Energy, the Environment, and Business: Filling Leadership Gaps in Green Energy and Climate Change

An overview of ideas from the Harvard University Advanced Leadership Initiative Think Tank

Harvard University
Advanced Leadership Initiative

2010
Energy, the Environment, and Business:  
Filling Leadership Gaps in Green Energy and Climate Change  
An Overview of Ideas from the Think Tank on Energy, the Environment, and Business:  
Leadership for Action in Time and at Scale  

Faculty Co-Chairs  
Rebecca Henderson  
Rosabeth Moss Kanter  
Joe Lassiter  
Forest Reinhardt  
Mike Roberts  
Bill Sahlman  

Co-sponsored by  
Advanced Leadership Initiative  
*at Harvard University*  
The Arthur Rock Center for Entrepreneurship  
*at Harvard Business School*  

March 3-5, 2010
# TABLE OF CONTENTS

Introduction: The Think Tank Premise ..................................................... 1
State of the Science ................................................................................. 3
Shaping Policy ......................................................................................... 5
Remaking Energy at Scale: Issues and Opportunities .......................... 8
Reshaping Demand at Scale: Issues and Opportunities ....................... 10
Customers, Partners, and the Challenge of Scaling .............................. 14
Leadership for Multi-Stakeholder Solutions ......................................... 16
Advanced Leadership for Change ......................................................... 18
Think Tank Agenda ................................................................................. 20
2010 Advanced Leadership Fellows ..................................................... 21
Advanced Leadership Initiative Faculty .............................................. 22
Introduction: The Think Tank Premise

The Advanced Leadership Initiative (ALI) at Harvard University is dedicated to educating and deploying a leadership force of experienced leaders who can address challenging national and global problems. An important part of the process is to stimulate discussion among experts and advocates about the gaps that can be filled by advanced leaders, including the Advanced Leadership Fellows at Harvard who are preparing to transition from their primary income-earning years to their next lives of service. Each year, ALI convenes three solution-finding workshops called Think Tanks to delve deeply into the nature of problems, potential solutions, barriers to change, and ways that advanced leaders can make a difference.

On March 3-5, 2010, global leaders in the fields of business, education, and policy gathered to share experiences and brainstorm future actions for addressing the challenge of green energy and climate change. The previous year had been tough for those working on the issue. The recession tightened capital markets and squeezed project financing. The public – and politicians – lost the stomach for trading off jobs for the environment. The price of oil fell from historic highs, reducing the incentive to invest in low-carbon energy sources. Leaked emails from the Climate Research Unit at East Anglia University and misstatements made in the Inter-governmental Panel on Climate Change (IPCC) led many, especially in the United States, to question scientific claims. Then, in Copenhagen in December 2009, country representatives failed to come to a legally binding agreement for reducing global greenhouse-gas (GHG) emissions.

And the problem remains. Scientific findings still point toward undeniable trends. The earth has continued to warm, the amount of CO² in the atmosphere has reached levels not seen in 650,000 years, these levels could soon hit rates last experienced 36 million years ago, and most evidence suggests that this shift is human-induced, beginning around 1750 at the dawn of the Industrial Revolution. The technological, economic, and political obstacles to action are daunting. The global economy is locked into the use of fossil-fuels, namely oil and coal. Future demand for energy, especially in emerging markets, will rise with the global population, which is expected to reach nine billion people by 2050. Despite progress, renewable energy technologies have yet to scale, few social issues cut across more sectors and more regions, no established pathways exist for dealing with the problem, and time is running out. Coordinating efforts to address energy and the environment requires cooperation rarely seen in history, leading The Economist, a global digest not known for hyperbole, to consider climate change “the hardest political problem the world has ever had to deal with.”

Addressing an unmet social need or unsolved problem, especially one like climate change which crosses sectors and societies, is distinct from assigning tasks or formulating strategies in an already-established organization or exercising leadership in a domain with existing pathways and institutions. Even seemingly simple ideas for change require multiple strategies in multiple domains, which take various stakeholders into account. Advanced leaders must work within complex and even unorganized social contexts, where authority is diffused, resources are dispersed, stakeholders are diverse, and goals are vague, ambiguous, or conflicting. Creating change in such an environment calls for a special set of competencies. When leaders lack formal authority over an unbounded system, they need to think systemically while mastering relevant subject knowledge. They must influence individuals and groups to mobilize resources and work together. They need a highly developed sense of contextual and emotional intelligence to identify stakeholder motivations and assumptions. And they have to find ways to create a shared purpose and common ground to

---

1 The Economist, “Getting Warmer,” December 3, 2009
get multiple actors to move forward on an issue. Coordinating a response to global climate change calls for the collaboration of many advanced leaders.

Over a three-day period, the Advanced Leadership Initiative at Harvard University and the Arthur Rock Center for Entrepreneurship at Harvard Business School convened roughly 200 leaders working on energy and climate issues to discuss where they were at and how to move forward. The Think Tank was co-chaired by Forest Reinhardt, John D. Black Professor of Business Administration at Harvard Business School and ALI Co-Chair; Rebecca Henderson, Senator John Heinz Professor of Environmental Management at Harvard Business School; Joe Lassiter, MBA Class of 1954 Professor of Management Practice at Harvard Business School; Mike Roberts, James M. Collins Senior Lecturer and Executive Director of the Arthur Rock Center for Entrepreneurship at Harvard Business School; Bill Sahlman, Dimitri V. D’Arbeloff – MBA Class of 1955 Professor of Business Administration at Harvard Business School; and Rosabeth Moss Kanter, Ernest L. Arbuckle Professor of Business Administration at Harvard Business School and ALI Faculty Chair and Director.

This report, a supplement to the conference’s main proceedings, offers a narrative summary of the gaps and opportunities for advanced leaders identified during the event.

The Think Tank grouped leaders onto panels, based on the conceptual relationship between carbon emissions, energy, gross domestic product, and population. The first panel (State of the Science) provided a primer on the levels of carbon emissions, their hypothesized causes, and their implications for society, with a focus on health. The second panel (Shaping Policy) discussed political challenges to setting international, national, and local policies. The third panel (Remaking Energy at Scale) focused on obstacles to creating a low-carbon energy supply. The fourth panel (Reshaping Demand at Scale) sought to identify ways to foster more energy efficient consumption. Since enterprise will play a pivotal role in finding solutions, the second half of the think tank focused on this domain. The fifth panel (Where Is the VC/PE Model Working – and Not Working – and Why?) explored challenges faced by green energy investors as they work, alongside government, to develop renewable energy sources. The sixth panel (Customers, Partners, and the Challenge of Scaling) heard from investors and start-ups collaborating with governments and large incumbents. The final panel (Leadership for Multi-Stakeholder Solutions) communicated lessons and offered models for creating a common ground for action.

Proceedings from each panel were filtered through the framework of advanced leadership. Throughout, the report highlights opportunities for actions, both large and small, which can be placed on the energy, environment, and business agenda.
State of the Science

The urgency for reducing GHG emissions rests on an accurate definition of the problem and on the veracity of scientific claims. If new evidence suggests that global temperatures are not rising or not rising as quickly as believed, that the increase is not attributable to human influence, or that high rates of carbon in the atmosphere will not have environmental consequences – such as melting ice caps and mountain snow, rising sea levels, floods, droughts, heat waves, arable land loss, and other natural disasters – then the need for action will disappear.

However, Daniel Schrag, Sturgis Hooper Professor of Geology and Professor of Environmental Science and Engineering at Harvard University, reported that the overwhelming majority of climate scientists agree that not only is the earth getting warmer but that the major contributor to climate change is human-induced or anthropogenic GHG emissions. Yet climate researchers face significant challenges communicating what Kevin Knobloch, President of the Union of Concerned Scientists, called a “near panic” among researchers advocating for action.

Schrag and Samuel Myers, Instructor in Medicine at Harvard Medical School and Research Associate at the Harvard Center for the Environment, identified several reasons for the difficulty of transferring knowledge about climate change into practice.

The culture of the scientific community makes researchers more conservative about their claims than practitioners. Hypotheses are never fully affirmed, only rejected. Cause and effect are never fully proven, only correlated. The field’s criteria for certainty are demanding, requiring a statistical confidence of 95 percent. The accumulation of empirical facts to support theories takes time. Climate researchers thus qualify assertions, which weaken the forcefulness of their communications. Although companies or the military also operate in a sea of uncertainty, their norms of operation differ. Economic studies, such as those by McKinsey & Company, make just as many assumptions and estimates as climate scientists regarding cost-abatement curves, yet they do not emphasize disclaimers. Military officers make decisions based on risk. They cannot wait for even 50 percent confidence, otherwise people die. They must assess decisions based on trends.

The earth’s climate system is complex. What is certain is that the amount of GHGs in the atmosphere is rising to unseen levels, creating a global experiment unlike any humans have seen. This injects additional uncertainty into a community already cautious about claims. What will happen once the earth’s temperature passes a certain threshold? The ocean and biosphere absorbs greenhouse gases and creates a small cushion, but at what point will absorption fall? How fast will Greenland and Antarctic ice shelves melt? How high will sea levels rise? How much arable land will be lost? What effect will mountain snowmelt have on water resources? And what are the human costs? Already, world food production will need to double by 2050. How will this be achieved with less arable land and less water? Will nutrition needs be met when crop growth in warmer temperatures needs more water of which there will potentially be less of? Will there be more soil microbes? What about increased effects of pests and pathogens? Infectious disease? What is the possibility for people displacement, and what are the political effects? The environment is tenuous and climate change is exacerbating it. While there is uncertainty about what will happen, the impacts will be indirect and will likely be surprising if the growth of global GHG emissions continues along the present path.

Public acceptance of conclusions have been weakened by revelations about research activities within the Climate Research Unit at East Anglia University and by misstatements made in a report published by the Inter-governmental Panel on Climate Change. The integrity of findings has been
called into question by some. On the other hand, core facts have been lost. Climate scientists know a lot about natural volatility in temperatures and what is happening is unique. Over the past 100 years, the Earth’s temperature has risen as much as it had in the previous 10,000 years.

Climate science is lobbied against through media campaigns. In the United States, $300 million was spent in 2009 to message against a clean energy bill and scientific claims about climate change versus $13 million spent in their favor. Uncertainties exist in climate science as do legitimate naysayers and skeptics within the research community. However, aspects of debates are easily picked up, generalized, and marketed to discredit entire classes of findings. The debate in the United States is a question of whether there is a problem, rather than having a healthy partisan debate about what to do.

The media, including major news organizations, cover science more like political reporting giving equal space to divergent perspectives, rather than like business reporting which investigates an issue with the goal of uncovering some truth. A shift in perspective would require reporters to assess information based on certain standards, much as business reporting treats topics based on standards of conduct. Naysayers or classic contrarians have a purpose in debate, while skeptics often focus on specific parts of a problem. Science reporters should be able to discern these distinctions and give an accurate portrait of the debate.

While discussing these issues, participants identified several opportunities for advanced leadership action.

Opportunities for advocacy are expanding as the U.S. Congress moves to take up an energy and climate bill. The country’s political geography is complex but messages can be sent through either individual effort targeting strategic regions and states or existing advocacy organizations, such as the Union of Concerned Scientists.

Messaging by scientists could be improved in at least two ways. Scientific uncertainty is not a reason for complacency. The issue can be reframed as one of insurance needed to protect from risk. Sacrificing 1-2 % of GDP over a 30-year period may appear as an acceptable cost for preventing environmental catastrophe. Scientists could also tout the positive benefits of addressing climate change, including health improvements, new markets, new jobs, more business efficiency, smart energy in homes, and better national security. “The way to move the ball forward is not to talk about science; it is to talk about economic benefits, job benefits, public health benefits, and energy security benefits,” said Trip Van Noppen, president of Earthjustice. Creating a new energy infrastructure requires massive capital investment, as China has already shown. In the United States, it would be the largest such initiative in 50 years, but has enormous potential payoffs.

Scientists can also improve research by better coordinating climate monitoring activities. For example, in the United States the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA) could do a better job sharing and comparing findings, despite existing organizational structures that separate them. New pathways of information flow are needed.
Crafting effective policy to address climate change is a core challenge for advanced leaders. The authority to reduce greenhouse gas emissions is diffused across countries and within them. Resources, including capital and talent, are dispersed across sectors. Multiple stakeholders have conflicting interests – developed versus developing countries, incumbent energy companies versus renewable start-ups, public concern for jobs versus interest in reducing energy consumption. Goals remain vague since the economic effects of policies remain uncertain. And pathways and institutions, such as the United Nations Framework Convention on Climate Change, have not yet developed to the point that they can address the problem.

The failure to achieve a binding global agreement for GHG reductions at Copenhagen altered the international policy landscape. Major stumbling blocks included the inability of the U.S. to make commitments due to impasse in its Senate and China’s reluctance to make firm numerical carbon-reduction promises. But not all was lost, claimed Robert Stavins, Albert Pratt Professor of Business and Government at Harvard University. Last-minute direct negotiations between the U.S., China, India, Brazil, and South Africa resulted in the Copenhagen Accord, a portfolio of political, but not legally binding, commitments which secured important new promises, including the acceptance of an international monitoring mechanism.

Meanwhile, China, the United States, and the European Union (EU) – the three largest producers of GHGs, accounting for half of global emissions – have moved policy forward on different fronts in different ways and at different rates.

Nancy Kontou, an EU official, reported that Europe will continue to push to meet its targets for 2012 and beyond. The reasoning was moral and strategic. It is the “right” thing to do for future sustainability, and it further decouples the region from energy supplies in Russia and the Middle East. China, the world’s biggest emitter, has also moved more aggressively into renewable energy for economic, environmental, and social reasons. Its energy consumption will continue to rise as its economy grows, and its reliance on coal has already had harmful effects on public health and water supplies, a situation which could lead to unwanted social unrest.

While approaches in the EU and China are more top-down, state and local governments in the United States have taken the lead in the face of federal paralysis. Although a climate bill has been held up in Congress, existing federal laws have created opportunities. The stimulus package apportioned $80 billion for renewable energy and energy efficiency projects. The Supreme Court’s ruling that GHGs may fall under the purview of the Clean Air Act has given the Environmental Protection Agency (EPA) greater potential regulatory jurisdiction. (Three weeks after the gathering, the EPA announced formal rules for automotive fuel efficiency standards.)

---

and appliance energy efficiency standards were followed, they could eliminate the need for as many as 250 power plants. At the sub-national level, states have already crafted their own electricity efficiency standards and emission reduction plans. Many have also agreed to set up regional emission trading schemes. However, some of the most exciting initiatives have come out of cities.

The top 100 metropolitan areas in the United States are home to 65% of the population and account for 75% of the GDP. Nationally, buildings produce 40% and transportation 30% of total emissions. Much of these GHGs are emitted in and because of cities where residents must commute from energy-inefficient homes in energy-inefficient cars to energy-inefficient offices. Douglas Foy, founder and CEO of Serrafix, argued that change in the United States, as often happens, will begin locally in cities and states before federal law takes up the issue in a satisfactory way. “Tell me the question. The answer is cities,” he said. Immediate opportunities for action include retrofitting buildings, a change in transportation goals from “getting there” to “being there,” and the repopulation and densification of urban areas, though the latter raises tricky zoning and social issues. Regardless, U.S. mayors have the potential of being the country’s most effective political leadership on climate change.

Participants outlined several scenarios for how the relationship between U.S. and international policy would play out. If the U.S. got a climate and energy bill through Congress by the end of 2010, it would strengthen its position at the December 2010 COP-16 climate meeting in Cancun, Mexico. If not, an international agreement would see further delays. Most concluded that the costs of U.S. federal inaction for both the U.S. and the international community were significant. In the U.S., businesses already devote resources to disentangling and complying with multiple state regulations, while in Europe, despite more regulations, the rules are clearer and easier to follow. Inaction also risks creating a further misalignment between the U.S. and global corporations. CEO engagement with sustainability, according to one survey, doubled from 17% to 35%, with leaders citing the belief that sustainability could drive revenue growth. Oil and coal interests may be moving into greater conflict with general business interests, many of whom already assume that action on climate change is not a question of whether but when. If the U.S. doesn’t craft a clear position and speak with a coherent voice, it may lack the ability to help create the new global rules. On the other hand, some questioned whether a concrete U.S. position would guarantee an international agreement. Emerging markets such as India and China also have tough choices to make between short-to-medium-term growth and longer-term environmental, health, and water risk from climate change. Some suggested that a focused U.S./China deal may help solve the problem.

Several opportunities for action exist globally and in the U.S. where the challenge lies in how to push upward from local and state arenas to the federal level.

Based on the observation that political actors have not heard enough from business interests – outside those directly affected by pending legislation – more companies could go public on the importance of pursuing low-carbon technology and putting a meaningful price on carbon of at least $30 per ton. At that level, many argued, gas and coal are more likely to operate at the same margin and could better drive efficiency and innovation.
Messaging could change from that of melting of ice caps to energy security and public health costs. It may also benefit from segmentation. Local and state governments may be more amenable to “efficiency,” the state and national level to “renewable,” and research groups to “carbon capture” messages. They are a three-legged stool – focusing on one to the detriment of others could leave issues unaddressed. For example, advances in geo-engineering and carbon capture are merely “tourniquets,” according to Daniel Schrag, failing to touch the problem of growing emissions.

Although there was some debate on the issue, legal interventions opened up through possible EPA regulation of GHG emissions could also be used to push back, especially against stationary emitters, and shift the balance away from coal. Globally, 8,000 stationary sources produce 50 percent of GHG emissions, with 1,000 accounting for 31 percent of the total.

Given financial constraints, approaches will need to be more integrative in addressing multiple problems at once. The U.S. can do a better job busting silos that separate agencies such as the departments of transportation, energy, and environment. Closer links can also be found with water issues. It, unlike energy, has no substitute, and its transport and processing requires excessive amounts of energy.
Remaking Energy at Scale: Issues and Opportunities

The reduction of GHG emissions requires a shift to low-carbon energy sources which confronts hefty technological, economic, and political obstacles. More research, development, and demonstration are needed to create renewable energy alternatives but this costs money, a tall order for companies beholden to the supply of affordable energy to customers and the delivery of profits to shareholders, especially during a recession. Creating incentives for shifting investment is a political challenge, especially in the United States where regional and industry interests standing to lose in the transition seek to block or weaken legislation.

Tim Wirth, former U.S. Senator and the President of the United Nations Foundation and Better World Fund, reported that a growing consensus had emerged around a three-pronged approach working its way through the Senate, which differs from the House Waxman-Markey bill which took an economy-wide, cap-and-trade approach. Since emissions are split between utilities, transport, and industry, reductions can also be made through a sectoral approach which uses cap-and-trade for utilities, tax for transportation, and regulation for industry.

Sensing impending legislation, utility companies have crafted new sustainability strategies. Jim Rogers, Chairman and CEO of Duke Energy, convinced his board to reverse its stance from opposing to supporting carbon regulation. The decision created tensions with the oil and coal industries, but it was a practical move. In 40 years, all of Duke Energy’s existing generation capacity will be retired. The company is the third-largest producer of carbon in the U.S. Some kind of cap on carbon will be set and it was best for the business to get in front of the change. The challenge is how to make the transition – and how fast. Duke Energy takes three major criteria into account when making business decisions. Is the energy affordable for customers? Is the energy source reliable? Is it clean? The time horizon for investment in generation facilities is 50 to 60 years. However, utility companies have difficulty assessing options because they do not have a government roadmap which clearly states the rules of the game. In the face of uncertainty, Duke Energy assumes that Copenhagen was a success and bets on a wide portfolio of renewable energy sources.

The commercialization of alternative energy such as wind, solar, and biofuels faces technological and economic barriers. Coal remains abundant and cheap, and the true cost of oil is not reflected in its price since it does not take the U.S. defense budget into account. The price of electricity has not changed significantly over the past five decades, and the price of gasoline in the U.S. remains relatively low, especially compared to Europe. For renewable energy to become competitive, many, though not all, agreed that a price needs to be set for carbon of at least $30 per ton. Otherwise, the alternatives will remain too expensive and will fail to attract necessary investment for improvement.

Recent innovations in shale gas extraction may change the landscape. Jim Hackett, President and CEO of Anadarko Petroleum Company, championed the product as an ideal bridge fuel, meeting both carbon reduction and energy security needs. Through a technique known as “fracking” – the fracturing of underground shale rock – natural gas can be extracted relatively cheaply. It emits half the carbon of coal, is in abundant supply in North America and parts of Europe, and has the potential to remake energy’s geopolitical landscape. Yet environmental questions remain and some utility executives are suspect. Jim Rogers likened shale gas to “crack cocaine” – it is cheap and causes an instant high. Given existing generation capacity, natural gas can only meet 50% of total demand. Investing in new plants is risky given past experience with the fuel’s supply reliability and
price volatility. Hackett acknowledged open issues, recognizing that shale gas would not solve all energy problems but emphasized that it could contribute significant carbon reductions.

Hackett also supported the use of nuclear and biofuel solutions though the latter requires more advanced research. Regardless, a mix of sources will be needed, including renewables, possibly clean coal achieved through advances in carbon capture technology, and likely nuclear. Although nuclear plants are expensive to build, they have a long half-life for recouping investment, are clean, offer energy independence, and have improved safety standards as reflected by their continued use in U.S. naval vessels. The future ratio of the mix will require experimentation and innovation as well as collaboration between start-ups, universities, and incumbents. Georgia Tech, for example, has worked with Exxon on the development of carbon capture and storage solutions. Renewable ventures have also begun to cooperate with established utilities.

Participants made several recommendations for changes in messaging. Jim Rogers suggested that the issue be reframed for business as the need for a roadmap – a clear set of rules and regulations for making investment decisions, many of which have 50-year time horizons. Tim Wirth called for the creation of a “relentless narrative” for change making the case for legislative action. Finally, Jim Hackett proposed the development of a guilt campaign to reduce energy use. This, however, raises demand-side issues.
Reshaping Demand at Scale: Issues and Opportunities

The reduction of GHG emissions can also be achieved through either less or more efficient energy use. Consumption falls into three broad categories – buildings, transportation, and industry, roughly accounting for 40%, 30%, and 30% respectively of total U.S. emissions. Although the reduction of energy use, especially in residential and commercial real estate, has little economic costs – just learning to turn off “blinking lights“ and knowing when to open and close blinds can shrink energy consumption by as much as 20% – the changing of ingrained behavior, much of which owes itself to the built infrastructure, is a difficult task.

Existing building stock is a major barrier since construction has not traditionally taken energy costs into account. However, clients have begun to demand “green” or LEED (Leadership in Energy and Environmental Design) buildings. Even if clients want the design merely for marketing or branding purposes, firms, such as Robert A.M. Stern Architects, see it as the starting point for a larger conversation and collaboration. Location is among the biggest global drivers of sustainable design. Commercial real estate in India, for example, must address water shortages and intermittent electricity supply while other issues predominate in other geographies. However, green design alone does not guarantee greater efficiency.

Buildings must be maintained and managed optimally. When real estate owners, developers, and managers, such as Hines – the owner of 120 million square feet of commercial space globally – sell the advantages of sustainability, they talk about the competitive advantages from cost savings rather than climate change. By delivering value for clients, the company achieves higher returns. It created a Green Office to listen to stakeholders for innovation ideas and measure and reward sustainability. It is also a founding member of the Greenprint Foundation, a non-profit consortium of real estate investors, developers, owners, managers, and lenders dedicated to reducing the energy consumption of the built environment through a procurement platform which helps lower supplier costs in a fragmented industry and an environmental performance database for measuring carbon footprints.

The development of metrics is crucial – and not just for the design and management of buildings. According to IBM, environmental sustainability offers competitive advantages and should be an integral component of business strategy. It enables companies to reduce costs, meet increasing consumer demand for green products and services, improve branding, and manage low-carbon compliance standards coming into effect. But to capture this value, companies need better information. For example, few realize that more efficient management of servers and data centers can both reduce energy use and increase capacity. The gathering of information on energy usage and presentation of it on an “environmental dashboard“ can induce behavior change. One study found that the use of smart meters helped consumers lower electricity bills by 10% and cut peak power usage by 15%. If scaled, the returns are large. A mere 5% reduction in U.S. peak demand could eliminate 625 power plants. The same efficiencies can be found through metrics which track product life cycles or monitor traffic patterns. UPS, for example, found that they could reduce gasoline use – and cut costs by $6 billion – if they avoided making left-hand turns in the United States, thus reducing waiting times in urban, energy-consuming environments. Getting trucks off diesel would also contribute significant reductions.

Inertia is built into the U.S metropolitan transport and real estate infrastructure. Only 1% of the U.S. building stock gets replaced every year, limiting the gains created by new construction. Although millennials and older generations have begun to move back to and reside in denser urban
neighborhoods, the market is ahead of homebuilding. Retrofitting is essential, but costly, especially in cities.

If greening commercial real estate is hard, retrofitting residences is even harder, especially in lower-income urban areas, which have financing difficulties. There is a social exclusion to sustainability. The Emerald Cities Collaborative, a partnership begun at the MIT Community Innovators Lab, developed a cross-sector model to address the problem. Built on a belief in the existence of hidden assets in poor communities and on the conviction that equity and efficiency go together, the project connects community colleges with unions to train and apprentice a new workforce capable of retrofitting residential homes. Understanding that communities who do not feel that they have a stake in the efficiency measures are more likely to block initiatives, as was the case with the congestion pricing proposal in New York City, the Emerald Cities project also includes a coalition of churches, housing authorities, and local groups who contribute to the project. Cities are complex and segregated, and the behavioral component of consumption cannot be separated from the social aspect of groups.

Other suggestions for future action on demand reduction included more convening, the development of metrics, and a focus on cities.

Henry Chow, the former Chairman of IBM Greater China and a 2010 Advanced Leadership Fellow, encouraged groups to seek collaboration projects to demonstrate ideas. They could be as small as the hosting of forums to educate or as large as a high-level agreement between the U.S. and China to work on a topic. Ideally, pilots should get started in as many countries as possible. “Don’t wait for legislation,” he said.

Kenneth Hubbard, executive vice president at Hines, and Meghan McDermott, a partner with Robert A.M. Sterns Architects, emphasized the need for better metrics, accountability, and incentives for the real estate sector. If developers, managers, and end-users could see the energy and water use on a simple dashboard, they could better control consumption and see cost savings. Common metrics for tracking building performance have yet to be created. If done, cost savings could be predicted, captured, and securitized. Securitization could improve the financing of retrofitting by demonstrating the expected savings over a certain period of time, but investors have not figured out how to do it yet. Performance metrics would hold investors, developers, architects, managers, and end-users accountable to standards or targets. A new financing mechanism would also be crucial at a time when collective debt is elevated and greening efforts have slowed due to capital constraints.

Finally, focus on cities. Retrofitting resources are limited and those that are available are dispersed. Although retrofit and weatherization funds are tied up in cap and trade bills in Congress, some state money exists. Dayna Cunningham, executive director of the Community Innovators Lab at MIT, called for the fuller inclusion of community members, including children, as stakeholders in the process. Students can be the best advocates for addressing the issue through, for example, monitoring competitions during public school upgrades. Such tactics have already been used in New England and the South Bronx. The organization of local energy cooperatives is another opportunity. Non-profits can fill gaps in the community, connecting local stakeholders, pushing for legal changes, or encouraging a change in existing behavior.
Where Is the VC/PE Model Working – Not Working – and Why?

New global investment in clean energy has hovered at $150 billion annually since 2007, with venture capital and private equity accounting for roughly $10 billion per year. In an industry where less than 5% of the investments accounted for over 60% of the returns, the bets are particularly risky in green technology where large amounts of capital are needed and returns – or information indicating that returns will come – are delayed. Energy investments also face technological, economic, and institutional barriers.

As the clean energy industry takes shape, venture capitalists seek to pick winners across a broad spectrum of possibilities in different stages of development. Domains include renewable energy and power generation, renewable fuels, transportation, smart grid and storage, energy efficiency, waste and water, and even nuclear. Ajit Nazre, a partner at Kleiner, Perkins, Caufield, & Byers, reported that investments in his firm range from low ($50 million or less) to mid ($50-$250 million) to high (above $250 million) capital projects. However, not all firms categorize investments based on capital intensity. If the opportunity is there, they can find the financing, said David Prend, managing general partner and co-founder of RockPort Capital Partners.

Major challenges lie in developing partnerships with the government. Traditionally, the U.S. Department of Energy (DOE) has supported early stage research and handed projects over to the private sector once they advanced to an application stage. But recently, the DOE has worked more closely with companies, offering funding and access to government research labs, especially for early stage businesses. One such office in the DOE is the Solar Energy Technology Program, managed by John Lushetsky. When investors were asked what they needed from government, requests included more money for research especially in basic science, greater transparency when making allocations in order to avoid lobbying, and the offering of internships or sabbaticals to allow people from the private and public domains to cross sectors and learn more about issues faced by the other side.

Renewable investments have shown considerable promise. The number of companies in the sector is growing, proving that the space exists. The bets are big but, if they pay off, then renewables, such as solar and wind, could go mainstream in as soon as three years and could disrupt the industry. If they can scale, there’s little need to buy other energy sources again. New industries, with major new players comparable to Google and Cisco in IT, would then emerge. There is also great promise in energy efficiency and smart grid technologies. Many felt that nuclear will be a part of the energy mix equation, and there is some venture capital activity in this domain, focusing on fission, fusion, and the fuel rod reuse.

New ventures face innumerable challenges, including technological development, business model innovation, scale, pricing, regulation, intellectual property (IP), human capital, incentive alignment with stakeholders, and government funding. In addition to capital and technology, IP protection and talent were cited as particular concerns. When the new IT and web industries were forming, there were no real rights. The issue was and is how to get market traction and lock in users as fast as possible. However, in renewable energy there are high capital costs, slow take-up, and low IP, which creates unique problems. It is also difficult to patent energy efficiency solutions. Some green investors also cited IP as an issue preventing companies from going to China. As for human capital, firms recruit executives from other industries with similar operating dynamics, such as IT, semiconductors, chemicals, and even NASA. The talent can be found at the managerial levels, and
relationship capital is crucial for raising money and developing partnerships, all of which are needed to execute. However, the lack of talent does hold back nuclear ventures. Since the U.S. moratorium on reactor construction, most nuclear engineers are, on average, in their mid-50s.
Customers, Partners, and the Challenge of Scaling

Identifying an innovative product or service is only part of the clean energy challenge. To have impact, solutions have to reach the widest swath of an industry or a society as possible. Yet during commercialization, new products and services often run up against structural barriers because institutions, pathways, and markets do not exist. Products and markets must be built together, which requires start-ups to collaborate closely with customers, incumbents, and governments. Select partnerships have begun to develop, but more are needed.

Craig Huff, co-CEO and co-founder of Reservoir Capital Group, successfully built one such partnership with Coca-Cola. As the soft-drinks giant enters emerging markets, energy availability has become a major barrier in production. Reservoir Capital’s firm proposed the creation of efficient miniature power plants whose carbon could be captured onsite and used for producing the beverages. It took one year and two prototypes to give proof of concept and convince Coca-Cola to do the project, but now that they are committed, they hope to roll it out to 80 plants in Eastern Europe. Energy efficiency and carbon capture can be good for business and the environment.

Opportunities also exist for collaboration with incumbents, especially on the delivery and service side. Utility companies are those closest to customers, especially in the residential sector – a fragmented market. Many utilities, who envision themselves as enablers of small companies, have offered to test innovations and give feedback. However, they may also request the option to invest in the venture and capture more value from the technology. A challenge for start-ups is to assess incumbent intentions. Assisting with pilots may be a branding play for utilities, but they may also be genuinely interested in the innovation. Yet if an incumbent acquires a stake in a venture, they could easily prevent its commercialization. What incentive would they have to switch to the new technologies? While some parallels may exist with the biotech industry, where large firms team up with small innovators, the conditions are not yet identical. Incumbents, such as oil companies, have in-house investment opportunities and do not yet need more. If or when circumstances change, they may still have the time and capital to catch up.

But the U.S. green industry as a whole may not. The U.S. government started late and many of its investments are attempts to keep pace with other regions and ventures. China readjusted quickly beginning around 2005. Although European regulation is not ideal, its tariff programs are simple and understandable, unlike in the United States, observed William Nesbitt, managing director of Good Energies. Since the 1980s, the decision-making context in the U.S. has been volatile and therefore sub-optimal because the country, in general, has lacked a comprehensive energy policy. A production tax credit for wind, for example, has been on and off since the early 1990s and is still considered “temporary.” “Big international companies didn’t focus on the U.S., which is a big price of not having a consistent wind policy,” said Michael Skelly, founder of Clean Line Energy Partners. Horizon Wind Energy, founded earlier by Skelly, was eventually sold to Goldman Sachs before they transferred ownership to a Portuguese company which saw it as a more strategic investment. During the recession, there has been an increasing competition for government funds and some foresee escalating capital costs, due to interest rate pressure created by the U.S. deficit. However, there has been some continuity at the DOE. While there are rhetorical and target differences separating the Bush and Obama administrations, funding areas have not shifted dramatically.

While several participants argued that government is a bad predictor of technological winners, others countered that China does predict as a part of its comprehensive energy strategy. Such clarity prompted Siemens, for example, to build one of its plants in China rather than in the U.S.
Crucially, China has begun to create an internal market which fosters incremental – and potentially exportable – innovations. Yet IP remains a barrier for the country and its foreign entrants. Once production goes in, the recipe is there and may leak. For this reason, Alan Greenshields of Fortu PowerCell will not consider manufacturing in China. According to Henry Chow, much innovation is also centralized at the Ministry of Science and Technology. In contrast, the DOE relies more on markets but with a vested interested in encouraging and funding the creation of scalable, “commoditized” solutions. Furthermore, Greenshields believes that the issue of scale is asked one stage too early. “Some niches are huge before they get to commodization,” he said, citing several battery and automotive market niches nearing $1 billion. Such opportunities enable collaboration with state governments.

Some states have taken a more active role seeking partnerships and fostering new industries. Michigan, for example, has made a bet on the electric drive train. They think that electric transportation will become ever more critical, and they want a strong position in these products. Texas, following a bill passed by then Governor George W. Bush in 1999, has developed a vibrant renewable sector. In 2010, wind provided 25% of the state’s total energy supply. The state is also unique in that its grid is not integrated with other states and thus gives it more opportunity to experiment.

Scaling requires collaboration – working with government to craft optimal regulations, partnering with universities and other R&D to develop technologies, teaming up with incumbents to commercialize products, forming coalitions that cut across sectors. These initiatives call for multi-stakeholder leadership.
Leadership for Multi-Stakeholder Solutions

Leading in environments where authority is diffused, resources are dispersed, and goals are diverse requires action on multiple levels which attack the problem systemically – at the macro, meso, and micro levels.

Ray Rothrock, the managing general partner at Venrock, and his team spent 18 months analyzing trends in government funding, awarded doctorates, and corporate laboratories in search of the next big return in the clean energy market. But they saw nothing but noise. Energy solutions already existed, they concluded. The biggest challenge lies in aligning the macro forces of government, industry, technology, and the public and leading them through successive stages of adoption, adaption, innovation, and evolution. The U.S. had aligned these components before when it set the goal of putting a man on the moon, a mission that resulted in innumerable innovations and positive spillover effects. Another opportunity arrived after the oil shocks in the 1970s but was missed due in large part to failed government and business leadership. In the 2000s, the challenge of climate change has dovetailed with the rise of China and India and the “revealing” of terrorism. An overarching vision, such as that of “save democracy, save the planet,” may be what is needed to get multiple stakeholders to align around an action plan.

Moving below the macro-level, David Vieau, president and CEO of A123 Systems, and Mindy Lubber, president of Ceres, offered insights on the challenge of leading specific multi-stakeholder solutions from the private and non-profit sector, respectively.

A123 Systems specializes in the production of energy storage systems, such as advanced lithium ion batteries. The company’s success depends, in part, on how well it develops the nascent market. To do this, they have relied on partnerships with state and federal government, universities, and venture capital firms. The DOE as well as Michigan and Massachusetts have provided grants, loans, and tax credits. Cooperation with the DOE began with a small shared venture which the company delivered on. In three years, the product could be bought at Home Depot, just the type of commercialization the DOE could highlight as a success. Work with Michigan began because the state, home to the U.S. automotive industry, was committed to developing the lithium ion battery industry. A123 began by making a small, specific request presenting a compelling business case for funding. In two weeks, they were awarded $23 million. The collaboration continued with matching recovery act grants and refundable tax credits. Vieau is confident that the problem of oil, especially in transport, can be solved with the help of an electrification coalition. However, he emphasized the need for a better framework for cooperation with the federal government. The passing of a comprehensive U.S. energy bill by the end of 2010 would be ideal.

A major objective for Mindy Lubber and Ceres is to better integrate sustainability into financial markets. Doing so requires advocacy and engagement with corporations, financial institutions, industry groups, environmental organizations, and governments. Ceres argues that addressing sustainability is a business opportunity and not addressing it is a business risk. Select companies, such as IBM and GE, have already integrated sustainability into their core strategies and use it to guide innovation. However, exposure to environmental issues, such as water shortages, also creates risks of unknown proportions, which financial investors and insurance companies struggle to take into account. Ceres believes that this issue can be addressed through the development of sustainability metrics which can be placed on balance sheets, rather than in a CSR report. Creating this change requires action on several fronts. Boards would need to take up the issue through the formation of sustainability committees. New policy could compel companies to report in a way that reflects the damage and cost to society of their environmental practices. The SEC, for example,
now requires firms to disclose exposure to climate risk in their 10-K’s. Although some financial institutions have begun to integrate sustainability into their analysis, the quarterly mindset, which emphasizes short-term performance, works against the embedding of a longer-term sustainability perspective. Bloomberg’s new environmental, social, and governmental (ESG) data service, which makes information available and searchable, is a move in the right direction. If a full set of sustainability metrics are developed, can be reported succinctly, and are published alongside financial reports, then investors and shareholders would have the tools they need to hold businesses accountable.

At the micro-level, Jonathan Rose, founder of a real estate firm of the same name, has led innumerable multi-stakeholder building projects which emphasize multiple use and sustainable design. In the real world, he said, all is interconnected, especially in local communities. Boundaries are mental. His projects seek to “repair the fabric of communities” by densifying the space and connecting diverse groups in multiple ways – combining commercial space, public gardens, and residences or better integrating youth aging out of foster care, seniors, the formerly incarcerated, and low-income housing into communities. Initiatives require buy-in from multiple stakeholders throughout the process. One project in Denver which sought to renovate a downtown warehouse and revivify the area began with an unlikely success – lawyers representing 23 different funders agreed to a contract because they authored it from scratch together in the same room. While the upfront cost of multi-stakeholder collaboration is high, when achieved, the returns include stability and reliability.
Advanced Leadership for Change

Reducing global GHG emissions – and creating jobs, improving health, saving water, and improving security – requires not only technological innovation but changes in human behavior. Strengthening climate science, crafting new policy, remaking energy supply, reshaping demand, and inventing markets requires collaboration across sectors (public, private, non-profit), industries (utilities, automotive, real estate, finance), and geographies (developed and developing; urban and rural; national, sub-national, and states). These domains intersect, and leaders that work on solutions, even if targeted, must think systemically about how the larger pieces fit together.

To address these problems, advanced leaders use a set of four important clusters of skills, many of which were on display during the think tank:

1. Advanced leaders start with a big vision but break it down into achievable steps, often beginning with a demonstration in the form of an operating program that is used to build a constituency for bigger change. They identify untapped resources and use them as opportunities for innovation. Investors know this process well. For example, Reservoir Capital Group demonstrated this skill during its collaboration with Coca-Cola, as did A123 Systems during its partnership with the U.S. federal and state governments. Renewable energy projects thrive on the identification of untapped resources – wind, solar, biofuels – and using them to innovate. But more research, demonstration, collaboration, and constituency-building are still needed to achieve scale and impact.

2. Advanced leaders look at problems in multi-faceted ways, first surveying the landscape for what already exists and finding gaps to be filled. They see the connections among issues and can create programs that themselves solve multiple problems simultaneously while building coalitions that create political will for change. The focus on cities, as touted by many, including Douglas Foy of Serrafix, is a systemic approach that can create jobs, reduce health risks, and improve the environment. Mindy Lubber and Ceres have led a coalition that identified a gap in sustainability metrics and is actively filling it, reducing financial risk and improving the environment at the same time.

3. Advanced leaders are advocates for ideas and mobilizers for change. They create social movements as well as social innovations. They shape public opinion. They create or join coalitions of organizations with similar missions to unite for impact. They engage with the political process and work hard to overcome resistance to change. Earthjustice and the Union of Concerned Scientists advocate for change through litigation and lobbying. Other non-profits have helped change energy consumption behavior. Within the real-estate industry, Hines, for example, has taken an active role as a founding member of the non-profit Greenprint Foundation, a coalition dedicated to reducing energy consumption in the built environment through a procurement platform and an environmental performance database.

4. Advanced leaders know how to understand constituencies and stakeholders and listen deeply to their perspectives, especially in a politicized context. They have the skills to gain the support and contributions of stakeholders with resources to address a problem and create a team approach to problem-solving. They use “kaleidoscope thinking” to rearrange the patterns, like shaking a kaleidoscope, by bringing together resources from partners that are traditionally unconnected. Start-ups with social innovations have teamed up with utility companies to test interventions. The Emerald Cities Collaborative unites unions, community colleges, urban housing authorities, and churches to train a new workforce to retrofit residences in low-income
urban neighborhoods. Jonathan Rose Companies engages a broad cross-section of stakeholders as it redesigns urban building and space to become more inclusive and energy efficient.

These and numerous other opportunities for advanced leadership were identified during the think tank. “Going Green” not only prevents environmental catastrophe but is an enormous economic opportunity which can remake the geopolitical landscape. But realizing this vision requires leaders to build coalitions and partnerships and, together, identify the levers needed to align the goals, exercise the authority, and mobilize the resources necessary for finding greener solutions, forging new pathways, building new institutions, and creating new markets.
Think Tank Agenda

Wednesday, March 3

6:00 – 7:30 pm  Welcome Reception

Thursday, March 4

8:30 – 9:30 am  Welcome & Introductory Remarks
                 Rosabeth Moss Kanter and Bill Sahlman

9:30 – 10:30 am  State of the Science
                 Dr. Samuel Myers and Daniel Schrag

11:00 am – 12:00pm  Shaping Policy
                    Douglas Foy, Serrafix; Nancy Kontou; Robert Stavins; Trip Van Noppen
                    Moderator: Susan Leal, ALI

12:00 – 1:00 pm  Lunch

1:00 – 2:00 pm  Remaking Energy at Scale: Issues and Opportunities (Panel)
                 James Hackett; Kevin Knobloch; Timothy E. Wirth; James Rogers
                 Moderator: Forest Reinhardt

2:30 – 3:30 pm  Reshaping Demand at Scale: Issues and Opportunities
                 Henry Chow; Dayna Cunningham; Ken Hubbard; Meghan McDermott
                 Moderator: Arthur Segel

3:30 – 4:30 pm  Breakout Sessions

4:30 – 5:30 pm  Energy and Environment Think Tank: Summary

6:00 – 8:00 pm  Reception and Dinner
                 Keynote Speaker: Dean Jay Light
                 Special Guest Speaker: Congressman Edward Markey

Friday, March 5

8:00 – 8:30 am  Energy and Environment Think Tank: Continental Breakfast and Registration

8:30 – 9:00 am  Introduction

9:00 – 10:00 am  Where Is the VC/PE Model Working – and Not Working – and Why? (Panel)
                 John Lushetsky; Ajit Nazre; William Nesbitt; David Prend
                 Moderator: Bill Sahlman

10:30 – 11:45 am  Customers, Partners, and the Challenge of Scaling (Panel)
                  Alan Greenshields; Craig Huff; Michael Skelly; Jeff Kupfer
                  Moderator: Joe Lassiter

12:00 – 1:00 pm  Lunch

1:00 – 2:30 pm  Leadership for Multi-Stakeholder Solutions (Panel)
                 Mindy Lubber; Jonathan Rose; Ray Rothrock; David Vieau
                 Moderator: Rebecca Henderson

2:30 – 3:15 pm  Closing Discussion
                 Rosabeth Moss Kanter; Rebecca Henderson; Forest Reinhardt; Bill Sahlman

3:15 – 5:00 pm  Closing Reception
2010 Advanced Leadership Fellows

Laurent Adamowicz *
Chairman and CEO, Fauchon

Marcel Amariglio *
Chairman, Sidma S.A.

Anthony Barash *
Director, ABA Center for Pro Bono

J. Veronica Biggins
Assistant to the President of the United States and Director of Presidential Personnel

Henry Chow *
CEO, IBM China

Jessie Colgate
Senior Vice President of Governmental Affairs, New York Life Insurance Company

Michael Critelli
Chairman, Pitney Bowes

Beth Dozoretz
Vice Chair of the Board of Directors of First Hospital Corporation Health Systems and ValueOptions

Richard Fahey
Environmental Attorney, Vorys, Sater, Seymour & Pease, LLP

Kirsten Glueck
Head of Global Licensing and Merchandising, Bertelsmann Music Group

Paul Irving
Co-Chairman and Chief Executive, Manatt, Phelps & Phillips, LLP

Raymond Jetson
Pastor, Star Hill Church

Jay Martin
Managing Partner, Dewey & LeBouef, LLP

John McCambridge *
Co-Founder, Grippo and Elden, LLC

Clifton L Peay, M.D.
Medical Director, American Eye Center

Richard Pettingill
CEO, Allina Health System

Douglas Rauch
President, Trader Joe’s Company

Rodney Slater
U.S. Secretary of Transportation

Frederick Southwick, M.D.
Chief of Infectious Diseases, University of Florida

Fredric Spar
Senior Partner, Kekst and Company

Junko Yoda
Managing Director, Shellingford Ltd.

Thomas Zeltner, M.D.
Secretary of Health, Switzerland

Official Program Partners:
Rumiko Mizuuchi-Adamowicz
Sharon Amariglio
Patricia Chow
Terri Dangerfield Hanson
Pam McCambridge

* Accompanied by official program partner
Advanced Leadership Initiative Faculty

**CHAIR/DIRECTOR**

Rosabeth Moss Kanter  
Ernest L. Arbuckle Professor of Business Administration  
Harvard Business School  
Chair and Director, Interfaculty Initiative on Advanced Leadership

**CO-CHAIRS**

Barry Bloom  
Distinguished University Service Professor Jack and Joan Jacobson Professor of Public Health  
Harvard School of Public Health  
Co-Chair, Interfaculty Initiative on Advanced Leadership

David Gergen  
Director of the Center for Public Leadership  
Public Service Professor  
John F. Kennedy School of Government  
Harvard University  
Co-Chair, Interfaculty Initiative on Advanced Leadership

Howard Koh  
Harvey V. Fineberg Professor of the Practice of Public Health  
Director, Center for Public Health Preparedness  
Harvard School of Public Health  
Co-Chair, Interfaculty Initiative on Advanced Leadership (2006-2009)

Rakesh Khurana  
Professor of Business Administration  
Harvard Business School  
Co-Chair, Interfaculty Initiative on Advanced Leadership

Charles J. Ogletree, Jr.  
Jesse Climenko Professor of Law  
Harvard Law School  
Executive Director, Houston Institute for Race & Justice  
Co-Chair, Interfaculty Initiative on Advanced Leadership

Fernando M. Reimers  
Ford Foundation Professor of International Education  
Director of Global Education and International Education Policy  
Harvard Graduate School of Education  
Co-Chair, Interfaculty Initiative on Advanced Leadership

Peter Brown Zimmerman  
Senior Associate Dean for Strategic Program Development  
John F. Kennedy School of Government  
Harvard University  
Co-Chair, Interfaculty Initiative on Advanced Leadership

**EXECUTIVE BOARD**

Donald Berwick  
Professor, Department of Health Policy and Management  
Harvard Medical School  
President and CEO of the Institute for Healthcare Improvement

David Bloom  
Clarence James Gamble Professor of Economics and Demography  
Harvard School of Public Health

William W. George  
Professor of Management Practice  
Harvard Business School

Allen S. Grossman  
Professor of Management Practice  
Harvard Business School

James P. Honan  
Senior Lecturer  
Co-Chair, Institute for Educational Management  
Harvard Graduate School of Education

Robert H. Mnookin  
Samuel Williston Professor of Law  
Director, Harvard Negotiation Research Project  
Chair, Steering Committee Program on Negotiation  
Harvard Law School

Nitin Nohria  
Richard P. Chapman Professor of Business Administration  
Harvard Business School

Forest Reinhardt  
John D. Black Professor of Business Administration  
Faculty Chair, European Research Initiative  
Harvard Business School
Harvard University, Office of the President and Provost
Harvard Business School
Harvard Graduate School of Education
Harvard Kennedy School
Harvard Law School
Harvard School of Public Health

Advanced Leadership Sponsors
Cisco Systems
George Family Foundation
IBM
James Harman
Jennifer and Sean Reilly Family Fund
John Hancock Foundation
John S. and James L. Knight Foundation
Monitor Group
Paul and Phyllis Fireman Foundation
Procter & Gamble
Xerox

Rapporteurs: Matthew Bird
Recording and transcription services donated by Chuck Denham and TMIT