Energy Management

Materiality Assessment Topic: Company energy use

Issue Summary

Globalization, population growth and other factors have led to the exponential adoption and use of smart technologies. Networks carry the voice, data and video that connect us, helping spread information and spur innovation. Delivering this content requires energy.

Our Position

Effective energy management has a direct impact on a company's bottom line, is an important environmental consideration, and is critical to the competitiveness of our business and the reliability of our service to customers. In 2012 we adopted a three-pronged approach to guide our efforts: company-wide energy efficiency initiatives, collaboration and alternative energy.

Data Highlights

2012 Key Performance Indicators

Electricity	2010	2011	2012
Energy intensity (KWh electricity/Terabyte network traffic)	415	347	281
Energy intensity (MWh electricity/$ billion revenue)	109,500	111,700	114,599
Alternative energy (solar and fuel cell) capacity (MW)	2.1	3.9	11
Alternative energy (solar + fuel cell) production (M kWh)	3.1	12.8	68.3
Energy projects implemented	4,200	4,500	5,600
Annualized energy savings from energy projects	$44M	$42M	$65M
Total electricity use (MWh)	13.6M	14.1M	14.6M

2012 Goals	2012 Progress Toward Goals
Reduce the electricity consumption of our company relative to data growth on our network by **60 percent** by 2014 (baseline of 2008).	We reduced the electricity consumption of our company relative to data growth on our network by **57 percent** compared to our 2008 baseline.
By end of 2012, the Top 500 Retail Stores will have Energy Champions and Scorecards (in addition to the top **1,000** operational facilities).	We identified Energy Champions and launched a retail-specific Energy Scorecard at **1,000** retail stores in 2012.
Alternative energy – expand deployment by a minimum of **5 megawatts (MW)** of additional installations.	We surpassed our goal and added an additional **7 MW** of alternative energy power in 2012.

2013 Goals

- Reduce the electricity consumption of our company relative to data growth on our network by **60 percent** by 2014 (baseline of 2008).
- Expand alternative energy deployment by a minimum of **10 MW** of additional installations.

Our Action

THREE-PRONGED APPROACH TO ENERGY MANAGEMENT

We focus on three areas of energy management.

Overview		
	Internal Energy management structure	• AT&T Energy Policy • John Schinter, Executive Director of Energy • Energy Council comprised of executives from energy-consuming business units
Company-wide energy efficiency	Visibility and Accountability	• Energy Scorecard at 2,000 largest energy-consuming sites (technical, administrative and retail) places premium on project execution • Reviewed quarterly to monitor performance and drive improvement • Tied to annual performance reviews

		• Integrated tracking system and regular meetings keep progress front of mind
	Energy efficiency projects	• Over 14,300 Energy Projects producing annualized savings of over $151 million from 2010-2012. • Regional Leads and Energy Champions engage in local project execution • Projects focus on network and facility efficiency
Collaboration with external groups	Rocky Mountain Institute Challenge	• Inaugural member of the RMI Portfolio RetroFit Challenge • Focus on identifying and sharing broadly applicable facility efficiency techniques
	Environmental Defense Fund	• Engaged Environmental Defense Fund Climate Corps Fellows every summer starting in 2010 • Projects include work with lighting sensors, free air cooling, energy data analysis and water efficiency in the cooling process
	City of Chicago	• Joined Retrofit Chicago's Commercial Building's Initiative to reduce energy use at our downtown Chicago facility by 20 percent within the next five years.
Alternative energy	Solar	• 3,525 kW solar capacity at seven sites in California and New Jersey; over 3,500 kW capacity planned in 2013.
	Fuel Cells	• 7,500 kW fuel cell capacity at 11 sites in California; 7,000 kW capacity planned in 2013.
	Wind	• 10 percent of our electricity consumption for all AT&T facilities in Austin, Texas is purchased through Austin Energy's GreenChoice alternative energy program.

COMPANY-WIDE ENERGY EFFICIENCY

In the United States, buildings account for 38 percent of CO2 emissions and represent 73 percent of electricity consumption. Implementing energy efficiency initiatives can reduce emissions and produce cost savings.

Internal Energy Management Structure

Energy Policy

AT&T has an Energy Policy that is signed by our Chairman and CEO Randall Stephenson. It states that "As a global communications leader, effective energy management is critical to the

competitiveness of our business and the reliability of our service to customers." The policy outlines AT&T's commitment to "developing in our offices and labs new technologies and approaches to energy use" and calls for a comprehensive energy strategy with clear goals, metrics and management systems.

Energy Team & Champions

Dedicated full-time to energy management, AT&T's Executive Director of Energy, John Schinter oversees AT&T's company-wide efforts across all business units. He leads AT&T's Energy Council as well as a dedicated 12-member Energy Team which also works full-time to oversee thousands of energy projects, analyze and collect data and track progress and goals. Working with the Energy Team are 13 regional energy leads who work with 229 Energy Champions. These Champions are largely real estate managers and network operators that who are on the ground and implementing energy management efforts. They are also held accountable for their performance and expected to achieve progress.

Energy Council

The policy also outlines the formation of the cross-functional Energy Council, which comprises key executives representing all business units that directly consume energy in their operations or that design, develop, or specify energy-consuming equipment.

In accordance with the policy, the Energy Council regularly provides information to the Citizenship and Sustainability Steering Council, which ultimately reports to the board.

Visibility and Accountability

Energy Scorecard

There is no shortage of technical tools available to help improve performance and drive energy efficiency throughout an organization. For us, one of the most powerful tools has not been a piece of technology, but a simple management system that fosters two very basic principles: visibility and accountability.

The heart of our energy management program is the Energy Scorecard. Fed by data from a centralized database, this Scorecard generates easy-to-understand "grades" at our top 1,000 energy-consuming facilities and 1,000 retail locations. The "grades" are based on energy consumption and activity, including initiatives attempted and training related to energy efficiency projects.

The Energy Scorecards are available to all facility managers, making energy consumption performance public within the team. We have found that this increased visibility is helping to set goals and is also promoting innovation through shared learning.

Tracking and Communicating Our Progress

We routinely share information on energy performance across our entire real estate operations through newsletters, email campaigns, meetings and video conferencing. Quarterly, we publish an energy newsletter that highlights the biggest and best energy efficiency initiatives underway, and it is available to our nearly 241,810 employees.

We have also created an energy progress database accessible to employees inside the company. This database includes all past, present and potential future energy projects. This database facilitates the sharing of best practices, and creates a spirit of healthy competition across the company, which promotes progressive and effective energy management practices.

Tracking Energy Management

As the foundation of our energy management tracking program, we centrally process all of our utility invoices and extract the energy consumption data from the invoices to manage the program. This energy information is available to all of the internal network operators and real estate managers — who we call the Energy Champions. This accessibility and transparency drive accountability. The Energy Team is also able to benchmark performance, set expectations and see trends over time.

In addition to collecting data from invoices, audits are performed quarterly at our largest 1,000 facilities.

Using data from the database, we have entered more than 1,400 unique properties — including our top 1,000 facilities — in the ENERGY STAR® Portfolio Manager.

Integrated Energy Dashboard

Making energy data accessible and clear to energy managers across the company is essential to keeping on top of its management. In 2011, our Energy Team partnered with a leading technology provider to implement a centralized, user-centered energy management media platform. When fully deployed, the Integrated Energy Dashboard (IED) platform and associated tools and systems will deliver energy program information in an intelligent and interactive manner, helping us improve reliability and support multiple energy-related goals throughout the AT&T organization.

Energy Efficiency Projects

Network Initiatives

Cell Sites

In 2012, we continued to implement and explore several energy-saving solutions in our wireless network. As part of our ongoing multiyear initiative to reduce energy consumption and site maintenance, we replaced tower light controllers and incandescent bulbs with LEDs. In 2011, we replaced tower light controllers and bulbs at 1,181 sites. In 2012, we completed replacements at 1,045 additional sites. For 2013, we plan to complete another 450 sites. Our average annualized energy savings from these projects is 763 kWh (per site).

Central Office Switches

Central offices house equipment, including switches that provide dial tones and allow users to originate and receive communications via the network. In 2012, we assessed our central office switch network for efficiency opportunities including the complete removal of switches to save electricity and heating, ventilation and cooling (HVAC).

We divide our Central Office switch efficiency efforts into three categories — replacement, optimization & elimination. In 2012, we replaced nine legacy switches with nine newer, more efficient switches as part of our work to modernize and consolidate the network. We also completed 26 switch optimizations, efficiently sizing them to conserve energy, as part of a multiyear goal, with additional switches targeted for the coming years. These continued central office switch network efficiency actions resulted in a cumulative annual electricity reduction of 60 million kWh.

Facility Initiatives

Projects and Savings

In 2012, we implemented 5,659 projects that totaled an annualized savings of $65 million. We estimate that these projects will result in approximately 437 million kWh annualized energy savings. This is equivalent to 308,545 metric tons of CO_2-e, which is itself equivalent to the annual emissions of 64,280 passenger vehicles and the electricity used to power

46,189 houses annually, according to the EPA GHG Equivalencies Calculator.

This chart shows a high-level view of the types of projects we have pursued over the last three years and their associated annualized electricity savings in kWh:

	2010	2011	2012
Cooling & Heating	199,864,127	353,309,786	212,222,672
Lighting	225,984,399	43,483,314	169,525,150
Building & Envelope & Management Systems	17,990,111	12,822,475	55,636,336
TOTAL	**443,838,637**	**409,615,575**	**437,384,158**

Workplace 2020
Advances in technology, greater mobility and globalization are leading to a highly distributed workforce. In 2012, we conducted the Workplace 2020 study to explore these trends and how they are redefining the how, when and where we work. Through telecommuting and shared space initiatives, approximately 130,000 employees have the ability to work from locations other than AT&T assigned offices and 22,495 (20 percent of the eligible AT&T employee base) are approved to work from home. This represents 29 percent growth in approved telecommuters over last year. In the future, our workplace will consist of 50 percent assigned offices and 50 percent shared offices, dramatically increasing our utilization of space while reducing our portfolio footprint.

Learn more about Workplace 2020.

Real Estate Reduction
By using space more wisely, we are able to reduce the amount of energy used to power it. In 2012, we vacated space at 149 facilities, or 3.9 million square feet of space. This portfolio reduction will help us conserve 93 million kWh[1] of electricity each year, which is equivalent to the electricity use of approximately 9,853 households, according to the EPA GHG Equivalencies Calculator.

Energy Saving Software
1E's NightWatchman is an energy-saving software product that turns off company desktop and laptop PCs that are connected to the internal network each night. We have deployed the software across our U.S. operations to power down over 200,000 retail and non-retail computers at night for an estimated annual savings of over 45 million kWh — equivalent to the electricity needed to power 4,753 U.S. homes for a year.

Training Employees
Equipping our energy managers with the proper tools and knowledge is critical to driving progress. Nearly 100 percent of our Energy Champions are ENERGY STAR® certified through an internal ENERGY STAR® online training course that is available to them at any time.

COLLABORATION WITH EXTERNAL GROUPS

Rocky Mountain Institute

We are currently working with Rocky Mountain Institute (RMI) on their Portfolio RetroFit Challenge. The challenge serves as a vehicle through which companies and RMI can collaborate on the investigation and implementation of deep energy efficiency measures across office buildings and we will share the results with others that may benefit from the experience.

Environmental Defense Fund

For the third year, we participated in the EDF Climate Corps program, an initiative launched by Environmental Defense Fund to help leading companies shave operational costs and reduce emissions by identifying large-scale energy efficiency opportunities. In 2012, we hosted two Climate Corps fellows. One helped develop a plan for installing energy dashboard systems at 600 AT&T locations, which could save up to 5 percent of electricity consumption. The other focused on how to use less water in our buildings' cooling towers.

City of Chicago

In 2012, we joined Retrofit Chicago's Commercial Building's Initiative to reduce energy use at our downtown Chicago facility by 20 percent within the next five years. This will also enhance our office space as part of an overall goal to retrofit 50 percent of commercial and industrial building stock. To date, this initiative has resulted in a 30 percent energy reduction.

ALTERNATIVE ENERGY

At the end of 2012, our alternative energy portfolio included 3.5 megawatts (MW) of solar installations and an additional 7.5 MW of clean, onsite fuel cell power from Bloom Energy Servers, for a total alternative energy capacity of 11 MW. These sources of power will produce 68.3 million kWh annually, which is equivalent to the electricity use of over 7,200 homes for a year, per the EPA Equivalencies Calculator. We also continue to participate in Austin Energy's GreenChoice alternative energy program.

Solar

In 2012, two solar systems came online in New Jersey, providing a combined 573 kW. Due to our business needs, regulatory and financing structures, our efforts in solar have been focused in California and New Jersey.

- The 107 kW Freehold, N.J. system will produce 128,000 kWh of electricity annually
- The 466 kW Middletown, N.J. system will produce 656,000 kWh of electricity annually

Fuel Cells

In 2012, AT&T and Bloom Energy Corporation announced that a second wave of Bloom Energy Servers (Bloom Boxes) will be installed at 17 additional AT&T sites in California and Connecticut, making AT&T Bloom Energy's largest non-utility customer at the time. AT&T was the first telecommunications service provider to utilize Bloom Energy Servers to help power its operations. This breakthrough solid oxide fuel cell technology provides clean, reliable, affordable onsite power that reduces CO_2 emissions by approximately 50 percent compared to the grid and virtually eliminates all SOx, NOx and other harmful smog forming particulate emissions.

In addition to the existing 7.5 MW of capacity that was already in operation at the end of 2012, the planned expansion of Bloom Box installations will provide a combined 17.1 MW, helping to power 28 AT&T sites in California and Connecticut when complete. These installations are expected to produce 149 M kWh of energy annually — enough to power approximately 13,680 homes per year.

Wind

We are always exploring collaborative relationships to expand our alternative energy portfolio. In Austin, Texas we have continued our involvement with Austin Energy's GreenChoice alternative energy program, through which we purchase 10 percent of our electricity

consumption for all AT&T facilities in the area. This effort will help us avoid 7.2 million kWh of fossil fuel-generated electricity each year.

ENERGY METRIC

In 2008, we established an intensity metric to measure our electricity usage as compared to our network traffic growth. We did this to show progress in our efficiency efforts at a time when heavier network demands are driving higher electricity use. Here is our progress to date:

Intensity Metric	2008	2009	2010	2011	2012
kWh/ terabyte	654	498	415	347	281
YOY Change		-24%	-17%	-16.5%	-19%

Looking ahead, we have set a goal to achieve an intensity metric of 262 kWh for each terabyte of traffic that flows over our network by 2014, which represents a 60 percent decrease compared to our 2008 baseline. If we meet this aggressive goal, we will be carrying almost **three times as much data for each kWh of electricity we use** in 2014 compared to 2008. This goal becomes increasingly ambitious given that mobile data traffic on AT&T's national wireless network has increased more than 30,000 percent from January 2007 through December 2012.

The methodology for calculating our intensity metric was developed to allow long-term tracking of efficiency. Since different companies' networks are configured differently and carry traffic in different ways, it is exceedingly difficult to compare one network to another. We believe that the critical measure is relative performance of a network over time, using a consistent methodology.

How do we calculate our metric?

There are two components to the Intensity Metric: electricity consumption and network traffic.

The electricity consumption value is calculated by aggregating all directly-billed electricity as well as estimates of electricity consumption for leased facilities where electricity usage is part of the rent globally.

The network traffic value is calculated by gathering data (or estimations when actual measurements are not available) from all network layers, including our global backbone as well as our U-Verse television distribution network and mobility network. Specifically, it includes:

- Traffic carried on all AT&T global networks, including estimates of private line usage, both local and long-haul
- All packet data traffic (Ethernet, frame, ATM and IP, including 107.0 million Mobility subscribers)
- Voice network traffic (TDM, IP, Mobility)
- Consumer broadband distribution network serving 16.3 million broadband subscribers
- U-verse® video distribution network serving 4.5 million consumers using an efficient multicast based IP network

Our network traffic calculation is a comprehensive measurement, and we took extreme care to ensure that traffic was only counted once to prevent inaccuracies in traffic volume. Since a network has many points at which traffic can be counted, it is analogous to counting cars on a toll road. One way of counting cars could be to say that we'll count the cars each time they pass through a toll booth. The challenge with this method is that there could be several toll booths on the trip depending on the duration and route. AT&T

employed a different methodology, counting each car once, regardless of how many toll booths it traversed on its route. Also, where actual traffic measurements were not available, AT&T took a disciplined and conservative approach in estimating such traffic, ensuring it was not counted elsewhere.

[1] The associated electricity savings has been adjusted to more accurately reflect the energy intensity of our administrative spaces.

U-verse® utilizes an efficient multicast based IP network design that allows for very efficient data traffic management, but a large number of network elements are still required to distribute and route the traffic.