



NEXT-GENERATION ENERGY MANAGEMENT

SOLUTIONS FOR THE NEXT LEVEL OF PERFORMANCE
IN CORPORATE REAL ESTATE

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AUTHORS & ACKNOWLEDGMENTS

Authors

Michael Bendewald, Douglas Miller

** Authors listed alphabetically. All authors are from Rocky Mountain Institute unless otherwise noted.*

Editorial Director: Peter Bronski

Editor: Laurie Guevara-Stone

Art Director: Romy Purshouse

Graphic Designer: Chris Rowe

Contact

For more information, please contact:

CoreNet Global

Craig Van Pelt

Director, Knowledge Community Research

+1.404.589.3248

cvanpelt@corenetglobal.org

Rocky Mountain Institute

Michael Bendewald

+1.303.567.8547

mbendewald@rmi.org

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Stephen Abbott, Associate, *Rocky Mountain Institute*

Kevin Brehm, Associate, *Rocky Mountain Institute*

Stuart Brodsky, Director of The Center for the Sustainable Built Environment, *New York University*

Jody Clark, VP of Commercial Real Estate Energy Efficient Finance, *Hannon Armstrong*

Matt Fanoie, VP of Real Estate, *Coca-Cola Refreshments USA, Inc.*

Sven Govaars, Senior Associate, *Gensler*

Ron Herbst, Energy & Sustainability Product Manager, *Deutsche Bank*

Phil Keuhn, Senior Associate, *Rocky Mountain Institute*

Mychele Lord, President, *LORD Green Real Estate Strategies, Inc.*

Scott Muldavin, Executive Director, *Green Building Finance Consortium*

Curtis Probst, Managing Director, *Rocky Mountain Institute*

Dan Probst, Chairman of Energy & Sustainability Services, *JLL*

Donald Reed, Managing Director, *Sustainable Business Solutions, PwC*

Peter Scarpelli, VP Global Director of Energy & Sustainability, *CBRE*

John Schinter, AVP of Energy and Smart Buildings, *AT&T*

Brian Schwagerl, NYC Global Real Estate Executive, *NBC Universal*

Bill Sisson, Director of Sustainability, *United Technologies Corporation*

Rives Taylor, Director of Sustainable Design, *Gensler*

Herve Touati, Managing Director, *Rocky Mountain Institute*

Tim Venable, Senior Vice President, Knowledge/Research, *CoreNet Global*

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FOREWORD

Buildings consume as much as two-fifths of the world's energy and trillions in capital to build and run our places of business, healing, education, home life, and culture. Trillions more are spent to generate and distribute those buildings' energy. Yet these functions, so critical to a well-functioning modern society, could often be better provided with far fewer resources.

We've made good progress over the years in understanding and capturing this opportunity to improve building fleets. An early effort toward understanding the opportunity was my 1992 inquiry into why energy efficiency was not being pursued by the market despite strong economics: it showed perverse incentives and lack of key-stakeholder communication at the root of the problem. Rocky Mountain Institute's 2007 collaboration with CoreNet Global established an agenda for corporate real estate to meet the "energy challenge" head-on, via practical recommendations for end users and service providers to start harvesting the low-hanging fruit. Through these and many other efforts, green-rated commercial buildings now total nearly 20 percent of total floorspace in 30 top office markets in the U.S.—about an 800-percent increase since 2005.¹

However, as this paper shows, far more progress can still be made. A whole-systems approach that wins buy-in from multiple stakeholders; capitalizes on modern trends in design, technology, and real estate; and optimizes real estate portfolios will continue to drop low-hanging fruit at the feet of the mindful.

Decision makers are also gaining a better understanding of how to value improvements. Think of the value a company can derive from improving a drab 1980s office building with always-stale air to a fully daylight building that efficiently delivers just the right amount of fresh air as needed. Occupants are healthier, which reduces absenteeism.

Employees want to work there, which helps reduce the cost of worker turnover. A total of nine value elements drop to the bottom line—all detailed and backed by evidence in Rocky Mountain Institute's 2014 practice guide How to Calculate and Present Deep Retrofit Value for Owner-Occupants. (Another guide for real estate investors is due in early 2015.)

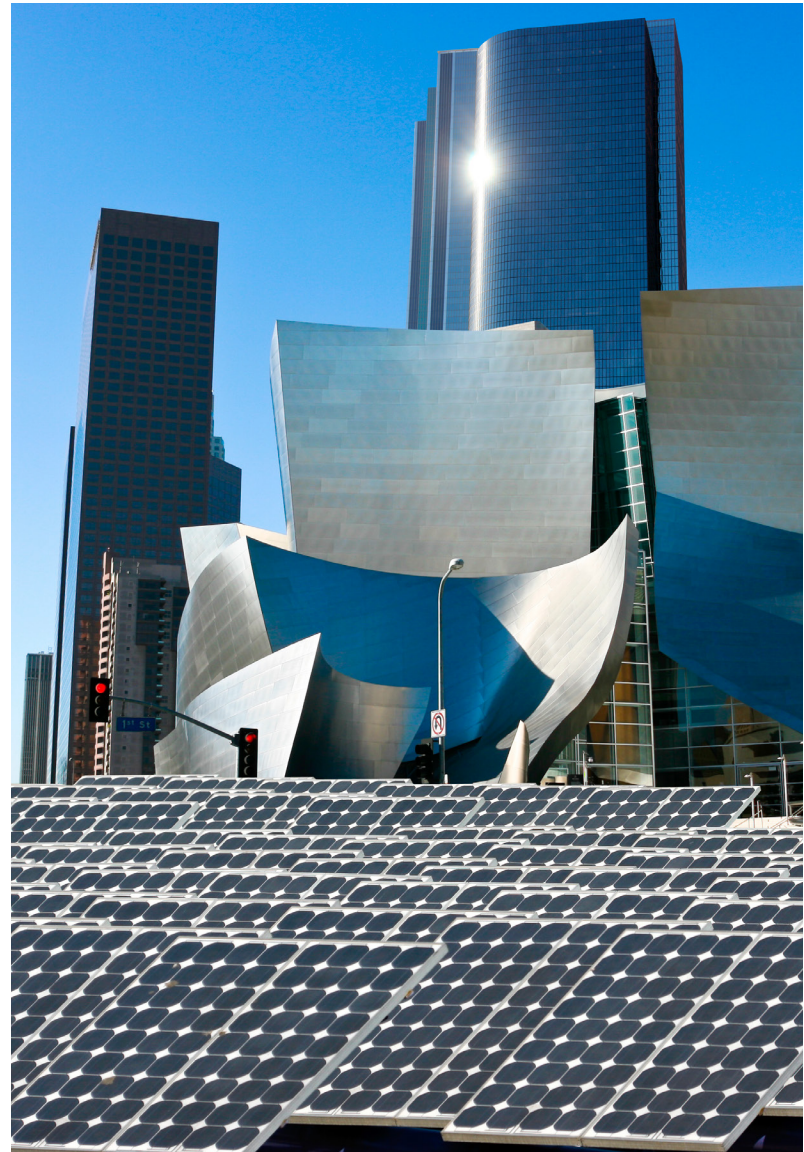
I applaud CoreNet Global's recent advocacy of net-zero energy as being the top indicator of long-term energy management success, especially when the energy-producing buildings are part of an integrated electricity grid. This collaborative report provides the next steps for members to turn this vision into action, stand out as dedicated professionals, and help make their companies more profitable—all while helping transform our building stock for a much more clean, prosperous, and secure world.



— Amory B. Lovins
Cofounder, Chief Scientist, and Chairman Emeritus
Rocky Mountain Institute

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EXECUTIVE SUMMARY

01



01. EXECUTIVE SUMMARY

Buildings represent the largest single share of global energy use, and a major opportunity for profitable investment by the companies that occupy them. Buildings currently account for 60 percent of worldwide electricity demand and 40 percent of primary energy consumption in most countries, and much of this energy is currently wasted or unneeded. As a result, the global market for building energy efficiency is immense—currently \$87 billion per year.

Most of the world's companies have yet to fully tap into this investment opportunity that can build company value through quality risk-adjusted returns, as well as through meeting customer and employee demands and providing other benefits. The largest companies have already committed to becoming 100 percent powered by renewable energy; however, the vast majority of the world's companies still do not have a goal concerning energy efficiency, renewable energy, or greenhouse gas emissions.

Inspired by CoreNet Global's 2013 call for companies to strive for net-zero energy in their facilities, this paper provides a set of strategic solutions that present clear evidence for the benefits of taking action and provides the direction corporate real estate professionals need to set and achieve the highest goals practical and profitable for building energy performance. The solutions provide information and real-world examples, informed by extensive third-party research and guided by interviews with 14 key industry experts.

The solutions fall into three categories: (1) organize—lay the appropriate foundation for pursuing the next step in building energy performance, (2) capitalize—seek out opportunities for profitable energy management investment, and (3) optimize—wring the most value out of the other solutions. Building upon a company's pre-existing energy management program, these solutions enable companies to advance towards net-zero energy across their corporate real estate portfolios.



ORGANIZE

1. **Garner C-suite support for next-generation energy management and performance:** Executive-level support is important for reaching the next generation of energy management and performance. Energy management, while not a strategic priority on its own for many companies, offers a lever to address other strategic priorities a company may have, such as sustainability, comprehensive risk management, and customer and employee perceptions.
2. **Emphasize efficiency before generation or offsets:** The path to next-generation energy management across corporate real estate portfolios likely includes a mix of energy efficiency, on-site generation, load flexibility/storage, and green power purchasing. Although there will be differences in which of these measures a company emphasizes, energy efficiency should be pursued first, as it is the most cost-effective.
3. **Establish a multi-disciplinary team with clear accountability:** A team that spans multiple business units and includes incentivized, trained members will help ensure that an energy management program is properly implemented and that the program's goals are achieved.

CAPITALIZE

4. **Invest in “smart” building management:** Advances in building controls and data processing are making it easier to monitor energy performance in buildings and respond more promptly and effectively to issues that arise. The value of these advances includes energy cost savings, more productive maintenance staff, greater insight into space utilization, and optimization of future investments into efficiency and on-site power generation.

5. **Emphasize strategies for health and productivity:** There are at least six type of measures that support goals for both energy efficiency and employee health/productivity: biophilic design, design for clean air, personal lighting control, personal thermal control, occupant engagement, and design for activity. Companies can leverage these measures to reap multiple benefits from single expenditures and gain an advantage over competitors.
6. **Fully utilize the suite of available external finance options:** External finance options are often underutilized. It is worthwhile to review the subsidies, incentives, and capital finance options to maximize capital availability for energy management investment.
7. **Support workplace mobility and density efforts:** Energy savings can be achieved by eliminating unneeded real estate across a portfolio. As companies continue to reduce office space per worker, they can mitigate or even remove the potential impacts of increased occupancy on energy use per square foot by ensuring that these denser spaces are properly managed.
8. **Work with landlords to accomplish energy goals:** A company's energy performance goals are easier to attain when it works with landlords to incorporate green lease provisions, especially clauses for building and tenant space construction, maintenance and tenant operations, and operating cost pass-throughs.

OPTIMIZE

9. Enable a more holistic and value-based approach:

Energy management investments deliver substantial business value beyond energy cost savings alone (e.g., improvements to employee health and productivity, improved risk management, etc.). Identifying all of the positive impacts of energy investments on a company and involving the relevant stakeholders for those impacts will help establish a clear link of the investment to business value.

10. Allocate investments across the portfolio:

Consider values such as length of hold, whether the building is owned or leased, and life cycle stage to identify where and when the next generation solutions discussed above are most appropriate. Different combinations of these variables will shape the portfolio-wide investment allocation strategy for next-generation energy management.

11. Support collaboration efforts:

The challenges a company might encounter to reach the next generation management are likely shared among others. Companies must collaborate to share best practices and catalyze the market to enable the achievement of their respective energy management goals.

Companies can use the solutions proposed in this paper to set and achieve higher energy management goals and build significant company value.





INTRODUCTION

02

02. INTRODUCTION

Buildings represent the largest single share of global energy use, and one of the world's largest opportunities for profitable clean energy investment. Buildings currently account for 60 percent of worldwide electricity demand,² 40 percent of primary energy consumption in most countries,³ and nearly 20 percent of global greenhouse gas emissions.⁴ The global market for energy efficiency in buildings is \$87 billion per year today, with 75 percent of the market located in the U.S., China, France, Germany, and the U.K.^{5,6} New investment in renewable energy reached \$214 billion in 2013, with 48 percent going to solar PV, of which an increasing amount is being placed directly on building rooftops.⁷

The investment opportunity for energy efficiency and renewable energy is only expected to grow—by 2020 the global buildings efficiency market has the potential to reach \$245 billion per year.⁸ In the U.S. alone, energy efficiency represents a \$1.4-trillion-net opportunity through 2050.⁹ Solar PV installation is growing exponentially (139 gigawatts in 2013 versus only 23 gigawatts in 2009).¹⁰

Many companies are capitalizing on the business opportunities presented by energy efficiency and renewables, and are committed to expanding their investment. For example, IBM has already saved \$477 million cumulatively from its energy conservation efforts and Walmart expects to save \$1 billion annually from its energy efficiency and renewable energy initiatives.¹¹ Fifty-nine percent of the Fortune 100 and nearly two-thirds of the Global 100 have set greenhouse gas emissions

reduction commitments, renewable energy commitments, or both.¹² Apple, Procter & Gamble, and Walmart each have long-term commitments to be 100 percent powered by renewable energy. These leading global companies are becoming far more active energy consumers as they increase their focus on comprehensive risk management, longer-term resilience, quality risk-adjusted returns, sustainability, and customer and employee demands.

Next-generation energy management and performance refers to a level of energy performance that approaches net-zero energy across the portfolio of corporate facilities. Net-zero energy portfolio has multiple definitions and is defined in this paper as a real estate portfolio that generates renewable energy (either on or off the building sites) equal to the amount of energy used for building operation, or in other words a 100 percent renewable energy powered buildings portfolio.



¹ Calculations include emissions from agriculture, forestry, and other land use.

This progress highlights the untapped business opportunity for the rest of the world's major companies to pursue. Less than one-third of the companies between the Fortune 250 and Fortune 500 have a greenhouse gas, renewable energy, or energy efficiency target.¹³ Only half of surveyed companies have energy managers¹⁴ and more than two-thirds agree that cutting energy costs will become more difficult in the future.¹⁵

Inspired by CoreNet Global's 2013 call for companies to strive for net-zero energy in their facilities, the goal of this paper is to present clear evidence for the benefits of taking action and provide the direction corporate real estate professionals need to set and achieve the highest goals practical and profitable for building energy performance. To this end, the paper presents eleven strategic solutions for next-generation energy management and performance that fall into three categories: organize, capitalize, and optimize. The solutions are intended to build upon the foundation established by a company's pre-existing energy management program.¹⁶ The authors encourage corporate real estate professionals, if they are not doing this already, to engage the energy management team to work together to implement these solutions.

The eleven solutions were developed through analysis of third-party research guided by insights from interviews with fourteen key industry experts. They were also developed through a synergistic analysis that balanced existing research and opinion with Rocky Mountain Institute assessment of key technology, real estate, and energy trends. Finally, this report is informed by our phase one research and report that provides a synopsis of the changes in the drivers of energy efficiency and renewables since 2007, when CoreNet Global and Rocky Mountain Institute collaborated to produce an agenda for corporate real estate energy management.¹⁷



SOLUTIONS

03



03. SOLUTIONS

ORGANIZE

1. GARNER C-SUITE SUPPORT FOR NEXT-GENERATION ENERGY MANAGEMENT AND PERFORMANCE

Getting to the next generation of energy management and performance requires similar executive-level support as to what it took to start the energy management program. The World Business Council on Sustainable Development suggests that the vision and goals for corporate energy programs should be revisited every few years.¹⁸ If it has been a few years since a company has established its program's vision and goals, a process should be proposed to senior executives to explore how the energy management program could become more aggressive and strive toward net zero.

It will take some time to identify and present enough evidence to show that such a process is worthwhile. Energy management, while not a strategic priority on its own for many companies, offers a lever to address other strategic priorities a company may have such as sustainability, comprehensive risk management, and customer and employee perceptions.¹⁹ Consider the ways in which the world or the company has changed over the last few years when evaluating the opportunity to pursue a new generation of energy management. There are many reasons to renew the energy program vision and goals of the company (see Table 1, next page).



TABLE 1. DRIVERS FOR RENEWED ENERGY PROGRAM VISION

DRIVER	DESCRIPTION
INNOVATION	<ul style="list-style-type: none"> • More cost-effective solutions: Lower cost of and improvements in technologies are creating more overall cost-effective solutions (e.g., LEDs and smart building technology). • Growing value of healthy and productive buildings: Most building owners now cite occupant health and wellbeing as the most important factors motivating investments to increase overall building performance.²⁰ • Workplace transformation: Two-thirds of workplaces are either in the process of implementing or planning a workplace transformation program, which creates opportunities for increased energy performance.²¹ • Rapidly improving technologies: Technology solutions are enabling continuous information flows that are actionable, which supports improved energy management.²² • New finance mechanisms: Financing solutions have evolved and more external capital is now available at low- or no- cost, on- or off-balance sheet, for energy management investment.²³ • Local leadership: There is a growing number of net-zero cities and communities.²⁴
ENTERPRISE RISK MANAGEMENT	<ul style="list-style-type: none"> • Customer demands: Retail and business customers are increasingly demanding sustainability performance.²⁵ • Shareholder demands: Growth of enterprise-wide sustainability measurement indicates shareholder demand. • Attracting and retaining employees: Millennials want to work for companies that help improve society.²⁶ • Keeping up with other companies: 24 companies of the Global Fortune 100 have set specific renewable energy targets—either a percentage of energy, capacity (MW), or level of investment.²⁷ • Meeting commitments: Nearly two-thirds of the Global Fortune 100 have set renewable energy or greenhouse gas commitments,²⁸ many of which are challenged to secure enough renewable energy to meet those commitments.²⁹ • Power reliability: Extreme events like Superstorm Sandy have taken down the electricity grid and increasingly put companies at risk; moreover, many companies increasingly have operations in regions with low grid reliability, such as India.³⁰ • National regulatory requirements: Increasing stringency of national commercial building codes globally;³¹ U.S. federal government requires all new federal buildings entering the planning process in or after 2020 to be net zero by 2030.³² • Local regulatory requirements: Increasing stringency of national commercial building codes across U.S. states;³³ California now requires all new commercial buildings to be net-zero energy by 2030 after revision to Title 24 building standard.³⁴
ELECTRICITY GRID	<ul style="list-style-type: none"> • Increase in customer choice: Technological, regulatory, and market dynamics the past few years have enabled unprecedented levels of customer choice.³⁵ • Improving economics of microgrids: On-site renewable energy generation and storage to create a “microgrid” is becoming economical, especially on islands (high energy prices) and areas with plenty of resource (e.g., biomass in Brazil).³⁶

2. EMPHASIZE EFFICIENCY BEFORE GENERATION OR OFFSETS

Getting on the path to next generation performance across the real estate portfolio can include a mix of a) energy efficiency, b) on-site generation, c) flexibility or storage, and d) green power purchasing. Each of these measures can help companies take steps toward net zero (see Figure 1). But every company is different and thus each must decide the types of measures that make most sense to emphasize.

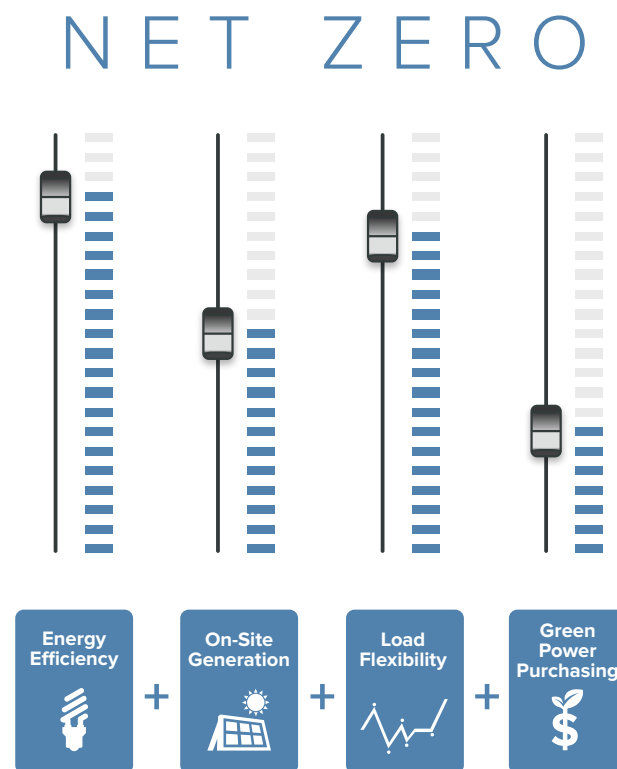
a. Energy Efficiency

Energy efficiency should be pursued first as it is one of the most cost-effective measures, especially when considering additional values beyond energy cost savings (see page 20). Efficiency measures can include focused programs or policies (such as installing LED lighting and controls in all office spaces, or widespread installation of energy management controls) as well as creating long-term energy plans using a deep energy retrofit approach.ⁱⁱ Some of these measures are no/low-cost and provide short-term wins for energy savings, while others that involve more tangible building upgrades (like upgrades to HVAC, windows, and the building envelope) provide a substantial boost to the bottom line in the medium to long term.

b. On-site Generation

Next, on-site generation of clean (or cleaner) power should be considered because it can be cost-effective and directly attributed to greenhouse gas reductions. Such technologies include rooftop solar and natural-gas-fired cogeneration. This option is limited, however, because the on-site generation may not meet the entire energy demand of facilities such as data centers and tall office buildings.

FIGURE 1. APPROACH TO NEXT-GENERATION ENERGY PERFORMANCE



ⁱⁱ For example, the Empire State Building deep energy retrofit is being implemented in phases over several years. For more information on deep energy retrofits, see http://www.rmi.org/retrofit_depot

c. Load Flexibility and Storage

Load flexibility and storage are the next logical areas of emphasis, as they can reduce peak power consumption, provide other valuable services to the electrical grid operators, and make the power supply much more resilient in the face of severe storms and electrical grid failure. Load flexibility can be accomplished with building energy management controls (which may have been installed earlier for efficiency reasons), building materials that store thermal energy, and batteries that store the power from on-site generation when it is not needed.

d. Green Power Purchasing

Green power purchasing is the next available option and comes in many forms. The most important variables to consider are whether there is a financial return from the purchase (e.g., carbon offsets purchasing yields no direct financial return) and whether the purchase actually creates additional renewable power, especially in the region where the company is consuming it.³⁷

ADVANTAGES OF NET ZERO AT THE PORTFOLIO LEVEL

Net zero can be measured at the building level as well as across the entire portfolio. There are several advantages to measuring net zero at the portfolio level. For instance, multi-building systems offer opportunities for taking advantage of diverse power load shapes, heat requirements, and opportunities for renewable energy production. Just as automakers can meld many models' fuel economies into a fleet average, so too can corporations achieve net-zero status in aggregate even though some individual buildings may do better or worse.

WALMART:

Progressing Toward Net Zero Through Energy Efficiency and On-Site Generation

Walmart is working towards a goal of 100 percent renewable energy. To get there, the company is committed to reducing the energy per square foot intensity required to power its buildings around the world by 20 percent by the end of 2020 compared to the 2010 baseline of stores. It has also committed to driving the production or procurement of 7 billion kilowatt-hours of renewable energy globally by the end of 2020—and is already 32 percent of the way there. Thus far, Walmart has reduced greenhouse gas emissions both per square foot and per dollar of sales by nearly 20 percent since 2006 and is the largest on-site green power generator in the U.S.

DEUTSCHE BANK:

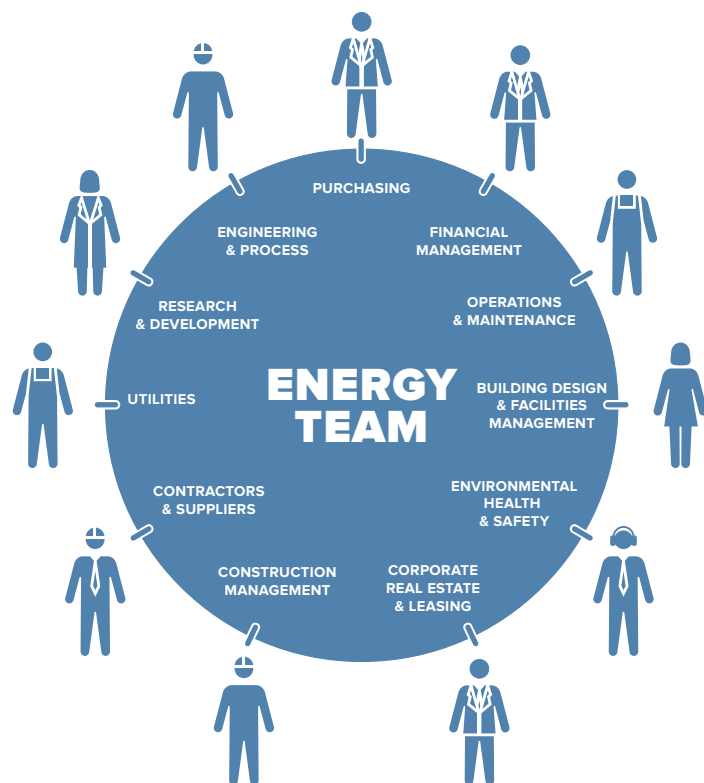
Maintaining Carbon Neutrality in Operations Since 2013

Deutsche Bank has met and maintained its goal to be carbon neutral in operations since 2013. The vast majority (83 percent) of the company's greenhouse gas emissions are attributed to its portfolio of 5,000 offices, retail spaces, and other facilities. These emissions are offset through energy efficiency investments, including a workplace initiative that according to Deutsche Bank's annual report is "the basis for energy savings and increased productivity of our corporate offices" and upgrades to data centers (30 percent more efficient in 2013 versus 2012). Deutsche Bank also installs on-site solar power, including a site in New Jersey that since 2013 generates 2,000 megawatt-hours a year. The majority of the company's energy use (79 percent of total electricity purchases in 2013) is offset through purchasing electricity from certified renewable sources—mostly hydro and wind power. Finally, Deutsche Bank buys carbon-offset certificates to neutralize any remaining carbon emissions.³⁸

3. ESTABLISH A MULTI-DISCIPLINARY TEAM WITH CLEAR ACCOUNTABILITY

Companies are more likely to achieve their energy goals with a dedicated energy manager. Yet this manager can do very little without an effective energy management team. The World Business Council on Sustainable Development recommends a multi-disciplinary team that spans multiple business units, with properly incentivized, trained members (see Figure 2).³⁹ The best

FIGURE 2. POSSIBLE ENERGY TEAM STRUCTURE



(WBCSD, Used with Permission)

incentives actually tie member performance assessment to the goals of the energy program, and training helps empower these motivated members—especially important for operations and maintenance staff—to ensure that buildings operate according to their design.

KOHL'S: Implementing Energy Efficiency with a Multi-Disciplinary Team ⁱⁱⁱ

Kohl's energy team wanted to implement energy efficiency measures with targeted, predefined payback periods across the chain. Over two years, the energy team executed several "low-hanging fruit" energy efficiency projects that resulted in monetary savings for the organization, and attracted the interests of Kohl's finance department. However, many challenges remained to assure that more and deeper energy efficiency projects would be approved.

Perhaps central to the challenges was the energy team's difficulty obtaining sustained corporate funding for unbudgeted energy efficiency projects. In order to overcome this barrier, Kohl's strengthened the relationship between the finance and the energy teams by embedding members of the company's finance department into the energy team. This expedited the communication of financial benefit and the approval of energy efficiency projects.

The energy team had an open position, but rather than adding another engineer to the energy team, they hired a business unit financial analyst who was devoted to the energy team. The analyst had the ability to translate technical engineering information into financial terminology and convey the financial impact of energy efficiency to the finance team. Having an embedded finance associate on the energy team created a teamwork approach with full transparency and understanding of efficiency project details.

ⁱⁱⁱ Reproduced with permission from the U.S. Department of Energy Better Buildings Initiative.

CAPITALIZE

4. INVEST IN SMART BUILDING MANAGEMENT

Investment in smart building management is expected to triple in the marketplace over the next few years,⁴⁰ and for good reason. Due to the cost reductions of enabling smart building management and the value it can create for a company, considering a broad investment strategy in smart buildings is well worth the time.

Chances are that the larger buildings in a portfolio have “Frankenstein” control systems: digital building automation systems controlling the central plant of the building and pneumatic controls elsewhere. Smaller buildings in a portfolio may not even have a comprehensive control system. While standard retrocommissioning can improve the operational performance of these buildings, the level of performance that is achieved is limited and degrades within a few years.

Fortunately, buildings controls have advanced—in part through the advent of wireless technology and “plug and play” lighting and other equipment—to the point where it is becoming affordable to introduce digital controls throughout both large and small buildings. These controls provide much more rich information and enable commissioning agents to reduce energy use beyond what they were able to before.

Moreover, applications that leverage the “Internet of things” (i.e., the interconnection of devices through the Internet that enables them to communicate and share information) have in recent years enabled the processing of enormous amounts of data—up to now essentially unusable by building operators—to be analyzed for a more consistent commissioning process, yielding detailed

WHAT IS A SMART BUILDING?

A smart building optimizes energy, life safety, telecommunications, user systems, and facility management systems in order to create maximum value from the space.

Through monitoring their own performance, detecting opportunities for improvement, making automatic adjustments, alerting management staff to issues that can be automatically corrected, and suggesting possible approaches and tools for solving problems, smart buildings help their owners and managers improve asset reliability and performance.⁴¹

instructions for the management team on how to fix problems. This process has become even more effective with the rise of cloud-based computing that enables data from hundreds of buildings and individual pieces of equipment to be transmitted to a single point for monitoring, analysis, and control.

There is a lot of value to be derived from these advances in building controls. They are useful for not only saving energy costs (10 to 15 percent or more, depending on the current efficiency of the building⁴²) but also helping maintenance staff be more productive.⁴³ The rich data streams also provide insight into space utilization that can lead to additional energy and cost savings through reduced square footage. Smart buildings enable greater power load flexibility (through the ability to turn up and down equipment power)⁴⁴ and help optimize future energy efficiency and on-site power generation investments. Finally, properly designed and installed smart systems provide an operational interface that is likely more attractive to the up-and-coming millennial generation and yet simple enough for most.



TESCO:

Using Smart Building Technologies to Reduce Energy Use and Costs

Tesco uses advanced data analysis tools, automation technologies, and technology-enabled energy management to drive energy savings across its real estate portfolio. In a pilot with IBM in one of its Ireland stores, the company used advanced data analysis tools to reduce refrigeration energy use. This pilot led to better assessments of large, complex energy use data sets and resulted in a 20 percent energy use reduction from refrigeration.⁴⁵ If applied across all of its stores, these improvements would save the company €20 million. Tesco also has 24/7 energy management monitoring systems to observe energy use across its 2,700 stores in the U.K. and a 1,000-person strong maintenance team to respond to issues that arise.⁴⁶ In addition, the company has automated lighting in stores that keep different sections dim until customers enter those particular sections.

These investments in advanced data analysis tools and automation systems are helping Tesco progress towards the company's zero carbon goal for 2050 and interim target to halve energy use per square foot in stores and distribution centers by 2020 compared to a 2006/2007 baseline. Tesco has already reached its 2013/2014 goal of reducing greenhouse gas emissions by 34 percent per square foot in its stores and distribution centers compared to a 2006/2007 baseline.⁴⁷ And with six zero-carbon stores in its portfolio, Tesco has observed the strong business case for net-zero portfolios.⁴⁸ These stores cost 10–15 percent more up front to build, but then pay back the investment in short order as a result of reduced operating costs.

5. EMPHASIZE STRATEGIES FOR HEALTH AND PRODUCTIVITY

Health (or wellbeing) and productivity have emerged as hot issues for many companies in recent years. Companies with healthy, productive employees are better equipped to develop innovative products and services, respond to business challenges, and outrun their competition. If a company has prioritized these issues, it can use that to its advantage because there are at least six types of measures that support energy efficiency as well as health and productivity. Effective coordination with human resources and workplace management around these measures should simultaneously build company value and drive greater energy savings.

1. **Biophilic design.** Biophilia is the innate human attraction to nature. Many biophilic design strategies such as daylighting and views to the outdoors bring nature to building occupants to simultaneously create a more delightful and healthy—as well as energy-efficient—space, including reduced occupant stress levels.⁴⁹
2. **Design for clean air.** Some measures such as underfloor air distribution systems and natural ventilation reduce energy use while also improving indoor air quality and, as a result, employee health.⁵⁰
3. **Personal lighting control.** Occupants feel better when they have control over their lighting.⁵¹ This control can be provided through task lighting, which enables the ambient or general settings for lighting to be lowered—thus saving energy.
4. **Personal thermal control.** When employees are thermally comfortable, they are more productive. However, the temperature at which one feels hot or cold varies from

person to person. When provided control over their temperature and airflow, such as through an energy-efficient underfloor air system, occupants are less likely to complain, more likely to feel comfortable, and may even be more productive.⁵²

5. **Occupant engagement.** Only 30 percent of the American workforce is engaged and inspired at work,⁵³ compelling many companies to respond by making employee engagement a top priority. Energy efficiency measures can support engagement strategies by creating a more physically comfortable workplace and demonstrating to employees that the company is helping improve society more broadly. A company that invests in energy-efficient workplaces may also inspire employees to extend greater effort on their own to further reduce energy use.⁵⁴
6. **Design for activity.** Many companies encourage their employees to be more physically active for the resulting benefits to employee health. This is often accomplished through workplaces that encourage a combination of standing, sitting, and walking throughout the day.⁵⁵ Companies can use workplace designs and strategies encouraging physical activity among employees to capture energy savings. For example, having proper controls in place that can shut down the lights and adjust the temperature when employees leave a space empty reduces energy use.

New tools are emerging to assess the value of these measures that benefit health and productivity. The Gensler Human Capital Calculator, for example, considers design factors with a connection to emotional and physical health to help companies better understand the direction of impacts (rather than an absolute number) they should expect workplace design

measures to have on employees.⁵⁶ Similarly, JLL's Green + Productive Workplace makes a baseline of the current state of a portfolio by assessing energy, water, waste, and use of natural resources; space use efficiency and layout; and employee wellness and productivity.⁵⁷ This online application then identifies the potential energy and productivity gains that are realistically possible. Rocky Mountain Institute's practice guide *How to Calculate and Present Deep Retrofit Value* documents the evidence and compelling logic of how deep energy efficiency and sustainability retrofits create value and introduces RMI's Deep Retrofit Value models that provide the foundational methodology necessary to calculate and present value to retrofit decision makers.⁵⁸

GOOGLE:

Leveraging Energy Efficiency Measures to Improve Employee Health and Productivity

Google emphasizes health, user experience, and sustainability throughout the lifecycle of its real estate. Because the company wants healthy, happy employees—due to the business outcomes like greater innovation, retention, and performance—it considers a range of options to create healthy workplaces. Google has found that energy efficiency measures improving thermal comfort and indoor air quality and increasing exposure to natural light have a positive impact on health and productivity. The company also continues to experiment with different ways to provide energy-efficient, comfortable office environments. For example, energy use was lowered to half the U.S. office building average during a pilot in one of its buildings. This and other successes are helping make energy efficiency a key workplace performance indicator for Google that is increasingly weighed equally among others.⁵⁹

6. FULLY UTILIZE THE SUITE OF AVAILABLE EXTERNAL FUNDING OPTIONS

Fast evolving external funding for energy management investments is beginning to reshape the landscape for next generation performance. Because it is generally difficult to know when and where the options exist, it may take some time to evaluate them across the portfolio and maximize the overall availability of capital. The options include subsidies and incentives, as well as capital finance.

Many federal, state, and local governments as well as utilities offer subsidies and incentives for energy management investment. Subsidies and incentives fall into three broad categories: tax credits and incentives; grants, rebates and other financial incentives; and entitlement-related benefits. The amount of time and cost it takes to identify these opportunities can be overshadowed by their value, especially after the initial effort to understand the landscape.

Promising capital finance options include energy service performance contracts (ESPCs), energy service agreements (ESAs), power purchase agreements (PPAs), and operating leases. ESPCs have historically operated in the public and institutional sectors and will need to overcome their perhaps unfounded distrust in the private sector in order to expand. ESAs are new, evolving, and to date only available for investment-grade credit quality. PPAs and operating leases for on-site power generation, where available, can in some cases provide companies with reduced bills for no upfront costs and all the environmental benefits.

Property Assessed Clean Energy (PACE) financing has emerged as a potentially powerful source of capital for borrowers and is currently available in over 500 cities and towns in the U.S.,⁶⁰ and is beginning to become available in Canada.⁶¹ Utility on-bill financing also has potential, but is only available in the U.S. and may offer a relatively low level of funding for each project.

A company can also speak to traditional capital sources about obtaining additional capital for energy management as part of its normal refinance, new acquisition, or tenant improvement project. While these discussions have been difficult to date, that may change because lender competition is fierce, the value of such improvements to building occupants is better understood, and market conditions are overall improving.

HILTON:

Making Profitable Deep Retrofit Investments with PACE Financing

The Hilton Los Angeles/Universal used PACE financing to achieve its recently completed \$7 million deep retrofit.⁶² PACE provided long-term, non-recourse, off-balance-sheet financing for upgrades to the HVAC system and controls, elevators, chillers, lighting, and other equipment. Driven by a goal to improve the comfort and experience of hotel guests as well as to meet Hilton sustainability standards, this project added net operating income exceeding \$13 million and increased the estimated value of the property by more than \$30 million.

7. SUPPORT WORKPLACE MOBILITY AND DENSITY EFFORTS

Perhaps the most effective way to reduce real estate energy use is to eliminate the real estate itself. The average office space per worker decreased from 225 square feet per employee in 2010 to 176 square feet per employee in 2012 and is expected to reach 151 square feet per employee in 2017.⁶³ Effective coordination with the space planner can lead to more informed choices as to which buildings to shed and which to keep. And while denser spaces can lead to increased energy use per square foot, a well-controlled building can help reduce the effects of increased occupancy. Therefore, deciding to keep a building for a longer hold should trigger energy management investment.

UNILEVER:

Improving Space Utilization and Energy Efficiency Together

Unilever evaluates energy and asset management information together. Since 2010, Unilever has increased occupancy without increasing floor space across the majority of the company's offices. There are several ways Unilever goes about this: the company uses open-plan workspaces, desk sharing, and the removal of individual offices, and also designs workspaces around activities rather than individuals. These efforts have led to a 13 percent reduction in electricity purchased per occupant, have enabled consolidation of offices, and will remain crucial as Unilever works towards its 2020 goal to halve energy purchased per occupant compared to 2010 for offices in its top 21 countries.⁶⁴

8. WORK WITH LANDLORDS TO ACCOMPLISH ENERGY GOALS

While it can take a significant amount of discussion and education, companies that work with their landlords to incorporate green lease provisions will have much greater success at achieving their energy performance goals. Many landlords with global portfolios already have green leasing experience making it easier for companies to reach their energy goals.⁶⁵ The most important lease clauses to address include: (1) building and tenant space construction, (2) maintenance and tenant operations, and (3) operating cost pass-throughs.⁶⁶

Implementing green lease provisions requires educating leasing and legal staff on what should be included in leases and why, and the cost impacts. It also requires incentivizing staff to follow-through and verifying the impact on energy performance. More guidance and information for energy-aligned leasing around the world can be found at the Green Lease Library, which is maintained by the Institute for Market Transformation.⁶⁷



PwC:

Working with Building Owners to Reduce Greenhouse Gas Emissions

PwC's goal is to reduce greenhouse gas emissions 30 percent between 2007 and 2016. The first carbon footprint analysis revealed that a little over 20 percent of its total footprint can be attributed to the workplace—the rest goes to air travel, commuting, and other activities. With offices in 776 locations in 157 countries, addressing energy use in this category would require a coordinated effort with stakeholders across the globe.⁶⁸ An important group within that mix of stakeholders is the building owners who own virtually the entire PwC office portfolio.

In order to streamline its effort to meet its greenhouse gas reduction goal, PwC has created standard negotiation terms for tenancy.⁶⁹ Before the company takes occupancy, PwC negotiates with landlords to encourage them to implement sustainability measures. The company leverages a standard lease that contains clauses for LEED certification, energy and water efficiency, indoor air quality, and green cleaning products. The company then tracks an array of key performance indicators including LEED certifications, greenhouse gas emissions reduction, and indoor air quality testing.

OPTIMIZE

9. ENABLE A MORE HOLISTIC AND VALUE-BASED APPROACH

Translating CEO support for next-generation performance into project-level funding can be a challenge without a clear link of the investment to business value. For example, 37 percent of surveyed CEOs who support sustainability said that a lack of a clear link to business value was the main barrier to making greater sustainability progress.⁷⁰ A value-based approach, similar to what leading companies such as Apollo Education Group have done in order to operate successful workplace initiatives,⁷¹ is needed in order to effectively manage an energy program. Well-structured energy management investments can deliver substantial business value, usually much more than just energy cost savings. This value is derived from improved employee health, productivity, and satisfaction; superior sustainability leadership and reputation; improved risk management; and reductions in non-energy operating costs. For example, a hypothetical owner-occupant tech company that retrofits its office building to achieve 50 percent energy savings will increase the simple rate of return from 24 to 55 percent through considering additional values.⁷² The body of evidence around this business value has reached a critical mass that makes it incumbent on energy managers to integrate value and risk analysis into internal decision-making structures.

The key approach here is to identify all of the positive impacts the investment would make for the company. Then identify the stakeholders for those impacts and engage them on how to optimize the investment for everyone involved. The resulting multi-stakeholder business case is much more likely to get executive support and unlock access to multiple budgets, if needed.⁷³

In addition to identifying and calculating all the value associated with the investment, it is important to have processes in place to manage the risk. This means developing risk analysis presentations that fully present the risk and risk management approaches. It is also important to make clear to decision makers the plan to track and verify the investment outcomes. More information can be found in Rocky Mountain Institute's practice guide *How to Calculate and Present Deep Retrofit Value*.⁷⁴

AT&T:

Integrating Energy Efficiency's Multiple Benefits into Decision Making to Drive Investment

When AT&T embarked on its energy management program in earnest in 2009, the focus was on finding high-impact solutions that move the needle on energy performance. While this still remains a guiding principle for the team, a recent area of focus has been on what the program leader calls the "intelligent integration of multiple benefits into a single expenditure." When AT&T thinks about the value of LED lighting and controls, for example, it considers the multiple benefits the investment provides and the company stakeholders that would receive them. This decision-making process emphasizes that LEDs and controls do not just result in reduced energy costs but also lower maintenance costs, provide better information about space utilization, and lead to greater workplace comfort and productivity. Because stakeholders across different departments desire these outcomes, they are willing and able to contribute to a pool of funding to ensure the investment in LEDs is made. This approach has provided key support to the continued success of the program, which from 2010 to 2013 has saved \$191 million in annual energy costs.

10. ALLOCATE INVESTMENTS ACROSS THE PORTFOLIO

It is valuable to understand the key variables that indicate where and when the next-generation energy management solutions discussed above are most appropriate. Considering these key variables will help turn a next-generation energy management strategy into a plan:

- 1. Length of hold.** Refers to the expected amount of time each building has left in the portfolio. A short hold is defined as less than five years; a long hold is five years or more.
- 2. Whether the building is owned or leased.**
- 3. Life cycle.** Refers to two key stages in the life of the hold: a) acquisition, refinance, or re-lease, and b) operation.

Table 2 recommends specific actions discussed in the solutions earlier for each combination of the variables. These broad recommendations provide guidance for getting started.

The boxes in blue indicate the opportunity to create a longer-term energy improvement plan. The World Business Council on Sustainable Development offers a helpful approach in its *Energy Efficiency Toolkit for Corporate Buildings*.

TABLE 2. GUIDANCE ON SPECIFIC ACTIONS FOR PORTFOLIO-WIDE INVESTMENT ALLOCATION

	SHORT HOLD		LONG HOLD	
LIFE CYCLE	OWN	LEASE	OWN	LEASE
Acquisition, Refinance, or Re-lease	Prioritize efficient buildings with fully digital automation system	Prioritize efficient buildings with fully digital automation system Require efficiency measures as part of tenant improvement	Consider as an opportunity buildings that are “ripe” for deep energy retrofit (i.e., major need for HVAC/envelope upgrades, high operating costs, or significant occupant comfort issues) Talk to mortgage provider about wrapping an investment into the loan	Prioritize efficient buildings with fully digital automation system Consider operations cost pass-throughs in order to facilitate investment
Operation	Consider financing that is transferable to new owners (PACE, on-bill, ESA) in order to fund further efficiency improvements	Implement behavior change and employee engagement programs	Create longer-term energy improvement plan	Work with landlord on longer-term energy improvement plan

11. SUPPORT COLLABORATION EFFORTS

More and more companies are starting to place a larger emphasis on energy management investment. Non-energy, non-financial companies like Google and Honda already are major solar investors. Walmart has more total solar on its rooftops than 38 U.S. states.⁷⁵ However, even though cost-effective project opportunities currently exist, with millions of megawatt- and “negawatt”-hours still needed to meet company energy goals, businesses face a variety of challenges accessing those economical projects. Companies must collaborate in order to share best practices and catalyze the market to meet their demand.

To share general energy management best practices, some corporate occupiers have found value through joining industry groups such as the U.S. Department of Energy Better Buildings Alliance. However, for renewable energy purchasing, much of the corporate-related progress has occurred on an ad hoc basis, with a single company or a handful of companies in dialogue with individual utilities, regulators, or legislators on a regional basis (e.g., Apple in Nevada,⁷⁶ eBay in Utah,⁷⁷ as well as Facebook, Google, and Apple in North Carolina⁷⁸). To meet this need, Rocky Mountain Institute is launching the Business Renewables Center, which will offer resources and case studies to help staff prepare and senior decision makers approve renewables strategies.⁷⁹

The Buyers' Principles: Collaborating to Enable Renewable Energy Purchasing⁸⁰

Several of the world's largest companies have recently joined together to make clear their common interests in accessing renewable energy. In July 2014, the World Wildlife Fund released a set of six buyers' principles signed by leading Fortune 500 companies—including Bloomberg, Facebook, General Motors, Hewlett-Packard, Intel, Johnson & Johnson, Mars, Novelis, Procter & Gamble, REI, Sprint, and Walmart—that frame the challenges and needs they are facing as large renewable energy buyers.



The Buyers' Principles outline six criteria that would significantly help companies meet their ambitious purchasing goals:

- **Greater choice in procurement options**—Companies want more than a “take it or leave it” option. They want a choice of renewable energy suppliers and products.
- **Cost-competitive options**—Companies know that renewable energy can achieve or even beat cost parity with traditional energy options, and they’re willing to explore alternative contract arrangements to bring down the cost of capital and make that happen.
- **Access to longer-term, fixed-price contracts**—One appeal of renewables for companies is to avoid fuel price uncertainty and lock in energy price certainty with longer- and variable-term contracts that meet individual companies’ needs.
- **Access to new projects that reduce emissions beyond business as usual**—Companies want a) bundled renewable energy projects that capture both the energy generated and renewable energy credits (RECs), b) to eliminate double counting and maintain accounting integrity, and c) to secure renewable energy from projects geographically close to facilities.
- **Streamlined third-party financing**—Companies want simplified and standardized processes, contracts, and financing to access the project prices at the scale they need to meet their goals.
- **Cooperating with utilities and regulators**—Working in partnership with a local utility can be more efficient and cost effective. To make that happen, companies are committed to fairly share the costs and benefits of renewable energy procurement, including the ability to meet renewable energy goals for both existing and new load.





CONCLUSION & NEXT STEPS

04

04. CONCLUSION & NEXT STEPS

Global energy investment in buildings is on the rise, and many companies are taking part to earn a profit, manage risk, and meet growing stakeholder demands. The world's largest companies have committed to aggressive goals such as becoming 100 percent powered by renewable energy, and are already profiting on their progress.

Significant business opportunities remain for the rest of the world's major companies to set and achieve higher energy management goals. The key for these companies is to become more active energy consumers by identifying opportunities for energy efficiency, power load flexibility, and renewable power generation investment. Companies can use the solutions proposed in this paper to get organized, capitalize upon specific opportunities, and optimize their overall approach to this business opportunity. The solutions are broad enough to be meaningful for most companies, yet some solutions will undoubtedly be more important for specific business sectors and situations.

Corporate real estate professionals who implement these solutions with the energy team have the opportunity to build significant company value. To assist in the implementation of these solutions, CoreNet Global and Rocky Mountain Institute will be facilitating ongoing interactions and events with members, such as roundtable discussions. Please inquire with the contacts of this paper for more information.



ENDNOTES

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