Energy Efficiency Basics

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An energy-efficient building ensures lower operating costs, more comfort, healthier indoor air quality and reduced environmental impact.

When starting down the path toward a more energy efficient building, a business owner can run into conflicting advice and confusing terminology. Sometimes it helps to begin with the basics.

Energy efficiency improvements for a Main Street building may include lighting upgrades, more efficient appliances, added insulation, refurbished windows and doors and improved control systems. In order to make informed decisions about where to invest energy efficiency dollars, a basic knowledge of energy issues is important. This publication includes some basic resources to aid in understanding of energy efficiency terminology.

How to Read a Utility Bill

Most people do not pay close attention to all of the details on their utility bill and may find the terms and formulas difficult to understand. Although each utility provider has a slightly different set of charges, there are some common terms that are used throughout the industry, and by understanding these terms, a customer can get a better grip on where their energy dollars go.

Account Number: The code identifying your location. This may be the same for both gas and electric if one company provides both. Basic or monthly service charge: This fixed monthly charge covers the costs for billing and processing payments, metering, meter reading and installation and maintenance of utility equipment.

Cycle, Meter Reading: The cycle refers to your meter reading and billing dates.

Calculations or Rate Calculations: The amount billed per unit of energy, expressed in kWh for electricity and therms for gas.

Demand Kilowatt (kW): This is a measure of the maximum rate at which electricity is being used during the billing period. Demand is expressed as kW.

Demand Kilowatt (kW) Charge: This charge covers the fixed cost of supplying transmission and distribution capacity to meet customer's energy demand. The transmission system includes the towers and high-voltage lines that transmit electricity from the power plants to the distribution system. The distribution system includes the lower-voltage power lines and poles (or underground power lines) and transformers that connect your service to the transmission system. The actual charge an individual customer pays will vary month to month according to the demand the individual places on the system.

Distribution: A charge for delivering utility services to a building or business. This cost may include wires and poles, repair crews and emergency services.

Energy Cost or Energy Charge: This is a variable charge, adjusted monthly according to fuel prices. It covers the cost to buy or produce energy during the billing period. It also may cover the variable cost of transmission and distribution facilities.

Franchise Fee: Some communities may charge a franchise fee through utility bills.

Non-coincident Charge: A charge based on a business's maximum demand during the billing period.

Peak Demand Charges: Charges incurred by utility companies during periods of highest energy usage may be passed along to users as peak demand charges. Peak demand may be determined daily, monthly or annually.

Percent Change: Increase or decrease in average daily usage compared with the previous billing period.

Regional Transmission Service: This is billed per kWh used and adjusts annually based on third-party transmission costs to move electricity from generation sites to distribution substations in communities.

Taxes: Applicable city, county and state taxes, sales tax and local option sales taxes.

Time-of-use Billing: Different rates may apply at times of peak demand or "off-peak" as well as seasonal adjustments.

Transmission: A charge covering the cost for delivering high-voltage electricity from power plants to local grids.

Units billed: The number of kWh or therms consumed in one billing period.

Glossary of Energy Efficiency Terms

Following is a short list of common energy effficiency terms. For a longer glossary of energy terminology, visit the United States Department of Energy website at: http://www1.eere.energy.gov/site_administration/glossary.html.

Air infiltration: Uncontrolled inward leakage of outdoor air through cracks and other unintentional openings of a building, caused by the pressure effects of the wind and/or the movement of air through chimneys, flue gas stacks, etc.

Audit: An energy audit is an analysis of current and historic energy use in a building, including recommendations for efficiency improvements.

Benchmarking: The process of comparing a facility's energy performance to that of other similar buildings or businesses.

BPI: Building Performance Institute:
A certifying agency for energy professionals.

Building Envelope: The physical separation between a buildings interior and exterior, including the foundation, walls, roof, insulation, doors and windows.

Building Performance: A holistic approach toward building efficiency.

Carbon Emissions: Polluting carbon substances released into atmosphere.

Carbon Footprint: The total set of GHG (greenhouse gas) emissions caused directly and indirectly by an individual, organization, event or product.

Conservation: A reduction in energy consumption that corresponds with a reduction in service demand. Service demand can include buildings-sector end uses such as lighting, refrigeration and heating; industrial processes; or vehicle transportation. Unlike energy efficiency, which is typically a technological measure, conservation is better associated with behavior. Examples of conservation include adjusting the thermostat to reduce the output of a heating unit, using occupancy sensors that turn off lights or appliances and car-pooling.

Current (electric): A flow of electrons in an electrical conductor. The strength or rate of movement of the electricity is measured in amperes.

Demand-side Management (DSM): A utility action that reduces or curtails end-use equipment or processes. DSM is often used in order to reduce customer load during peak demand and/or in times of supply constraint. DSM includes programs that are focused, deep and immediate such as the brief curtailment of energy-intensive processes used by a utility's most demanding industrial customers, and programs that are broad, shallow and less immediate such as the promotion of energy-efficient equipment in residential and commercial sectors.

Distribution System: The portion of the transmission and facilities of an electric system that is dedicated to delivering electric energy to an end-user.

Electric and Gas Service: The Basic Units

British thermal unit (Btu):
The amount of heat required to raise the temperature of one pound of water one degree Fahrenheit; equal to 252 calories. The Btu is one of the most common units of measure for energy.

Therm (thm):
A unit of heat energy equal to 100,000 Btu. It is approximately equivalent to 100 cubic feet of natural gas.

Watt (W):
The unit of electrical power equal to one ampere under a pressure of one volt. A Watt is equal to $^1/_{746}$ horse power.

Kilowatt (kW):
A kilowatt is equal to 1000 watts.

Kilowatt/hour (kWh):
A measure of electricity defined as a unit of work or energy, measured as one kilowatt (1,000 watts) of power expended for one hour. One kWh is equivalent to 3,412 Btu.

Outfitting an entire commercial kitchen with a suite of ENERGY STAR qualified equipment could save around 300 million BTUs of energy and about $3,600 per year.

Energy Efficiency: Services provided can include building-sector end uses such as lighting, refrigeration and heating: industrial processes; or vehicle transportation. Unlike conservation, which involves some reduction of service, energy efficiency provides energy reductions without sacrifice of service. May also refer to the use of technology to reduce the energy needed for a given purpose or service.

Energy Star: EPA and Department of Energy provided energy performance rating system for buildings and appliances.

Grid: An electrical distribution system.

HERS (Home Energy Rating System): A professional certification for home energy auditors.

HVAC: Heating, Ventilation and Air Conditioning.

Investor-owned Utility (IOU): A privately-owned electric utility whose stock is publicly traded. It is rate regulated and authorized to achieve an allowed rate of return.

Load: An end-use device or customer that receives power from the utility.

LEED: Leadership in Energy and Environmental Design, a rating for green building design.

Lumen: A measurement of light perceived by the eye. In effect, this is an indication of the level of brightness of a particular type of lighting.

Municipal Utility (muni): A publicly-owned utility provider. A muni may provide electric, gas, water and telecommunication services.

Peak Demand: The maximum load during a specified period of time.

Phantom Load: Electricity consumed by an electrical device when it is not being used or is in the "off" mode.

RESNET (Residential Energy Services Network): A certifying agency for energy professionals.

R-value: A commonly used term to measure a material's insulating properties. It is a measure of resistance that a material has to the flow of heat.

Rural Electric Cooperative (REC): An electric utility legally established to be owned by and operated for the benefit of those using its service. The utility company will generate, transmit and/or distribute supplies of electric energy to a specified area not being serviced by another utility. REC's were initially financed by the Rural Utilities Service (prior Rural Electrification Administration), U.S. Department of Agriculture.

Transmission (electric): An interconnected group of lines and associated equipment for the movement or transfer of electric energy between points of supply and points at which it is transformed for delivery to customers or is delivered to other electric systems.

U-value: The inverse of an R-value. U-value measures how well a building material conducts heat. To convert a U-value to an R-value divide one by the U-value.

Weatherization: To make (a house or other building) secure against cold or stormy weather by adding insulation, siding and storm windows.

Weather-stripping: a narrow strip of metal, wood, rubber or the like placed between a door or window sash and its frame to exclude rain, wind, etc.

References and Resources

U.S. Energy Information Administration, Glossary of Energy Terms
www.eia.gov/tools/glossary/

Alliant Energy, Understanding Your Bill
www.alliantenergy.com/UtilityServices/CustomerService/ManagingYourBill/014657

Iowa Association for Energy Efficiency
www.iowaenergy.org/

Iowa Energy Center
www.energy.iastate.edu/Efficiency/

Database of State Incentives for Renewables & Efficiency
www.dsireusa.org/

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