

Energy Policies, Trends, and Strategies in Challenging Times

Keynote Address to the ACG 5th Annual Conference on Total Building Commissioning

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Thank you, Rob, for that very kind introduction. And I want to thank ACG for inviting me. I'm delighted to be here.

Before I get started, everybody take out your phones, blackberries, et cetera, and pass them to your left, all the way down your row to the aisles...

I know your focus never fully leaves the office. Your income is dependent on it. But if you have the energy to listen to what I'm saying about energy this morning, I hope to convince you that a tremendous business opportunity is on the horizon.

U.S. energy policy is not what it has been historically. Energy is indisputably a central theme of the new Obama Administration's ambitious agenda. Many of those initiatives will directly impact buildings. I'm also going to talk about climate change—or, more specifically, the business potential inherent in climate change.

In my view, climate change—specifically the issue of atmospheric carbon and what to do about it—will be the single most important influence on our business in the foreseeable future. This applies to all of us who work in the energy or building sectors—including commissioning.

Let me share one of my favorite commissioning stories, a cautionary tale about what can happen when a building is not commissioned professionally. In 1994, we were hired to conduct an energy audit of a 650,000 square foot mixed-use building in downtown Chicago. The owners had just been handed the unappealing recommendation of installing a new \$200,000 chiller in order to improve occupant comfort.

The building engineer complained of a lack of air supply during periods of peak cooling load. During our energy audit, we discovered the reason. Switches inside the fan-powered boxes were failing at a high rate, causing about twice the design volume of chilled primary air to be dumped into the boxes. Instead of being distributed to cool the building, most of this chilled air was wasted as it joined the return air plenum.

As part of a commissioning process that should have been completed when the structure was built in the 1980s, we recommended overhauling the fan-powered boxes, and replacing the e/p switches, which—along with some other recommendations—solved their problem. The management company no longer needed a new chiller, and their energy bills dropped by \$150,000 a year. The commissioning cost them a mere \$45,000 plus our consulting fees, so they recouped their investment in less than one year.

Such success stories give me great satisfaction. Energy efficiency is a passion of mine that I've built into a career at Sieben Energy Associates. Since 1990, we have helped large corporate and institutional energy consumers to purchase energy as effectively as possible, and also demonstrated to these clients how to use energy as efficiently as possible. Now we're witnessing a surge in interest for our services—

particularly with existing buildings—as companies continue to strive for better performance at lower cost with fewer CO₂ emissions.

I'm also producer of a documentary called "Carbon Nation." I'll be showing a clip this morning. This is not just another global warming film, another "Inconvenient Truth." It is a film about solutions to global warming—that is, what to do about carbon. You see, carbon is about to become by far the most important game in town. Carbon changes everything. Regardless of what you think about climate change, whether you embrace it wholeheartedly or eye it skeptically, I challenge you to think about it in a fresh way for one simple pragmatic reason: Carbon is good business. Specifically, solving the problem of CO₂ emissions is going to be a lucrative enterprise for those who choose to become involved.

I understand the challenges that the commissioning world faces: We at Sieben Energy Associates face many of them ourselves. These issues range from the constant struggle for recognition of our vital services to the complex problems of a downturn in new construction.

But we also see extraordinary opportunities. From the recent stimulus package and presidential initiatives, to draft legislation and beyond, let me reiterate: Carbon is good business, and it will remain so for the foreseeable future.

In that respect, there are no competitors in this room. We can share in rebuilding and re-commissioning existing infrastructure in our country, and we can prosper as we also create hundreds of thousands of additional skilled jobs in the coming years.

Speaking of rebuilding, one thing you'd probably most like to rebuild right now is your 401(k). While energy prices were low and carbon was an afterthought, the tremendous business potential in commissioning old homes and buildings lay dormant. It is time to awake to this potential—and refresh that 401(k) in the process.

Before we look any further forward, however, let's look back. The energy history of mankind began with wood. We progressed to coal, which powered the Industrial Revolution.

Then came oil and the rise of the automobile.

The problem with carbon began to surface as the population of the developed world climbed higher and higher. When a relative handful of people throw carbon into the atmosphere, there's no problem. When billions of us do, the result is global warming. We have no choice but to confront it.

We are on the cusp of a new era, an Age of Smart and Sustainable Energy. Smart—through efficient practices. Sustainable—through renewable, low-carbon sources.

This is a watershed moment. A consensus that we must do something is forming. And I believe this consensus will swell and intensify no matter what happens to the price of oil, or the costs associated with containing greenhouse gases. One striking example of this was last year's presidential race, during which both Senators McCain and Obama presented comprehensive energy platforms built on the premise that we must move beyond the hydrocarbon economy.

The building construction and management sector is trapped in an inefficient mindset. I know first-hand the importance of selling energy efficiency measures, including commissioning, to clients who may not even know if they want what we're selling, or why they might need it.

As an industry, we encounter three incorrect assumptions that took root in our hydrocarbon economy.

Number One: We have inexhaustible, fairly inexpensive energy resources.

Number Two: We can use our energy resources without worrying about future consequences.

Number Three: We can construct and operate our buildings without much concern about energy consumption.

With the light of U.S. energy policy now shining on climate change, we can more clearly distinguish our misguided steps of the past. No surprise, then, that our focus was not on our domestic building stock—in which old buildings outnumber new ones by 100 to 1. A larger audience is beginning to understand that our buildings are tremendously wasteful and desperately in need of re-commissioning or retro-commissioning.

Just as we all need to get in some exercise to keep our bodies healthy as they age, our buildings should be maintained in a more healthful state.

But the building construction and management sector needs to take the extra effort, and spend the additional resources of time and money. Our buildings have had the equivalent of a chronic illness for a long while. It is time for the doctor to make house (and building) calls. And we are those doctors.

The primary challenge for those of us who provide energy efficiency services—whether through energy audits, certification programs, or building commissioning—is to replace those three mistaken assumptions with the facts.

This is no easy task—we're essentially asking people to think in a new way. But we have ammunition—proof that green buildings generate profits. Money talks in a way nothing else can.

First, the dilemma. We need more energy, but the more we consume, the more we emit greenhouse gases.

According to some estimates, the world is currently at or near 387 ppm of CO₂ in the atmosphere. **[Figure 1. CO₂ Concentration, Hawaii, 1958–2004]** The safe threshold is 350 ppm, so we're already past the danger point. With the concentration of CO₂ rising at 1.8 ppm per year, we would be around 415 ppm by 2025. Even if we immediately stopped using all forms of energy that emit CO₂, we would still need to remove that excess CO₂.

Buildings are a major culprit. According to Richard Moe, President of the National Trust for Historic Preservation, 43 percent of CO₂ emissions come from of heating, cooling, lighting, and operating our buildings. Buildings account for 39 percent of primary energy use, and 72 percent of our national electricity load. The building sector produces more greenhouse emissions than either the transportation or industrial sectors. And buildings are responsible for more than 50 percent of greenhouse gas emissions in most cities—in excess of 70 percent in large cities such as Chicago, New York, and Los Angeles. Nobody knows better than the people in this room how to attack these problems. We cannot fight global warming without addressing our buildings.

Let's turn to the three-headed monster of our hydrocarbon economy.

The U.S. Energy Information Administration projects sustained increases in electric demand through 2030, with coal's share of the generation mix rising from 49 percent today to 54 percent, assuming standard economic growth. **[Figure 2. Projected Sources of Electricity Generation in the U.S. by 2030]**

Coal is quite plentiful. It will be a primary fuel for the foreseeable future.

But coal is also tremendously dirty. Some efforts are under way to make it cleaner, but coal as a fuel must eventually be replaced.

Now on to oil and gasoline.

The prices of oil, and of course gasoline, are increasingly subject to wide swings. **[Figure 3. Gasoline Prices in the U.S. since 1993]** Currently, the U.S. consumes about 7.5 billion barrels of oil each year, roughly 25 percent of worldwide consumption. Domestic production meets only a quarter of our demand. We import about 5.6 billion barrels annually. This path is unsustainable, not only because of the CO₂ problem and price issues, but also because of the growing desire to limit our exposure to energy from overseas.

Natural gas is an important short-term alternative for electric generation. Per unit of energy, CO₂ emissions from natural gas combustion are less than half of those from coal. Yet natural gas prices are as volatile as those of oil.

During this recession, prices of both oil and natural gas have declined again, and some people have forgotten about last summer's energy shock as they focus on their finances. General Electric's CEO Jeff Immelt noted that our energy policy for the last 30 years has been the price of a gallon of gas. This past fall, Richard Hass, President of the Council on Foreign Relations, noted how "recession cannot become our energy policy." Unfortunately, this is exactly how energy has been treated over the past 35 years. We've addressed it when times are bad, and forget about it when times are good. Are we going to keep replaying this broken record?

We've covered the dilemma. Let's explore the politics and the potential solutions, emphasizing how these solutions will impact buildings.

Throughout last year's presidential campaign, both candidates advocated a highly ambitious commitment to reduce CO₂ emissions to 1990 levels by 2020—a reduction of some 20 to 25 percent in just 11 years. It was clear that the U.S. was finally going to have some sort of comprehensive energy policy, regardless of who was elected.

The complementary thrusts of then-Senator Obama's policy were to address global warming and to reduce U.S. dependence on oil and coal. He acknowledged from the start that he was setting a Herculean task for himself and the country. "Developing the next generation of energy," Candidate Obama said in late 2007, "will be one of the greatest challenges that this generation of Americans will ever face. It will not be easy. It will not come without cost or without sacrifice." Asked later what single major accomplishment he would like to see as president, Candidate Obama responded: "I would enact a bold energy policy." He recognized that energy could address climate change, economic malaise, and national security all at once.

Candidate Obama set a national goal of improving new building energy efficiency by 50 percent, and existing building efficiency by 25 percent, over the next decade. He also proposed a Federal Renewable Portfolio standard requiring that a quarter of the electricity consumed in the U.S. be derived from clean, sustainable sources by 2025. In addition, he proposed a cap-and-trade system for CO₂ emissions, which would set upper emission limits that would decline gradually over time. He supported federal production tax credits to facilitate a substantial expansion of wind, solar, and other renewable energy sources.

As an example of solutions that these energy policies promote, I'd like to show a clip from "Carbon Nation," currently in post-production, which suggests the business potential for ordinary folks in this Age of Smart and Sustainable Energy. [**Figure 4. Carbon Nation Film Website**]

Let's look at how Candidate Obama compares with President Obama: His promise versus his performance.

President Obama's choice for Energy Secretary, Nobel-Prize-winning scientist Steven Chu, will promote or even require greater energy efficiency in buildings. According to Chu, new design features, including smart sensors, can reduce energy consumption in office buildings by 80 percent. At his confirmation, he said: "I do think the best thing we can do is work on energy efficiency. That remains the lowest-hanging fruit at this time."

The president's campaign agenda is reflected in the recently passed American Recovery and Reinvestment Plan. The plan includes \$5 billion to help retrofit the homes of a million modest-income citizens. Specific tax credits for up to 30 percent of the cost of some energy efficiency home improvements are already available. The plan also directs \$4.5 billion toward energy-efficiency upgrades in federal buildings, which could reduce the government's annual operating costs by \$10 to \$20 billion over the next decade. The states will receive \$3 billion or more, but they must adopt stricter building energy codes.

The "American Clean Energy and Security Act of 2009," called the Waxman-Markey bill, has the full support of the administration and addresses every area of energy: clean sources, efficiency, global warming, and transitioning to the new energy economy. According to Congressman Henry Waxman, the bill will "create millions of clean energy jobs, put America on the path to energy independence, and cut global warming pollution."

In this proposed legislation, the energy efficiency provisions related to buildings include federal training and funding to the states to encourage them to adopt stricter codes, retrofits of commercial buildings, and the development of new EPA procedures for rating efficiency. One landmark provision is cap-and-trade regulation of CO₂ emissions. Cap-and-trade has the potential to be a game changer, and its effect on domestic companies—and how they operate their buildings—would be considerable.

Cap-and-trade would impact roughly 85 percent of the U.S. economy. How would it work? Emission permits would be bought and traded in a special market. Rebates would be available for the most energy-intensive industries—including building materials such as steel, cement, and glass. Tariffs could be imposed on trading partners to help U.S. companies compete internationally. Permit price fluctuations could be a serious problem for companies accustomed to making careful budget projections. Most remarkably, if CO₂ emissions goals are not met, the Energy Secretary would be charged with creating stricter regulation to make sure they are met—with potentially significant impact on the building sector. This is serious, folks.

Cap-and-trade has seemed more palatable around Washington than the alternative, a carbon tax, recommended by Congressman John Larson. On the other hand, while cap-and-trade introduces a complex new market that will have many global players, a carbon tax is simple and straightforward, perhaps more easily understood by Americans as an economy-wide tax on CO₂-emitting goods and services. As Thomas Friedman, author of

Hot, Flat, and Crowded, has asserted, “People won’t support what they can’t explain,” and a carbon tax is more easily explained than cap-and-trade.

Whether cap-and-trade or a carbon tax is imposed, prices will rise, and consumers will bear some of the burden, even if proceeds are returned in some form. Exelon CEO John Rowe has estimated that if cap-and-trade emission permits traded at \$50 to \$100 a ton, the price of electricity would increase by five to ten cents per kWh. With the national average electric price currently hovering around four to six cents per kWh, a ten cent increase would more than double this price. As we know, higher energy prices increase the value of commissioning services.

The president will need to explain and ultimately sell these potential cost increases. Ultimately, everyone wins—but how soon? Offering the promise of long-term benefits can be difficult amidst near-term suffering, but we are beginning to look further ahead than we are accustomed to, many of us for the first time.

Ordinary citizens are getting it. Policymakers are getting it. And now corporations are finally getting it. We truly are entering an Age of Smart and Sustainable Energy.

More and more companies are monitoring and disclosing their CO₂ emissions, both in an effort to be more socially and environmentally responsible, and in preparation for carbon legislation. Last year, 321 S&P 500 companies provided these emissions data to the Carbon Disclosure Project, a British non-profit. These companies could be your clients.

According to Jonathan Lash, president of the World Resources Institute, “As companies begin measuring their carbon emissions, they are likely to begin to manage their emissions. And that smoothes the path for governments to pass legislation requiring emissions reductions.” Some companies have even shelved expansion plans as they await definitive carbon regulation. Earlier this year, four major investment firms—Bank of America, Citigroup, JPMorgan Chase, and Morgan Stanley—announced standards that effectively prevent them from financing the construction of new conventional coal-fired power plants. The bankers are worried about global warming and its effect on their bottom line.

Once companies know definitively what to expect, and the economy recovers, we may witness a corporate building boom spurred by a backlog of projects. Venture capitalist John Doerr describes the move to a low-carbon economy as a market worth “ENORMOUS trillions.”

The overall green building market is projected to more than double from today’s \$50 billion to over \$100 billion by 2013. McGraw Hill Construction has noted that 82 percent of corporate America was expected to be “greening” at least 16 percent of their real estate portfolios by this year, with 18 percent greening more than 60 percent of their portfolios, indicating once again that carbon is good business.

How can you as building commissioners sell your services to skeptical building owners and managers who want proof? Recent reports from Deloitte, Charles Lockwood, and the U.S. Green Building Council have synthesized some of the early data and illustrate ways to sell commissioning to prospective clients.

Number One: Green buildings add little to initial costs, and these costs are quickly recoverable. A 2007 study by Davis Langdon found “no significant difference in average costs for green buildings as compared to non-green buildings.” Other studies have demonstrated only a one percent premium for the cost of green buildings. They may cost

even less, because efficient strategies often enable the downsizing of more costly mechanical, electrical, and structural systems.

Number Two: Green buildings are more valuable than the conventional alternative, and they command premium rents. An April 2008 study found that green buildings had rental rates two percent higher per square foot, and expected rents—after adjusting for building occupancy levels—that were six percent higher per square foot.

Number Three: Green buildings promote improved health, well-being, and productivity. A 2007 study found that common improvements to indoor settings can reduce health care and work loss costs from allergies, communicable diseases, and other health effects from 20 to 50 percent. Higher-quality workspaces have encouraged better employee performance. Lockheed Martin managers reported a 15 percent drop in absenteeism in their newly-opened green facility in Sunnyvale, California.

Number Four: Green buildings help businesses to attract and retain the best employees. A 2007 MonsterTrak.com study revealed that 80 percent of young professionals now seek a job that has a positive environmental impact, and 92 percent of them are more interested in environmentally friendly companies.

Number Five: Green buildings reduce liability while benefiting the community. More insurers are including “sick-building” exclusion clauses and hiking rates because of lawsuits. As green buildings increase in number, insurance companies may lower their premiums. Energy efficiency measures often garner positive press, free advertising, and market differentiation.

Number Six: Green buildings diminish risk in the energy markets and help achieve predictable results. Using less electricity and natural gas means that volatility in the commodities markets will have less of an impact on the bottom line. Green building projects emphasize “best of class” practices that reduce project uncertainty—through life cycle analysis and energy modeling, for example. And green buildings have been projected to have longer lives because of diminished depreciation and the use of superior materials.

Again, I must emphasize: You may know all these, but your potential clients may not. You may need to educate them even as you try to sell to them.

Energy efficiency may get the least attention, but in my opinion and experience, it can and will create the greatest benefit at the lowest cost. As Exelon CEO John Rowe stated, “[Energy] efficiency produces the most cost-effective way to reduce the reliance on foreign energy, reduce reliance on fossil fuels, reduce GHG emissions, and reduce the total cost of energy.”

For too many years, energy efficiency has been perceived as too expensive, primarily because supply was too cheap, or, I should say, supposedly too cheap. In reality, the true cost of energy is far higher than what we’ve been paying on our bills. The debt that we have been accruing in the form of expensive climate change will have to be paid. Energy bankruptcy is not an option; we cannot pack up and leave our planet for a new one.

So much emphasis has been placed on the supply side—with the mantra of more renewable energy—that the potential on the demand side—including energy efficiency—has been substantially undervalued. Tearing down an old, inefficient building with the intention of replacing it with a new, efficient one is tremendously wasteful. In Richard Moe’s words, “Preserving a building is the ultimate act of recycling.” Major retrofits to

cut energy use are planned for the Empire State Building in New York and the Willis—formerly Sears—Tower in Chicago, and the motivation isn't altruism or advertising—its economics.

Last month, the American Council for an Energy-Efficient Economy estimated that reducing electric demand by 15 percent and natural gas usage by 10 percent by 2020 would not only prevent 262 million tons of CO₂ emissions and 390 new power plants, but would also result in 220,000 net permanent, high-quality jobs.

Exelon committed itself recently to improving the energy efficiency of all of their operating companies by 25 percent. And in 2004, General Electric began a program to cut energy use at its own facilities by 30 percent over seven years. And some of the most familiar companies in the world—Coca-Cola, McDonald's, Wal-Mart—have independently sought to reduce their energy consumption. A recent McKinsey study showed that climate change is one of the three most important sociopolitical issues for corporate executives, with half saying it will “attract the greatest amount of public and political attention and most affect shareholder value.”

We're in a global economic crisis. We're almost 100 days into a new administration. These are challenging and exhilarating times. But I am optimistic by nature, and I think that a year from today we'll see an America deep into transition toward an Age of Smart and Sustainable Energy.

Earlier, I discussed three incorrect assumptions that have led us to where we are now. I'll correct those now.

Number One: Energy prices are on a rollercoaster. Resources are not inexhaustible. Business has seen the end of cheap energy.

Number Two: Climate change is a big hairy deal. It is already having serious consequences, and it is transforming the old rules of business.

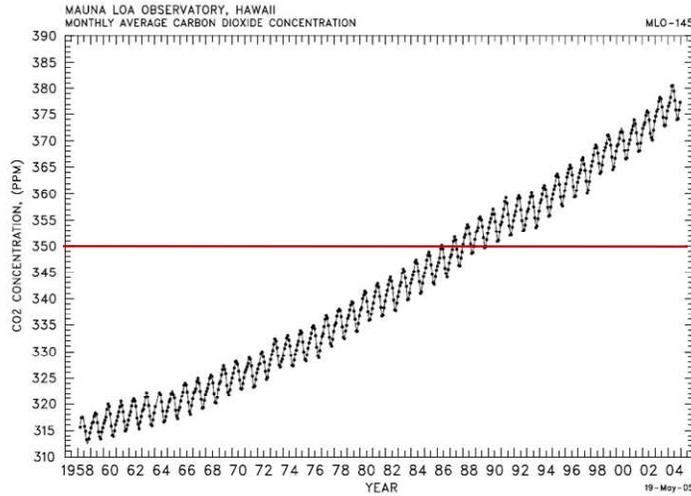
Number Three: Many of our buildings are ailing, inefficient beasts. We can construct better buildings. And commission existing ones again. What you do as building commissioners fixes them and cuts CO₂—and that's good business. There's incredible potential in existing buildings.

Regardless of your opinion about global warming, business is changing. Now is the time to retool your skills, revise your client presentation, listen to your customer base, and keep abreast of local and national laws and programs. Your reward? Gainful employment and a well-recovered and healthy 401(k).

Now more than ever, it pays to stay ahead of the curve, to be aware not only of the present, but also the possible futures—and to plan your business accordingly. Carbon is good business. Are you onboard? The carbon reduction train is about to leave the station. It's time to get to work.

Figures

Figure 1. CO₂ Concentration, Hawaii, 1958–2004



415 ppm
by 2025

350 ppm

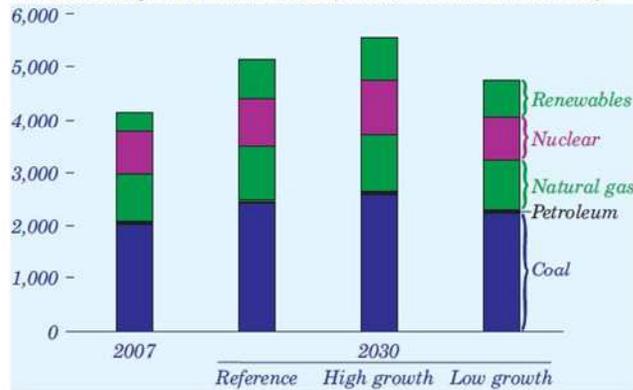
Source: Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory



Figure 2. Projected Sources of Electricity Generation in the U.S. by 2030

Coal-Fired Power Plants Provide Largest Share of Electricity Supply

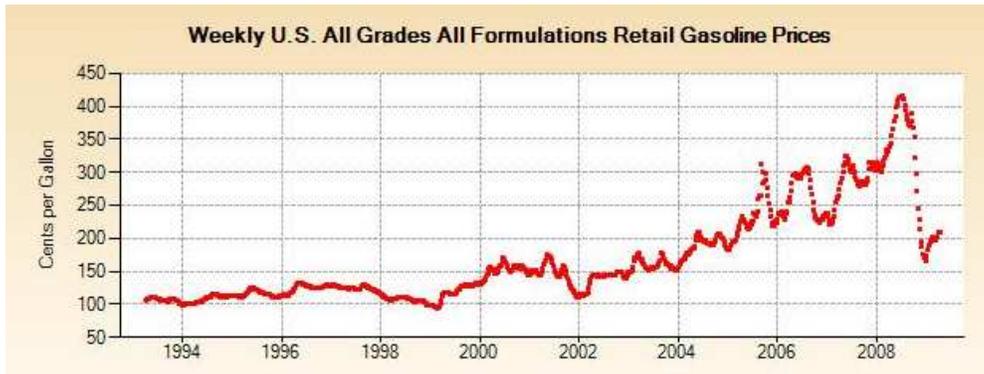
Electricity generation by fuel in three cases, 2007 and 2030 (billion kilowatthours)



Source: U.S. Energy Information Administration



Figure 3. Gasoline Prices in the U.S. since 1993



Source: U.S. Energy Information Administration



Figure 4. Carbon Nation Film Website



carbon₂ nation
a 90 minute **climate change solutions** documentary

www.carbonnation.tv



Selected References

Carbon Dioxide Information Analysis Center. Oak Ridge National Laboratory. U.S. Department of Energy. <http://cdiac.ornl.gov/>

Carbon Nation. <http://carbonnation.tv/>

Chicago Tribune.

Committee on Energy and Commerce. U.S. House of Representatives. Henry A Waxman, Chairman. Publications including a summary of the proposed The American Clean Energy and Security Act of 2009. <http://energycommerce.house.gov/index.php>

Committee on Energy and Natural Resources. U.S. Senate. Jeff Bingaman, Chairman. Publications including a brief entitled “Clean, Efficient, American Energy” detailing energy provisions of the American Recovery and Reinvestment Act of 2009. <http://energy.senate.gov/public/>

Deloitte and Charles Lockwood. “The Dollars and Sense of Green Retrofits.” Deloitte Development LLC. 2008. <http://www.deloitte.com/>

Energy Information Administration. U.S. Department of Energy. <http://www.eia.doe.gov/>

The Administration of President Barack Obama. The White House. Various speeches, press releases, and websites including an “Energy and the Environment” section of the agenda. http://www.whitehouse.gov/agenda/energy_and_environment/

The New York Times.

The Wall Street Journal.

Thomas Friedman. *Hot, Flat and Crowded: Why We Need a Green Revolution – And How it Can Renew America.* Farrar, Straus and Giroux. 2008.

U.S. Green Building Council. “Making the Business Case for High Performance Green Buildings.” <http://www.usgbc.org/>

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