?

Secretary BURKE. Over the past four years DOD has spent approximately $1.5B in direct appropriations for energy efficiency projects. Separately, it has awarded approximately $782M in ESPCs. In the near term, to respond to the President's memo of 2 Dec 11, DOD will significantly increase its reliance on ESPCs, with a target of $1.2B combined in FY12 and FY13. This trend will continue beyond the timeline defined in the President's memo as DOD leverages the power of ESPCs to reduce our energy use without an outlay of appropriated funds. Given the limited availability of appropriated funds in today's budget environment and the large number of deserving projects in need of funding, the DOD services and agencies select the biggest impact projects—i.e., those with meaningful returns-on-investment and reasonable payback periods. Thus, although these projects are not accompanied by the same type of performance guarantees associated with ESPCs, we know from careful analysis that they will generate a good return on our investment.

Mr. PALAZZO. 47) As you may know, the LEED green building system discourages the use of wood products, thus greatly disadvantaging our home state of Mississippi and the countless forest jobs and forest landowners that rely on this industry in the state. It was one of the reasons my colleagues and I included a provision in the FY12 NDAA that required a cost based study on LEED and other rating systems.

Recently, you said that your office plans to change the Department's green building policy. And, this new policy will be based heavily on ASHRAE 189.1.

What elements of ASHRAE 189.1 will be included? What elements will be excluded? Will all wood standards be able to compete for construction projects? Regarding the study, will you solicit input from outside organizations? If so, when and how?

Dr. ROBYN. The Department of Defense embraces sustainable building practices inasmuch as they reduce the total cost of ownership of DOD facilities and enhance the resiliency of our installations. To that end, the Department is currently drafting a new DOD-specific set of criteria for high-performance buildings that will apply to new buildings, major renovations, and leases. The new criteria are anticipated to be based on American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) 189.1, which treats all sustainable forestry standards equally. While the new Unified Facilities Criteria for High Performance Buildings will make reference to ASHRAE 189.1, there are some elements of the standard that may not be cost effective for application in the DOD and therefore will not be incorporated in the new UFC. In a parallel effort, the Department has partnered with the National Research Council to study the cost-effectiveness of ASHRAE, LEED, and Green Globes as required by 2012 NDAA, Section 2830. The results of the study will be used to assess the cost effectiveness of future capital investments.

Mr. PALAZZO. 48) Over the past four years, to what extent has DOD used appropriated monies vs. ESPCs for funding energy efficiency projects to reduce installation energy consumption, and what changes in funding sources do you anticipate in future years? To what extent are all projects you fund by appropriations accompanied by performance guarantees, as is the case with ESPCs?

Dr. ROBYN. Over the past four years DOD has spent approximately $1.5B in direct appropriations for energy efficiency projects. Separately, it has awarded approximately $782M in ESPCs. In the near term, to respond to the President's memo of 2 Dec 11, DOD will significantly increase its reliance on ESPCs, with a target of $1.2B combined in FY12 and FY13. This trend will continue beyond the timeline defined in the President's memo as DOD leverages the power of ESPCs to reduce our energy use without an outlay of appropriated funds. Given the limited availability of appropriated funds in today's budget environment and the large number of deserving projects in need of funding, the DOD services and agencies select the biggest impact projects—i.e., those with meaningful returns-on-investment and reasonable payback periods. Thus, although these projects are not accompanied by the same type of performance guarantees associated with ESPCs, we know from careful analysis that they will generate a good return on our investment.

Mr. PALAZZO. 49) To what extent is the expedited contractor selection process being used at DOD and what is the average length of time for your contractor selection process for ESPC projects?

Dr. ROBYN. The expedited contractor selection process is being used for all DOD Energy Savings Performance Contracts (ESPCs), under both the Department of Energy Super ESPC contract and the Army Corps of Engineers Huntsville contract.

The DOD's average length of time for contractor selection for its nine most recent ESPC awards has been 91 days. This includes two Navy projects which averaged 120 days, five Army projects which averaged 77 days, and two Air Force projects which averaged 90 days.

Mr. PALAZZO. 50) Are you confident that DOD has access to a sufficient number of contracting officers, appropriately trained in the ESPC contracting process, to successfully meet your goal in new ESPC project investment over the next 24 months?

Dr. ROBYN. While all three Military Departments believe they have access to a sufficient number of appropriately trained contracting officers to meet DOD's goal in Energy Savings Performance Contract (ESPC) project investments by the end of 2013, this is based on the currently accepted process time of 12–18 months to contract award. Process improvement initiatives underway could reduce process time and increase throughput in a way that could invalidate the above statement. ESPC contracting officer expertise will be a topic of discussion during our process improvement initiative to ensure this is not a limiting factor in our ability to quickly process ESPC contracts.

Mr. PALAZZO. 51) What is the specific nature and frequency of reports and/or progress updates your office is required to provide up the chain for command that identify delays or barriers to expeditiously implementing ESPC projects?

Dr. ROBYN. DOD is required to report monthly to OMB and DOE on progress toward achievement of the President's goal for performance-based contracts. While Military Services plan and execute their own ESPC projects without approval from OSD or higher authority, the OMB reporting process allows identification of issues that may delay a project. In recognizing that all Services approach ESPCs differently, I have formed a working group with stakeholders from across the Department to identify opportunities for standardization and process improvement with the goal of reducing the time needed to execute ESPC projects and improving the quality of the projects.

Mr. PALAZZO. 52) To what extent has the DOD completed its required energy and water evaluations? What is the number and profile of potential energy conservations measures (ECM) the audits have identified to date? How many of these audit identified ECMs do you anticipate being implemented in your effort to comply with the President's December 2, 2011, directive?

Dr. ROBYN. The Department has completed about 40% of its required energy and water evaluations, as reported in the Federal Energy Management Program's (FEMP) Energy Independence and Security Act (EISA) of 2007 Section 432 Compliance Tracking System (CTS). More than 27,000 potential ECMs were identified during these audits. The total estimated cost to implement these ECMs, as reported by the Defense Components, is approximately $2.7 billion. The ECMs identified in CTS are a result of initial audits. Prior to implementation (either through appropriated funding or Energy Savings Performance Contracts (ESPC)), a more in-depth investment-grade audit is typically conducted, where a more refined list of ECMs is developed. Therefore, the ECM listing in CTS is preliminary and does not directly track to the ECMs in the President's performance contracting initiative.

Mr. PALAZZO. 53) Over the past four years, to what extent has the Army used appropriated monies vs. ESPCs for funding energy efficiency projects to reduce installation energy consumption, and what changes in funding sources do you anticipate in future years? To what extent are all projects you fund by appropriations accompanied by performance guarantees, as is the case with ESPCs?

Secretary HAMMACK. Over the last four years (FY08–FY11) Army has used $398.3M in appropriated funds (including ECIP) and $540.9M in alternatively financed investment (ESPC and UESC) to implement energy projects on installations. The Army's current plan for FY13–17 includes more than $1.3B in appropriated funding dedicated for energy projects plus undetermined amounts for the ECIP program. The Army expects funding sources through alternatively financed projects will also increase. Use of alternative financing is increasing rapidly over historic levels, with at least $200M of investment through ESPC's and UESC's expected in FY12. Army is already the largest user of ESPC's in Federal Government and second largest user of UESC.

Appropriated funds projects are typically not structured to include performance guarantees, however, they may include performance assurances, Measurement and Verification, and/or commissioning. UESCs also include performance assurances

rather than performance guarantees since many state public utility commissions do not allow utilities to provide guarantees.

Mr. PALAZZO. 54) To what extent is the expedited contractor selection process being used in the Army and what is the average length of time for your contractor selection process for ESPC projects?

Secretary HAMMACK. The Army executes its ESPC Task Orders through both the U.S. Army Corps of Engineers and Defense Logistics Agency—Energy (DLA–Energy). The U.S. Army Corps of Engineers—Engineering and Support Center, Huntsville (USACE–HNC) utilizes an expedited approach to all ESPC new start activities by using a Multiple Award Task Order Contract (MATOC) with 15 pre-qualified ESCOs and down selects to one ESCO based on responses to the task order RFP. DLA–Energy now uses a similar expedited process for task orders on the Department of Energy MATOC to down-select to one contractor. That was enabled by the 2011 contract modification in response to NDAA11, section 828, which clarified how the competition requirements for MATOCs apply to ESPCs.

Huntsville Center routinely completes ESCO selection in 90 days or less (average over last seven selections was 80 days). While the ESPC Task Order award schedule allowed for a large, fairly complex ESPC under the USACE–HNC MATOC is up 480 days (16 months), the typical time to award is 12–14 months.

DLA—Energy has recently instituted changes to their acquisition process under the DOE ESPC MATOC that will shorten their award cycle time including adopting the new expedited down-select process and eliminating some redundant internal reviews. No projects have moved all the way through to award under this new process so we cannot yet give data on cycle time to award for this new process improvement, but it is expected to be in the 14 month timeframe.

Five of the last eight ESPC Task Order awards done for Army were completed or executed in less than 12 months.

Mr. PALAZZO. 55) Are you confident that the Army has access to a sufficient number of contracting officers, appropriately trained in the ESPC contracting process, to successfully meet your goal in new ESPC project investment over the next 24 months?

Secretary HAMMACK. Army is confident that it has access to a sufficient number of contracting staff to successfully meet goals under the Better Buildings Initiative. Army uses multiple contracting vehicles, including the U.S. Army Corps of Engineers—Huntsville Center (USACE–HNC) and Department of Energy (DOE) MATOCs, to ensure execution of our program. Both USACE–HNC and Defense Logistics Agency-Energy (DLA–Energy—used for DOE MATOC Task Orders) currently have a sufficient number of contracting officers for the projects already in the pipeline and have already begun adding contracting support staff to meet future demand growth. While demand for ESPC's is not yet expected to exceed availability of contracting personnel trained in ESPC's, plans are also underway to expand the number of interdisciplinary teams from related programs capable of awarding and administering an ESPC, if necessary to meet higher than expected increased demand.

Mr. PALAZZO. 56) What is the specific nature and frequency of reports and/or progress updates your office is required to provide up the chain for command that identify delays or barriers to expeditiously implementing ESPC projects?

Secretary HAMMACK. As per guidance issued by OSD in response to the Better Buildings Initiative, Army provides monthly ESPC & UESC project pipeline milestone progress reports to OSD for consolidation with other DOD elements and submission to OMB. Monthly reporting started in April 2012. The Army is using this report internally to ensure that projects remain on track. If projects slip behind on milestone attainment, the reports will flag this slippage, prompting oversight activity to determine what the situation is and how it can be remediated.

Mr. PALAZZO. 57) To what extent has the Army completed its required energy and water evaluations? What is the number and profile of potential energy conservations measures (ECM) the audits have identified to date? How many of these audit identified ECMs do you anticipate being implemented in your effort to comply with the President's December 2, 2011, directive?

Secretary HAMMACK. The Energy Security and Independence Act of 2007 require the Army to complete annual energy and water evaluations of 25% of covered facilities. Covered facilities include those which constitute 75% of the agencies' total energy use, so that an evaluation of each covered facility is completed at least once every four years. In FY 11 the Army performed energy and water audits on approximately 30% of its total square footage covering more than 34% of its energy usage. These audits identify potential ECMs which are incorporated into ESPC/UESC task orders or undertaken using appropriated funds, where life cycle cost effective. There currently is no process to count the number of ECM's identified and implemented, nor is a profile of the ECMs tabulated. Additionally, ESPC/UESC task orders often

include building audits that identify additional ECMs, which are then incorporated into the contract.

Mr. PALAZZO. 58) Over the past four years, to what extent have the Navy and Marine Corps used appropriated monies vs. ESPCs for funding energy efficiency projects to reduce installation energy consumption, and what changes in funding sources do you anticipate in future years? To what extent are all projects you fund by appropriations accompanied by performance guarantees, as is the case with ESPCs?

Secretary PFANNENSTIEL. Navy investment in energy efficiency projects has been supported with a mixture of funding sources. Navy uses appropriated funds (Operations & Maintenance, Navy (OM,N), Military Construction (MILCON), Energy Conservation Investment Program (ECIP), and Navy Working Capital Fund (NWCF)) as well as leverages privately-financed projects such as Energy Savings Performance Contracts (ESPC) and Utilities Energy Savings Performance Contracts (UESC).

A funding comparison between financed energy projects (ESCP and UESC) and all other appropriated funding profiles is provided below:

Investment	FY09	FY10	FY11	FY12	PB13
Appropriated Energy Efficiency Investments	$221.3M	$46.6M	$58.6	$441.4M	$343.0M
ESPC Investment*	$71.5M	$107.8M	$12.3M	—	$82.0M
UESC Investment*	$72.5M	$29.4M	$46.1M	$33.2M	$9.0M

*The ESPC and UESC funding amounts listed represent the financed investment that will be paid with energy savings over the course of the contractual agreement.

Similar to a performance guarantee, identified appropriated shore energy efficiency investments shall undergo the same measurement and validation process using the methodologies of the Federal Energy Management Program (FEMP) M&V guidelines (Options A, B, C and D) that are presently being performed for ESPC projects.

The Navy remains committed to utilizing ESPCs and UESCs to leverage the high-level of expertise of Energy Savings Companies.

Mr. PALAZZO. 59) To what extent is the expedited contractor selection process being used in the Navy and Marine Corps and what is the average length of time for your contractor selection process for ESPC projects?

Secretary PFANNENSTIEL. The expedited contractor selection process is being used for 100% of all Navy ESPC efforts under the Department of Energy (DOE) Super ESPC contract. The ESPC contractor selection process, incorporated into the NAVFAC Business Management System allows for contractor selection based on contractor statement of qualifications (fair opportunity assessment) and a down selection to one or more energy services contractors to perform the preliminary assessment in accordance with the DOE contracts.

Two projects have been initiated since the process has been enacted and the time to down selection has been five months for one project and three months for the second. Two new fair opportunity assessments are about to be issued. Goal moving forward is to decrease the original down-select timeframe to about two months to include any headquarters or legal reviews.

Mr. PALAZZO. 60) Are you confident that the Navy and Marine Corps have access to a sufficient number of contracting officers, appropriately trained in the ESPC contracting process, to successfully meet your goal in new ESPC project investment over the next 24 months?

Secretary PFANNENSTIEL. Depending on the number of new contract actions over the next 24 months, there may be a need for more contracting officers trained in ESPC to expedite contract awards. Currently navy contracting for ESPC is centralized in one location. There are sufficient contracting personnel to handle the current ESPC contract actions projected through FY–13.

Mr. PALAZZO. 61) What is the specific nature and frequency of reports and/or progress updates your office is required to provide up the chain for command that identify delays or barriers to expeditiously implementing ESPC projects?

Secretary PFANNENSTIEL. Navy is compliant with 10 U.S.C. § 2925 which requires all services to report annually the performance of installations energy management

through the Secretary of Defense to the congressional defense committees. As such, the Annual Energy Managers Report (AEMR) is the vehicle utilized to collect and report the Department's energy performance.

Section 8.1 of the AEMR Reporting Guidance directs Navy to, "list all projects funded through third-party financing to include energy savings performance contracts (ESPC), enhanced use leases (EUL), utility energy service contracts (UESC), utility privatization (UP) agreements, and power purchase agreements (PPA). Appropriated projects should include all projects funded through military construction (MILCON), the Energy Conservation and Investment Program (ECIP), operations and maintenance (O&M), sustainment, restoration and modernization (SRM), and working capital funds."

There is no requirement to identify delays or barriers to expeditiously implementing ESPC contracts.

Mr. PALAZZO. 62) To what extent have the Navy and Marine Corps completed their required energy and water evaluations? What is the number and profile of potential energy conservations measures (ECM) the audits have identified to date? How many of these audit identified ECMs do you anticipate being implemented in your effort to comply with the President's December 2, 2011, directive?

Secretary PFANNENSTIEL. The Navy has consistently met the EISA 2007 requirement for comprehensive energy and water auditing 25% of covered facilities annually. Audits have resulted in recommended energy and water ECMs inside the covered facility envelope. The energy audits completed to date report over 70 types of ECM's. The most frequently reported ECM's fall into the following categories:

1. Retro-commissioning
2. Energy Management Control Systems
3. Temperature Setbacks
4. Boiler Replacement
5. Chiller Replacement
6. Insulate Roofs, Walls, Attics, Piping
7. HVAC Controls Upgrades
8. Lighting Upgrades
9. Lighting Controls and Occupancy Sensors
10. High Efficiency DX Heat Pumps
11. Solar Domestic Hot Water
12. Water Conservation Improvements
13. Weatherization
14. High Efficiency Motors, Fans and Condensing Units
15. Convert Constant Volume Air Handling Units to Variable Air Volume (VAV)

The ECM's identified in the energy audits will be used to inform DON investment strategy to meet energy consumption reduction and renewable energy goals across all available funding mechanisms (i.e. Energy Savings Performance Contracts (ESPC), Utility Energy Savings Contracts (UESC), Restoration and Modernization (RM energy), Energy Conservation Incentive Program (ECIP), etc.). The Installation Planners and Installation Energy Managers responsible for using the audit results for future project development have to consider a wide variety of installation specific factors such as local facility condition and utility costs, as well as previous implementation of ECMs and approved energy projects. It is difficult to anticipate the decisions being made in the field for which ECMs will be included in performance based contracts and which ECMs will be included in other project types. Furthermore, performance based contract development is an interactive process which includes input from both contractors and installation personnel. Performance-based contracts currently in development include the following ECM categories in the scope of work:

- HVAC Controls Upgrades
- Lighting Upgrades
- Lighting Controls and Occupancy Sensors
- Data Center Upgrades and Controls
- Chiller Replacement
- Insulate Roofs, Walls, Attics
- Building Envelope Weatherization
- Energy Management System
- Biomass (landfill gas)
- Boiler Replacement
- Backwash Water Recycling in Waste Water Plant
- Install Direct Digital Control (DDC) Systems
- Temperature Set Backs
- Water Conservation Measures

Mr. PALAZZO. 63) Over the past four years, to what extent has the Air Force used appropriated monies vs. ESPCs for funding energy efficiency projects to reduce installation energy consumption, and what changes in funding sources do you anticipate in future years? To what extent are all projects you fund by appropriations accompanied by performance guarantees, as is the case with ESPCs?

Secretary YONKERS. Over the past four years, the Air Force spent more than $500 million in appropriated dollars compared to an investment cost of $59 million in Energy Savings Performance Contracts (ESPC) for funding energy efficiency projects to reduce installation energy consumption.

The Air Force has budgeted approximately $200 million per year for FY12–15 for appropriated energy conservation projects but is also increasing emphasis on the use of ESPC and Utility Energy Service Contracts (UESC) authorities. We anticipate awarding ESPC and UESC contracts valued at approximately $300 million over the next 2 years and are escalating our capability to identify and develop more projects in future years.

Although our appropriated projects do not normally include performance guarantees in the contracts, the Air Force has instituted a policy to measure and verify energy savings on those projects. The AFCESA Capital Investment Project Measurement and Verification (M&V) program is designed to provide feedback and validity to these projects. Data collected will be used to document energy and financial savings, support future energy programs funding, improve engineering efforts (design, operations, maintenance), and aid in future financial budgeting and energy forecasting.

Mr. PALAZZO. 64) To what extent is the expedited contractor selection process being used in the Air Force and what is the average length of time for your contractor selection process for ESPC projects?

Secretary YONKERS. The Air Force plans to execute all future Energy Savings Performance Contracts (ESPC) projects via the Department of Energy's Federal Energy Management Program (DoE–FEMP) Super ESPC Indefinite Delivery Indefinite Quantity (IDIQ). This IDIQ contract provides competition and streamlines the process. The Air Force follows the DoE–FEMP timeline for ESPC development and reviews, and took approximately 90 days to select the first two contractors using the DoE–FEMP Super ESPC IDIQ.

Mr. PALAZZO. 65) Are you confident that DOD (or substitute military service) has access to a sufficient number of contracting officers, appropriately trained in the ESPC contracting process, to successfully meet your goal in new ESPC project investment over the next 24 months?

Secretary YONKERS. Yes, the Air Force has access to a sufficient number of contracting officers. The Air Force uses installation contracting officers, trained by the Federal Energy Management Program (FEMP), to award our Energy Savings Performance Contracts (ESPC) Task Orders.

Mr. PALAZZO. 66) What is the specific nature and frequency of reports and/or progress updates your office is required to provide up the chain for command that identify delays or barriers to expeditiously implementing ESPC projects?

Secretary YONKERS. In April 2012, the Department of Defense implemented the Department of Energy's ESPC project reporting tool that provides a month-by-month view of targets and milestones toward achieving performance-based contract goals. Use of the tool tracks the progress of projects that will identify changes in the schedule and the ability to determine the causes of any delays. Air Force submitted the first report to the Office of the Secretary of Defense in May.

Mr. PALAZZO. 67) To what extent has the Air Force completed its required energy and water evaluations? What is the number and profile of potential energy conservations measures (ECM) the audits have identified to date? How many of these audit identified ECMs do you anticipate being implemented in your effort to comply with the President's December 2, 2011 directive?

Secretary YONKERS. To date, the Air Force is approximately 50% complete with energy audits for covered facilities as defined by the Energy Independence and Security Act of 2007 (EISA07). In 2010, forty installations covering 84 million square feet identified 15,000 energy and water conservation opportunities. Potentially these ECMs can save six trillion BTUs of energy. The 2011 energy audits are nearly complete and these audits will identify similar quantities of ECMs.

To comply with the President's December 2, 2011 directive, the Air Force validates and prioritizes all potential ECMs, evaluates them for the most effective contracting method and executes them as quickly and efficiently as possible. The Air Force anticipates entering into Energy Savings Performance Contracts (ESPC) and Utility Energy Service Contracts (UESC) valued around $300 million over the next two years with an additional $400 million identified for evaluation over the next five years. In addition to third-party funding, the Air Force is committing approximately

$200 million in appropriated funding annually in FY10–15 to execute identified energy conservation measures.

QUESTIONS SUBMITTED BY MR. REYES

Mr. REYES. 68) Energy security is an increasingly complex and pressing issue. How does energy security affect military readiness, and what new solutions are you developing to meet those challenges?

Secretary BURKE. The 2010 Quadrennial Defense Review and FY 2011 NDAA define energy security as "assured access to reliable supplies of energy and the ability to protect and deliver sufficient energy to meet operational needs." Operational energy is an essential enabler of military operations, so it is an integral part of military readiness. Threats to our ability to provide operational energy undermine our ability to deploy, sustain, and employ military forces around the globe. In an era of growing irregular and anti-access/area denial threats, the size and scale of our fuel storage, transportation, and distribution networks raise risks to our military operations and readiness.

The Department's Operational Energy Strategy and supporting Implementation Plan provide a framework for reducing these risks, improving warfighting capability, and enhancing military energy security. The Department has initiated a series of initiatives to reduce the demand for energy in military operations, assure the supply of energy, and adapt our future force development.

Mr. REYES. 69) Energy security is an increasingly complex and pressing issue. How does energy security affect military readiness, and what new solutions are you developing to meet those challenges?

Dr. ROBYN. The 2010 Quadrennial Defense Review and FY 2011 NDAA define energy security as "assured access to reliable supplies of energy and the ability to protect and deliver sufficient energy to meet operational needs." Operational energy is an essential enabler of military operations, so it is an integral part of military readiness. Threats to our ability to provide operational energy undermine our ability to deploy, sustain, and employ military forces around the globe. In an era of growing irregular and anti-access/area denial threats, the size and scale of our fuel storage, transportation, and distribution networks raise risks to our military operations and readiness.

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Mr. REYES. 70) Energy security is an increasingly complex and pressing issue. How does energy security affect military readiness, and what new solutions are you developing to meet those challenges?

Secretary HAMMACK. Energy is fundamental to Army capabilities and performance, over reliance on fossil fuels and connection to a vulnerable electrical power grid jeopardize the security of Army installations and mission capabilities. To meet these challenges the Army is developing solutions in three areas; basing power, soldier power and vehicle power.

On its permanent installations, the Army is working to improve energy efficiency, install alternative energy sources and develop grid security projects. On its contingency bases, the Army is implementing efficient grid technologies and deploying more efficient generators and alternative energy technologies. In the area of Soldier power, the Army is deploying advanced Soldier power capabilities such as power management devices, fuel cells, and renewable energy alternatives that helped to reduce the volume and weight of Soldier's energy loads. Finally, to address vehicle power in its tactical fleet the Army focus is on better fuel consumption management, thermal systems management and materials development that will help to improve fuel efficiency.

Mr. REYES. 71) The Army Improved Turbine Engine Program (ITEP) envisions a significantly more fuel efficient and powerful engine for the Black Hawk and Apache helicopter fleet as well as the next generation Joint Multi-Role helicopter. Bringing 25% more fuel efficiency and 50% more power to the fleet is a has enormous operational and energy benefit throughout the DOD. Can you please elaborate on the benefits you see and the importance of the ITEP program within the Department of Defense?

Secretary HAMMACK. The increased power of the ITEP engine will allow the Black Hawk and Apache helicopters to carry more payload and fly faster across a wider

range of environmental conditions that currently limit these helicopters with their currently installed engines. In some combinations of pressure and temperature, the same mission may take multiple aircraft or multiple lifts or both to accomplish the mission in the conditions and time required. These aircraft with an ITEP installed, will more often be able to accomplish those missions with fewer aircraft in fewer lifts. At the same time, with the engine being more fuel efficient, it will dramatically decrease the fuel requirement across these fleets. The ITEP is tremendously important to the Department of Defense, not only does it increase the capability of the Black Hawk and Apache helicopters to provide the war fighter with rotary wing support, it does so while requiring less fuel per engine.

Mr. REYES. 72) Energy security is an increasingly complex and pressing issue. How does energy security affect military readiness, and what new solutions are you developing to meet those challenges?

Secretary PFANNENSTIEL. There is an undeniable link between energy security and military readiness. For the Navy, energy security means having assured access to a reliable, secure, and affordable supply of energy for Navy missions, both today and in the future. The Navy's efforts to reduce energy consumption and improve the energy efficiency of our platforms/installations, in concert with increased use of non-petroleum sources, turn our energy usage from a vulnerability into a combat multiplier.

Afloat, testing and evaluation of numerous technologies to improve fuel economy and reduce maintenance requirements for existing ships and aircraft is complete, and we continue to make targeted investments for the future. We are developing best practices for reducing fuel consumption by ships and aircraft, as well as investing in simulator upgrades.

Navy's small investment in biofuel 'fit-for-use' testing provides an off-ramp from conventional fuel sources when those fuels are competitively priced, while buffering our fuel accounts from future price volatility when these biofuels are competitively priced. This advanced biofuel requires no modification to the engines in our current inventory or changes to our fuels distribution or logistics resupply networks.

Ashore, Navy is working to ensure reliable, resilient, redundant power for our critical assets, improve the energy efficiency of our buildings, reduce petroleum consumption from non-tactical vehicles, and incorporate renewable and alternative energy technologies where economically viable. Advanced metering and microgrid technologies will enable better energy management and improve resiliency in emergencies.

For the Marine Corps, increased energy efficiency and performance will enhance readiness by providing Marines more time to focus on the mission, and less time focused on logistics and sustainment. Lower requirements for fuel translate to reduce requirements for resupply and sustainment missions.

The Marine Corps is developing models to understand demand, and the impact of equipment investments on the force. Initial findings indicate that with our $350M investment over the FYDP we estimate this investment will improve the energy efficiency of our Marine Expeditionary Brigades (MEB) by nine percent, enabling our forces to sustain longer and go further, incurring less risk. The MEB of 2017 will be able to operate an estimated one month longer on the same amount of fuel that we plan to use today, and it will need 208 fewer fuel trucks, thereby saving seven million gallons of fuel per year.

The Marine Corps has deployed energy efficient and renewable energy systems to five Battalion-equivalents in the Helmand Province of Afghanistan: energy efficient shelter liners, low power LED lights, plus the GREENS and SPACES renewable energy power systems for recharging batteries and running equipment at small outposts at the forward edge. At remote locations these systems eliminate the need for fuel or battery resupply. Proven through the USMC Experimental Forward Base process, this gear is now 'program of record' and integrated into the Marine Corps kit.

The Marine Corps FY13 plan includes additional investment in renewable energy systems GREENS and SPACES, as well as investment in energy efficient generators and environmental control units, the two largest ground users for power, and efficiency improvements to the MTVR.

Mr. REYES. 73) Navy/Air Force related: I understand that there is approximately $1 billion budgeted for FY13 for energy efficiency and renewable energy acquisition. I also am aware of the private financing vehicles available to you for both upgrading the energy efficiency and installing renewable capacity. Why then is the Department using appropriated dollars for short payback energy efficiency measures when you could leverage more energy efficiency by including these in an Energy Savings Per-

formance Contract (ESPC)? Would appropriated dollars be more wisely used as a part of an ESPC?

Secretary PFANNENSTIEL. Navy invests in energy efficiency through a mixture of funding sources to optimize our shore energy investment portfolio and provide maximum return-on-investment. We use appropriated funds—such as Operations & Maintenance, Navy (OM,N), Military Construction (MILCON), Energy Conservation Investment Program (ECIP), and Navy Working Capital Fund (NWCF))—as well as leverage privately-financed projects such as Energy Savings Performance Contracts (ESPC) and Utilities Energy Savings Performance Contracts (UESC). The decision to use appropriated or financed funding is based upon availability of funds, and technical complexity of the project.

The Navy remains committed to utilizing ESPCs and UESCs to leverage the high-level of expertise of Energy Savings Companies.

Mr. REYES. 74) Energy security is an increasingly complex and pressing issue. How does energy security affect military readiness, and what new solutions are you developing to meet those challenges?

Secretary YONKERS. From aviation operations to installations, both within the homeland and abroad, energy is a strategic imperative for Air Force operations and is key to our national and economic security. Every aspect of our mission—ISR, communications, space, medevac, air defense, mobility operations—is dependent on access to reliable sources of energy. We realize that access to energy can come at great cost in treasure and lives; therefore, the Air Force strives to reduce consumption and increase our preparedness to exploit available alternatives. Through improvements in our weapon systems (e.g., drag reduction) and by changes in our techniques, tactics, and procedures (e.g., cargo loads, flight approach profiles, etc.), we are reducing our demand. Through activities such as our alternative fuels certification program—aviation and vehicle—and our 1000 megawatt renewable energy initiatives, we are increasing our preparedness to exploit available alternatives. Thus reducing our dependence on fossil fuels and enhancing our energy security posture.

Mr. REYES. 75) Navy/Air Force related: I understand that there is approximately $1 billion budgeted for FY13 for energy efficiency and renewable energy acquisition. I also am aware of the private financing vehicles available to you for both upgrading the energy efficiency and installing renewable capacity. Why then is the Department using appropriated dollars for short payback energy efficiency measures when you could leverage more energy efficiency by including these in an Energy Savings Performance Contract (ESPC)? Would appropriated dollars be more wisely used as a part of an ESPC?

Secretary YONKERS. The Air Force is currently developing an energy investment strategy that will emphasize the combined use of funding streams to maximize Air Force appropriations and provide the best value for the Department. As part of this strategy, the Air Force is requesting more than $530 million in Fiscal Year (FY) 2013 for aviation, infrastructure, and research, development, test and evaluation (RDT&E) energy initiatives to reduce demand, improve efficiency, diversify supply, and enhance mission effectiveness. This includes over $215 million specifically to reduce facility energy consumption. As the Department of Energy found, using ESPCs to fund energy conservation measures (ECMs) with shorter payback while using appropriated dollars as part of an ESPC to fund ECMs with longer payback resulted in 22% more value in facility improvements.

QUESTIONS SUBMITTED BY MRS. ROBY

Mrs. ROBY. 76) As you may know, the LEED green building system discourages the use of wood products, thus greatly disadvantaging my home state of Alabama and the countless forest jobs and forest landowners that rely on this industry in the state. It was one of the reasons my colleagues and I included a provision in the FY12 NDAA that required a cost based study on LEED and other rating systems.

Recently, you said that your office plans to change the Department's green building policy. And, this new policy will be based heavily on ASHRAE 189.1.

What elements of ASHRAE 189.1 will be included and excluded?

Dr. ROBYN. The Department of Defense embraces sustainable building practices inasmuch as they reduce the total cost of ownership of DOD facilities and enhance the resiliency of our installations. To that end, the Department is currently drafting a new DOD-specific set of criteria for high-performance buildings that will apply to new buildings, major renovations, and leases. The new criteria are anticipated to be based on American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) 189.1, which treats all sustainable forestry standards equally.

While the new Unified Facilities Criteria for High Performance Buildings will make reference to ASHRAE 189.1, there are some elements of the standard that may not be cost effective for application in the DOD and therefore will not be incorporated in the new UFC. In a parallel effort, the Department has partnered with the National Research Council to study the cost-effectiveness of ASHRAE, LEED, and Green Globes as required by 2012 NDAA, Section 2830. The results of the study will be used to assess the cost effectiveness of future capital investments.

Mrs. ROBY. 77) Will all wood standards be able to compete for construction projects?

Dr. ROBYN. The Department of Defense embraces sustainable building practices inasmuch as they reduce the total cost of ownership of DOD facilities and enhance the resiliency of our installations. To that end, the Department is currently drafting a new DOD-specific set of criteria for high-performance buildings that will apply to new buildings, major renovations, and leases. The new criteria are anticipated to be based on American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) 189.1, which treats all sustainable forestry standards equally. While the new Unified Facilities Criteria for High Performance Buildings will make reference to ASHRAE 189.1, there are some elements of the standard that may not be cost effective for application in the DOD and therefore will not be incorporated in the new UFC. In a parallel effort, the Department has partnered with the National Research Council to study the cost-effectiveness of ASHRAE, LEED, and Green Globes as required by 2012 NDAA, Section 2830. The results of the study will be used to assess the cost effectiveness of future capital investments.

Mrs. ROBY. 78) Regarding the study, will you solicit input from outside organizations? If so, when and how?

Dr. ROBYN. In preparing the report on the energy-efficiency and sustainability standards utilized by the Department of Defense (DOD) for military construction and repair, required by section 2830 of the National Defense Authorization Act for Fiscal Year 2012, the DOD has partnered with the National Research Council (NRC). The study from this partnership will evaluate the cost-effectiveness of American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Leadership in Energy and Environmental Design (LEED), and Green Globes standards. The DOD chose to partner with the NRC to ensure the study is conducted in the most transparent, objective, and unbiased manner. The public was invited to come and speak or provide written input to the NRC committee at its first meeting on June 28th and 29th. There will be an additional call for public input prior to the second meeting of the committee in mid-September.

QUESTIONS SUBMITTED BY MR. KISSELL

Mr. KISSELL. 79) What are some of the most effective measures to make DOD installations more efficient? And, efficiency is critical not just to reducing electricity consumption but also oil consumption. What impact do the rising petroleum prices have on each branch of the military?

Secretary BURKE. In regards to the impact of the rising petroleum prices on each branch of the military, higher fuel bills have on opportunity cost for DOD in two ways. In the long term, without growth in the defense budget, the DOD will have to shift funds from other priorities to meet high and rising fuel bills. This opportunity cost is one reason DOD's Operational Energy Strategy emphasizes the importance of reducing the demand for fuel (the primary reason is to improve military effectiveness). In the near term, volatile oil prices with the year of execution have become a challenge to DOD, with the potential to affect training and readiness. In the past, DOD has asked Congress for new authorities to better manage this price volatility.

Mr. KISSELL. 80) The wood products industry is extremely important to my home state, supporting thousands of rural jobs and encouraging strong investments in my state's forests, to keep them healthy and intact. This is why I was pleased to hear you recently say, "This year my office will issue a new construction code for high-performance, sustainable buildings, which will govern all new construction, major renovations and leased space acquisition. This new code, based heavily on ASHRAE 189.1 . . . "

I'd be interested to know exactly what parts of ASHRAE 189.1 will be incorporated? Will the new policy continue to certify buildings through rating systems that discourage the use of wood produced in my state? Will all wood products from my state be able to compete in RFP bids?

Dr. ROBYN. The Department of Defense embraces sustainable building practices inasmuch as they reduce the total cost of ownership of DOD facilities and enhance

the resiliency of our installations. To that end, the Department is currently drafting a new DOD-specific set of criteria for high-performance buildings that will apply to new buildings, major renovations, and leases. The new criteria are anticipated to be based on American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) 189.1, which treats all sustainable forestry standards equally. While the new Unified Facilities Criteria for High Performance Buildings will make reference to ASHRAE 189.1, there are some elements of the standard that may not be cost effective for application in the DOD and therefore will not be incorporated in the new UFC. In a parallel effort, the Department has partnered with the National Research Council to study the cost-effectiveness of ASHRAE, LEED, and Green Globes as required by 2012 NDAA, Section 2830. The results of the study will be used to assess the cost effectiveness of future capital investments.

Mr. KISSELL. 81) What are some of the most effective measures to make DOD installations more efficient? And, efficiency is critical not just to reducing electricity consumption but also oil consumption. What impact do the rising petroleum prices have on each branch of the military?

Dr. ROBYN. The Department's facility energy strategy, designed to reduce the energy costs and improve the energy security of our fixed installations, has four interrelated elements. The first element of the facility energy strategy, reducing the demand for traditional energy through conservation and energy efficiency, is critical to reduce electricity consumption and to make DOD installations more energy efficient.

The Department continues to reduce its demand for traditional forms of facility energy through conservation and improved energy efficiency. Its Fiscal Year (FY) 2013 budget includes more than $1.1 billion for investments in conservation and energy efficiency, and almost all of that is directed to existing buildings. The majority of this funding is in the Military Services operations and maintenance accounts, to be used for sustainment and recapitalization projects. Such projects typically involve retrofits to incorporate improved lighting, high-efficiency HVAC systems, double-pane windows, energy management control systems and new roofs. As DOD strives to improve its energy efficiency, accurate, real-time facility energy information is becoming essential. Therefore, metering a larger fraction of the Department's buildings to standardize processes and integrate systems will be needed to systematically track, analyze and benchmark our facility energy and water use and the related costs.

Mr. KISSELL. 82) What are some of the most effective measures to make DOD installations more efficient? And, efficiency is critical not just to reducing electricity consumption but also oil consumption. What impact do the rising petroleum prices have on each branch of the military?

Secretary HAMMACK. The Army is taking several measures to improve the energy efficiency of its facilities. The Army is investing in improving all aspects of its buildings from more efficient heating and cooling units to energy efficient lighting. The Army has the most robust energy savings performance contract (ESPC) program in the Federal Government. To Date, the Army has secured more than $1.5B in ESPC and Utilities Energy Savings Contracts (UESC) investment. These past investments have resulted in annual cost avoidance to the Army of $148 million and an energy savings of 7.986 trillion British thermal units (Btu).

Over the past several years the Army has made significant improvement in energy efficiency. Since 2003 the Army has decreased its facility energy usage by 13%, while at the same time its energy costs have increased by more than 50%. In addition, the Army reduced its petroleum usage in its non-tactical vehicle fleet by 8% in FY11.

Rising petroleum costs and rising energy costs in general are squeezing Army budgets. As both fuel and electricity costs continue to increase, it is critical that the Army invest in energy efficiency in its buildings and vehicle fleet and continue investment in renewable energy projects to lower costs over the long-term.

Mr. KISSELL. 83) What are some of the most effective measures to make DOD installations more efficient? And, efficiency is critical not just to reducing electricity consumption but also oil consumption. What impact do the rising petroleum prices have on each branch of the military?

Secretary PFANNENSTIEL. The Department of the Navy is investing aggressively in energy efficiency to reduce total energy consumption afloat and ashore. We are conducting facility energy audits while completing installation of advanced meters to implement a wide range of facility energy efficiency measures. By the end of this year, over 27,000 meters will be installed in existing facilities to provide the means to better measure the amount of energy we are consuming. We will continue to invest in energy-efficient building upgrades and cost-effective renewable systems; in-

stall advanced meters and energy management systems; procure alternative fuel vehicles; achieve sustainable building standards; and transform our energy culture and behavior for long-term sustainability.

In FY11, the price of petroleum went up by $38/bbls, an increase of 30%. Already in this fiscal year, fuel price increases present a $900M bill to Navy's operational accounts that we must resolve within our operating budget. This extreme price volatility and upward trend of fuel prices significantly impacts our readiness in execution years.

Mr. KISSELL. 84) What are some of the most effective measures to make DOD installations more efficient? And, efficiency is critical not just to reducing electricity consumption but also oil consumption. What impact do the rising petroleum prices have on each branch of the military?

Secretary YONKERS. Overall, the Air Force's focus is to reduce our energy footprint across all operations, including installations and aviation operations. The Air Force has reduced its overall facility energy consumption by nearly 20% and reduced energy intensity by more than 16% since FY03. Included in the FY13 budget request is $215 million for energy conservation projects on our installations, a continuation of the nearly $800 million the Air Force has invested in such projects over the last four years. As a result of the initiatives put in place over the last eight years, the Air Force has cumulatively avoided $1.1 billion in facility energy costs since FY03.

One example of the Air Force efforts is the heat plant decentralization project at Dover Air Force Base, Delaware. This project, which replaces a 1950's era system with natural gas fired boilers and electric water heaters, is estimated to save about $2 million a year by reducing energy use by more than 15% per year. All new building projects on base are also having new boilers installed, so no new specialized training will be required. The project is scheduled to be completed in December 2012, and the Air Force anticipates recovering its costs in 12 years. Additionally, the Energy Conservation Investment Program (ECIP) is a critical element of the Air Force's strategy to improve the energy performance of its permanent installations. In FY11, the Air Force completed 17 ECIP projects at a cost of under $30 million. The Air Force estimates these projects will save more than 253 billion BTUs annually and nearly $54 million over the life of the projects.

Efficiency is not just about aircraft improvements, but also changing how we fly. The Air Force aviation efficiency goal is to improve aviation energy efficiency 10% by 2020, based on a 2011 baseline. To address this, the Air Force is looking at policy changes across our mobility, combat, and training aircraft, in addition to investments in equipment. The Mobility Air Forces account for 64% of aviation fuel consumption within the Air Force, and as their mission lends itself to capturing lessons from industry, these aircraft have been our primary focus for energy savings. For example, Air Mobility Command (AMC) updated their policies to eliminate any extra fuel carried, while still maintaining safety standards. Category 1 fuel requirements existed for decades as an added amount of reserve fuel equal to 10% of the time over water (outside of ground-based navigation systems) to account for inaccurate navigation systems. With technological advances and current on-board navigation systems requirements, this additional fuel is unnecessary, and by eliminating the requirement (and associated excess weight) the Air Force estimates an annual savings of 5 million gallons in fuel, or more than $19 million a year based on today's fuel prices. While each one of these policy changes is small, together they add up to 19.5 million gallons of fuel, or $75 million, in FY11, with an expected savings of $325 million over the Future Years Defense Program (FYDP). With these efficiencies put into practice, the cost for AMC to move 1 ton of cargo 1 mile by air is down by 21% and the Air Force was able to move 27% more cargo on just 3% more fuel last year.

The Air Force is the largest single consumer of energy in the Federal Government. Energy is becoming a larger share of the Air Force budget, going from 3% of the Air Force budget in 2003 to over 8% in 2011, and it is becoming more difficult for the Air Force to forecast and plan for volatile prices. Last year, the Air Force spent $9.7 billion on fuel and electricity, up $1.5 billion from FY10. While long-term energy cost increases are a significant concern, short-term fluctuations in energy prices can critically impact the budget in the year of execution. For example, in June 2011, the price for a gallon of JP–8 jumped 30% from $3.03 to $3.93 a gallon, and today the price is at $3.82. The Air Force is anticipating a shortfall of approximately $1.3 billion this year due to the increased price of fuel from the FY12 budgeted rate.

QUESTIONS SUBMITTED BY MR. BARTLETT

Mr. BARTLETT. 85) After consulting with the Services, please identify the viable work-arounds for the assurance of JP–5, F–76, JP–8 and diesel for mobile platforms as well as to generate electricity for critical missions in the Indian Ocean and in the Pacific Ocean—specifically at Diego Garcia, Guam, Korea, Japan, and Hawaii in the event that supplies and delivery of crude oil originating from the Persian Gulf are disrupted for a period of 2 weeks to 2 months or no longer available to the U.S. and allied militaries in those locations? Please provide an answer for each location. Please only include work arounds that do not rely on (a) competing with the Chinese for crude oil or fuel; (B) That don't increase U.S. Military reliance on crude oil or fuel from Russia; and (c) that don't rely on purchasing fuel or oil from a secondary source that gets it from the Persian Gulf, such as India, which gets crude oil from Iran. Please provide answers and estimates of additional cost and impacts upon PACOM and CENTCOM readiness compared with current operations for both short-term work arounds (e.g. 1–3 months) and for long-term work arounds (e.g. 6 months to 2 years.) Please include estimates of impacts upon PACOM and CENTCOM readiness compared with current operations and the earliest year of potential availability of access to supplies of certified, milspec JP–5, F–76 and JP–8 that would displace 50% of crude oil feedstock with bio-based feedstocks as a result of the proposed USN/DOE/USDA biofuels and biorefinery initiatives utilizing DPA authority.

Secretary BURKE. Historically, the Defense Logistics Agency's (DLA) sources of JP5, F76 and JP8 for DOD customers in Guam, South Korea and Japan are refiners located in South Korea and Singapore. DOD customers for those products in Diego Garcia are served by refiners located in South Korea, Singapore, Greece, Bahrain, Kuwait, and the United Arab Emirates. Alternative sources for these areas could include refiners located on the U.S. West Coast or in Malaysia, Greece, Spain, Ruwais and Yanbu in Saudi Arabia, and Fujairah in the United Arab Emirates, which is located outside the Strait of Hormuz. DOD customers in Hawaii have traditionally procured refined products on island or from U.S. West Coast refiners. Alternative sources for Hawaii would be refiners located primarily on the U.S. West Coast.

The impact to CENTCOM or PACOM readiness of a disruption of oil shipments from the Persian Gulf would depend upon the extent of the disruption. At this point, DLA sees little impact on CENTCOM or PACOM readiness compared to current operations for short term disruptions; however, CENTCOM and PACOM would face increasing constraints after 8–12 months. Note that the refiners we work with buy crude oil on the global market; although we can choose where we make purchases from, it would be difficult to determine the effects on Chinese demand or that of other nations. DOD's total product demand is 300,000 barrels out of 89 million barrels of daily global demand.

Regarding costs, in late December 2011 Iran threatened to close the Strait of Hormuz. While most of the oil leaving the Strait goes to Asia, the world oil market is interconnected. Following that threat, Brent crude oil prices increased roughly 20% through early March 2012, though how much of that price increase can be directly attributed to the threat is difficult to say. Since then, Brent crude oil prices have declined from their peak of more than $128/bbl.

Based on the above, one might project the minimum increase in crude oil prices would be $20/bbl as an immediate reaction to any closing of the Strait. Several analysts have publicly predicted increases between $20/bbl and $100/bbl. If such a disruption lasted several days and even weeks, the higher end cost increases would be possible. However, the range of such estimates suggests how difficult it is to predict oil prices with any precision given the many factors that can either mitigate or exacerbate any price increase. Sustained for a year, an increase in crude oil prices of $20/bbl would cost DOD $2.6B.

The U.S. Navy/DOE/USDA DPA authority may result in the construction of relatively small (approximately 10 million gallons/year) domestic bio-refineries with production capacity available in the late 2015/2016 timeframe. None of this domestic production would be expected to offset fuel requirements for Diego Garcia, Guam, South Korea and Japan. If one of the bio-refineries was constructed in Hawaii, the potential for a small offset of conventional petroleum products in Hawaii exists. The goal of the DPA is to help create U.S. industrial capacity, however, so we anticipate the ability to increase output when the goals of this project are met.

Mr. BARTLETT. 86) The Congress last year authorized a new DOE program for Small Modular Reactors (SMRs) which included $67M for FY2012 ($452M over 5 years) for design and licensing of two LWR designs of SMRs. After consulting with the Services, please provide details about current or proposed plans at DOD to consider development and deployment of Small Modular Reactor (SMR) at military in-

stallations. What actions has DOD undertaken to date independently or in conjunction with the Department of Energy (DOE), Nuclear Regulatory Commission or the National Nuclear Labs to consider development and deployment of SMRs at military installations? What is the budget and please identify the personnel assigned to this effort going forward? Has DOD approved consideration of SMRs for 30-year power purchase agreements at military installations? If not, what are the obstacles to using this authority for SMRs?

Dr. ROBYN. The Department of Defense (DOD) continues to collaborate with the Department of Energy (DoE) and its associated National Labs as they investigate the potential of small modulator reactors (SMRs). Initial meetings with DoE identified a wide variation (relative to normal base demand) in power output among the four technologies under consideration. DoE expects to select two primary technologies by the end of 2012. Further meetings with DoE are planned once the technologies are identified. At that time, DOD needs can be better matched with SMR capabilities. Since DoE does not expect the first SMR plant to be in commercial operation until 2022, further exploration of possible siting locations is premature at this time.

The DOD's authority to enter into up to 30-year agreements for energy production facilities on lands under its jurisdiction, 10 U.S.C. 2922a, would apply to an SMR the same as to any other energy production facility. Although there are clearly issues that would have to be dealt with because of the special considerations surrounding SMRs, section 2922a is available to use for contracting for provision of such a facility.

Mr. BARTLETT. 87) Please explain obstacles, including CBO scoring, to DOD authority to approve long-term contracts for acquisition and procurement of drop-in 50/50 crude oil/biofeedstock blend milspec JP–5, F–76, and JP–8. Are there any other alternatives besides authority under the Defense Production Act Title III Program for DOD to approve long-term contracts for acquisition and procurement of drop-in 50/50 crude oil/biofeedstock blend milspec JP–5, F–76, and JP–8?

Secretary PFANNENSTIEL. As the biofuel industry is still relatively immature, the new capital costs for large-scale production are significant, and industry needs longer contractual terms so that those costs can be amortized over a longer period of time. Accordingly, DON believes that it would be beneficial to DOD to have the ability to enter into long-term contracts for biofuels. DOD has general multiyear contracting authority under 10 USC § 2306. DOD has historically not utilized this authority for the acquisition of fuels. Obstacles to exercising this authority generally include OMB scoring and resulting fiscal law concerns and budget implications.

DON and DOD have supported legislation to specifically provide long-term contracting authority to DOD for the acquisition of alternative fuels. DON does not have any information regarding the methodology used by CBO to address scoring for these legislative proposals. It is DON's opinion that longer contracts will result in lower operating costs for suppliers and ultimately lower prices for DOD, in which case CBO pay-go concerns should be allayed.

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