WHITE HOUSE ENERGY INNOVATION CONFERENCE

Summary Report

May 7, 2010

Ewing Marion KAUFFMAN Foundation

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Date of Event:	May 7, 2010
Location:	South Court Auditorium, Eisenhower Executive Office Building White House Conference Center
Conveners:	Ewing Marion Kauffman Foundation White House Council of Economic Advisers White House Office of Energy and Climate Change Policy White House Office of Public Engagement and Intergovernmental Affairs White House Office of Science and Technology Policy White House Office of Social Innovation and Civic Participation

Context

The Obama administration has made it a priority to find new ways for the government to partner with private organizations in solving shared problems. Given the scale of the challenges this country faces, the ability of government to forge effective relationships with organizations across sectors will be critical in making progress on the president's agenda, and building upon the work of already existing networks of organizations and entrepreneurs will be necessary for achieving expedient progress on these challenges.

Enhanced American innovation is needed to create American jobs, and no area is riper for innovation than the energy sector. If America does not harness its resources and ingenuity to become the world leader in clean energy production, it may fall behind in the 21st century global economy as other nations capitalize on this rapidly growing sector. U.S. investment in basic energy research was at its highest this year, but increased attention must also be paid to enabling the private market for energy. Energy

innovations do not receive adequate attention from investors, businesses and some states because of short-term costs, limited financing options, and a cumbersome U.S. regulatory environment.

Acceleration of commercialization requires collaboration and reform at all stages of the energy innovation pipeline, from research to development, demonstration, and deployment. In the United States, universities and research laboratories are our major centers of research and knowledge generation. Despite our strength in producing knowledge and new ideas, the current system does not allow for the efficient identification of innovations with the potential for commercialization. Moreover, new technologies and insights will not result in commercial impact unless research aims to address relevant issues in the marketplace.

Once innovations are identified and successfully developed and demonstrated, significant barriers slow and often prohibit deployment. Innovations fall victim to the so-called “Valley of Death” caused by outdated and capital-intensive business models. For the few technologies that survive the Valley of Death, these pre-companies or technologies may be disconnected from domestic manufacturers and customers, which might mean that distribution happens outside of the United States. Communication from investors, early adopters, and mainstream customers is critical to ensuring that the research and resulting designs accurately reflect the market needs.

If a market for energy efficiency does not materialize in the United States, investors will have little incentive to increase investments to the level required to foster increased deployment. In sum, a lack of connectivity along the energy innovation

pipeline and supply chain creates significant barriers to commercialization and job creation in the energy sector.

Participants and Description of Event

The Ewing Marion Kauffman Foundation and White House Office of Social Innovation and Civic Participation co-convened a conference on Energy Innovation that included participation by five White House offices, four federal departments, three federal agencies, entrepreneurs, state government officials, representatives of academia, private-sector leaders, nonprofit leaders, and innovators on May 7, 2010. The conference was designed to bring together diverse stakeholders in a forum for discussion on how to leverage private- and public-sector investments and direct philanthropic support to accelerate innovation and job creation in the energy sector.

The conference was structured into several segments. The morning keynote presentation, roundtable discussion, and panel were structured with either a keynote speaker or group of speakers introducing the subject, followed by a brief question-and-answer session. U.S. Secretary of Commerce Gary Locke delivered a presentation during lunch about the need for cross-sector partnerships that leverage all stakeholders' unique capabilities and skills to ultimately expedite the process of bringing ideas to market. The afternoon allowed participants to select from four breakout sessions, with topics including: innovating the grid; sustainable and high-growth energy businesses; early adopters of energy innovation; and new pathways for entrepreneurs to advance innovation to the market. All sessions are briefly described below.

Welcome and Keynote

Diana Farrell, deputy director of the National Economic Council, delivered the welcome and keynote address. Farrell emphasized that, to ensure the prosperity and longevity of our future, we must embrace the dynamism of our economy and emerge as a global leader in the advancement of innovation. The economic impact of catalyzing the energy sector, in particular, cannot be ignored. Energy technologies will define the 21st century, and, to date, the energy sector has been one of the slowest sectors to advance innovation. Accelerating the pace of energy innovation will create jobs, revolutionize the way we create and consume energy in the United States, and reduce our dependence on fossil fuels.

Farrell explained that energy policy is typically characterized as a series of two-sided debates: efficiency vs. exploration, nuclear vs. renewable, economic progress vs. environmental protection, and costs for consumers vs. profits for producers and investors. Now is the time to move beyond this simplistic characterization and to develop policy strategies that involve all stakeholders towards a shared vision: a highly connected and dynamic energy-innovation-to-job-creation pipeline.

Announcement from the Department of Energy and the Small Business Administration

Kristina Johnson, undersecretary of energy, and Karen Mills, small business administrator, announced two funding opportunities to fill gaps in the energy innovation pipeline and support high-growth entrepreneurs.

First, Karen Mills announced that the Small Business Investment Company (SBIC) program is going green with a new energy saving debenture that allows the

SBIC to make early stage investments in the area of clean energy. Mills emphasized that the program is specifically designed to address the need for growth capital and attract new funds. The SBIC has helped to start more than 100,000 businesses including FedEx, Intel and Costco. Applications will be available in fall 2010.

Second, Kristina Johnson announced that the Small Business Innovation Research (SBIR) program and the Small Business Technology Transfer (STTR) program will promote small green-energy firms through a new $60 million Small Business Clean Energy Innovation fund. This is a Phase II funding opportunity for companies that already demonstrated successful results as part of the Department of Energy's Phase I program that awarded 120 small tech firms $150,000 each. The Phase II program provides resources to support a firm's "staying power" on the path to commercialization by facilitating access to equity investments and long-term loans.

Roundtable Discussion: Supplying Regional Innovation in Energy

Karen Mills also moderated a roundtable discussion with Dan Reicher, director of climate change and energy initiatives at Google; Gururaj "Desh" Deshpande, chairman of Sycamore Networks; Carl Schramm, president and CEO of the Ewing Marion Kauffman Foundation; and Michael Crow, president of Arizona State University. The discussion focused on the current lack of connectivity between researchers and real problems and between entrepreneurs and capital. Regional innovation clusters have the potential to leverage existing assets to realize local benefits such as job creation and a lower carbon footprint.

Universities have the potential to be centers of knowledge generation in a regional innovation cluster. However, according to Michael Crow, we must first design and implement new models of higher education to achieve the levels of connectivity, transparency, and speed of technology transfer necessary to accelerate the innovation pipeline. Without enhanced transparency and access to information, potential innovations will remain hidden in scholarly articles rather than being tested, piloted, and ultimately demonstrated and deployed.

Regional innovation clusters could also provide support after an innovation has been identified. Cultivating environments that support collaboration across disciplines and embrace the potential for technology crossover will result in an accelerated path to discovery. According to Carl Schramm, acceleration is essential because the velocity of entry into the marketplace is the key factor to determining a business's success and, ultimately, ending the current recession.

Schramm also cautioned that universities' and businesses' current dependence on government funding causes institutions to absorb government vision rather than seek inspiration from the market. Fast-growing entrepreneurs would be better served with a diversity of funding options including venture capital firms, angel investors, and customers.

Other major barriers to commercialization that were discussed include the need to develop strategies to keep the fruits of innovation and manufacturing in the United States, and to improve entrepreneurship education in conjunction with the STEM (science, technology, engineering, mathematics) fields.

Panel: Jump-Starting Commercialization and Early Stage Companies

Ginger Lew, senior advisor to the White House National Economic Council and the SBA administrator, moderated a panel with Kristina Johnson, Department of Energy; Tom Baruch, CMEA Capital; Dave Lazovsky, Intermolecular; Lesa Mitchell, Kauffman Foundation; and Yet-Ming Chiang, Massachusetts Institute of Technology (MIT).

In addition to the lack of connectivity from research to deployment, the lack of retention of human capital is a significant barrier to accelerating energy innovation. The pipeline for industrial employees and academics in the energy sector is nearly empty. Moreover, two-thirds of engineering science graduate students are not U.S. citizens. In addition, even in environments committed to interdisciplinary collaboration, researchers and scientists could benefit from education in opportunity recognition and analysis. The gap between insight and innovation will persist unless researchers are trained in how to recognize an innovation in the lab and evaluate its potential for success along the innovation pathway. Moreover, as demonstrated in Silicon Valley, access to high-quality advisory boards accelerates commercialization success. Recommendations were made to strengthen mentoring relationships available to pre-companies.

Some panelists also made recommendations specifically aimed at reframing universities' research operations. Suggested actions include: rewarding innovation that has commercial impact and measuring the value of research not by the number of papers/patents but rather by the number of new products and processes developed; teaching faculty about the pathway from innovation to commercialization so that they may pass on knowledge about opportunities in the marketplace to their students; and

increasing transparency and access to research by providing access to abstracts and data.

Lunch with Secretary of Commerce Gary Locke

Secretary Locke emphasized the need for leadership, collaboration and vision to strengthen the energy sector through enhanced efficiency. He highlighted two initiatives involving the Department of Commerce that support the acceleration of the energy innovation pipeline. First, President Obama's National Export Initiative aims to increase the export of American products and services to spark economic growth and job creation. As part of the Export Initiative, the Department of Commerce will develop a comprehensive strategy to identify market opportunities in fast-growing sectors such as clean energy technology.

Second, Locke highlighted the Commerce Department and U.S. Patent and Trademark Office's newly launched pilot program that will accelerate the examination of green technology patent applications. Providing innovators with more timely patent protection will help bring technologies to market more quickly. Current pendency times for applicants can be as long as three years. Energy patents that are "fast-tracked" will receive notification about their application in twelve months or less. Locke concluded by emphasizing that the sector is ripe for opportunity. He explained that we can meet half of the future energy demand by enhanced efficiency and *existing* technology.

Innovating the Grid: Solar, Geothermal, and Distributive Generation

Arun Majumdar, Advanced Research Projects Agency-Energy (ARPA-E), moderated a session with Ramona Graves, Colorado School of Mines; Terry Boston, PJM; Jason Wolf, Better Place; and Rob Brenner, Environmental Protection Agency. This session focused on the need to accelerate smart grid modernization as a platform to facilitate the use of renewable energy technologies. Given that 40 percent of energy is consumed in buildings, the lack of information about energy use is a major issue. Participants suggested cultivating public support, and therefore a marketplace, for the smart grid using a campaign similar to the Department of Energy and Environmental Protection Agency's ENERGY STAR initiative.

Moreover, participants in this session identified technological, policy and financial barriers and offered specific recommendations. For example, policy suggestions included leveraging limited financial resources through interagency and federal-state collaboration and supporting the development of affordable energy storage, such as high-energy-density, low-cost batteries. The group also discussed the need for infrastructure development due to the current lack of available land for wind farms. Finally, participants discussed the need to redesign the current R&D&D model (research and development and deployment) and build a bridge across the "Valley of Death" to improve the current deployment rate of only 25 percent for Department of Energy projects.

Sustainable and High Growth Energy Businesses: The Way Forward with Innovative Models

Gene Fitzgerald, MIT, moderated a session with Elise Zoli, Goodwin Procter LLP; Dan Reicher, Google; and Gerd Goette, Siemens Venture Capital. The session began with commentary about the major shift in the innovation pipeline, with universities currently bearing most of the responsibility for idea generation. Despite this knowledge generation shift, venture capitalists, universities, and global corporations need to work together to spur clean energy innovation. Lessons can be drawn from both the biotechnology and semiconductor industries, where the pace of firm formation and outcomes occurred through very different models.

Venture capitalists in the session agreed that they need risk-adjusted returns and that one of the biggest risks is the lack and variability of regulation. Gerd Goette also addressed the question of whether energy innovations can be accelerated through the apparently normal delay from the lab to the marketplace. “Speed equals risk, since the ideas have not been proven at a smaller scale,” Goette said. The panel and audience suggested that the more incremental innovations with potential for impact, like setting efficiency standards on the consumer side, may be low-hanging fruit.

The group offered several policy suggestions to aid in energy innovation adoption, including renewable portfolio standards, grid storage, and homogeneity in state regulation. One investor emphasized that his primary concern is not finding technology, but rather finding customers in the United States with a range of scales so that capital requirements and risk are minimized for a growing venture. Early adoption policies are much more aggressive in other countries. One recommendation to address

the lack of a customer base is for the Department of Defense to engage in the energy sector as both an investor and consumer/customer. This model was noted to be very successful in stimulating early electronics (transistor) innovations to scale through sustainable high-growth electronics and semiconductor companies.

Early Adopters of Energy Innovation: Consumer Focused Applications and Technology

Andrew Hargadon, UC Davis, and Jackalyne Pfannenstiel, Department of Defense, moderated a session with Jim Davis, Chevron Energy Solutions; Gene Rodrigues, Southern California Edison; and Maura O'Neill, USAID. For most energy innovations, the consumer is the utility, energy service company, or large end user (i.e., municipal, state, and federal governments or the military). Applications must be developed with a complete understanding of the consumers' needs because increased funding for technology development alone will not attract this consumer base. On the other hand, attracting this consumer base will result in increased private funding. The consumer needs in this market space require that technology developers address such challenges as the high costs of installation (often one to two times the cost of the technology itself) and the high costs and risks of long-term warranty and service commitments for energy technologies (which typically run on the order of fifteen to twenty years, and can add another one to two times the cost of the technology). Moreover, the government is needed as both a source of research and development funding and as a customer that can adopt technologies at scale. Finally, increased funding for research and development and improvements in STEM and

entrepreneurship education are necessary, but ultimately will not be sufficient unless these reforms are connected as part of an integrated energy innovation ecosystem.

New Pathways for Entrepreneurs to Advance Innovation to the Market

Author Steven Berlin Johnson moderated this session with Dan Cherian, Green Xchange and Nike; Nicholas Donofrio, IBM; and Barbara Bennett, Environmental Protection Agency. This session prompted discussion about the creative and collaborative use of existing resources in the energy sector. Enhanced interdisciplinary cooperation that is open, collaborative and global is particularly important when first attempting to identify whether an insight has the potential to be commercially viable. Examples of pre-competitive models in the semiconductor industry were used as a potential framework for accelerating the pace of deployment. Donofrio discussed how IBM has shifted its focus from value *creation* to value *capture*. He explained how IBM invited 400,000 innovators to a seventy-two-hour collaborative "Innovation Jam" intended to uncover ideas waiting to hatch. The "Jam" resulted in 44,000 ideas that were narrowed to 300 ideas and, ultimately, to twelve projects that were each funded for two years. When asked whether the government should host a similar event to generate ideas, Donofrio suggested that this model would be effective because it operates in the unregulated marketplace.

Conclusions and Recommendations

Numerous barriers to commercialization exist in the energy sector as a reflection of the structure of the sector itself. Underinvestment occurs because projects require

large, long-term, and high-risk investments in an environment with low consumer demand for energy efficient technologies. Without access to capital, decades can pass between the research, development, demonstration and deployment stages.

Radical transformation of the existing energy innovation pipeline requires solutions that engage all stakeholders in a collaborative network. Government can create the legal and policy conditions for energy prosperity, draw on large-scale resources, and use its prestige, power, and ability to attract attention to drive market progress. Private corporations play a productive and sustaining role in helping to tactically address structural and institutional challenges that inhibit the long-term success of proven models, and can bring business acumen, innovation, and resources to the table to achieve the goal. Philanthropic foundations have experience thinking strategically about effective ways of working with multiple stakeholders to address these conditions. Finally, nonprofit and service organizations have the flexibility to come up with new ideas, and the on-the-ground experience and relationships to know where local problems are and what forms of intervention make a true difference. We cannot foster innovation in silos; rather, we must consider the pathway from innovation to job creation in an interconnected ecosystem.

Participants at the White House Energy Innovation Conference offered a variety of recommendations, listed below, to break down silos and strengthen the energy innovation pipeline:

Advance energy innovation

- Accelerate smart grid modernization as a platform to facilitate the use of renewable energy technologies.
- Support the development of affordable energy storage, such as high-energy-density, low-cost batteries.

Increase human capital to support energy innovation

- Support the retention of human capital in the STEM (science, technology, engineering, mathematics) fields.

Do outcomes-focused research

- Increase interdisciplinary collaboration that is open, collaborative and global, particularly when first attempting to identify whether an insight has the potential to be commercially viable.
- Support a culture shift in the production of university research that values the production of processes and products rather than patents and papers.
- Reform the federal grant selection process to ensure that grants are awarded to researchers who have a clear understanding of a specific problem the proposed research will address.

Overcome marketplace challenges

- Address barriers to infrastructure development such as the lack of available land for wind farms.
- Address demand-side challenges such as the high costs of installation (one to two times the technology itself) and warranty and service.

- Develop strategies to keep the fruits of innovation and manufacturing in the United States.
- Re-design the current R&D&D model (research and development and deployment) and build a bridge across the “Valley of Death” so it is no longer acceptable that only 25 percent of DOE projects deploy.

Encourage investment

- Remodel existing funding and financing structures. The marketplace is not robust enough to provide the capital that is needed to move from innovation to job creation.
- Encourage private investment in the energy sector by enabling a more transparent regulatory environment.
- Conceptualize capital-conserving business models that are suitable for venture capital financing and leverage partnerships to reduce costs.

Collaborate across the government

- Leverage limited financial resources through interagency and federal-state collaboration.

Next Steps

Over the next few months, a series of regional follow-on meetings will take place, beginning in Omaha, Neb. on June 16, 2010. Regional meetings will continue the dialogue with a diverse set of actors. Subsequent meetings will take place in Portland, Ore. and Phoenix.

Appendix: Attendee List

130 participants convened at the Energy Innovation Conference at the White House on May 7, 2010.

FIRST	LAST	ORGANIZATION
Daniel	Abbasi	MissionPoint Capital Partners
David	Anthony	21Ventures
Tom	Baruch	CMEA Capital
Quincy	Beal	Gallup
Barbara	Bennett	EPA
Evan	Berger	Viridity Energy
Diana June	Blalock	USDA
Judith	Blanchard	Chevron Energy Solutions
Rochelle	Blaustein	DOE
Terry	Boston	PJM
Steve	Boyd	Clean Economy Network
Kate	Brandt	DOD
Robert	Brenner	EPA
David Charles	Brown	Nike
Carol	Browner	White House Office of Energy and Climate Change Policy
Colin	Bryant	Paladin Capital Group
Howard	Buffett	White House Office of Social Innovation and Civic Participation
Allen	Burchett	ABB
Will	Byrne	The DC Project
Dan	Carol	NDN
Michael	Caslin	URGENT VC
Dan	Cherian	Nike
Yet-Ming	Chiang	MIT
Lynette	Commodore	Kauffman Foundation
Michael	Cox	Calvert Financial Advisory
Michael	Crow	Arizona State University
Philip	Cullom	U.S. Navy
Lauren	Culver	DOE
Elizabeth	Cushing	U.S. Navy
Chris	Darby	In-Q-Tel
James	Davis	Chevron Energy Solutions

Jorge	de los Santos	Kauffman Foundation
Kimberly	de los Santos	Kauffman Foundation
Gururaj	Deshpande	Sycamore Networks
Harrison	Dillon	Solazyme
Gary	Dirks	Arizona State University
Elliott	Donnelley	--
Nick	Donofrio	IBM
David	Dover	City of Omaha, Neb.
Robert	Estill	Marathon Oil Company
Eugene	Fitzgerald	MIT
Matthew	Foley	American Council on Renewable Energy
Joshua	Freed	Clean Energy Initiative
Paul	Frey	SBA
Susan	Gander	National Governors Association
Zachary	Gibler	Lightning Science Group / Pegasus Capital
John	Gilleland	TerraPower
Eric	Gimon	DOE
Gerd	Goette	Siemens Venture Capital
Ramona	Graves	Colorado School of Mines
Sean	Greene	SBA
Kris	Haag	DOD
Andrew	Hargadon	UC Davis
Julia	Hughes	DOE
Reed	Hundt	Coalition for the Green Bank
Chavonda	Jacobs-Young	USDA
Kristina	Johnson	DOE
Steven Berlin	Johnson	Author
Tom	Kalil	White House Office of Science and Technology Policy
Leslie	Kenagy	Kauffman Foundation
Scott	Kleeb	Energy Pioneer Solutions
Christine	Koronides	SBA
Eric	Kuhn	Journalist
Kelly	Lauber	Nike
Dave	Lazovsky	Intermolecular
Esther	Lee	U.S. Commerce Dept.
Joshua	Leffler	SBA
Gary	Leonard	GE

Ginger	Lew	White House National Economic Council
Sue	Liu	Department of Energy
Laura	Lovelace	Wellford Energy Advisors
Arunava	Majumdar	ARPA-E
Paul	Maxwell	Bi-National Sustainability Laboratory
Dmitri	Mehlhorn	Gerson Lehrman Group
Kira	Mesdag	White House Council on Environmental Quality
Gueta	Mezzetti	Solazyme
George	Miller	Kauffman Foundation
Karen	Mills	SBA
Lesa	Mitchell	Kauffman Foundation
Joseph	Morton	Omaha World-Herald Bureau
Elizabeth	Mullins	TechNet
Asaf	Nagler	DOE
Robert	Nelsen	ARCH Venture Partners
Greg	Nelson	White House Office of Public Engagement
Joe	Neulight	Holden Holdings
Mark	Newberg	SBA
Rex	Northen	Cleantech Open
Peter	O'Keefe	Leaf Clean Energy
Erik	Olbeter	Pacific Crest Securities
Maura	O'Neill	USAID
Jonathan	Ortmans	The Public Forum Institute
Joseph	Paluska	Better Place
Eugene	Pentimonti	Paladin Capital Group
Darren	Peters	Entergy
Julia	Petkun	Gerson Lehrman Group
Jackalyne	Pfannenstiel	DOD
Laetitia	Pichot de Cayeux	Ajna Capital
Casey	Porto	National Renewable Energy Laboratory
Dan	Reicher	Google
Gene	Rodrigues	Southern California Edison
Patrick	Rooney	Indiana University Center on Philanthropy
Jeffrey	Ross	GridPoint
Carolina	Rossini	Harvard University
Karin	Schrader	CIA
Carl	Schramm	Kauffman Foundation
Jason	Scott	EKO Asset Management Partners
Jigar	Shah	Carbon War Room

Alan	Shaw	Codexis
Jeramy	Shays	American Council on Renewable Energy
Robert	Sienkiewicz	DOE
Michael	Simmons	Extreme Entrepreneurship Tour
Scott	Sklar	The Stella Group, Ltd.
Jacqueline	Smith	Arizona State University
Roya	Stanley	Iowa Office of Energy Independence
Jeffrey	Steiner	USDA
Elizabeth	Stewart	The DC Project
Richard	Stuebi	Cleveland Foundation
Lili	Thomas	Columbia University
Peter	Vicars	Heavy Lift Systems
David	Vieau	A123 Systems
Sanjay	Wagle	ARPA-E
Mary Jo	Waits	National Governors Association
Kristina	Wamstad-Evans	City of Omaha, Neb.
Lorraine	Wheeler	Qado Energy
John	Wilbanks	Creative Commons
Frank	Wolak	Stanford University
Jason	Wolf	Better Place
Kassia	Yanosek	Hudson Clean Energy Partners
Jeffrey	Yost	Nebraska Community Foundation
Elise	Zoli	Goodwin Procter, LLP

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