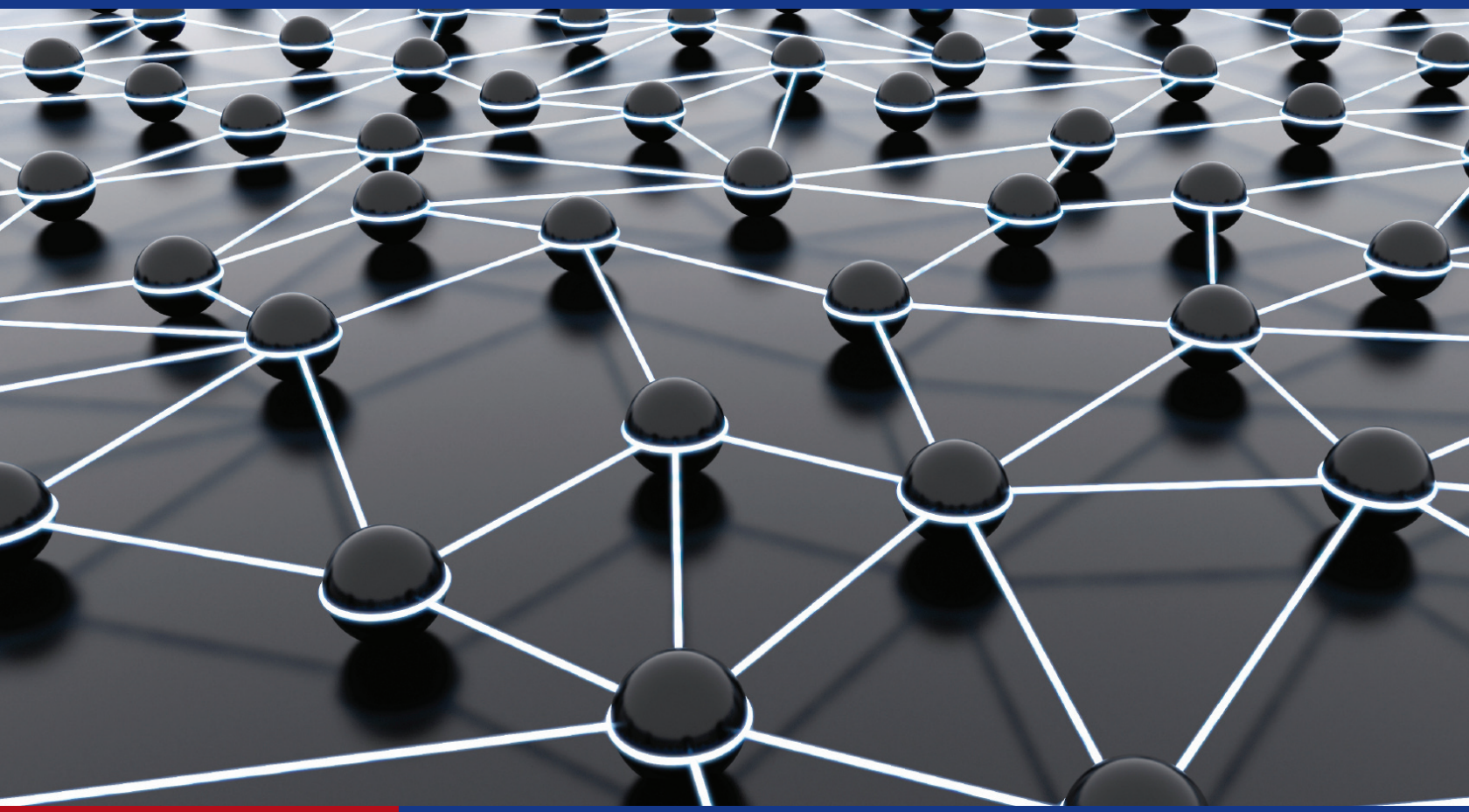


JUNE 2009

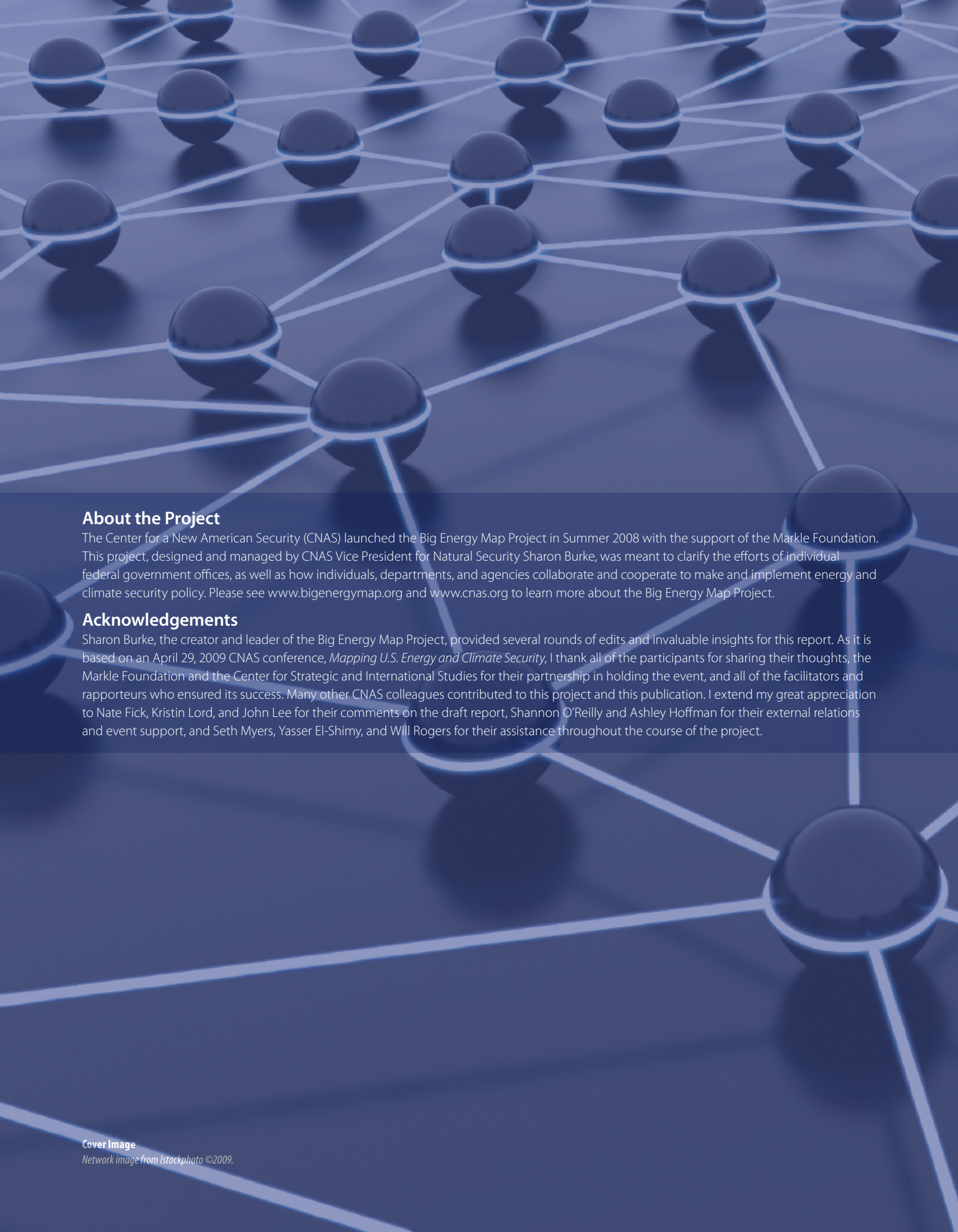
WORKING PAPER

# The Obama Plan for Energy and Climate Security

*Conference Proceedings and Final Recommendations*

By Christine Parthemore

Center for a New American Security



## About the Project

The Center for a New American Security (CNAS) launched the Big Energy Map Project in Summer 2008 with the support of the Markle Foundation. This project, designed and managed by CNAS Vice President for Natural Security Sharon Burke, was meant to clarify the efforts of individual federal government offices, as well as how individuals, departments, and agencies collaborate and cooperate to make and implement energy and climate security policy. Please see www.bigenergymap.org and www.cnas.org to learn more about the Big Energy Map Project.


## Acknowledgements

Sharon Burke, the creator and leader of the Big Energy Map Project, provided several rounds of edits and invaluable insights for this report. As it is based on an April 29, 2009 CNAS conference, *Mapping U.S. Energy and Climate Security*, I thank all of the participants for sharing their thoughts, the Markle Foundation and the Center for Strategic and International Studies for their partnership in holding the event, and all of the facilitators and rapporteurs who ensured its success. Many other CNAS colleagues contributed to this project and this publication. I extend my great appreciation to Nate Fick, Kristin Lord, and John Lee for their comments on the draft report, Shannon O'Reilly and Ashley Hoffman for their external relations and event support, and Seth Myers, Yasser El-Shimy, and Will Rogers for their assistance throughout the course of the project.


**Cover Image**

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# The Obama Plan for Energy and Climate Security

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By Christine Parthemore

## About the Author

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# EXECUTIVE SUMMARY

On April 29, 2009, the Center for a New American Security convened a group of scientists, investors, business executives, academics, nonprofit representatives, defense professionals, and federal, state, and local officials to discuss how to implement President Obama's energy and climate security goals. The conference was the culmination of a year-long CNAS project, called the Big Energy Map, looking at the role the federal government is playing and can play in protecting and promoting the nation's energy security.

This report is a compilation and analysis of the proceedings of the April 29 Big Energy Map conference. Drawing on the discussions and recommendations of the group of experts, CNAS has identified three main recommendations for the Administration:

- Draft a comprehensive national strategy;
- Link that strategy to a major, systems-level demonstration project for a future, low-carbon energy economy;
- And create a scorecard to track progress and capture lessons learned from the historical level of federal investment in energy and climate security.

**A National Strategy.** Through recent speeches, the 2009 stimulus bill, and the FY 2010 Budget, the President has already laid out the main elements of what might be called a "directional" strategy, or what one expert at the CNAS conference described as a "go west" strategy. The main elements of the President's strategy are to reduce reliance on foreign oil and cut greenhouse gas emissions by investing in "green" jobs and cutting demand for energy. We recommend that the Obama Administration expand this initial directional strategy into a fuller national strategy that more specifically delineates the goals, as well as the way in which the nation will meet those goals, potentially updating the strategy on a regular basis. A clear strategy, coming from the White House, will help unite the federal government and steer the American people in the direction the President intends to go.

**A Major Systems-Level Demonstration Project.** CNAS recommends that the Obama Administration define what a transformed energy future might look like by demonstrating a low-carbon, energy-secure economy at a systems level, on as large a scale as possible. Such a demonstration project will help direct individual, private sector, and government efforts toward the President's

strategic goals. The federal government can create such demonstration projects by using existing federal buildings or planned new structures as test beds for cutting-edge, not to-scale, or experimental technologies that address not only individual energy and climate challenges, but also the ways in which technologies work together as a system, including electric generation and transportation components. Indeed, the federal government already conducts such demonstrations on a small, more fragmented scale, especially through the Department of Defense (DOD). This plan would simply ramp up such efforts, integrate a cross-section of technologies, include more experimental technologies, and closely link the project to a national energy and climate security strategy.

**A National Scorecard.** The Obama Administration should consider adopting a national energy and climate scorecard to measure success in meeting the national energy security strategy. This scorecard could begin with a very simple framework of four basic questions:

- Does the policy or action contribute to reducing emissions 14 percent below 2005 levels by 2020 (i.e., does it create short-term emissions reductions)?
- Does it contribute to reducing emissions 83 percent below 2005 levels by 2050 (i.e., does it create long-term emissions reductions)?
- Does it work to reduce U.S. oil consumption?
- And does it diversify energy inputs (to include more renewable energy sources)?

These questions are aimed at ensuring that the nation's actions are aligning with the President's goals. But the national strategy — which should include these questions in scorecard format — could include increasingly strict metrics each time it is updated. For now, we know that the President wants us to "go west," and we must therefore start by tracking that we are indeed heading westward.

This report begins with an introduction about the Big Energy Map project, offers commentary on the efficacy of a conference of energy security experts, summarizes the proceedings of the expert panels, and offers an expanded discussion of CNAS findings. We hope that the observations we captured on both the group dynamics and the substance of the discussions from the conference, as well as our own recommendations, may contribute to the national conversation on how best to ensure energy and climate security.

## INTRODUCTION

On May 27, 2009, standing in front of a sea of more than 72,000 solar panels at Nellis Air Force Base in Nevada, President Barack Obama delivered a speech that showcased his Administration's focus on energy and climate security. Commenting on the solar array behind him, the President outlined several notable metrics of the benefits of the alternative energy installation:

> It's a project that took about half a year to complete, created 200 jobs, and will save the United States Air Force, which is the largest consumer of energy in the federal government, nearly $1 million — $1 million a year. It will also reduce harmful carbon pollution by 24,000 tons per year, which is the equivalent of removing 4,000 cars from our roads. Most importantly, this base serves as a shining example of what's possible when we harness the power of clean, renewable energy to build a new, firmer foundation for economic growth.[1]

Through speeches like this, the 2009 American Reinvestment and Recovery Act (ARRA), and the FY 2010 Budget, President Obama and his Administration have reiterated and clarified the energy and climate security goals that they first set during the 2008 presidential campaign, and are continually developing a framework for transforming the energy economy. Those goals include creating climate security by reducing greenhouse gas emissions approximately 14 percent below 2005 levels by 2020 (and, in the longer term, 83 percent below 2005 levels by 2050), and increasing energy security by investing in clean energy, creating "green jobs," and ending the U.S. "addiction to oil."[2]

During the campaign, the Center for a New American Security (CNAS) set out to study how the candidates might execute their energy security platforms. While the project, which we called the Big Energy Map, often took us out of traditional defense and military studies and into research in domestic policy and politics, we quickly found that defining energy and climate change as core security challenges for the nation would require understanding how the federal government is currently set up to make and implement policy on these issues.

The initial findings from this project, an effort to "map" the federal energy policy infrastructure, were released in November 2008. The online map[3] indicated that there are robust structures already in place that could execute President Obama's goals. However, those with responsibilities in these areas are often disconnected or their efforts overlap, and they do not always work in a unified direction for the nation. Some structural upgrades, coupled with a national strategy, could help set the federal government on a more direct path to achieving energy and climate security. The Obama Administration has already taken steps in this direction.

With policy options well developed, stimulus and budget funds flowing, a good overview of the federal tools available to the President, and clear long-term goals, CNAS concluded that the next logical question for examination has to do with implementation. President Obama has outlined nothing short of a transformation to the U.S. energy economy. Can the nation achieve such a transformation? Can the federal government play a crucial, catalytic role? What mechanisms for doing so are in place, and what are the primary obstacles? Finally, what are the proper metrics of success?

On April 29, 2009, CNAS partnered with the Center for Strategic and International Studies and the Markle Foundation to host a day-long, off-the-record working conference called *Mapping U.S. Energy and Climate Security* to address these questions. Participants spent most of the day in working group sessions, focusing on four areas that

*Table 1: Key Elements of the Obama Energy and Climate Security Plan*

| | GOALS | OBJECTIVES | INITIATIVES |
|---|---|---|---|
| SPEECHES | • An end to the "tyranny of oil"<br>• A "revolution" in energy efficiency<br>• Diversified energy supplies | • Improving the electric grid<br>• Increasing civilian nuclear energy to supply low-carbon energy<br>• Making the Department of Energy a leader in renewable energy innovation<br>• Advancing clean coal technologies<br>• Creating and using reliable, consistent climate information | • Foster innovation through science and engineering fellowships, with R&D funding, and by commercializing clean energy technologies<br>• Develop biodiesels from organic waste and non-food crops, battery and other energy storage advances, smart electricity-saving tools for buildings, and cheaper solar photovoltaic systems<br>• Launch a National Climate Service which would involve collaborating with several federal agencies |
| FY 2010 BUDGET | • National energy security<br>• Climate security<br>• More American jobs that cannot be outsourced<br>• A 25% reduction in the federal government's energy bill by 2013 | • Developing new electricity transmission and use technologies<br>• Building research networks within the Department of Energy, across the government, throughout the nation, and around the globe<br>• Increasing the use of public transportation<br>• Create a national emissions cap-and-trade system | • Dedicate $15 million annually towards renewable energy research starting in 2012<br>• Establish a National Infrastructure Bank<br>• Weatherize 1 million homes per year, and fund Housing and Urban Development programs to spur a new market for retrofitting and for building more efficient new housing<br>• Provide $1 billion annually in grants for high-speed rails |
| AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009 | • A lower-carbon U.S. economy<br>• Economic recovery and job creation<br>• Improved transportation and infrastructure | • Creating or saving more than 3.5 million jobs over the next two years<br>• Reviving the renewable energy industry and providing the capital over the next three years to eventually double domestic renewable energy capacity | • Protect critical infrastructure, via $700 million allocated to NASA, the National Labs, State Department and Department of Homeland Security<br>• Invest in high-risk, high-return research grants through the National Science Foundation<br>• Invest in smart grids, efficiency and conservation technologies, and related programs |

*The preceding table identifies key examples of the goals, objectives, and specific initiatives that the President has put forward through his speeches, his FY 2010 budget, and the 2009 stimulus legislation. CNAS provided this table to participants with other advance materials for the April 29, 2009 conference (See Appendix C).*

CNAS has identified[4] as key to achieving the President's energy and climate security goals:

- *Diversification and protection.* The issues of diversification and protection incorporate the crux of the security challenges of today's energy system. The U.S. transportation system is 96 percent reliant on a single fuel source, petroleum, of which often-inefficient national oil companies hold around three-fourths of proven global reserves.[5] Fifty-one percent of the nation's electricity is coal-generated, which in its current usage is a threat to global climate security.[6] To improve U.S. energy security, the nation must diversify its energy supplies — in other words, it must generate more of the energy it uses from a larger number of energy inputs — and its energy suppliers, including increased use of domestic energy sources. Protection is another key security challenge to U.S. energy systems, with an electric grid, pipeline systems, and waterways that are often inefficient and highly vulnerable to natural disasters, human error, and sabotage.
- *End use.* One of the most immediate and most cost-effective ways of reducing energy demand and greenhouse gas emissions in the United States is by adopting the best end-use technologies currently available and in development. From using Energy Star appliances to turning off unneeded lights, efficiency and conservation offer the shortest route to early successes in working toward the Administration's energy and climate security goals.
- *Information sharing and collaboration.* The President can leverage the federal government infrastructure, composed of dozens of energy and climate-related offices, to aid in working toward the goals he has outlined. However, these offices are often disconnected, and at times federal agencies work on similar problems using different data and information, from various internal and external sources. An important part of implementing the Obama Administration's strategy for energy and climate security will therefore be information sharing and collaboration among federal agencies and with the private sector.
- *Innovation.* While efficiency and conservation are early steps that can help work toward the targets the President has set, the nation will not reach his goals for ending reliance on foreign oil and cutting greenhouse gas emissions without new developments in basic research into alternative and renewable fuels, end-use technologies, and propagation and commercialization of energy and climate science and technology. Innovation — the creation of new ways to produce, consume, and transport energy, and to reduce the environmental impacts of the energy we use — must be part of the solution.

*"Solutions for energy and climate security will inherently include whole-of-country action; it is a security problem that cannot be solved solely by the military or even the federal government alone."*

At the April 29th conference, working groups focused on each of these areas, presenting recommendations and insights to all participants. The groups included a broad range of individuals in the energy and climate communities, each of whom

is likely to play some part in implementing the Obama Administration's proposed policies and goals.

A signal challenge of achieving a transformation in the U.S. energy economy is the vastness of the system — every element of American society uses energy in some way, whether to fuel tractors, ships, trains, cars, and trucks, light and heat homes, or to power industry, from the local Starbucks to cement factories. There is no aspect of economic and civic life that can work without energy, and the country — and world — is overwhelmingly dependent on very few sources (mostly oil, coal, and natural gas). In a sense, every American is a stakeholder when it comes to energy, and all major suppliers and users, and potential suppliers and users, have a role to play in this transformation. Solutions for energy and climate security will inherently include whole-of-country action; it is a security problem that cannot be solved solely by the military or even the federal government alone. Identifying the most critical stakeholders, therefore, or even a representative sample, is no easy task.

The Obama Administration has worked to identify and consult with various stakeholders, including with governors and CEOs, and through town hall meetings around the country.[7] Previous Executive Branch efforts have demonstrated how

*Figure 1: Matrix to guide invitations to* Mapping U.S. Energy and Climate Security *(held April 29, 2009).*

| | | CATEGORIES OF ACTORS | | | | | |
|---|---|---|---|---|---|---|---|
| | | Academia | Business | Investors | NGO | Federal Gov't | State & Local Gov't |
| INNOVATION | Basic Research | | | | | | |
| | Applied Research, Development and Engineering | | | | | | |
| | Commercialization | | | | | | |
| DIVERSIFICATION | Domestic Energy | | | | | | |
| | International Energy | | | | | | |
| EFFICIENCY AND CONSERVATION | Electricity | | | | | | |
| | Transporation | | | | | | |
| | Industry | | | | | | |
| | Residential and Commercial Buildings | | | | | | |
| | Consumer Products | | | | | | |
| SECURITY AND PROTECTION | Electric Grid | | | | | | |
| | Natural Gas | | | | | | |
| | Oil | | | | | | |

challenging such consultations can be, however. Vice President Richard Cheney's National Energy Policy Development Group, for example, lacked structure or clear methodology for deciding who to bring to the table, and its results were challenged in the courts and remain in litigation. Such consultations can focus on those companies and organizations with the biggest lobbying presence in Washington, D.C., even though they may not be the most important actors for an energy transformation. Industries primarily focused on traditional energy sources, for example, tend to dominate those focused primarily on new, alternative energy sources or technologies not directly related to energy (such as information technologies or nanotechnologies).

To ensure diversity in the group we met with on April 29th, 2009, CNAS developed a matrix to help guide conference invitations. On the *x* axis we placed categories of key "policy implementers," including academia, private business, investment, non-governmental organizations, federal government, and state and local government. On the *y* axis, we listed the functional areas and specializations that would be critical to transforming the energy economy to a low-carbon system: in innovation, basic research, applied research, development and engineering, and commercialization; in diversification, domestic and international energy supplies and suppliers; in end use, electricity, transportation, industry, residential and commercial buildings, and consumer products; and in supply security and infrastructure protection, oil, natural gas, and the electric grid. With the help of the organizations partnering with CNAS for the event, we were careful that invitees included a balance of: big and small businesses, as measured by the Small Business Administration; those working primarily with energy sources that make up more than five percent and less than five percent of U.S. energy inputs; participants from all areas of the country; and individuals who focus specifically on energy, climate, and both.

CNAS had two main goals for this meeting. Our first goal was to observe whether such a diverse group could come to a consensus in support of the President's energy and climate security goals. Could they reach an agreement about the most important initiatives for the nation to undertake in pursuit of those goals? Can a state-level energy policy maker agree with someone whose sole professional responsibility is the security of oil and gas pipelines? Will clean tech investors, who must make good returns on their investments, agree with the priorities of scientists? Can the interests of those with federal-level responsibilities and those with responsibilities to local governments or businesses align?

The other goal concerned each group's recommendations. The focus questions offered by CNAS were designed to stimulate a discussion on implementation, starting with how the President's goals related to the focus area of each group, and whether the goals should be more explicit or expanded. Later parts of the discussion included questions to identify near- and medium-term objectives, metrics for success (in other words, what signs the Administration may look for that indicate movement toward the President's energy and climate security goals), and the most important initiatives. These questions were designed not only to generate direct answers, but to spark conversations about opportunities and obstacles and generate suggestions for ways to overcome whatever obstacles may be standing in the way of the nation reaching the goals outlined by the President.

Although CNAS encouraged the working groups to pursue their own lines of inquiry, there were guiding questions, facilitators keeping the meeting on track, and rapporteurs in each room recording the essential points. This report first compiles the thoughts and discussions of the experts who

participated in the conference, then offers high-level recommendations based on the conference and the months of research, interviews, and analysis that we conducted for the Big Energy Map Project. We hope that the observations we captured on both the group dynamics and the substance of the discussions may contribute to the national conversation on how best to ensure energy and climate security.

## OBSERVATIONS ON THE GROUP DYNAMICS

One purpose of the April 29, 2009, conference was to determine if experts from a range of energy and climate security communities of interest could accomplish the following:

- Hold a common dialogue on the Obama Administration proposals;
- Agree on national-level goals and objectives;
- And move beyond vested interests to find areas of agreement on policies.

**Each working group held conversations dynamic and rich enough to prove that there is great benefit in bringing together all relevant sectors, which unfortunately is not a frequent occurrence.** There was no lack of willingness from such a wide variety of actors to engage one another. At times individuals did revert to talking points that reflected their vested interests, but by and large the experts in each room were able to use their experience as a starting point rather than as a final position. As expected, it was easier for the group members to affirm the general goals outlined by the President than to come to agreement on specific measures, particularly those that might not serve their respective areas of interest. From oil company representatives, to alternative energy innovators, to climate change analysts, the vast majority of participants seemed to accept that in the long term, transformation of the energy economy was inevitable, if not a good and needed thing.

While the groups did more or less answer the focus questions, their **final presentations reflected more a majority view than a true consensus.** Nonetheless, each working group held good debates on the goals, objectives, and initiatives presented to the full conference at the end of the day. Yet even results short of consensus were telling: **lack of hard opposition on specific issues may**

**shine light on areas in which it might be easier for national leaders to enact new policies.**

Each group had different patterns of discussion, as noted below:

**Diversification and protection.** The diversification and protection group proved to be the most interesting in studying whether the different communities can agree on common goals, objectives, and initiatives, as it was the group least able to do so. This group was not able to hold its conversations to the designated focus areas. However, the inability to do so did not derive from an unwillingness of these experts to discuss the focus areas or a lack of understanding of the exercise. Indeed, the group conducted a detailed, interesting conversation spanning diversification and protection issues

What blocked the group from answering these broad focus questions had to do with the range of challenges and actors in this area (i.e., private sector shipping companies, national oil companies, public utility commissions, and the federal government all bear some responsibility for diversification and protection). Though the President and many energy and climate security experts have voiced diversification and protection energy goals, there is no singular, well-defined problem to serve as a starting point in this area, and no real prioritization of which problems require the most focus or from whom. Participants therefore essentially offered answers to different questions. Experts in the security of oil and gas infrastructure tended to identify challenges and provide potential solutions specific to that issue area. Still others noted that current energy supply and demand patterns exert a heavy influence on U.S. foreign policy decisions. Likewise, experts in the security and reliability of the electric grid infrastructure listed the problems and potential remedies in that area as most important.

*"…one of the biggest obstacles to innovation is current energy prices (and a lack of a price on carbon emissions), which are driving down investment in emissions-reducing and alternative energy technologies."*

With no unifying theme, the conversation produced a litany of issues and suggestions. Indeed, the question of *how* to ensure security through diversification and protection may have been premature given the lack of prioritization and fidelity in the problem set. The group even broke away from the focus questions provided and tried to answer the questions indirectly, by applying a basic strategic framework for problem-solving, perhaps not realizing that there was not one single question to be solved. Luckily, though the social experiment showed that these communities perhaps need more clearly defined goals if they are to collaborate, the discussions did yield important insights.

**End use.** The end use working group was the most amicable, though that was largely because President Obama has set the clearest and most explicit goals in this area. This allowed the group to reach quick consensus on the challenges and focus better on questions of implementation.

**Innovation.** Innovation, as it turned out, was a hot topic in each of the other three sessions. Someone in each group at some point commented that they were relying on the innovators to come up with

solutions to the problems related to their focus areas. One participant commented that innovation was the only way to overcome the vested interests they themselves represented.

**Information sharing.** The information sharing and collaboration group displayed a clear gap between those in the private sector who offered IT and private business-tested tools to help in this area and those with federal government experience who knew the structural and cultural impediments. However, the two sub-groups were able to come to agreement on several issues, and held a useful conversation.

But the group dynamics were not all that the conference was meant to measure. The larger hope was to be able to derive from the conversations good recommendations on how the Obama Administration might clarify or expand upon its goals, what obstacles and opportunities stand along the path of transforming today's energy system, advice on how to overcome or leverage the obstacles and opportunities, and suggestions for measuring progress.

*"…many of the tough questions regarding infrastructure – such as whether to invest in decentralized electric generation or a centralized, national grid – do not have clear answers."*

## RESULTS OF THE WORKING GROUPS

The energy and climate security plans outlined to date by the Obama Administration through speeches, budget priorities, and the stimulus package all show that the President intends for the federal government to have a starring role in setting the United States on a better energy security path. Most participants accepted this role for the government, though there was a consensus that the private sector will be the primary "doer" in each working area — diversification and protection, end use, information and collaboration, and innovation. Each working group offered insightful suggestions on the President's goals and regarding implementation.

### Are the President's Goals Clear?

While there was a general consensus that the goals were clear and mostly sufficient, all of the working groups suggested that the Administration add fidelity to the goals that the President and his aides have set. Some participants expressed concern that they still did not know how to translate the goals down to the average consumer, or even to the different classes of consumers (industrial, residential, and commercial). One efficiency expert noted that regardless of what the goals are, the end user has to be driven by economic and other motivations to actually achieve the goals, even if they are reacting to government incentives.

Another helpful comment by a national security expert compared energy and climate innovation to weapons system development. Defense officials provide the private sector or governmental researchers, engineers, and developers with specific needs to fulfill, and those developers have a sense of what the demand will likely be for their product before they invest in its production.

One private sector participant noted that broad goals such as creating jobs and reducing the use of certain energy types — with innumerable potential

routes for getting there — provide the private sector with far less direction on what exactly they should do. While the interlocutor may have meant to highlight the downside of this, broader goals also have the potential to open up the world of ideas to a wider range of inventors. Unfortunately, this is little comfort to investors, and it is worth searching for ways to make achieving the President's goals less of a roll of the dice.

The groups also recommended that the Administration:

**Clarify the goals for infrastructure development.** Several groups noted the need for greater clarity on infrastructure goals. In the diversification group, participants acknowledged that the Administration may be waiting to develop policy in this area, given that many of the tough questions regarding infrastructure — such as whether to invest in decentralized electric generation or a centralized, national grid — do not have clear answers. Indeed, infrastructure questions drive to the heart of transformation: if the national goal is to alter the fuel mix of today, some costly infrastructure changes could prove to be poor investments in the long term.

**Include economic sustainability in national goals.** Several private sector actors, including a few investors, suggested that the national goals on reducing greenhouse gas emissions and foreign oil dependence need to include an element of *economic sustainability*. This would mean ensuring that the energy economy can meet the climate and energy security goals outlined, but over the long term be viable and hopefully profitable without continued government subsidization. Some took the expression of this goal a step further, suggesting that the nation's sustainable energy economy should be "job-creating, export industry" generating — an even more proactive approach.

**Expand short-term innovation goals.** The innovation group suggested that the Administration add shorter-term goals in the areas of U.S. technological leadership and job creation, as shown through good innovation policies. It also offered a suggestion in its final presentation that the Administration should clarify that "The purpose of innovation is to increase economic viability and achieve our energy and climate goals," in order to state more explicitly what role it intends innovation and innovators to play.

## Key Debates and Suggestions

While the working groups presented answers to the given focus questions in the final plenary session, a major goal of this study was to capture the discussions behind the final presentations. Major debates included:

- How to balance economic, environmental, and security concerns at the federal level;
- Whether and in what form to create new government structures versus reviving or reworking existing agencies;
- And how to push inventions through to commercialization in a financially viable manner.

With the President's energy and climate security goals in mind, the groups discussed a long list of **obstacles that might stand in the way of implementation:**

**Money.** Reflecting current economic conditions, the participants focused on the ways in which money will be an obstacle. One participant noted that the technology to get to the President's greenhouse gas emissions reduction goals is and will be the easier part of the equation; the taller hurdle will be getting enough capital to support the development of that technology. Representatives of larger companies noted that sufficient financing is barely available to them, leaving little hope for small businesses and entrepreneurs — as one person phrased it, "only big dogs can afford" real science and

technology investment. At the same time, many agreed that even large companies and public utility commissions (PUCs) do not have the money right now to invest in innovation.

**Unpredictable investment environments.** A deeper look at the comments reveals that many participants, and the companies they represent, have been willing and able to invest sufficient financial resources if the incentives and demand are visible. (This obviously impacts the money issues outlined.) An investor in one group commented that "unpredictability is the problem for private action." Some not involved in the investment field faulted both large companies and private investors for their lack of support, noting that innovation is clearly present all over the country today, but funding too often goes to conservative investments rather than those with riskier but potentially game-changing ideas.

**Energy prices that fail to reflect costs.** The innovation group noted that one of the biggest obstacles to innovation is current energy prices (and a lack of a price on carbon emissions), which are driving down investment in emissions-reducing and alternative energy technologies. Representatives of all of the groups voiced concern, however, that whatever mechanism is adopted for pricing carbon and other externalities, the price may not accurately reflect their cost to society. In this economic environment, such price distortions may mean that the nation cannot even maximize the innovation that has already taken place.

**Uncertainty about the electric grid.** Several participants identified two different challenges to creating a "smart grid" for electric generation. On the consumer end, many agreed that without off-hour pricing for the smart grid, installing the right technologies will not translate into measurable changes in behavior. On the investment end, others criticized the funding levels proposed to date as so insufficient as to render unrealistic the President's concepts for what a smart grid can do. On a related note, another participant criticized that the "grid is old thinking" and is perhaps the wrong focus altogether — that widespread decentralization of energy generation is a better bet.

**Insufficient information sharing within and by the federal sector.** The government itself has some challenges ahead. One federal agency participant stated that his office had "no clue" what the Department of Defense (DOD) did on energy and climate change, for example, although it is by far the single largest consumer of energy in the federal sector. The federal organizational structure was blamed in some cases as an impediment to progress, as competing interests for funding, information, and intelligence among the agencies creates gridlock and institutional barriers to cooperation. While one participant with federal government experience suggested that you can incentivize information sharing and interagency cooperation, another argued that many of the processes and structures in place now have been there for decades, and abruptly changing them would prove difficult or impossible. Another complicating factor, according to one information and collaboration working group member, is that scientists and technical experts around the government produce a lot of information and data, but there is often not a sufficient structure for it to work its way up to policy makers in "actionable" formats.

A number of non-governmental participants said that a general lack of transparency is an obstacle, noting that the private sector cannot often access what information the federal government is using in its decision making. A few venture capital investors, for example, noted that they would be able to consider putting money toward projects that could contribute to the President's goals if they could easily find what specific types of projects government money is going to, and what types of funding are available. Even with this information available, however, it further complicates their decisions to

not have access to original data sets where they exist, so that investors can interpret the outlook for certain technologies without political filtration. The Obama Administration, luckily, seems to already be working on this question and recently launched a website that should serve as a resource for information and original data on a variety of topics.[8]

Officials from most every sector present echoed concerns that policy makers did not understand the intricacies of their areas of expertise, and that their opinions were not often sought. More to the point, many believed that there was no good mechanism for them to educate the public or decision makers. One federal official likewise noted that it was an issue that government agencies did not often involve the private sector in their deliberations, and that most interaction with the private sector on energy and environment issues in recent years was through the Executive Office of the President and reflected existing biases.

**No systems-level approach to the problems and solutions.** One problem that many participants hinted toward but only a few identified explicitly was that the perceptions of change tend to be limited to single pieces of technology rather than at the systems level. Without a system-wide approach, it is hard for goals to trickle down to individual private sector decision makers on where to invest in research and development, or where to place their investment capital. Participants most frequently identified the authority exercised by the public utilities commissions (PUCs) as the main system-level blockage to nationwide transformation, as they create an often inconsistent patchwork of policies and make it more difficult for technology to spread from state to state. Indeed, several participants represented businesses and nonprofits that operate only within a single state.

A few participants also noted that it would be a challenge to integrate international and national concerns and needs in a single energy and climate security strategy. Another issue raised several times was that the United States doesn't have the human resources or educational foundation to actually achieve the 2050 emissions goal the President set. Others identified local opposition to energy projects of all kinds as the biggest obstacle, while many voiced concern that the post-R&D phase of innovation would be the most challenging piece of the puzzle due to intellectual property issues.

*"[F]ederal standards for various types of energy technology areas would…enable more rapid innovation by increasing the likelihood of interoperability among all ongoing efforts."*

**Questions about the role of Congress.** A notable coincidence among the working groups is that none seriously considered the role of Congress in transforming the energy economy or the steep hurdles it may face in implementing the policies they suggested. All working groups voiced some level of agreement on setting a carbon price or a cap and trade system, yet none seriously debated how Congressional leaders might get the votes to do so. The innovation group did note that legislation might be needed to direct the National Labs to engage in certain collaborations, but the discussion did not extend to any political difficulties that may or may not involve. Rather, the working groups tended to signal issues that could form political

*"The President may wish to consider establishing either an annual update of the National Energy Security Strategy, or a Quadrennial Energy Security Review to reaffirm, measure success, and update the strategy."*

difficulties in terms of state or regional tensions or solutions, including directing any future cap and trade revenues to those most hurt by the program as a way to "make peace with the states."

**Being stuck in the status quo.** The working group sessions also hinted toward other, more implicit obstacles. Perhaps the strongest was that the groups by and large reflected traditional thinking about energy and climate security problems. It proved difficult for even those tasked with building a new future to imagine what that might look like, and how to get there from where the nation stands today. Most participants, especially those from traditional energy sectors, believed strongly that there was no way to speed up the innovation timeline enough to make the President's 2020 emissions goals feasible. While this may be correct when viewing straight-line projections from data and information available today, it is based on an assumption that there will be no major changes that allow progress in low-carbon energy to advance more rapidly than at its current pace. Though a few participants did make the leap of saying that it would be necessary to speed up the innovation timeline, most could offer no concrete advice on what that will look like and how it could plausibly occur.

These obstacles are daunting, but rather than remaining pessimistic, participants readily offered advice on some possible ways to overcome them. While the groups most often did not find points of consensus, they did identify many areas of general agreement and offered ideas for **important initiatives and opportunities:**

**Balance and define government and private sector roles.** At the most basic level, the groups displayed a consensus that innovation and technology are best generated from the private sector, but that the private sector has to have supportive federal and local policies that price the externalities of the energy economy and level the playing field for all energy sources to compete fairly. Whatever balance the President prefers, the roles of government and of the private sector should be well defined and explicit, with signs from the government that funding for innovation will remain consistent and predictable. Finally, a grassroots, public education campaign will be necessary to inform the public of what the energy goals are, why they are necessary, and the role each American should play in reaching these goals.

**Improve the regulatory framework.** Some general first steps outlined include setting better interoperability protocols, regulations, and standards at the federal level. A first step could be a study akin to an audit to check that the hundreds of energy and climate related regulations around the various agencies are working toward the new goals the President has recently set. Setting minimum federal standards in a range of areas — from building codes to renewable energy production — was one focus area that drew much agreement. With minimum requirements setting a baseline, individual states, cities, and companies could do more if they so decide, but everyone would at least be

moving in the same direction more than is the case with today's patchwork of state standards and regulations. This could also help in hedging against consumer behavior, which is less likely to move toward a common goal, as the price signals individuals receive are not as strong as those felt by large companies.

Several entrepreneurs noted specifically that federal standards for various types of energy technology areas would also enable more rapid innovation by increasing the likelihood of interoperability among all ongoing efforts. The example offered most frequently was a requirement for microchips in new appliances for smart grid developers to work with. As one participant noted regarding innovation, "If you don't have a platform that everyone can play on, then it won't happen."

**Improve information sharing.** Many useful suggestions on collaboration came through from the groups as well. Internal structures within agencies to be the designated "sharer of information" with other departments and with the White House were suggested by several participants, as they incorporate an element of individual responsibility. As one participant described, "No one wants to be the person not doing what the President wants." Many federal officials recommended that any structural changes be carried out by adapting existing institutions rather than creating new ones because the information most agencies can and should produce is already there — it just needs to be used differently. One idea was for every federal agency to have a Chief Environmental Officer, who coordinates information within that agency, meets with the Chief Environmental Officers of other agencies, and reports to a single person in the White House (now Carol Browner). While one person noted that the government does this to some extent with the Climate Change Science and Technology Programs, those efforts are focused on only one part of the problem, and working with those groups is not the sole job of representatives to those groups. The main missing element still is a structure beyond the President and his direct advisors who balances energy, economic, and national security concerns.

**Set a price on carbon.** The private sector representatives present voiced many concerns that they do not have complete enough information about what the government is thinking and doing regarding energy and climate change. There was a surprising level of agreement that an important way for the government to communicate with businesses and the public would be to set a price on carbon. The diversification and protection group discussed that price floors, carbon prices, or any other mechanism to reduce the volatility in energy pricing — so that business know not just what prices are, but what they are likely to be — would be the single biggest way to increase innovation. All were sensitive to the political realities involved with such a task, but many noted that the nation now has the presidential-level leadership to carry it out. If a cap and trade program is the ultimate tool for pricing carbon, there was widespread agreement that most of the revenue should be reinvested in energy and climate programs.

**Engage the public, especially through technology.** Others noted that the government was too static, especially with its websites, and encouraged the federal government to better embrace web 2.0 concepts even beyond its efforts to do so in recent months. Agencies or the main coordinating body in the Executive Office of the President on these issues could include wiki functions in their websites, for example, or create other platforms for users to offer reactions and suggestions. The sticking points with such applications would be guaranteeing that wrong information does not replace factual assertions, and finding ways to share such large amounts of data on a user-friendly site.

A public education component will also be necessary for marketing new technology products and lifestyles if the country is to move toward the President's energy and climate security goals. More Americans will have to be trained in the jobs a new energy economy will create, and all citizens will need to understand and be able to operate whatever new technologies become part of daily life. The public may also benefit from improved disclosure standards of efficiency for buildings and other commonly-purchased items to incentivize improvement.

**Pair business leaders with innovation leaders.** Private business representatives noted that they themselves are not without some blame for the status quo. Often scientists, engineers, and other inventors start small ventures to support the work of only themselves or small groups of collaborators. Such businesses often start off and even go through extensive expansion without anyone with business or finance expertise in their management. This can create situations where government grant-makers and public financiers see great prospects for new technologies but do not trust that their investments will sufficiently pay off. Many participants from in and out of government, and notably several investors, therefore suggested that accessing and placing good CEOs alongside promising innovators is one of the most important ways for those in science and technology to receive the President's signals. This links back to issues with federal funding as well: start-ups cannot easily get funding from the federal government because they do not have balance sheets to provide to the government. Those with great innovations often need better guidance on the business side of their operations.

**Reform and perhaps federalize the public utility commissions.** Many participants voiced concern that the PUCs are a major obstacle to progress under their current structure and with their current operating concepts. The main issue, as one participant formulated, is that the federal government is "dealing with 50 states that do not listen" to its preferences regarding electricity generation. While the group members expressed much agreement with the idea of federalizing the system, they equally expressed concern over the practical considerations of how to do so. As one woman noted, it is difficult to conceive how a federal system could be sensitive to and maximize any efficiencies created by regional preferences. One interesting but unlikely solution offered was to hold a kind of BRAC process for transmission lines, although this seems more politically complicated than federalizing the system.

**Increase distributed generation.** The single most-repeated suggestion for tackling several of the obstacles to transformation at once was to increase distributed generation. Investors noted that this area is in definite need of incentives for local energy production. One specific suggestion within this was for any federal renewable energy production standard to include a distributed generation standard within it.

In addition to these suggestions, the groups came to a general level of agreement on top initiatives in their focus areas. While these policies did not necessarily garner consensus approval, it is helpful to note that at minimum, they represent policy options that drew the least resistance:

**End Use.** In addition to its agreement on several of the points outlined above — particularly on increasing distributed generation and pricing carbon — the end use working group identified tough, enforced standards on green buildings and operations, time-of-use pricing, and better incentives for disclosure on efficiency as specific key initiatives for achieving the President's goals.

**Diversification.** The diversification and protection group did not really come to a consensus on major initiatives, but it generally agreed that diversification policies could include a national renewable

portfolio standard (RPS), a carbon price or cap and trade system, electricity cost transparency, and a gasoline price floor. Security-related policies might include national electricity policies and standards, possibly with increased authority for the Federal Energy Regulatory Commission (FERC), and greater coordination with our allies.

**Information and collaboration.** The information group suggested that it was important to create a central access point where people can find information and ask questions concerning all energy and climate grants, metrics, partnerships, data sources, budgets, and news. To do this, the government would have to identify and address any legal or policy impediments to information sharing. More generally, the government would need to remove disincentives and build greater incentives for collaboration, and ensure that the organizational infrastructure of the government allows the transparency required for officials to share information and coordinate. Finally, an integrated evaluation program for those leading coordination efforts should include security, economic, and environmental metrics.

Another suggestion offered by the information group was that possibilities are limited by the lack of information regarding valid measurements on emissions. As they described, Americans should "Become as good at measuring carbon as we are at measuring internet advertising."

**Innovation.** Some of the innovation working group's top initiatives for the government included:

- Create robust evaluation procedures to direct further investment in innovation;
- Help fill the gaps in going from fundamental research to commercial products (at scope and scale), with Small Business Innovation Research (SBIR) as a possible vehicle;
- Incentivize collaboration between Universities, National Labs, and the private sector for commercialization of new technology (this might require regulatory reform);
- Use the government's installed infrastructure, purchasing power and energy needs to develop a more competitive and sustainable market; this could be especially helpful in creating economies of scale;
- And competitively award research and development funding.

Notably, no participants offered U.S. leadership in the 2009 Copenhagen negotiations as a distinct way to work toward the President's goals. While the focus questions did not direct participants specifically to consider how the rest of the world views the United States, this could reflect that those active in the energy and climate security areas tend to focus on U.S. leadership that starts at home.

## MEASURING PROGRESS

Many of the suggestions offered by the groups addressed not what the goals should be, but rather how to measure success in reaching those goals. The major point of consensus in measuring progress, echoed in several of the groups, was that money is an inadequate metric. One participant noted specifically that "funding things doesn't get us where we need to go," and it therefore should be considered one of many policy tools to use but not a way to measure change.

Another point reiterated by many participants was that the baseline against which to measure — no matter what is to be measured — needs to be established quickly both for the sake of making measurements (and therefore demonstrating success) and in order to add clarity to the nation's goals. Once baselines are set — preferably a combined set of baselines for climate, energy security, and economic goals — the metrics developed should be easy to understand and actually measurable. Metrics should convey meaning to consumers, so that they understand how supply, demand, and personal action tie into the nation's goals; they should also include both supply chain and demand side indicators. Suggestions included:

- Renewable energy plants built
- Americans with smart meters in their homes
- Compact fluorescent light bulbs (CFLs) sold
- U.S. demand for petroleum products
- Graduates from schools in energy- and climate-related fields
- Net jobs created in related sectors
- Federal government end-use energy reductions
- Percentage of domestically-generated energy versus imports
- Percentage of residential and commercial buildings conforming to efficiency standards
- Capacity and consumption of energy by type (carbon vs. low/non-carbon)
- System losses (energy lost through lines or through roofs of buildings)

A few of the working groups generated more specific metrics. The end use group suggested measuring the change in return on equity over the next two to three years, which would provide a nearer-term metric other than carbon emissions. Another working group held robust debates on federalizing energy regulation, and suggested that a good yardstick would measure to what degree state-level policies and regulations become harmonized with the President's goals.

The innovation working group struggled with defining metrics of success, given that innovation is a somewhat abstract concept. The group did, however, present agreed-upon positions to the conference that innovation metrics "should be tailored for each sector and stage of innovation," and that "a full spectrum of metrics from prototype to market will include revenue from products in addition to number of licenses, patents, and start-ups." Creating metrics for each stage of innovation will be crucial to ensure new ideas push from the research phase all the way through to commercial production. One venture capitalist suggested that a proper metric for the final stage would be how many energy and climate security-related products are making money, as a way of mirroring how the private sector will measure success. A member of the information and collaboration group commented that "points of reference" might be a more useful concept than metrics against which to keep score, specifically in research, development, and deployment. For example, this would include not just the number of patent applications related to energy and climate security, but also the diversity of the patents and timeframes between R&D and production stages.

While the information group came to no real agreement on metrics related specifically to their focus area, information sharing and collaboration would certainly be required for the federal government or a nongovernmental institute (such as the Advanced Research Projects Agency-Energy set up by the Obama Administration) to measure such points of reference on a regular basis and provide results to the public or concerned stakeholders.

As the working group sessions elicited, there are also issues of concern with these metrics. Many of the potential metrics listed are good for urban areas but not for rural areas, where infrastructure and local economies might not lend themselves to certain solutions, but where change in other ways is possible. Another issue that will arise with any metrics that drive at reducing energy use is that consumers can achieve great efficiency but still consume energy at a far greater absolute level; decoupling efficiency progress from overall demand growth may therefore be useful, but could also mask that trends are not moving in line with the President's goals. As one group noted, some of the metrics would be skewed by regional and seasonal variations in weather. There was also some disagreement on whether or not net job creation is or should be a measure of success in innovation, or if it measures only broader economic shifts that may or may not relate to science and technological changes. Yet another concern expressed was that some of the metrics were bound to vary based on political processes and business cycles. Many participants agreed that any measures of success outlined by the Administration should include compliance with any standards set.

It is notable that beyond efficiency and conservation measures, the groups did not propose metrics that will demonstrate early success in meeting the Administration's goals. Certainly innovation, the cornerstone of transforming the U.S. energy economy, is a long-term venture. The concept of "breakthroughs" in science and technology, so often touted as a requirement for changing how we consume and produce energy, was notably absent in discussions throughout the day.

## AUTHOR RECOMMENDATIONS

President Obama has set ambitious energy and climate security goals for the nation, and backed those goals with funding and potential policies. The working groups at the April 29th conference identified ways to overcome the barriers to progress in reaching those goals, as well as measurements of success, offering a useful survey of what the nation's implementers — in research, development, investment, commercialization, academia, government, private business, and the nonprofit sector — think are necessary or good paths toward the President's goals. Based on the observations of facilitators and rapporteurs, CNAS also extracted some overall recommendations from the day's deliberations. Moving forward, we recommend that the Administration consider drafting a comprehensive national strategy, link that strategy to a major, systems-level demonstration project for a future, low-carbon energy economy, and create a scorecard to track progress and capture lessons learned from the historical level of federal investment in energy and climate security.

**A National Strategy.** Through recent speeches, the 2009 American Reinvestment and Recovery Act (ARRA), and the FY 2010 Budget, the President has already laid out the main elements of what might be called a "directional" strategy, or what one participant in a 2008 CNAS workshop described as a "go west" strategy. He has set the climate security goal of reducing greenhouse gas emissions approximately 14 percent below 2005 levels by 2020 (and, in the longer term, 83 percent below 2005 levels by 2050), and the energy security goals of higher investment in clean energy and an end of the U.S. "addiction to oil." President Obama and his Administration have also outlined several key policy elements that already form the beginning of a comprehensive national strategy:

- Diversification and protection budget and stimulus funding items, including to improve the nation's electric grid to facilitate more renewable energy production, to increase biofuels production, and to reinforce security and protection measures in U.S. ports, transit, and rails supply routes against natural disasters and deliberate sabotage;
- End use measures, including a weatherization program targeted at two million low-income Americans, energy efficiency improvements for military family housing and other installations, and increasing funding for residential retrofitting;
- Changes to facilitate information sharing and collaboration, particularly in establishing an energy and climate leader/adviser/coordinator in the White House;
- And innovation measures, including new fellowships and other incentives in science and engineering, renewed focus on research and development that will increase "game-changing" technologies including in biodiesels from non-food crops and energy storage advances, and efforts to bring clean energy technologies closer to private sector commercialization and widespread deployment.

We recommend that the Administration continue this work of amplifying its directional strategy in order to focus all agencies in the federal government on common goals — and to clarify its goals for the American public and key external actors. This entails producing a comprehensive strategy within a year or two that tells the nation not only to go west, but how to get there and what to build upon arrival.

External support and input to the more detailed and far-reaching strategy — not only from industrial and commercial interests but also Congress, states, and nongovernmental actors — will be essential to its success. It will take time to properly cultivate stakeholders to buy into such a strategy, but we recommend the Administration continue to

deepen its outreach to the groups we identified in our matrix, including in ways that bring disparate groups together: officials from state, local, and federal government, academia, big and small private businesses, investors, and the nonprofit community involved in both energy security and climate security. This would help in overcoming a major problem that many participants (namely in innovation and investment) identified, which is that their communities are not often involved in the policy world, and therefore policy does not reflect how their worlds operate.

The President may wish to consider establishing either an annual update of the National Energy Security Strategy, or a Quadrennial Energy Security Review to reaffirm, measure success, and update the strategy. In the meantime, however, the directional strategy should include short-term outcomes: demonstrating early success, such as energy efficiency gains, improved cooperation with other oil consuming nations, and a formula for negotiating success on climate change, will be important.

The Obama Administration is off to a great start in working toward this comprehensive strategy. The primary problem today is that the Administration's end goals point toward a reality that does not yet exist — an issue that might typically deter transformation. An important way to increase the odds of success, therefore, is to accompany the strategy with a vision of what that future might look like. What *does* the world look like in 2020 with an energy economy that isn't "addicted to oil" and that has the nation reducing its emissions 14 percent below 2005 levels look like? What does a 2050 economy with emissions hitting 83 percent below 2005 levels look like?

**A Major Systems-Level Demonstration Project.** One way to define what a future low-carbon economy might look like — and therefore better direct individual, private sector, and government efforts toward the President's goals — is to demonstrate a low-carbon, energy-secure economy at a systems level, on as large a scale as possible. The federal government can do this by using existing federal buildings or planned new structures as test beds for cutting-edge, not to-scale, or experimental technologies that address not only individual energy and climate challenges, but also the ways in which technologies work together as a system, including electric and transportation components. Indeed, the federal government already conducts such demonstrations on a small, more fragmented scale, especially through the Department of Defense, though this usually involves technologies that are already commercially viable or close to viability. This plan would simply ramp up such efforts, include more experimental technologies, and closely link the project to a national energy and climate security strategy.

*"…the Administration is already implicitly utilizing the goals it has set as metrics for success. Making them explicit will add another level of clarity and direction for the private sector, the government, and the American people."*

One defense sector participant noted that in his community, they always start with a vision. This allows more clarity for deeper questions: Whatever we are building, what will it look like? What are its necessary components? What will it do and how

will it function? This serves to hone efforts in on a single target. Even if that target is somewhat broad and general, it ensures that all efforts are at least moving toward a common end.

Participants repeatedly suggested that the U.S. government continue to conduct demonstration projects, just in greater quantity, without changing the nature of what they are actually demonstrating. A few talked around the edges of doing something bigger. One participant suggested after the event that such an effort should start with a project plan that outlines the various technologies and compares how they contribute to working toward the Administration's goals. Almost all participants offered suggestions or hinted toward components of this kind of project.

The truth is that there are many promising scientific and technological developments already in hand, though few would be able to scale up to meet national energy needs. Many of these innovations are in demonstration phases already. However, there is insufficient attention paid to how to integrate diverse innovations into a single system, which is arguably what will actually transform the U.S. energy posture. More to the point, all of these developments are ad hoc — each is moving in its own direction, without reference to other innovations. As one participant aptly described, we are still operating with a plantation model when what is required is actually a full new ecosystem.

The federal government could have a historical opportunity to help create such an ecosystem, and in doing so provide a clearer vision of a low-carbon energy system. The government already has laws on the books and demonstration projects underway that could form the stepping stones for such an effort. The Energy Policy Act of 2005 sets an increasing minimum percentage of federal electricity purchases that must be generated from renewable energy sources. Congress passed and President Bush signed the Energy Independence and Security Act of 2007, which ramped up federal energy use reduction goals to about three percent per year, with a target of increasing efficiency by 30 percent by 2015. The government already aims for efficiency and often LEED certification in its new buildings. Though LEED certification has an important role in commercializing innovation, it applies mostly to off-the-shelf technologies and is unlikely to push any breakthrough technologies. The Department of Defense currently has many important demonstration projects that pull together various technologies in a systematic manner, but they are mostly for forward operating bases, which do not necessarily reflect the needs of civilian society. The goals of these projects are also not necessarily aligned with the President's energy and climate security goals. For example, one major project currently underway at Fort Irwin in California involves housing service members in energy-efficient domes that incorporate many clean energy elements, rather than in tents. The goal of the project, however, is to create a forward operating base that can generate enough energy to meet its own demand, but not necessarily low-carbon energy.

The U.S. government could take the next step in embracing the federal role in "pulling" innovation by building new structures to test advanced technologies and advanced systems that are better than what is on the market today, including high-risk technologies that have the potential to fail, but also the potential for breakthroughs.

One route for doing this would be to turn any new federal building planned for the next few years — or several buildings — into a large-scale demonstration project to incorporate all of the elements that would show what a future energy system might look like. A second option would be to house the effort within DOD, and utilize the nation's more than 570,000 military installation buildings. This is an even more attractive option: bases are basically microcosms of civilian towns — and are

sometimes larger than many American towns — incorporating transportation systems, electrical systems, commercial buildings, shopping centers, private homes, schools and day care, and all of the normal services and facilities that families and professionals rely on (and then some). Military bases provide the best opportunity for the nation to essentially create model cities. Furthermore, the military construction and family housing request for the President's FY2010 budget is $23 billion, and the ARRA legislation included over $6 billion to invest in infrastructure, including funds designated for energy conservation improvements and research, development, and testing. Some of this funding will go toward building new facilities, including hospitals and child care centers.[9] Construction and upgrades at this level should include some investment in technologies that push beyond what's available off the shelf today, and this presents a great opportunity. It presents a major opportunity to maximize the money that DOD will already be spending on new energy technologies.

The President should clearly state that energy and climate change are national security challenges and that there is a role for the Department of Defense in meeting these challenges. One role will be to help transform the nation's energy posture. This could also help drive home to the American people how high the stakes are with these security challenges.

Perhaps the biggest concern with using a military base to test new energy technologies and systems is ensuring reliability. Such a project must not jeopardize the missions of the service men and women using the base, and clearly there should be precautions to make sure that bases will always be operational.

In observing how a new system might work, those managing and working within such a project would be able to identify which elements of the electric and transportation systems are the easiest and the most difficult to change and secure, and which are the most critical areas to address in getting to a low-carbon system. A major demonstration project could also provide further proof of weak points in the system, and test alternatives that may boost reliability. It would serve as a study in the economic effects of the "greening" of the economy that the President has often described, by showing the costs, savings, and man-hours of work created by combining different inputs and outputs with new types of networks. The project could also serve as a mechanism for identifying state and federal policies and regulations that restrict innovation, implementation, and profitable commercialization.

Perhaps most important to the average citizen — whom the government must work to bring on board with transforming the energy economy — a large-scale, systems-level demonstration project could help to ease the transition to a new national energy posture. Creating a clearer picture of the future could point to what economic sectors of today could be most harmed by the transition, so that Congress and the Administration are sure to consider their wellbeing through the process.

This would also be an efficient way to study what incentives can get the different sectors to work together better. As the April 29 conference proved, the energy and climate communities that are charged with implementing the President's vision too often do not work with or even speak to one another. The federal government programs to do this to date, including ones designed to get the National Labs, universities, and the private sector to work together, were described by some working groups as just funding for single initiatives — not really incentivizing continual relationships. Private sector representatives also commented that big and small businesses could benefit from new incentives to work together. All elements of the energy community need to work in tandem: the basic sciences

cannot create dramatic change without engineering, private sector investment, commercialization, and public demand. This kind of project could bring together the diverse range of players in the energy and climate world to help them test how better to cooperate and coordinate.

What might a systems-level demonstration project look like? Current DOD demonstration projects can serve as starting points. Several bases are working to demonstrate many new energy technologies simultaneously, including alternative energy generation and improved air conditioning and heating units. Expanding demonstration to the systems level, such a project should include lower-carbon technologies that are already available but not at commercial scale, such as promising solar technologies. It should also incorporate various distributed generation technologies, including applications to achieve "islanding" goals set out by many defense advisors in recent years to ensure that bases can operate and conduct critical missions if the civilian energy systems they rely on are disrupted. It should also involve transportation elements, including refueling stations and other related infrastructure.

No major project is without risk. Intellectual property is of great concern to the entrepreneurs trying to create a new energy future, and such a project would have to include a period in which related agreements are settled upon up front. This could also be seen as one big case of the government choosing winners, on which its track record is certainly mixed. Including a diverse group of advisors for the project might reduce that image. A more modest project, such as using a single new federal building or site, could mitigate some of the risks. On the other hand, DOD bases better reflect the dynamics of the U.S. system by incorporating aspects of work and home life, and both transportation and electric systems, into concentrated areas. It has a management infrastructure already charged with overseeing its installations. And as many participants reiterated, the private sector will never tolerate such risk, which makes breakthroughs without a public component — or a crisis, such as an oil supply interruption — unlikely.

Furthermore, the federal government and especially DOD make investments in energy-related technologies on a daily basis. The distinction that one working group made between government investment in energy technologies or alternative fuels and weapons systems is in a sense false — they are both large-scale, expensive, and might not work at all. Yet the public's tolerates the latter, for the most part.

The government will be spending money on energy technologies and even conducting demonstration projects. The open questions are all in the details, and the American people will get the most bang for the buck if the government aims for revolutionary, systems-level change with its investments.

**A National Scorecard.** Perhaps the most distinct finding from our April 2009 conference is that investors, inventors, government officials, and private business leaders believe metrics to be a critical piece of any future energy and climate security strategy. As the information sharing and collaboration group noted, "What gets measured gets done." The Obama Administration, should it take on the tasks of creating a national strategy and solidifying a vision of the future with a major, system-level demonstration project, should include a national scorecard as a component of its work.

Businesses create scorecards and similar devices regularly in order to check that activities align with an overall strategy and work toward common goals. Scorecards and similar devices at times grow into complicated matrices of objectives, metrics, and activities, while many companies merely create checklists or assign points to signs of progress. The "national" component is important to showing success in energy and climate security; the

government's own successes may be significant but the entire economy must see a transformation, not just the public sector.

Finding ways to measure success will be critical, given the disconnect between the often slow, incremental progress of systematic change and fast-paced political cycles. The Administration will need to demonstrate that the billions of dollars approved in the stimulus legislation and the 2010 budget make a difference and align with the President's long-term goals for the nation — not only for domestic political reasons, but also to showcase U.S. energy and climate leadership to the rest of the world.

We recommend that the national energy security scorecard, for the first year to two years of the Obama Administration, begin with a very simple framework of four basic questions:

- Does the policy or action contribute to reducing emissions 14 percent below 2005 levels by 2020 (i.e., does it create short-term emissions reductions)?
- Does it contribute to reducing emissions 83 percent below 2005 levels by 2050 (i.e., does it create long-term emissions reductions)?
- Does it work to reduce U.S. oil consumption?
- Does it diversify energy inputs (to include more renewable energy sources)?

These questions are, of course, merely to ensure that the nation's actions are aligning with the President's goals. It is perhaps a weakness that they create only a "yes or no" answer, and once the answers are broadly "yes" the scorecard can expand to include real metrics with increasing fidelity. Indeed, the national strategy — which should include these questions in scorecard format — could include increasingly strict metrics with every cycle. For now, we know that the President wants us to "go west," and we must therefore start by tracking that we are indeed heading westward.

However, such broad questions will also be helpful in several ways. First, if the Administration cannot answer "yes" to each question for policies or government investments under deliberation, it must consider the fact that it is trading off energy and climate progress for other goals. Obviously the Administration must deal with political realities and work toward goals not distinctly related to energy and climate security, but this creates a useful device for ensuring that any tradeoffs made are deliberate.

Second, they point to conclusions by our information sharing and collaboration group that progress hinges on the ability to measure greenhouse gas emissions and make that information available to all government agencies and to the public. The National Labs, universities, and many others around the world are working to improve in this area. In the meantime, the less exact estimates used today suffice — even if measurements are somewhat crude, the point is to actively compare the actions of the nation against the goals of the nation to check that they align.

Finally, scoring all actions this way may help alleviate a concern many participants identified: the government too often measures success only in dollars spent. If funding contributes to energy efficiency, but on a minor scale not nearly aggressive enough to hit the long-term emissions reduction targets, that knowledge can force policy makers to consider putting those funds to other uses or inform changes to funding requests in the next year's budget, or simply fail to help the nation move any closer to energy independence and a low-carbon future. This early, general scoring will help illuminate likely imbalances, for example showing whether a disproportionate amount of effort and funding are going toward long-term emissions reductions over energy diversification goals. Perhaps most important, it will showcase policies and funding decisions that contribute to all of the President's energy and climate goals, rather than

being directed toward only energy or only climate security.

We recommend using these high-level, long-term goals in the form of early metrics in and of themselves for several reasons. While the number of compact fluorescent light bulbs purchased and numbers of graduates in fields related to climate and energy are important — and should be measured, noted, and touted to the public — these metrics do not necessarily indicate that the country is moving in a uniform direction. And as the nation learned from the tumult of the 1970s energy crises, price signals change and do not always align with goals to bolster the nation's long-term security and stability.

These goals-turned-metrics are also broad enough and simple enough that they can apply to all activities and all levels of decision. One finding of our conference was the widespread belief that individual Americans do not know how to translate the nation's goals down to their own decisions and behavior. Scoring against these questions provides a simple solution to this problem: every citizen can consider these questions. From vehicle purchases to turning off the lights, from leasing farmland to wind power companies to taking the city bus to work, Americans can consider these questions in their own choices. These standards have the benefit that they are not bound by regional or economic differences.

This is a plausible way to help educate the public that energy use is one facet of national security to which everyone is a party and to which everyone must contribute. Likewise, businesses can score their own companies against these questions to show that they are in line with a national strategy and take corporate responsibility for the nation's security. Government agencies at all levels can check their decisions against these metrics, and the Office of Management and Budget can incorporate them into other scorecards to make sure that federal government efforts align on these issues. Indeed, as the President's May 2009 Nellis Air Force Base speech shows, the Administration is already implicitly utilizing the goals it has set as metrics for success. Making them explicit will add another level of clarity and direction for the private sector, the government, and the American people.

## Conclusion

President Obama and his Administration need to demonstrate that their investments in energy and climate security through the stimulus and the 2010 budget meet with some success. But the country also needs the President to demonstrate that innovation can happen, and that new technologies can achieve commercial scale. At the same time, U.S. political leadership must be honest with the American people about the potential barriers to success, offering ways to overcome them. In pursuing a range of options, the Administration should consider changing how it uses the federal government itself in driving change. Rather than just setting standards and goals, the government should set a national strategy, consider investing in a large-scale demonstration project linked to that strategy in order to test innovative energy and environmental science and technology at a systems level, and define metrics that would show that the nation is heading in the right direction. This approach is a tangible way to offer the nation — and the world — a complex but compelling vision for a low-carbon, secure energy future.

# APPENDICES

# APPENDIX A

## PARTICIPANT RECOMMENDATIONS

The following lists specific recommendations (for the Obama Administration, unless otherwise noted) as suggested by Mapping U.S. Energy and Climate Security conference participants, April 29, 2009.

### Goals for the Nation

- Clarify goals on infrastructure improvement.
- Include an element of *economic sustainability* in national goals on reducing greenhouse gas emissions and foreign oil dependence – in other words, ensure that the energy economy can meet the climate and energy security goals outlined, but over the long term be viable and hopefully profitable without continued government subsidization.
- Add short-to-medium-term goals in the areas of U.S. technological leadership and job creation, as shown through good innovation policies.
- Clarify that "The purpose of innovation is to increase economic viability and achieve our energy and climate goals," in order to state more explicitly what role it intends innovation and innovators to play.

### Opportunities and Initiatives

- Enact federal and local policies that price the externalities of the energy economy and level the playing field for all energy sources to compete fairly.
- Define the roles of government and of the private sector, and signal that funding for innovation will remain consistent and predictable.
- Launch a grassroots public education campaign to inform the public of what the national energy goals are, why they are necessary, and the role each American should play in reaching these goals.
- Set minimum federal standards in a range of areas from building codes to renewable energy production, as well as interoperability protocols, regulations, and standards, at the federal level.
- Designate structures within agencies as "sharers of information" with other departments and with the White House.
- Adapt existing institutions rather than creating new ones as much as possible.
- Name a Chief Environmental Officer in each agency to coordinate information within their agencies, meet with their counterparts in other agencies, and report to a single person in the White House.
- Set a price on carbon, price floors for petroleum products, or any mechanism to reduce the volatility in energy pricing so that businesses know not just what prices are, but what they are likely to be.
- Reinvest all or most cap and trade program revenue in energy and climate programs.
- Include wiki functions or other platforms for users to offer reactions and suggestions on the websites of agencies or the main coordinating body in the Executive Office of the President.
- Improve disclosure standards of efficiency for buildings and other commonly-purchased items to incentivize improvement.
- Place good CEOs alongside promising innovators (this measure would be incumbent on the private sector).
- Federalize the national energy system.
- Hold a kind of BRAC (Base Closure and Realignment Commission) process for transmission lines.
- Increase distributed generation and incentivize local energy production.
- Include a distributed generation standard in any federal renewable energy production standard.

- Create robust evaluation procedures to direct further investment in innovation.
- Help fill in the gaps between fundamental research and commercial products (at scope and scale), with SBIR as a possible vehicle.
- Incentivize collaboration among universities, National Labs, and the private sector for commercialization of new technology.
- Use the government's installed infrastructure, purchasing power, and energy needs to develop a more competitive and sustainable market.
- Competitively award research and development funding.
- Create a central access point where people can find information and ask questions concerning all energy and climate grants, metrics, partnerships, data sources, budgets, and news.
- Identify and address any legal or policy impediments to information sharing.
- Remove disincentives to and build greater incentives for collaboration, and ensure that the organizational infrastructure of the government allows the transparency needed for officials to share information and coordinate.
- "Become as good at measuring carbon as we are at measuring Internet advertising."
- Increase authority for FERC.
- Coordinate better with U.S. allies.

## Measuring Progress

- Do not use money spent as a metric.
- Establish a baseline quickly both for the sake of making measurements (and therefore demonstrating success) and in order to add clarity to the nation's goals.
- Set metrics that are easy to understand and actually measurable, that convey meaning to consumers and that include both supply chain and demand side indicators.
- Tailor metrics for each sector and stage of innovation.
- Measure the diversity of patents and timeframes between R&D and production stages.

**COUNT ANY OF THE FOLLOWING:**

- Number of renewable energy plants built.
- Americans with smart meters in their homes.
- Compact fluorescent light bulbs sold.
- U.S. demand for petroleum products.
- Graduates from schools in energy- and climate-related fields.
- Net jobs created in related sectors.
- Federal government end-use energy reductions.
- Percentage of domestically-generated energy versus imports.
- Percentage of residential and commercial buildings conforming to efficiency standards.
- Capacity and consumption of energy by type (carbon vs. low/non-carbon).
- System losses (energy lost through lines or through roofs of buildings).
- The change in return on equity over the next two to three years.
- Revenue from related products.
- Number of licenses, patents, and start-ups.
- Number of profitable products related to energy and climate security.
- Account for regional, seasonal, and economic variations in national metrics.

# APPENDIX B

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# APPENDIX C

## APRIL 29, 2009 CONFERENCE BACKGROUND PAPER

### Participant Instructions

The Obama Administration has already begun to outline its energy and climate security strategy. The goal of this conference therefore is to leverage the breadth of knowledge and experience of the participants to come up with practical recommendations for what obstacles and opportunities might be expected in implementing the Administration's strategy. The outcome will be a better understanding of the most productive roles for the private and nonprofit sectors, and for state, local, and federal government agencies.

The United States must go through a transformation that will fundamentally alter its energy and climate security posture – into one that protects the economy, the environment, and the security of the nation. If the nation is to achieve the President's target of dropping greenhouse gas emissions to 83% below 2005 levels by 2050, while decreasing reliance on foreign oil, it will require short- and long-term changes: in the near term, efficiency, conservation, diversification, and protection of the energy system; and for the long term, innovation. Improved coordination, information sharing, and knowledge management will be important throughout the process.

Each participant will be assigned to a working group to discuss one of these energy and climate issues: diversification and protection; innovation; end use; and information sharing and collaboration. CNAS constructed each group to include a diverse range of actors, such as NGO representatives, investors, small and large business executives, academics, and federal, state, and local government officials. Participants will all have opportunities to express their views and recommendations based on their unique experiences during the small working group sessions, and in an afternoon plenary session.

The conference is considered off the record. Two facilitators will lead each working group session,

and rapporteurs will capture the day's conversations in detailed notes. While the rapporteurs may take down direct quotes, no participants will be quoted by name publicly and no specific concepts or ideas will be attributed to specific participants.

## Background: The President's Strategy

Through recent speeches, the 2009 American Reinvestment and Recovery Act (ARRA), and the FY 2010 Budget, President Obama and his Administration have begun to outline a strategy to transform U.S. energy supply and demand, mitigate and adapt to climate change, and bolster the economy. According to the budget, the Administration is working on a "comprehensive energy and climate change plan to invest in clean energy, end our addiction to oil, address the global climate crisis, and create new American jobs that cannot be outsourced."

The goals of this new plan are to create climate security by reducing greenhouse gas emissions approximately 14% below 2005 levels by 2020 (and, in the longer term, 83% below 2005 levels by 2050), and increase energy security by investing in clean energy and ending the U.S. "addiction to oil." The Administration has assigned high priority to these issues, stating that this plan will "advance U.S. foreign policy" and that reaching these goals will enhance national and environmental security. It has also outlined many of the ways and means it intends to pursue in achieving this dual energy security/climate security goal: in general, through a cap-and-trade system and a dramatic increase in funding and policies to drive the nation toward a clean energy future. Given this path, the most important questions for us to address today concern implementation: Can the nation achieve these goals? Can the federal government play a crucial, catalytic role? What mechanisms for doing so are in place, and what are the primary obstacles? Finally, what are the proper metrics of success?

## Diversification and Protection

The issues of diversification and protection incorporate the crux of the security challenges of today's energy system. The U.S. transportation system is 96% reliant on a single fuel source, petroleum, of which often-inefficient national oil companies hold around three-fourths of global reserves. Fifty-one percent of the nation's electricity is coal-generated, which in its current usage is a threat to global climate security. To improve U.S. energy security, the nation must diversify its energy supplies – in other words, it must generate more of the energy it uses from a larger number of energy inputs – and its energy suppliers, including increased use of domestic energy sources. Protection is another key security challenge to the U.S. energy systems, with an electric grid, pipeline systems, and waterways that are often inefficient and highly vulnerable to natural disasters, human error, and sabotage.

President Obama has spoken often on both diversification and protection issues as they relate to his energy and climate goals, using phrases such as "end the tyranny of oil in our time." Energy Secretary Steven Chu stated the goal of reducing dependence on foreign oil in his confirmation hearing, and spoke of the role of improving the nation's electric grid in diversifying energy supplies to include more renewables. The President and Deputy Secretary of State James Steinberg both affirmed that on a global scale, civilian nuclear energy will be one way to supply more low-carbon energy. The President even extended the issue of energy input diversification to international policy, telling the parliament of Turkey that the United States should "build on our Clean Technology Fund to leverage efficiency and renewable energy investment."

Projects to protect critical infrastructure and supply routes against natural disasters and deliberate sabotage received about $700 million in the 2009 ARRA. The Department of Homeland Security, for example, will give $300 million in grants for

reinforcing security and protection measures in U.S. ports, transit, and rails. The FY 2010 budget does even more than the stimulus package to address the challenges of diversification and protection. It includes a proposal for a National Infrastructure Bank to better invest federal funds while increasing coordination with states, cities, and the private sector in building transportation infrastructure, including mass transit. Specific to infrastructure security, the budget emphasizes the need for the Department of Homeland Security to reinforce, monitor, and protect U.S. transportation systems.

On diversification, the budget language concentrates more on broadening the range of energy supply inputs (especially non-fossil fuels) than it does on diversification of energy suppliers, as the focus is largely on domestic energy plans. The priorities as expressed in the budget are for domestic energy projects, especially for increasing supplies of renewable energy. These priorities are to be addressed, for example, through: $250 million in new USDA loans and grants for rural U.S. renewable energy development, including biofuels and wind power; an extension of the production tax credits for wind (to 2012) and other renewables (to 2013); an increase of $50 million to the Department of Interior to cover the requisite environmental and technical studies to develop new renewable and other energy resources on public lands; new fees or other incentives to produce for oil and gas companies not tapping the energy supplies from the leases they hold; and new manufacturing tax credits for low-carbon-emitting technologies.

To this category, CNAS recommended in a 2008 working paper that the Administration's strategy include geostrategic concerns, such as cooperation with other major oil consuming nations, including China and the members of the European Union. And while lower oil prices present a new set of challenges relative to alternative fuels and efficiency improvements, they may also provide an opportunity to reestablish or improve U.S. relations with producer nations, such as Iran, Russia, and Venezuela. Another related aspect that U.S. plans might consider is the strategic imperative of the Department of Defense to protect access to energy supplies, despite DOD having no inherent energy security policy-making role. A complementary specific recommendation put forth by CSIS and WRI, in their 2009 report, *A Roadmap for a Secure, Low-Carbon Energy Economy*,[10] is for the Administration to ensure that any public-private partnerships for infrastructure projects (whether a bank or another mechanism) have "clear upfront rules with respect to spending to ensure taxpayers get full value for their investments."

## End Use

One of the fastest and most cost-effective ways of reducing energy demand and greenhouse gas emissions in the United States is by adopting the best end-use technologies currently available and in development. From using Energy Star appliances to turning off unneeded lights, efficiency and conservation offer the shortest route to early successes in working toward the Administration's energy and climate security goals.

President Obama and others in his Administration have focused great attention on end-use measures. With a strong focus on federal buildings, the President stated that the stimulus legislation would create a "revolution in energy efficiency." Only a few weeks into office, the Administration outlined a plan to weatherize homes for 2 million low-income Americans. The heart of the 2009 Recovery Act is creating a lower-carbon economy through efficiency, conservation, and other end-use methods. The $28 billion in spending in this category (a much larger sum than the stimulus legislation allocates for protection or supply diversification, for example) reflects that it is a high priority area for the Administration, in part due to its job-creating nature. In one example of end-use allocations, the stimulus bill includes more than $200 million

to the Department of Defense for energy efficiency improvements on military installations, including military family housing. Several other federal departments and National Laboratories will receive similar stimulus funds for building efficiency technologies and upgrades. The ARRA also includes several billion dollars for efficiency-related innovation through the Department of Energy, and a range of investments in electric grid improvements to aid in energy conservation.

Reiterating this emphasis on near-term end-use efficiency, the FY 2010 budget sets a goal of a 25% reduction in the federal government's energy bill by 2013, backed by $11 billion for building modernization. Other end-use budget measures include: increasing weatherization programs for low-income Americans to spur that industry, with a goal of weatherizing one million homes per year; building on the stimulus funding for state and local government energy efficiency grant programs; modernizing the electric grid in part to increase its capacity to handle increasing renewable energy supplies, especially from rural to urban areas; and funding for Housing and Urban Development programs to spur a new market for retrofitting and building more efficient new housing. The budget also focuses on increasing the use of public transportation, including $1 billion annually in grants for high-speed rails, with the funding to be directed at the state level.

## Innovation

The President's goal of dramatic reductions to U.S. greenhouse gas emissions presents a daunting challenge. While efficiency and conservation are early steps that can help work toward this target, it appears unlikely that the nation can get there from here without new developments in energy and climate science and technology. Innovation – the creation of new ways to produce, consume, and transport energy, and to reduce the environmental impacts of the energy we use – must be part of the solution. President Obama expressed support for innovation in his February 24, 2009 address to a Joint Session of Congress, speaking of transforming the country's energy economy: "To support that innovation, we will invest fifteen billion dollars a year to develop technologies like wind power and solar power; advanced biofuels, clean coal, and more fuel-efficient cars and trucks built right here in America." In his confirmation hearing, Secretary Chu said that making the Department of Energy a leader in renewable energy innovation would be his "primary goal," and he has stated his support for rapidly advancing "clean coal" technologies. He indicated that DOE's methods for improving the innovation process will include: new fellowships and other incentives in science and engineering; a focus on research and development that will increase "game-changing" technologies; and efforts to bring clean energy technologies closer to private sector commercialization and widespread deployment. Some areas of focus for innovation will be biodiesels from organic waste and non-food crops, battery and other energy storage advances, smart electricity-saving tools for buildings, and cheaper solar photovoltaic systems.

With more than $4.7 billion for related programs, the 2009 American Recovery and Reinvestment Act also showcases innovation as a key component of achieving U.S. energy and climate goals while creating jobs. The Department of Energy and the National Science Foundation (NSF) are the largest two recipients in this category. Funding for DOE, about $6 billion of which is in the form of loan guarantees for innovative technologies, includes $1 billion for fossil energy research and development, $820 million for clean coal and carbon sequestration research projects, and $277 million for Energy Frontier Research Centers to accelerate basic sciences and fundamental research underlying energy innovation. In contrast, the National Science Foundation is devoting $2 billion, two-thirds of its ARRA budget, to high-risk, high-return research grants. The stimulus legislation also includes $300

million for energy technology development for the Department of Defense.

Like the stimulus package, the FY 2010 budget focuses on innovation mostly in renewable energy on the supply side, and on smart grid and efficiency technologies in end-use. While some of the money is designated in the budget for grants and federal investments, loan guarantees to leverage private investment to spur innovation constitute an important mechanism. The budget also specifies funding for many components of innovation, such as education, basic science, research and development, commercialization, and rapid deployment of technologies. Key areas of innovation signaled by the President's budget include: new electricity transmission and use technologies, including deployment of smart meters; space-based research sensors developed by NASA for climate monitoring and research; basic climate science research through the Department of Energy; carbon sequestration; advanced biofuels; and low-carbon-emitting coal technologies.

As CSIS and WRI outlined in their 2009 *Roadmap* report, "Positioning the United States to achieve significant emissions reductions requires measures that 'push' technology innovation through direct investment, and policies that 'pull' innovation in the right direction through market signals, standards, and incentives." And as previous CNAS projects have explored, partnering with developing nations in various stages of research and development, or outright technology transfers to them, may be necessary components of a future international climate change agreement.

## Information Sharing And Collaboration

The President can leverage the federal government infrastructure, comprised of dozens of energy and climate-related offices, to aid in working toward the goals he has outlined. However, these offices are often disconnected, and at times different agencies work on similar problems using different data and information. An important part of implementing the strategy the Obama Administration has outlined for energy and climate security will therefore be information sharing and collaboration among federal agencies and with the private sector. The Administration has so far given several indications of how it intends to increase coordination and collaboration within the federal government. It took one strong first step in appointing Carol Browner as the White House climate and energy czar. NOAA administrator Dr. Jane Lubchenco, in recognizing the need for reliable, consistent climate information, has advocated a National Climate Service which would involve collaborating with several federal agencies. Beyond just the federal government, Secretary Chu testified to the Senate that as part of the energy research and development programs outlined in the FY 2010 budget, his goal is to "build research networks within the Department, across the government, throughout the nation, and around the globe."

The budget also includes indications of the Administration's intention of information underpinning climate change efforts, and designates several areas for concerted study and information collection. The budget designates $130 million for the Department of Interior to conduct reports on how climate change might affect wildlife and carry out adaptation projects, for which ideally federal, state, and tribal agencies should all work from the same assumptions. It also provides NOAA with over $1.3 billion for weather, climate, and environmental monitoring. Another $19 million is directed to the EPA to work with other agencies and with industry to develop a greenhouse gas emissions inventory. NASA is also instructed specifically in the budget to "coordinat[e] with other federal agencies to ensure continuity of measurements that have long-term research and applications benefits."

One collaborative initiative outlined in the President's FY 2010 budget, with $25 million in support, is for the Department of Homeland

Security and the Department of Transportation to integrate their programs to plan for linking freight infrastructure networks. Beyond these discreet proposals, however, it is not entirely clear what types of information will underpin the efforts the Administration has outlined, and how it intends to guarantee consistency across agencies and with the private sector, states, and local governments.

The initial findings from CNAS suggested that energy and environment policy receive a higher profile and a greater level of coordination in the new Administration, including oversight responsibility for the President's strategy; partnerships with Congress, state and local governments, and the private sector; innovation; international negotiations, in coordination with the State Department; and climate science and technology, to incorporate and elevate the current U.S. Climate Change Science and Technology Programs. CNAS also recommended an advisory board similar to the President's Intelligence Advisory Board, in recognition that the private sector will drive any major transformation in the nation's energy economy. In their 2009 *Roadmap* report, CSIS and WRI analysts also suggested that the Administration work with Congress on incentives to send signals to consumers, who often lack sufficient information to make energy efficiency and conservation choices, particularly for the long term.

## Conclusion

President Obama and others in his Administration have taken many steps toward delineating elements of a national strategy for energy and climate security. The President has set long-term goals for the nation on these issues, and with each speech by key Administration officials and with each new piece of legislation, a comprehensive energy and climate security plan is taking shape. The most important next step will be to add greater detail to what they have already outlined, particularly in specifying medium-term objectives, and to identify key opportunities for and obstacles to implementation. The plans that the Administration has outlined should serve as a foundation for each of the working groups to discuss these questions.

# ENDNOTES

[1] President Barack Obama, "Remarks by the President on Alternative Energy," Nellis Air Force Base, Nevada (27 May 2009), available at http://www.whitehouse.gov/the_press_office/Remarks-by-the-President-at-Nellis-Air-Force-Base-in-Las-Vegas-Nevada/.

[2] Ibid.

[3] See www.bigenergymap.org.

[4] Sharon Burke and Christine Parthemore, *A Strategy for American Power: Energy, Climate, and National Security* (Washington, D.C.: Center for a New American Security, 11 June, 2008).

[5] Flynt Leverett, "The New Axis of Oil," *The National Interest* (July 2006).

[6] Energy Information Administration, "U.S. Primary Energy Consumption by Source and Sector, 2007," *Annual Energy Review* (2007), available at: http://www.eia.doe.gov/emeu/aer/pecss_diagram.html.

[7] See White House Briefing Room, "MCTF Meeting 4: Building a Strong Middle Class through a Green Economy," *The Blog* (22 May 2009), at http://www.whitehouse.gov/blog/Building-a-Strong-Middle-Class-through-a-Green-Economy/; Kim Chipman, "White House's Emanuel, Browner Talk Climate With CEOs," *Bloomberg News* (8 May 2009); and "Gov. Schwarzenegger Issues Statement Following Climate Change Meeting with Obama Administration Officials," Press Release (21 February 2009), at http://gov.ca.gov/press-release/11531/.

[8] Peter R. Orszag, "Democratizing Data," Office of Management and Budget Blog Post (21 May 2009), at http://www.whitehouse.gov/omb/blog/09/05/21/DemocratizingData/. The new website can be found at http://www.data.gov/.

[9] Honorable Robert F. Hale, "FY 2010 Military Construction Budget Request," Statement before the U.S. House of Representatives Committee on Appropriations, Subcommittee on Military Construction, Veterans Affairs and Related Agencies (19 May 2009): 1-3.

[10] Sarah Ladislaw, Kathryn Zyla, Jonathan Pershing, Frank Verrastro, Jenna Goodward, David Pumphrey, and Britt Staley, *A Roadmap for a Secure, Low-Carbon Energy Economy: Balancing Energy Security and Climate Change* (Washington, D.C.: Center for Strategic and International Studies and World Resources Institute, January 2009).

## *About the Center for a New American Security*

The mission of the Center for a New American Security (CNAS) is to develop strong, pragmatic, and principled national security and defense policies that promote and protect American interests and values. Building on the expertise and experience of its staff and advisors, CNAS aims to engage policymakers, experts and the public with innovative fact-based research, ideas, and analysis to shape and elevate the national security debate. A key part of our mission is to help inform and prepare the national security leaders of today and tomorrow.

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