

Smart Energy Management: A Win for the Environment, People and Business

INNOVATIONS 2 SOLUTIONS

The Sodexo logo features the word "sodexo" in a blue, lowercase, sans-serif font. A red swoosh underline is positioned beneath the letters "o" and "d". A blue five-pointed star is located above the letter "o".
QUALITY OF LIFE SERVICES

SMART ENERGY MANAGEMENT: A WIN FOR THE ENVIRONMENT, PEOPLE AND BUSINESS



Randy S. Michael, LEED AP, CEM, CEA, CEP, CDSM, Senior Director, Energy Management Services, Sodexo

INTRODUCTION

Greenhouse gases increased at an average annual rate of 1.4% between 1990 and 2013. Efforts to reduce greenhouse gases continue to escalate in the global community. More countries are expected to join a new [United Nations emission protocol](#) in early 2016.¹ The Durban Platform for Enhanced Action (ADP) focuses on achieving [climate effectiveness](#) through reductions in net greenhouse-gas emissions.² Emission reductions of at least 60% by 2050 are recommended.

There is growing recognition that human activities are major contributors to climate change. Aggressive action is needed to stem this tide. None of this bodes well for the construction of additional fossil fuel power generation despite increasing demand. The new normal is likely to require consumers to become more active participants in the creation and use of energy.

A global study carried out in 2013 by [The Institute for Building Efficiency](#) found that decision-makers in every country surveyed — from 71% in Australia to 93% in China and India — considered energy management very or extremely important to their organizations.³ Energy Awareness & Technical Expertise were among the top five barriers to achieving an organization's energy goals.

The trend of energy consumers playing a key role in energy consumption and potential reduction carries over to the workplace. The value placed on reducing energy in the workplace will grow if business consumers are educated that a unit of energy saved at the meter represents more than that one unit. This will broaden responsibility by showing how individual action affects the energy chain. With more education and resources, the workplace consumer could strategically plan how and when they use energy — from lowered use when energy prices are highest to initiating front-line plans to conserve energy.

This paper will evaluate these trends and recommend steps that business consumers should take to prepare for this new normal. Waiting for utility companies to take responsibility will result in higher expenses. By implementing an action plan, businesses can reduce carbon footprint, lower cost and obtain financial incentives to offset efficiency improvements.

THE IMPACT OF CLIMATE CHANGE

Climate change refers not only to changes in temperature (global warming) but also to changes in wind, precipitation, the length of seasons as well as the strength and frequency of extreme weather events like droughts and floods. Global warming is the term used to describe the increase in the Earth's average temperature.

Climate change is introducing new types of challenges and opportunities to businesses across the globe. Weather events, water scarcity, biodiversity loss and other climate-related changes in the environment are already and will increasingly affect businesses and how they operate.

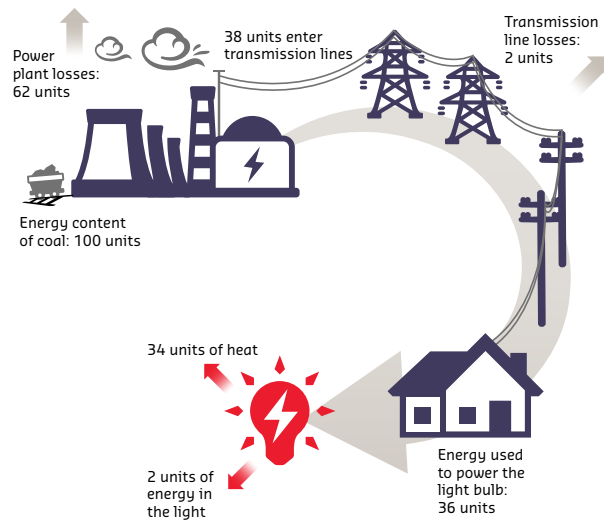
While a small quantity of greenhouse gases is produced naturally, the majority is emitted by human activities. The massive use of fossil fuels such as hydrocarbons (e.g., coal, gas, oil), deforestation and intensive livestock raising and agriculture produce large quantities of greenhouse gases, which are concentrated in the atmosphere. These emissions accelerate global warming. According to the research of the Intergovernmental Panel on Climate Change (IPCC), a temperature increase of over 2°C would lead to serious consequences, such as a greater frequency of extreme climate events.⁴

FOUNDATIONS IN ENERGY CONSERVATION

As Albert Einstein correctly observed, “Energy cannot be created or destroyed; it can only be changed from one form to another.” This basic law forms the first law of thermodynamics — the *Law of the Conservation of Energy*. We live in a world where we must transform one source of energy to another so it can be used for the required purpose. Today’s workplace transforms ideas into actionable items, similar to the energy conversion process. Likewise, the power of people in offices, campuses, warehouses, hospitals, manufacturing plants are all valuable sources of energy.

Transforming one energy source to another is a complicated and expensive process. Some of the energy contained in the original source is lost during conversion. Some of the energy contained in the original source is lost during conversion, as illustrated in Figure 1. Imagine that the coal needed to illuminate an incandescent light bulb contains 100 units of energy when it enters the power plant. Only two units of that energy eventually light the bulb. The remaining 98 units are lost along the way, primarily as heat.⁵

Figure 1. Energy lost during conversion and transmission



This waste contributes to environmental pollution. Even clean energy sources, such as hydropower, have flaws and can contribute to ecosystem disruption. The environment is best served by limiting the amount of energy we need and producing energy efficiently with no carbon emissions.

In a test environment, the conversion of energy can be performed with a high measure of efficiency, and the device using the electric energy can be designed to deliver higher levels of efficiency. Outside of a controlled setting, the consumer is responsible for

the proper use of the device. Variations in use can lower the level of performance. An example is the fuel efficiency estimate on new cars. Manufacturers state that under ideal conditions a car may achieve a certain mile per gallon for city and highway driving. Variations in speed, weather, road conditions and driver skill may skew these results to higher or lower miles per gallon.

Using this analogy, people in the workplace are the most powerful resources to curb carbon emission. By turning off the lights or raising the temperature in an air conditioned space, a business saves more than one unit of energy. It cuts the energy that the utility company uses to produce and distribute that unit. In the process of converting fuel to electricity, energy is lost and greenhouse gases are produced. When the electricity is put into the electric grid, it has to travel over high voltage wires. Some electricity is lost during the trip and converted into heat. These losses are called line losses, which equate to lost energy and dollars.

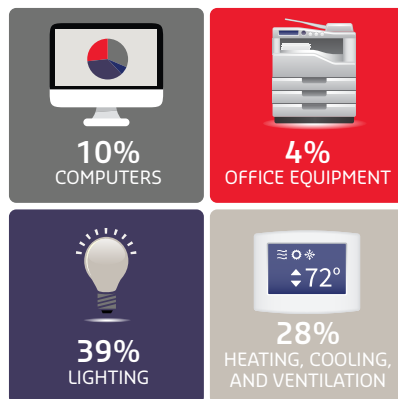
A consumer who eliminates 1 unit of energy can save an average of 1.2-1.5 units. The savings is exponential. These *negawatts* (negative watts) further reduce greenhouse gas emissions down the supply chain, from mining to transport.

ENERGY CONSERVATION IN THE WORKPLACE

People in the workplace are the key to reducing carbon emissions. They drive change not only by contributing negawatts, but also by requesting more efficient facilities, sustainable products and use of renewable energy. Demand generates a competition for efficiency and contributions that may seem small can quickly escalate into large-scale energy savings.

Energy awareness and education is the key to conservation. Teaching occupants about steps they can take will immediately reduce energy consumption in the office. The formatting of utility bills is complicated

Office Building Electricity Use⁶



BEST PRACTICES FOR A SUCCESSFUL ENERGY AWARENESS PROGRAM⁷

- Determine SMART goals and objectives for your program
- Obtain upper management buy-in and support
- Assemble a cross-functional team to lead and drive change
- Solicit input from employees to guide program development
- Develop impactful key messages tailored to your workforce
- Use appropriate communication channels to share program information
- Plan fun and competitive activities tailored to your workforce
- Incorporate rewards, incentives and recognition throughout
- Create an evaluation method to gather behavioral data and results
- Share results with your employees and publicly recognize their accomplishments

by design; rate nerds, industry slang for utility experts, devised a sophisticated system for billing. Utility bills also reflect usage that occurred in the past and cannot be changed. These two factors complicate the training process. Successful education programs should be simplified for maximum results — show users how much energy was consumed and give them ideas about how they can lower it in the future. Asking workers to contribute ideas, launching competitions and making the exercise fun will motivate change.

In addition, it is important to remember that people like competition. Like playing a game of football without keeping score, few participants will stay engaged if they aren't told how they are doing. With this in mind, energy programs must include visible measurement.

This feedback can be provided by capturing energy data at client sites and presenting it graphically on an ongoing basis through a Web portal, smartphone application or monitor display located where it can be easily viewed by employees. An example of visible metrics is the new [LEED® Dynamic Plaque™](#) by the U.S. Green Building Council, which shows the current performance of a building. It is placed in a visible location where occupants can view energy and efficiency trends and provide feedback on their experience.⁸

How can we create a win-win for people and the environment? **Businesses can approach energy as a quality of life issue.** Smart energy management can

improve several aspects of the physical environment. For example, devices using electricity generate heat. Many items drawing electricity in an enclosed space can make it uncomfortably warm for the occupants, and soaring temperatures may impact worker performance and morale. In this example, employing an energy management program addresses the environmental dimension of quality of life, thereby enabling greater worker efficiency and satisfaction.

Energy management is not only good for the environment and employees, it is also good for business. A Nielson study of 30,000 people in 60 countries indicated that 55% of online consumers say that they are willing to pay more for products and services provided by companies that are committed to positive social and environmental impact.⁹ The U.S. Environmental Protection Agency estimates that a typical workplace energy awareness program can result in overall savings of 3% on an organization's energy bill.

Workers who drive the need for conservation are the greatest energy generators — but they can also generate new business growth. Through the cycle of creating responsible workplaces, workers encourage greater consumer demand for green products and services. Thus, the cycle of negawatt creation is renewed.

Electricity Budget Tracker Menu ▾

friday
 < 19 >
 February 2016

February

S	M	T	W	T	F	S
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3

7 Better than average days 5 Average days 8 Worse than average days

Goal \$250 or less So far this period: \$181 How are we doing? 9% too high

Community Comparison Menu ▾

Monday, Feb. 1 - Sunday, Feb. 21

90th Percentage 195 kw

YOU 330 kw

50th Percentage 450 kw

Washington, D.C. Menu ▾

Sunny 56° Humidity 50% UV Index 1Low
 Pressure 30.09 in Dew Point 31°

SUN	MON	TUE	WED	THU	FRI	SAT
56°	54°	48°	40°	45°	48°	52°

Floors Energy Challenge (50 Participants) Menu ▾

3rd Floor		
2nd Floor		
4th Floor		
1st Floor		

= **3%** **\$SAVINGS**
 Energy Awareness Program on an organization's energy bill

**93% of companies
invested funds in energy
management over the
past four years.¹⁰**



KEY INSIGHTS & IMPLICATIONS

- People in the workplace are the most powerful resources to curb carbon emissions. A consumer who eliminates 1 unit of energy can save an average of 1.2–1.5 units.
- With more education and resources, the workplace consumer could strategically plan how and when they use energy. Energy awareness and education is the key to conservation.
- To create a win-win for people and the environment, businesses should approach energy as a quality of life issue. Smart energy management can improve several aspects of the workplace physical environment.
- Energy management is also good for business. Consumers are willing to pay more for products and services provided by companies that are committed to positive social and environmental impact.

LINKING TO SODEXO'S QUALITY OF LIFE DIMENSIONS

- **Physical Environment:** Smart energy management can improve occupant comfort, for instance, through better temperature control.
- **Ease & Efficiency:** Enhanced workplace comfort increases employees' efficiency and productivity.
- **Health & Well-Being:** A large body of research supports the crucial role the environment plays in people's physical and mental well-being. Conserving energy in the workplace contributes toward a cleaner, healthier environment for all.



| REFERENCES

SMART ENERGY MANAGEMENT: A WIN FOR THE ENVIRONMENT, PEOPLE AND BUSINESS

1. European Parliament Research Service. (2015). Negotiating a new UN climate agreement: The road to Paris. Retrieved from [http://www.europarl.europa.eu/RegData/etudes/IDAN/2015/551347/EPRS_IDA\(2015\)551347_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/IDAN/2015/551347/EPRS_IDA(2015)551347_EN.pdf)
2. Bodansky, D. (2010). The Durban Platform Negotiations: Goals and Options. Harvard Project on Climate Agreements, Belfer Center for Science and International Affairs, Harvard Kennedy School. Retrieved from http://belfercenter.ksg.harvard.edu/publication/22196/durban_platform_negotiations.html
3. Institute for Building Efficiency. (2013). 2013 Energy Efficiency Indicators Survey. Retrieved from http://www.institutebe.com/InstituteBE/media/Library/Resources/Energy%20Efficiency%20Indicator/061213-IBE-Global-Forum-Booklet_I-FINAL.pdf
4. Intergovernmental Panel on Climate Change (IPCC). (2014). Climate Change 2014: Impacts, Adaptation, and Vulnerability. Retrieved from <http://www.ipcc.ch/report/ar5/wg2/>
5. The National Academy of Sciences. (2008). What You Need to Know About Energy: Sources and Uses. Retrieved from <http://www.nap.edu/reports/energy/sources.html>
6. U.S. Energy Information Administration. (2015). 2012 Commercial Buildings Energy Consumption Survey (CBECS). Available from <http://www.eia.gov/consumption/commercial/>
7. U.S. Department of Energy: Energy Efficiency and Renewable Energy. (2007). Creating an Energy Awareness Program: A Handbook for Federal Energy Managers. Retrieved from http://energy.gov/sites/prod/files/2013/10/f3/yhtp_ceap_hndbk.pdf
8. United States Green Building Council. (2015). Leed Dynamic Plaque: Getting Started. Retrieved from <https://www.leedon.io/gettingstarted.html>
9. Nielson. (2014). Global Consumers are Willing to Put Their Money Where Their Heart is When it Comes to Goods and Services from Companies Committed to Social Responsibility. Retrieved from <http://www.nielson.com/us/en/press-room/2014/global-consumers-are-willing-to-put-their-money-where-their-heart-is.html>
10. Deloitte Center for Energy Solutions. (2015). Deloitte Resources 2015 Study: Energy management passes the point of no return. Retrieved from <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/energy-resources/us-er-deloitte-resources-study-series.pdf>

Sodexo
9801 Washingtonian Blvd.
Gaithersburg, MD 20878
888 SODEXO 7
www.sodexo.com

