



EVENT SUMMARY REPORT

Capturing the Energy Efficiency Opportunity: Lessons from EDF Climate Corps

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Participating Organizations

Environmental Defense Fund

Since 1967, Environmental Defense Fund (EDF), a leading national nonprofit organization representing more than 700,000 members, has linked science, economics, law and innovative private-sector partnerships to create breakthrough solutions to the most serious environmental problems. Through their Corporate Partnerships Program, EDF has a 20-year track record of success in partnering with business. To maintain its independence and credibility, EDF accepts no money from corporate partners; generous individuals and foundations fund its work.

The EDF Climate Corps is an innovative fellowship program that places specially-trained MBA students in companies to develop energy efficiency investment plans. Focusing on commercial buildings (responsible for 18% of U.S. greenhouse gas pollution), Climate Corps fellows deliver a compelling business case for energy efficiency consistent with the organizational culture, which moves their host companies to cut their energy use, capture savings and reduce emissions. EDF created Climate Corps to overcome common organizational barriers to energy efficiency - such as lack of bandwidth and expertise, competing business priorities, and disincentives to work across departments - and to capture big energy savings today while training the next generation of business leaders to employ resources more wisely.

Duke Center for Energy, Development and the Global Environment (EDGE)

Few forces will have as profound an impact on business in the 21st century as the global dynamics of energy, natural resources, development, and environment. Exploding global demand for energy, water, and other resources are causing extreme stress on ecosystems and intensifying challenges to business success and society's long-term prosperity. This turbulent environment creates new opportunities and risks for businesses. The Center for Energy, Development, and the Global Environment (EDGE) at Duke University prepares today's and tomorrow's business leaders to meet the global demand for energy, resources, and improved quality of life. Through education, research, and engagement, EDGE helps identify the most promising pathways toward a sustainable economy, and brings together the right players to enable those transformations.

Duke Center on Globalization, Governance, and Competitiveness (CGGC)

The Center on Globalization, Governance & Competitiveness (CGGC) uses global value chain analysis to understand economic and environmental issues affecting corporate and regional competitiveness, and to study the effects of globalization on regions, institutions, and corporations. Global value chains are the networks of companies and supporting institutions required to produce final products.

CGGC is dedicated to undertaking innovative, interdisciplinary research projects to make meaningful contributions to scholarly dialogue and to enlighten the public conversation on the dynamics of globalization and competitiveness. We strive to link global, national and local levels of analysis involving researchers and educators from diverse disciplines, which range from the environmental sciences, medicine, and engineering. Recent projects have included topics such as

industrial energy efficiency, the environment, global health, engineering and entrepreneurship, and innovation in the global knowledge economy.

Supporting Organizations

- Nicholas Institute for Environmental Policy Solutions, Duke University
- Nicholas School of the Environment, Duke University

Sponsoring Organizations

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Introduction

From 2008 to 2010, more than 65 companies and over 80 select MBA fellows have worked together through EDF's Climate Corps Program to identify opportunities for energy efficiency investments that save money and reduce greenhouse gas emissions. Based on the Climate Corps Fellows' 2010 efforts alone, EDF estimates that the program will deliver efficiencies in lighting, computer equipment and heating and cooling systems that, if implemented, can:

- save \$439 million in net operational costs over the project lifetimes
- cut the equivalent of 958 million kilowatt hours of energy use per year -- enough to power 85,000 homes
- avoid over 557,000 metric tons of greenhouse gas emissions per year -- equivalent to taking more than 86,000 SUVs off the road.

Many of these recommendations do get funded and executed in participating companies. For instance, 2008 and 2009 companies report that they are implementing upgrades representing 84% of the energy savings recommended by the fellows.

Recognizing that the Climate Corps program has a rich base of experience related to improving energy efficiency in industrial settings, Duke University's EDGE Center and the Center on Globalization, Governance and Competitiveness approached EDF about co-convening a one-day event to bring Climate Corps companies and fellows together to identify effective approaches to profitably reduce energy use and greenhouse gas emissions.

The September 2010 event hosted at Duke University's Fuqua School of Business brought together Climate Corps companies and fellows from the past three summers to share lessons learned, and to identify common themes or innovations that could be more broadly applied to accelerate energy savings and reduce climate impact. This inaugural event attracted nearly 100 Climate Corps companies, fellows, EDF and Duke staff, guest speakers and members of the Duke community. The interactive format of the event gave participants, organizers and supporters an opportunity to identify the most promising strategies for identifying and delivering on efficiency gains in industry.

The organizing framework for the conference was the "energy efficiency process" (see Figure 1 below), which views energy efficiency in corporations as a series of decisions about identifying, financing, implementing, benchmarking and reporting on energy efficiency investments. Duke faculty, company representatives, and Climate Corps Fellows shared their insights through panel discussions around each of these phases.

Figure 1: The Energy Efficiency Process



Source: CGGC, Duke University.

Panel #1: Energy Efficiency Motivation and Identification

Moderator: Rick Larrick, Professor of Management, The Fuqua School of Business, Duke University

Panelists:

- **John Schinter**, Executive Director of Energy, AT&T
- **David Walker**, Director of Environmental Sustainability, PepsiCo

The first panel addressed the incentives that motivate companies to pursue efficiency gains and the strategies they use to identify specific opportunities. **A primary motivator for all companies is return on investment, though interestingly, this driver alone is rarely sufficient to drive action.** For most companies, energy efficiency investments are evaluated in the same manner as other corporate projects. For example, John Schinter from AT&T outlined their process: (1) mandatory goals are established, translated into financial metrics, and tied to individual accountability and performance; (2) initiatives become part of a corporate-wide database, where results are compared and monitored; and (3) aggressive training programs are in put place to support attainment of the goals. While the process for achieving the goals is also considered through a Balanced Score Card, AT&T sees that **“the biggest commitment is money.”**

David Walker from PepsiCo also affirmed that financial goals are the single most important motivator to invest in energy efficiency. Because PepsiCo annually spends \$800 million - \$1 billion on energy, savings from energy efficiency projects could have significant financial impact.

However, PepsiCo also views consumers and employees as motivators for energy efficiency and sustainability investments and goals. For example, plastic-bottled water is currently perceived as an environmentally-unfriendly product and failing to respond to this consumer preference could affect not only PepsiCo’s product sales, but also its license to operate. In addition, employees now have a keen interest in sustainability, which creates strong internal pressures to invest in energy efficiency.

Historically, energy efficiency projects and investments at many companies are predominately made in the areas of manufacturing and operations. The majority of these projects target immediate savings, though some have a longer time horizon of investment and return. For example, through Climate Corps, PepsiCo identified several opportunities to improve efficiency in their office buildings, plants, and vehicle fleet.

Beyond the typical “low hanging fruit” that is often the focus of energy efficiency efforts, a Climate Corps Fellow at AT&T also identified opportunities that had been overlooked previously in the company. By **conducting a rigorous assessment of the company’s lighting controls**, the Fellow identified cost-saving opportunities that can be scaled across hundreds of millions of square feet of building space and recommended investments that may yield tens of millions of dollars in savings.

The panel also discussed the **critical role of partnerships between corporations and NGOs and engaging other external parties as sources of motivation and insight for identifying energy efficiency investments.** Beyond the individual actions of companies, David Walker of PepsiCo suggested using corporate-NGO partnerships to **influence policy change**, as well as **engaging a company’s supplier base** to incentivize efficiency. John Schinter of AT&T also stressed the

important role of universities and other educational institutions in enhancing the effectiveness of efficiency efforts. Despite strong academic credentials, many new employees still struggle to apply their knowledge in practical settings.

While panel members and the audience agreed that financial factors are a primary motivator to invest in energy efficiency, other ideas and best practices were also elaborated, including:

- Recognize the **power of consumer and employee preferences** as a motivator of sustainability efforts generally, including energy efficiency investments.
- In addition to broadly-applicable interventions, **seek highest value, custom solutions** that may need to be more narrowly applied. For example, utility rates are higher in California and New England, which provides higher returns for the same investments.
- Make use of **third-party financing**. Many vendors are currently offering attractive financing terms for energy efficiency investments.
- **Consider modifying existing infrastructure rather than replacing it**. In many cases, control devices on existing infrastructure can generate a better return on investment and shorter payback period than purchasing new equipment.

Panel #2: Efficiency Financing

Moderator: David Robinson, Professor of Finance, Fuqua School of Business, Duke University

Panelists:

- **Paul Baier**, Vice President of Sustainability Consulting, Groom Energy
- **Jeremy Lemieux**, Senior Auditor, EHS PE, Diversey
- **Brian Weldy**, Vice President of Engineering and Facility Services, Hospital Corporation of America (HCA)

Because of geographical differences in the price and source of energy, the same efficiency projects can derive different financial and environmental outcomes. Global companies with geographically-dispersed operations could miss out on huge energy and money saving opportunities depending on the financial evaluation method employed. In their efforts to fund efficiency projects, Jeremy Lemieux from Diversey recognized that the **classical approach of internal project financing can miss big opportunities**. For instance, applying a simple project-based payback method and capital cost per metric ton of emissions reduced for its carbon reduction projects would result in only 30 projects out of the potential 120 projects meeting their investment criteria.

However, by **taking a portfolio approach of aggregating projects across its global operations, adjusting the simple payback period criterion, and emphasizing total metric tons of carbon emissions reduced**, not only did Diversey increase the number of projects that met the criteria to 90, but Diversey also improved its carbon emissions reductions from 8% to 25%; reduced its capital investments from \$19 million to \$14 million; and tripled its cash savings.

The panel highlighted the **importance of measurement, verification, and credibility** of the energy savings from projects. For example, Groom Energy stated one of their clients whose LED lighting project was expected to derive a 97% annual energy spending reduction was not approved

by the CFO because of a lack of confidence in energy benefits from past capital projects. On the other hand, Diversey discussed how it secured a 40% year-on-year budget increase during a time when all other divisions of the company experienced a 50% budget cut because of the availability of data to verify past project performance. Professor Robinson pointed out that, from the theoretical point of view, **net present value is the most appropriate metric to compare across projects**, by contrasting a modest NPV with a short payback against a significant NPV with longer payback. It may also be necessary to **consider sensitivity analysis** to evaluate whether adjusting a criterion produces a different investment decision. An audience member also suggested that although NPV makes theoretical sense, the **payback period method becomes an important consideration when addressing leased assets**.

When considering the NPV method, **what is the appropriate discount rate** to calculate the NPV of energy efficiency projects, given that they typically have lower risk compared with other corporate investments? Diversey stated it should be no different from the company's standard discount rate. The only way for sustainability projects to be truly sustainable over the long-term is to have them deliver satisfactory financial returns based on uniform corporate criteria, regardless of the interest level of the company's leadership. In situations where an organization has no standard discount rate or does not employ NPV as a metric, an alternative proposed by a Climate Corps Fellow was to adopt the discount rate for energy efficiency projects suggested by the U.S. Environmental Protection Agency.

Since finding the capital internally can be an important inhibitor, **third-party financing for efficiency is becoming more readily available and attractive**. Diversey also stressed that the absence of or ambiguity of international standards on defining ownership of the environmental attributes associated with an energy efficiency project (e.g., greenhouse gas offsets or energy efficiency credits) could be addressed when engaging in third-party financing, particularly across jurisdictional borders.

Panel #3: Energy Efficiency Implementation and Benchmarking

Moderator: Gale Boyd, Director of the Triangle Research Center, Senior Research Scholar, Duke University

Panelists:

- **Judd Eder**, MBA Candidate, University of Minnesota and EDF Climate Corps Fellow, Eaton Corporation
- **Daniel Gisser**, Sustainability Manager, Eaton Corporation
- **John Queenan**, Head of Environmental and Sustainability Property, RBS Citizens Bank

This session focused on obstacles to energy efficiency implementation, creative solutions to these challenges, and how companies use targets and benchmarking to measure their progress and facilitate energy efficiency implementation. John Queenan of RBS Citizens Bank discussed **the knowledge gap between finance and sustainability departments as a primary barrier to implementation**. He lamented that if the finance team does not have an appreciation or knowledge of corporate sustainability goals then projects may take longer to get approved or not get approved at all. He noted **two ways to respond** when facing this obstacle: either **escalate the project above**

finance department's oversight or **change the general financial model** for meeting sustainability goals. As a third alternative explored in the panel, companies can take preventative measures to close this knowledge gap by educating the finance organization to help develop solutions as opposed to saying “no” to these types of projects.

Climate Corps Fellow Judd Eder agreed that **departmental silos can be a setback to implementation**. Judd cited the example of Eaton, where the Environmental Health and Safety department is responsible for environmental reduction goals but the Operational Excellence group controls the budget and actual identification of energy efficiency projects come from the Supply Chain group. To achieve company energy reduction goals, all three groups have to work together, which can be tricky in a fast-paced and dynamic environment. However, Eder pointed out that **having a corporate commitment and C-suite buy-in to reduce energy is a huge advantage in getting projects funded**. All projects are competing for limited capital but having the ability to tag a corporate commitment to the top of an efficiency project proposal has helped many projects at Eaton reach the implementations stage.

The panel **highlighted the importance of asking the right questions to determine the appropriate metrics for a company rather than simply following preexisting, generic metric models**. For example, while many companies use energy consumption per full-time employee as a metric, RSB Citizens Bank is using energy consumption per *occupant*. This seemingly subtle alteration allows RSB to account for contract workers and others that may not otherwise be included in the full-time employee metric. A metrics challenge arose as a result of related energy efficiency improvements at RSB. Specifically, the company is eliminating vacant space and thereby reducing the amount of empty space that must be heated and cooled. However, the denser space means that the watts used per square-foot metric increases. This may look like a negative trend without context, when in fact they are more optimally using the space. Similarly, Eaton commented that **benchmarking metrics can be vulnerable to misinterpretation without context**. For example, “project cost per ton of greenhouse gases reduced” will increase as low-hanging fruit are eliminated.

Overall, the panel agreed that in order to move the needle forward on implementation and benchmarking, companies must not only have a centralized and single person or point collection to which energy information flows, but also an **established process and governance for assessing and reassessing progress**.

Conclusions and Looking Ahead

The conference concluded with a rich discussion in breakout groups focused on identifying the most important unanswered questions that need to be addressed to accelerate efficiency efforts. We summarize key themes from the discussion below.

Communication: One of the primary barriers to accelerating energy efficiency involves the challenge of communicating to, and engaging players across, the enterprise and supply chain. As energy and greenhouse gas management efforts shift toward value chain and product lifecycle assessments, the need for clear and consistent communication is even more critical. In addition to

signaling the importance of efficiency to these various stakeholders, it is also important to share the required tools, frameworks, and information to facilitate the process.

Organizational incentives: Participants also highlighted the issue of “split incentives”, e.g. tenant-lease-sublease relationships that hinder efforts that are in the collective, but not necessarily the individual, interest of each organizational actor. This is a major challenge, but can be substantially addressed by the design of incentives. Participants suggested that detailed examples of incentive design used to accelerate efficiency efforts could be helpful to organizations.

Risk assessment: Another promising area is to anchor efficiency efforts in a broader evaluation of organizational risk. Wasteful energy use generates many risks for firms, including vulnerability to business continuity, increased costs, regulatory actions, and excessive infrastructure requirements. Efficiency advocates may help highlight these risks by better quantifying the impact of energy consumption on their business and supply chain.

In addition to the direct cost implications, risk assessment can be a powerful tool in motivating more organizational attention to efficient energy use. Modeling these risks and impacts will require a more expansive analytical approach than is typical of energy evaluations. To recognize the big picture opportunity, the efficiency analyst must integrate energy consumption, cost, infrastructure, policy, and many other factors, to build a sense of urgency. Risk assessment can also help to evaluate the implications of energy price uncertainty for companies. Since many factors point to the increased likelihood of energy price volatility, it is in the interest of every firm to reduce their exposure. However, these factors are rarely included in the value proposition of energy efficiency.

Time horizon: While there is broad understanding of how to finance energy efficiency projects within the current boundaries, (e.g., quantifiable outcomes, short payback period, and reasonable-scale capital investment), participants highlighted the importance of challenging these boundaries. Specifically how can we shift the interests of corporate shareholders and stakeholders toward more long-term orientation?

Financial instruments: Participants noted the current lack of appropriate instruments for financing energy efficiency efforts. Since most current efficiency efforts are internally funded on a project basis, investments are too risky and ad hoc to really transform the organization. Conversely, strategic efficiency funding could increase the scale of investment, put capital against the biggest opportunities, and reduce the risk the portfolio for potential investors. While this idea is promising, there still is resistance in the financial community to pursue this market in earnest. Likely, movement on this opportunity will require mutually-reinforcing policy development and financial innovation to succeed.

Scaling Efficiency: Finally, progress on efficiency depends significantly on the ability to replicate and scale efficiency projects across the boundaries of organizations, industries, geographies, and jurisdictions. So far, there is not a clear and replicable approach to energy efficiency – while it is unlikely that a universal approach can ever be developed, most felt that the fundamental design elements of these interventions could usefully be defined. These approaches would include both quantitative and qualitative elements because effective organizational change must be holistic.

At the economy level, it is perhaps most important that there be robust policy support for efficiency, including incentives and coalition-building. Additionally, it is critical that these approaches be developed for small and medium-sized companies.

Future Plans

EDF

EDF's Climate Corps Program will continue to grow and utilize the talent of MBA students to help companies find cost savings opportunities and reduce greenhouse gas emission through commercial building energy efficiency. Key components of the program's future plans include:

- Moving companies beyond the short-payback efficiency projects to a fully realized energy management strategy with emission reduction goals
- Developing and nurturing the growing network of fellow and company alumni
- Harvesting and sharing Climate Corps lessons learned with the broader business community

EDF's Climate Corps Program is just one aspect of EDF's energy efficiency work. EDF's cross-program strategy lies in removing regulatory, policy and market barriers that prevent energy efficiency from being employed exponentially. EDF current and future work to further advance energy efficiency includes:

- Partnering with the Carbon War Room (CWR) in its Green Capital - Global Challenge (GCGC), working with large international banks and private equity funds to facilitate aggregation, securitization and other strategies to attract investments at scale
- Ensuring sufficient measurement & verification protocols for the engineering and financial communities
- Modeling solutions for the split incentives in commercial and residential real estate
- Cataloging best practices for internal efficiency financing structures at companies and extracting lessons learned from internal corporate project financing
- Advancing Climate Corps Public Sector successes within minority-serving institutions, municipalities, and religious institutions nationwide
- Working with Walmart to launch an ambitious energy efficiency program with its suppliers
- Working with the private equity industry to drive energy efficiency into portfolio companies
- Developing innovative new financing tools to finance energy upgrades in commercial and multi-family residential buildings

Duke EDGE Center

To move this initiative forward, Duke's EDGE Center is pursuing related opportunities, including:

- Partnering with the Carbon War Room (CWR) through student research projects to identify gigaton-scale carbon reduction strategies in energy-intensive industries.

- Conducting a Roundtable on “Next Generation Energy Efficiency” (planned for May 2011): This event will be a 1-day invitation-only workshop with energy industry leaders, focused on overcoming the key barriers to achieving industrial energy efficiency. The objective of the workshop is to identify the most powerful levers for accelerating systemic efficiency in industry, and to outline a research and outreach plan to enable the desired change.
- Supporting student research opportunities on city-scale energy efficiency, in partnership with the Southeast Energy Efficiency Alliance.

Duke Center on Globalization, Governance & Competitiveness

CGGC is active in a number of Duke University and externally-funded initiatives on energy and energy efficiency. Relevant projects include:

“Smart Grid”

- “U.S. Smart Grid: Finding New Ways to Cut Carbon and Create Green Jobs” (funded by EDF) highlights the potential of selected smart grid technologies to save energy and reduce carbon emissions through increased energy efficiency and use of renewables.
- CGGC is conducting an inventory of core smart grid firms in the 13-county Research Triangle region, including each firm’s footprint across 15 technology categories and preliminary analysis of strengths and gaps in the NC supply chain. Follow-on work may include a statewide cluster analysis of smart grid industry in North Carolina, including linked industries and supporting industry assets, to identify strengths and gaps in the value chain at core and linked industry levels.

Future of U.S. electric power generation

- CGGC, in partnership with the Nicolas School for the Environment, Nicolas Institute for Environmental Policy Solutions, and EDGE, is investigating the energy solutions for a carbon-constrained world. The project investigates the future of electric power generation by engaging key business leaders and other stakeholders that occupy different positions within the broad electric power value chain.

These projects, as examples of CGGC's quality interdisciplinary research, illustrate how GVC analysis highlights the competitive contexts in which firms adopt innovations that lead to both environmental and financial benefits.

Additional Resources

Additional information on the conference, including the agenda and links to a video of each session, may be found at http://cggc.duke.edu/events/energy_efficiency_conf/overview.php

Readers interested in a broader discussion of how the framework used for the conference affects the adoption of energy efficient practices by companies and their supply chains should consult CGGC’s recently completed report (sponsored by EDF) entitled *The Multiple Pathways to Industrial Energy Efficiency: a Systems and Value Chain Approach*. The report is available free of charge at http://cggc.duke.edu/pdfs/DukeCGGC_EE-Report_2011-2-15.pdf