

Take Control & Save

A Cooperative Effort for Energy Efficiency








**Associated Electric Cooperative Inc.
Energy Efficiency Program Guide**

January 2011



Take Control & Save

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2011 Rebate Summary



CLOTHES WASHERS	
ENERGY STAR rated (must have electric water heater)	Rebate \$100
DISHWASHERS	
ENERGY STAR rated (must have electric water heater)	Rebate \$50
ROOM AIR CONDITIONERS	
ENERGY STAR rated (for new or replacement units)	Rebate \$50
ELECTRIC WATER HEATERS	
.90 efficiency or higher For a new unit or the replacement of an existing electric water heater that is less than .90 efficiency. <i>No rebates will be given for replacement of a gas water heater.</i>	Rebate \$50



GROUND - SOURCE HEAT PUMPS	
Requirements	Rebate
ENERGY STAR rated <ul style="list-style-type: none"> On new home or building construction Replacement of electric resistance heat Replacement of existing natural gas or propane heating system Replacement of an existing dual-fuel heat pump Electric backup heat will be allowed for ground-source heat pumps. 	AECI will match dollars 2 for 1 for new loop and indoor unit systems; the total maximum amount is \$500 per ton
For the replacement of a ground source heat pump unit only	\$150 per ton
DUAL- FUEL HEAT PUMPS	
Requirements	Rebate
ENERGY STAR rated <ul style="list-style-type: none"> New home or building construction Replacement of electric resistance heat The dual - fuel heat pump must have a <u>back-up</u> automatic thermostat control and natural gas, propane, or fuel oil supplemental heating system 	\$150 per ton



HOME ENERGY AUDITS	
This program is a 50/50 cost-shared program for distribution cooperatives.	Incentive is up to \$125 + \$25 for travel greater than 50 miles from cooperative



ENERGY EFFICIENCY EDUCATION
A variety of options exist to help you educate your members.



COMMERCIAL & INDUSTRIAL ENERGY AUDITS	
This program is for commercial and industrial businesses that use greater than 50kw per month.	50-50 cost share based on the annual peak demand consumption of the member at each location.

AGRICULTURE & SMALL COMMERCIAL ENERGY AUDITS	
This program is for farms and small businesses that use less than 50kW	75% of the audit fee at no cost, 25% paid by member



BUSINESS LIGHTING PROGRAM	
This program is for C&I and agricultural businesses that want to install high-efficiency lighting	Incentives for commercial, industrial and agriculture businesses

Residential Appliance Rebates

ENERGY STAR[®] rated Clothes Washers

Program Type: Year-round offering

Rebate: Associated rebate is **\$100**



Purpose/Concept:

The Take Control & Save Bonus Savings program is offered year round and is designed to increase the production, distribution, purchase and installation of high-efficiency, ENERGY STAR rated clothes washers in the consumer market.

The participating cooperatives will provide rebates to their residential members who purchase and install qualifying new ENERGY STAR rated clothes washers.

Goal

The program is implemented by cooperatives with the common goal of increasing members' awareness of saving energy.

Eligibility Criteria

1. Must be a member of the cooperative
2. **Electric water heating** must be present in the home to be eligible
3. Cooperative verifies an ENERGY STAR rated clothes washer is purchased
4. Rebates are available for existing and new homes
5. The rebate will apply for the purchase of one new ENERGY STAR rated clothes washer or for the replacement of an existing unit with an ENERGY STAR rated clothes washer

Rebate Requirements

1. **Member must fill in all information requested on the application form including the installation address, mailing address and their cooperative account number**
2. Member must sign the application and submit it to their cooperative, along with an original dated sales receipt
3. Rebate request should be submitted within 90 days of purchase
4. Cooperative verifies account number, name and address of member
5. **Limit one (1) rebate** per member address
6. A separate application must be completed for each residence

Note: Appliance dryers are not ENERGY STAR rated and therefore not eligible for a rebate.

Note: Rebate forms not completely filled out will be returned to the cooperative without reimbursement. Be sure to download the latest forms from the [Take Control & Save area of AECI's Members Only Web site.](#)

ENERGY STAR Rated Dishwashers



Program Type: Year-round offering

Rebate: Associated rebate is **\$50**

Purpose/Concept:

The AECI Take Control & Save Bonus Savings program is offered year-round and is designed to increase the purchase and installation of high-efficiency, ENERGY STAR rated dishwashers.

The participating cooperatives will provide rebates to their residential members who purchase and install qualifying new ENERGY STAR rated dishwashers.

Goal:

The program is implemented by the cooperatives with the common goal of increasing member awareness of saving energy.

Eligibility Criteria

1. Must be a member of the cooperative
2. **Electric water heating** must be present in the home to be eligible
3. Cooperative verifies an ENERGY STAR rated dishwasher is purchased
4. Rebates are available for existing and new homes
5. The rebate will apply for the purchase of one new ENERGY STAR rated dishwasher or for the replacement of an existing unit with an ENERGY STAR rated dishwasher

Rebate Requirements

1. **Member must fill in all information requested on the application form including the installation address, mailing address and their cooperative account number**
2. Members must sign the application and submit it to the cooperative along with an original dated sales receipt
3. Rebate request should be submitted within 90 days of purchase
4. Cooperative verifies account number, name and address of member
5. **Limit one (1) rebate** per member address
6. A separate application must be completed for each residence

Note: Rebate forms not completely filled out will be returned to the cooperative without reimbursement. Be sure to download the latest forms from the [Take Control & Save area of AECI's Members Only Web site.](#)

ENERGY STAR Rated Room Air Conditioners

Program Type: Year-round offering (summer season focus)

Rebate: Associated rebate is **\$50**

Purpose/Concept:



The AECI Take Control & Save Bonus Savings program is offered year-round and is designed to increase the purchase and installation of high-efficiency, ENERGY STAR rated units. Member homeowners are encouraged to replace cooling equipment that is more than 10 years old and make a change to ENERGY STAR rated units.

The participating cooperatives will provide rebates to their residential members who purchase and install qualifying new ENERGY STAR rated room air conditioners.

Goal:

The program is implemented by the cooperatives with the common goal of increasing member awareness of saving energy.

Eligibility Criteria

1. Must be a member of the cooperative
2. Cooperative must verify an ENERGY STAR rated room air conditioning unit is purchased
3. The rebate will apply for the purchase of one new ENERGY STAR rated unit or for the replacement of an existing unit
4. Rebates are available for existing and new homes

Rebate Requirements

1. **Member must fill in all information requested on the application form including the installation address, mailing address and their cooperative account number**
2. Member must sign the application and submit it to the cooperative along with an original dated sales receipt
3. Cooperative verifies account number, name and address of member
4. Rebate request should be submitted within 90 days of purchase
5. **Limit one (1) rebate** per member address
6. A separate application must be completed for each residence

Note: Rebate forms not completely filled out will be returned to the cooperative without reimbursement. Be sure to download the latest forms from the [Take Control & Save area of AECI's Members Only Web site.](#)

Electric Water Heaters



Program Type: Year-round offering

Rebate: Associated rebate is **\$50**

Purpose/Concept:

The AECI Take Control & Save Bonus Savings program is offered year-round and is designed to increase the purchase and installation of new high-efficiency electric water heaters rated at 0.9 efficiency or higher.

Goal:

The program is implemented by the cooperatives with the common goal of increasing member awareness of saving energy.

Eligibility Criteria

1. Must be a member of the cooperative
2. The efficiency rating of the new unit must be a minimum of .9 or greater
3. If the new unit replaces an old unit, the efficiency rating of the old unit must be electric with less than 0.9 efficiency.
4. Tankless water heaters are not eligible for this program
5. Hybrid heat pump water heaters are not eligible for this program
6. Rebates are available for existing and new homes
7. Rebate applies only to electric water heating units

Rebate Requirements

1. **Member must fill in all information requested on the application form including the installation address, mailing address and their cooperative account number**
2. Member must sign the application and submit it to their cooperative along with an original dated sales receipt
3. Rebate request should be submitted within 90 days of purchase
4. Cooperative verifies account number, name and address of member
5. **Limit two (2) rebates** per member address (effective July 1, 2010)
6. A separate application must be completed for each residence
7. **Existing electric water heater required** to qualify for electric water heater rebate

Note: Rebate forms not completely filled out will be returned to the cooperative without reimbursement. Be sure to download the latest forms from the [Take Control & Save area of AECI's Members Only Web site.](#)

Heating & Cooling Equipment Rebates

Ground-Source Heat Pumps (GSHP)

Program Type: Year-round offerings

Purpose/Concept:



The AECI Take Control & Save Home Comfort program is offered year-round and is designed to increase the purchase and installation of high-efficiency heat pump systems.

Goal:

The program is implemented by cooperatives with the common goal of increasing member awareness of saving energy.

Rebates:

For ground-source heat pump installations that include the indoor unit and loop, AECI will match \$2 for \$1 with a maximum of \$500 per ton to the cooperative. Cooperatives may provide an additional rebate to the member.

Rebates are only available for **up to** 50 tons commercial and 10 tons residential.

Note: Cooperative facilities are also eligible for this rebate and limited to the same rebate limits as detailed above.

For the replacement of the indoor ground-source heat pump unit only (does not include loop system), a \$150 per ton rebate will apply. If the heat pump (compressor) unit is replaced, it must be a gain of 3 EER ratings and meet the Take Control & Save Program requirements.

Specifications for sizing ground-source heat pumps for installation

For distribution systems north of the Missouri River, the ground-source heat pump will be installed with a Delta T of 80. A Manual J calculation will be used to support the Delta T. The electric backup heat must be separated from the ground-source unit with a separate breaker and must be wired to only act as second stage supplemental heat on a two-stage thermostat or as emergency heat. The distribution system must determine if a minimum of R-38 insulation is present in the ceiling and a minimum of R-13 is present in the walls.

For distribution systems south of the Missouri River, a Manual J calculation must be based on using a 70 degree design temperature as the extreme on the heating side. The electric backup heat must be separated from the ground-source unit with a separate breaker and must be wired to only act as second-stage supplemental heat on a two-stage thermostat or as emergency heat. The distribution system must determine if a minimum of R-38 insulation is present in the ceiling and a minimum of R-13 is present in the walls.

Manufactured, double-wide mobile homes and modular homes may not meet the minimum insulation standards (R13 walls; R38 ceiling). This does not make them ineligible for the ground-source heat pump rebate. (See item 7 under eligibility criteria.)

Electric backup heat will be allowed for ground-source heat pump units.

For Ground-Source Heat Pumps:

Eligibility Criteria

1. Must be a member of the cooperative (all classes of customers are included)
2. On new home and building construction
3. Replacement of electric resistance heat
4. Replacement of an existing dual-fuel or ground-source heat pump
5. Replacement of existing natural gas or propane heating system
6. The heat pump must be qualified with an ENERGY STAR rating and meet the following efficiency standards for rebates:

New for 2011 GEOTHERMAL HEAT PUMP CRITERIA

2010	ENERGY STAR rating	14.2 EER
2011	ENERGY STAR+1 rating	17.1 EER
2012	ENERGY STAR+2 rating	19.1 EER

*Note: New requirements for ENERGY STAR rated ground-source heat pumps will take effect on January 1, 2011 and 2012.

The criteria in the charts above apply to single stage models.

Multi-Stage Geothermal heat pumps are designed to operate at more than one stage or capacity through the use of technologies such as multiple stage compressors, dual compressors, variable speed compressors, etc. Multi-stage models are more efficient while running at lower capacities, but have the capability to supply more heating or cooling using higher capacities when required.

Multi-stage models may be calculated by:

$$\text{EER} = (\text{highest rated capacity EER} + \text{lowest rated capacity EER})/2$$
$$\text{COP} = (\text{highest rated capacity COP} + \text{lowest rated capacity COP})/2$$

7. The home where the ground-source heat pump is installed must be a permanent structure on a permanent foundation and on land owned by the homeowner
8. AECI will not rebate DX (direct expansion) Ground Source Heat Pumps

Rebate Requirements

1. Member must fill in all information requested on the application form including the installation address, mailing address and their cooperative account number
2. Member must sign the application and submit it to the cooperative along with an original dated sales receipt
3. Rebate request should be submitted within 90 days of purchase
4. A separate application must be completed for each installation site with a limit of one (1) rebate per address. Attach additional sheets for multiple units.
5. Cooperative must verify account number, name and address of member
6. Cooperative must verify a qualified heat pump system has been purchased and installed by going to the ENERGY STAR website: <http://www.energystar.gov/> and select: [Find Products](#) from the top of the page, then select [Heating & Cooling](#) or for additional assistance go to:
7. The Air-Conditioning, Heating and Refrigeration Institute (AHRI) is the trade association representing manufacturers of air conditioning, heating and commercial refrigeration equipment. AHRI develops standards for and certifies the performance of many of these products. If you know AHRI's unique identification number assigned to the model/combination and need to know if the GSHP unit is ENERGY STAR qualified go to the - [AHRI HVAC look-up directory](#).

Note: Rebate forms not completely filled out will be returned to the cooperative without reimbursement. Be sure to download the latest forms from the [Take Control & Save area of AECI's Members Only Web site](#).

Dual-Fuel Heat Pump (DFHP)



Program Type: Year-round offerings

Rebates: Associated rebate is **\$150 per ton**

For Dual-Fuel Heat Pumps

Eligibility Criteria

1. Must be a member of the cooperative (all classes of customers are included)
2. New home and building construction
3. Replacement of electric resistance heat
4. Replacement of an existing dual-fuel heat pump
5. The dual-fuel heat pump must have back-up automatic thermostat controlled natural gas, propane or fuel oil heating system for supplemental heat. *Note: wood burning systems are not eligible as back-up for heating.*
6. The heat pump must be qualified with an ENERGY STAR rating and meet the following efficiency standards for rebates:

New for 2011 DUAL-FUEL HEAT PUMP CRITERIA

2010	ENERGY STAR rating	14.5 SEER
2011	ENERGY STAR+1 rating	15.5 SEER
2012	ENERGY STAR+2 rating	16.5 SEER

Rebate Requirements

1. Member must fill in all information requested on the application form including the installation address, mailing address and their cooperative account number
2. Member signs the application and submits it to their cooperative along with an original dated sales receipt
3. Rebate request should be submitted within 90 days of purchase
4. A separate application must be completed for each installation site, limit one (1) rebate per address. Attach additional sheets for multiple units.
5. Cooperative verifies account number, name and address of member
6. Cooperative verifies a qualified heat pump system has been purchased and installed by going to the [ENERGY STAR Web site](#) and selecting: [Find Products](#) from the top of the page, then select [Heating & Cooling](#) or for additional assistance go to: [CEE Directory](#)

Home Energy Audits and Weatherization Incentives



Program Type: Year-round offering

Purpose:

The AECI Take Control & Save Home Energy Audit program is offered year-round and is designed to increase the purchase and installation of high-efficiency products in members' homes. The home energy audits and weatherization measure is a multi-faceted program designed to improve the energy efficiency of the member's home.

Goal:

The program is implemented by cooperatives with the common goal of increasing member awareness of saving energy.

Rebates:

Associated rebates \$125 for an audit with a blower door test.

The home energy audit will be a 50-50 cost share with the distribution cooperatives for audits that do not exceed \$250. AECI will reimburse the distribution systems up to \$125 of the \$250 audit fee. This service will be provided to all distribution system members regardless of the type of heat found in the home.

AECI's rebate for energy audits will be increased by \$25 for any audit that is conducted by an outside contractor who is located more than 50 miles from the cooperative's headquarters. This is to compensate for additional expenses with the travel that is required by these outside contractors.

An incentive of up to 50% of the cost, with a cap of \$500, will be paid for the corrective actions taken. A weatherization rebate form is located on the [Take Control & Save area of AECI's Members Only Web site](#). Corrective measures include such items as labor and materials for insulation, building shell sealing, and interior duct sealing/insulation. Repair costs for HVAC equipment are not eligible for a rebate.

Cooperatives have the option to do a 2nd energy audit after energy efficient measures have been implemented on a 50-50 cost-shared basis with AECI.

2 nd Energy Audit	Cost to Co-op	Cost to AECI	2 nd Audit Total Cost
		\$87.50	\$87.50

Eligibility Criteria

1. Must be a member of the cooperative
2. Audits are available for new or existing homes
(On new homes, it is recommended that the audit take place after the home is sealed and before sheet rock and insulation have been installed)
3. A separate audit form must be completed for each installation site
4. See home audit measure procedure below for details
5. Multiple occupancy (apartments, duplexes, dormitories) buildings are eligible for a weatherization rebate on a single structure basis, (not single unit basis). One cost-shared audit on a single unit can be paid to the co-op to determine base-line energy use. The weatherization rebate (up to \$500) will be for the building owner. (effective July 1, 2010)

Rebate Requirements

1. Member/auditor must fill in all information requested on the AECI Residential Energy Audit 5-page form located at the [Take Control & Save area of AECI's members only Web site](#).
2. Member/auditor must submit the form to local cooperative
3. Cooperative must verify account number, name and address of member

Home Audit Measure Procedure

A 5-page audit form is posted at the [Take Control & Save area of AECI's members only Web site](#) that contains the basic data to be collected during the home energy audit.

The energy audit will consist of the following:

1. A blower door test which pressurizes the building to locate places of air leakage and energy loss
2. Inspect rim joists, windows, doors, recessed lighting, electrical outlets and switches for air leaks
3. Document all air leaks as candidates for sealing
4. Check of the heating system filter
5. Check the heating/air conditioning ductwork for air leaks, if accessible
6. Check the temperature setting on the water heater. (Recommended temperature setting is a range of 120 –140 degrees. If an Energy Star rated dishwasher is not present, the upper end of the range is recommended)
7. Install an AECI provided water heater wrap on all water heater units
8. Install an AECI provided hot water pipe wrap from the top of the water heater up to 10' if accessible
9. Install a low-flow shower head with the owner's permission only
10. Inspect attic and wall insulation and determine if any additional insulation is needed
11. Inspect crawl space and basement, if present, for any energy efficiency opportunities.
12. Determine the presence of CFLs. Leave AECI-provided CFLs and install, if agreed to by home owner

Weatherization Kits

AECI will provide a weatherization kit for the homeowner. The kit will include a water heater wrap, hot water pipe wrap (first 10'), 3 CFLs, insulation kits for electrical outlets and wall switches, a low flow shower head, caulk and weather stripping.

How to Order Weatherization Kits

1. The distribution cooperative can place orders for the weatherization kits from Judy Rodgers at jrodgers@aeci.org.
2. Please include your name, shipping address and number of kits requested when ordering.
3. Kits are to be ordered in increments of 24. The option is available to order just the kits without the water heater blankets. Please specify when ordering.

The kits will be shipped directly to the distribution cooperative from the supplier.

In the event that the distribution cooperative performs an energy audit that does not include a blower door test, AECI will provide a weatherization kit to the distribution cooperative providing that the rest of the requirements of the AECI energy audit are performed. Weatherization kits will be available for sale to the distribution system at AECI's cost if the distribution systems wish to make them available to their members without the energy audit.

To be eligible for this program, distribution cooperatives must comply with the audit procedure standards listed above. The distribution system may either perform the energy audit with their staff or contract with a vendor to provide the service. AECI recommends that all contracted employees performing the energy audits be certified by the Building Performance Institute (B.P.I.). Community action agencies are recommended by AECI to provide this service. If the local community action agency is unable to perform the audit, the distribution system may call a community action agency in an adjoining territory.

If the distribution cooperative wishes to use a community action agency to perform the audit, they should contact the agency to perform the work. The distribution cooperative will be responsible for providing the weatherization kits to the community action agency. The agency will perform the work and submit an invoice to AECI for payment. AECI will then bill the distribution cooperative for its share of the cost.

If the distribution cooperative performs the audit, the cooperative will submit an invoice to AECI for the reimbursement of AECI's portion of the energy audit cost. A copy of the energy audit with the address where the audit took place will accompany the invoice.

Upon the completion of the home energy audit, the distribution cooperative will then provide the customer with a list of contractors that can complete the work recommended in the audit. The customer, upon completing the work, will provide the distribution cooperative with invoices documenting the work. The distribution cooperative should decide if an inspection should be made to determine if the work has been completed. All inquiries under this program measure should be directed to Rick Holmes, AECI energy efficiency program manager at 417-885-9227 or e-mail rholfmes@aeci.org

Energy Efficiency Education



Educational Seminars

AECI can work with the cooperative in the development of an energy efficiency seminar to promote the “Take Control & Save” program. The following is how the seminars can be implemented:

1. Energy efficiency seminars hosted by AECI throughout the three-tiered system with a focus on promoting the program
2. Home show and/or contractor association events utilizing the Take Control & Save booth
3. Cooperative annual meetings
4. Employee program training (on-site or video-conference)
 - 1-day basic energy efficiency training
 - Half-day program specific training

Any distribution system that would like to conduct an energy efficiency seminar or inquire about this program should contact Rick Holmes, AECI Energy Efficiency Program Manager at 417-885-9227.

Commercial/Industrial Energy Audits and Energy Efficiency Incentives



Program Type: Year-round offering

Purpose/Concept:

Commercial & Industrial Energy Audits

This program is for commercial and industrial customers who have greater than 50kW annual average demand. This program provides energy audits for industry, commercial businesses, local government units, community colleges, K-12 school systems, and nonprofit organizations that have potential for energy efficiency. AECI studies show that targeted categories such as lighting, motor replacement and HVAC applications are candidates for incentives.

Requesting Commercial and Industrial (C&I) Energy Audits From AECI

Contact Rick Holmes to coordinate with an energy efficiency auditor acceptable to both parties to perform the audit. The auditor will need to have the following information from the cooperative prior to the scheduled audit date:

1. A twelve (12) month history of energy usage
2. General information about the member such as contact name, title, company name, address, type of operation
3. Correct cooperative member's information

AECI will coordinate with the auditor, and the cooperative will contact its member to schedule the audit.

Energy audit procedure

1. The auditor will meet with the cooperative and member key personnel for preliminary interview to identify the audit scope.
2. The auditor will conduct a walk-through of the facility to observe equipment, processes, and to identify energy management opportunities.
3. After the walk-through, the auditor will conduct a post survey interview with member key personnel to discuss energy management opportunities identified.
4. The auditor and/or cooperative representative will request a 25% audit fee from the member (payable to the cooperative) at the time of the audit.
5. Auditor will invoice AECI for 100 % of audit costs. AECI will then invoice the cooperative for its 50% of the cost share.

A draft report will then be sent to the cooperative and AECI for review and approval before being presented to the member. A follow-up meeting will be scheduled with the auditor, cooperative and member to review the final results.

Note: The energy audit can encompass several hours for gathering data. The cooperative is responsible for all contact with the member.

Cost-Shared Fees:

C&I cost shared audit fees will be based on the annual peak demand consumption of the member.

Peak Demand	Cost to Co-op	Cost to AECI	Total
50 kW to 500kW	\$2,250	\$2,250	\$4,500
501 kW to 1,000 kW	\$2,500	\$2,500	\$5,000
1,001 kW to 3,500 kW	\$3,000	\$3,000	\$6,000
3,501 kW to 6,000 kW	\$3,250	\$3,250	\$6,500*
6,001 kW and Larger	\$3,500	\$3,500	\$7,000*

Beginning June 1, 2010 commercial and industrial customers will pay an initial 25% of the audit fee paid to the cooperative, reimbursable from the cooperative when one or more of the recommended measures are implemented within twelve (12) months of the audit date. The changes are to encourage customers to install energy efficient measures.

There is no limit on the number of cost-shared C&I audits a cooperative can request per year. Audits are conducted to identify energy management opportunities and will conform to the audit description/scope of work outline to be eligible for the cost-share. The outline is available on the [Take Control & Save area of AECI's members only Web site](#).

Auditor credentials

All audits must conform to the established program energy analysis and be returned to the C&I member by an experienced Certified Energy Manager (CEM) to qualify for the cost-share.

Reporting

All audit reports to become part of a database at AECI for monitoring purposes.

Note: Second audits (2 years or longer since 1st audit) will also be eligible for cost-sharing of the audit fee. Part of the audit analysis should identify any recommendations from the original audit that were implemented and energy savings that have resulted.

Small Business and Agriculture Energy Audits



Program Type: Two (2) year offering initiated May 1, 2010

Purpose:

These audit programs is for agriculture and small business customers with less than 60,000 kWhs usage per month and have a variety of energy consuming equipment and processes with the potential for energy efficiency.

Recently the USDA Rural Development has taken steps to encourage the availability of energy audits. This includes creating a separate grant program to cost share audit fees through Rural Energy for America Program (REAP). The USDA Rural Development has awarded matching REAP funds to Associated to implement an agriculture and small business energy audit program for 2010 and 2011. These funds will be used to cover the cost of the audit, up to 75%. The member recipient will be required to pay 25% to AECI.

How to schedule an audit:

The cooperative will coordinate with its member and the auditor to schedule the audit. A list of farm energy auditors will be available on the [Take Control & Save area of AECI's members only web site](#). The audit will include a site visit by an auditor who will inspect and inventory energy-consuming processes and equipment. The auditor will prepare a report recommending changes that could reduce energy consumption.

Prior to the audit:

The auditor will need to have the following information:

1. A twelve (12) month history of energy usage
2. General information about the member such as contact name, title, company name, address, type of operation
3. Correct cooperative member's information

Energy audit procedure:

1. Member contacts the cooperative and requests an audit
2. Cooperative selects its auditor
3. Cooperative coordinates with the auditor and member to schedule an audit
4. The auditor conducts a walk-through of the member's operation to observe and inventory equipment, processes and to identify energy management opportunities. A cooperative representative may also accompany the auditor.
5. After the walk-through, the auditor will conduct a post survey interview with member to discuss energy management opportunities identified
6. Auditor or cooperative representative will request a 25 % audit fee from member (payable to AECI) at the time of the audit
7. The final audit report will be sent to the cooperative, member and AECI
8. Auditor will invoice AECI for 100% of audit costs

Cost of Audit

Fee schedules are available on the [Take Control & Save energy audit area of AECI's Members Only Web site](#)

Note: The energy audit can encompass several hours for gathering data. The cooperative is responsible for all contact with the member. The audit report can be used to apply for USDA grant funds.

Business Lighting Program



Program Type: Year-round offering, starting June 1, 2010

Purpose/Concept:

To provide commercial, industrial and agricultural cooperative business customers a high-efficiency lighting rebate program. Cooperative customers have a mixture of existing lighting systems that have high potential for energy efficient lighting replacements. By installing new high-efficiency lighting, these members can lower their operating and maintenance costs, reduce cooling loads and enhance lighting levels.

An incentive rebate will be provided to C&I and agriculture customers for installing qualified energy efficient lighting fixtures and bulbs.

Eligible new lighting equipment includes:

- Fluorescent T-5 and T-8 lighting systems with electronic ballasts
- 2-piece compact fluorescent bulbs and fixtures
- LED exit signs
- Other technologies listed in the new lighting rebate tables

Rebate should be calculated based on new equipment lighting tables and verified with the Business Lighting Rebate [CALCULATOR](#) on the [Take Control & Save: Business Lighting Program](#) website. The lighting program [CALCULATOR](#) is available at the Take Control & Save Business Lighting Program Web site and can be downloaded to your laptop or flash drive. The calculator is date sensitive and will expire on December 31 of each program year. At that time, a new version can be downloaded for the next program year.

Eligibility Criteria

1. Must be a member of the cooperative (only commercial/industrial classes of customers are included)
2. A separate application form must be completed for each installation site
3. Only applicants that have greater than 10 bulbs or fixtures qualify
4. The total rebate for each member is \$30,000 per year.

Note: Co-op facilities are eligible to participate in the lighting program and receive rebates.

Rebate Requirements:

1. Member will contact the cooperative to discuss the program and obtain the lighting rebate application
2. Using the lighting program application and lighting tables, a walk through is conducted to verify existing lighting. Existing lighting inventory, obtained during the walk-through, is recorded on the application along with information on the member's business. The walk through may be performed by cooperative staff, a trusted vendor, or the member. (There is no fee or payment for this service)

3. Members and/or their selected lighting vendor will complete the new lighting section of the application.
4. The member will send the completed application to the cooperative to verify calculations, estimated energy savings and receive approval for member to purchase lighting fixtures/bulbs.
5. When the approved lighting has been installed, the member will send a copy of the application, specification sheets (cut sheets) and receipts to the cooperative for reimbursement.
6. The cooperative will perform a walk-through to verify new lighting installation
7. The cooperative will send a monthly invoice, copy of application and receipts to AECI for approved rebate amount
8. Vendor who installs new lighting is responsible for appropriate disposal of replaced fixtures/bulbs.

Note: Lighting contractor assistance

If the cooperative needs assistance when performing the Business Lighting member walk through audits, a list of companies is available regionally or statewide to assist. See link with contact email and phone numbers at [Take Control & Save: Business Lighting Program](#)



ENERGY EFFICIENCY

Phantom Loads

Purpose: A phantom load is any device that consumes electricity when turned off but still plugged into an outlet. You can reduce your phantom load use by unplugging appliances and chargers when not in use or using smart strips.

Member household phantom load example¹					
Product type	Total phantom loads²	Monthly phantom load - energy use (kWh) and cost		Annual phantom load - energy use (kWh) and cost	
Plasma TV (<40")	3 Watts	2.19	\$0.20	26.28	\$2.37
DVR	37 Watts	27.01	\$2.43	324.12	\$29.17
DVD player	1 Watt	0.73	\$0.07	8.76	\$0.79
Audio system	8 Watts	5.84	\$0.53	70.08	\$6.31
Cordless phone	2 Watts	1.46	\$0.13	17.52	\$1.58
Desktop Computer, monitor and speakers	8 Watts	5.84	\$0.53	70.08	\$6.31
Computer modem	5 Watts	3.65	\$0.33	43.80	\$3.94
Multi-function printer	6 Watts	4.38	\$0.39	52.56	\$4.73
Power tool charger	4 Watts	2.94	\$0.26	35.04	\$3.15
Totals	74 Watts	54.04 kWh	\$4.87	648 kWh	\$58.35

¹For informational purposes only. Check with your product's manual for specifications, as some devices need to stay in standby mode to work properly. Convenience and lifestyle will dictate how you use this information.

²Source: American Council for an Energy-Efficient Economy (ACEEE); www.aceee.org/consumerguide/electronics.htm and Lawrence Berkeley National Laboratory; www.standby.lbl.gov/summary-table.html

Totals shown only reflect the device's use when turned off. Many electronic devices use significantly more energy when on, and on but not running. This scenario is just an example; actual phantom loads and total electronics use may be more or less depending on the amount of electronics in your home and how often they are used. If you have more than one of any device, multiply the monthly or yearly totals by the amount of your devices to get your totals. *Costs based on an average rate of 9 cents per kilowatt-hour

Finding the phantoms:

To find the phantoms lurking in your home, take a closer look at your appliances. Phantom loads can be found in almost every room of a home, though a common spot is the entertainment center.

When the television is turned off, it isn't really off. It's sitting there, waiting for someone to press the on button of the remote, and waiting uses energy. TVs also use energy to remember channel line-ups, language preferences, and the time. DVD players, DVRs, video game consoles, cable or satellite boxes and stereos also use energy when turned off.

Home office equipment such as desktop computers, monitors and printers, and anything with a digital display such as microwaves and coffee machines are also working against your electric bill. And many of those chargers around the house that keep cell phones, power tools and MP3 players at the ready constantly draw power when plugged in.



Switch off:

The best way to get rid of your phantom load is to unplug appliances and electronic devices every night or when not in use, but that isn't convenient or easy to remember. *And some devices need to stay on in a standby mode to work properly.*

Here are some additional ideas on how to reduce your phantoms:

- Group appliances and electronics together on power strips and switch on only when needed, however be careful not to overload your power strip.
- Unplug unneeded night lights.
- Screen savers do not reduce energy use by monitors; automatic switching to sleep mode or manually turning monitors off is a better energy-saving strategy.
- Turn off your computer when not in use for 20 minutes or more and both the computer and monitor if away for two hours or more.
- Unplug battery chargers when the batteries are fully charged or the chargers are not in use.
- Buy ENERGY STAR equipment, in which standby power use may be lower than one watt.
- Purchase and use “smart strips,” which are explained below.

Take Control & Save with smart strips:

Smart strips are advanced power strips that allow you to plug an appliance into a master outlet, which controls the other outlets.

For example, you can plug your computer into the master outlet (shown here in blue), and plug speakers, printers and monitors into “automatic” outlets (shown here in white) on the strip. When you turn off your computer (master outlet) all the appliances plugged into the “automatic” outlets will turn off as well. Smart strips usually also have one or two “constant” outlets, shown here in red, which allow for appliances plugged into those to always stay on unless manually turned off.



Advertising & Promotion

Radio programming:

The Doug Rye Radio Program on cooperatives' local stations is available.

Associated Electric will solicit proposals for energy efficiency radio programming from each of the three-tiered system distribution members beginning April 1.

Doug Rye's "Home Remedies" radio program is available via satellite to local radio stations. The cost for this weekly broadcast is paid for through the Take Control & Save initiative. Local cooperatives can advertise energy efficiency, safety or other initiatives during the program.

The process for 2011 and beyond has changed. For cooperatives that have existing contracts to carry the program, extensions have been negotiated for broadcast through the end of 2011. There will be no reimbursement process and no need for contract negotiations by local cooperatives. Associated Electric Cooperative has contracted with its media buyer to conduct all negotiations and execute all contracts beyond 2011.

If you would like more information on the process or to discuss the addition of a local radio station to this weekly broadcast, please contact Darryll Lindsey (dlindsey@aeci.org).



Program Marketing Components

Material development:

Associated will develop/design materials for use by the distribution cooperatives for the purpose of promoting the Take Control & Save Program. The cooperative will have access to the various materials through the AECI members only Web site for customized printing using their logos.

Rebate template forms:

Templates for the rebate/incentive forms reside at [Take Control & Save area of AECI's members only Web site](#). The distribution systems can customize the forms by adding their name, logo and other cooperative-pertinent information as needed.

If you do not have login credentials, contact Rick Holmes, AECI energy efficiency program manager at (417) 885-9227 or e-mail rholmes@aeci.org

Types of promotional materials available:

- Radio/newspaper ads
- Promotional elements included for advertising in target publications, posters, appliance brochures, bill inserts
- Information for company newsletters and special media events
- Display materials for handouts at annual meetings, fairs and home shows

GLOSSARY of TERMS

AHU - See air-handling unit.

Air-handling unit (AHU) - Equipment used to distribute conditioned air to a space. Includes heating and cooling coils, fans, ducts, and filters.

Air-source heat pump mini-split system - Mini-split heat pumps are a good equipment choice for home additions, or selective area cooling, such as one floor or wing of a home. The advantages of a mini-split heat pump system over other types of cooling equipment is that it provides cooling in homes that do not have air ducts

Air-source heat pump split systems - Split cooling systems that have equipment installed both inside and outside the home. In a split system, the condenser or heat pump is installed outside the home, an air handler is installed inside the home. The indoor and outdoor components of a split-system are connected by refrigeration pipes and a low-voltage electrical wire. Cold air is distributed through a duct system inside to each room in the home.

Air-source heat pump single packaged unit - Self-contained cooling systems sit outside the home on the ground or on the roof and all components are contained internally in a single unit. The self-contained units use a duct system to distribute cold air throughout the home

Air side systems - Equipment used to heat, cool, and transport air within building HVAC systems.

ARI - Air-Conditioning and Refrigeration Institute.

ASHRAE - American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.

ASME - American Society of Mechanical Engineers.

Back-up heating systems – a reserve heating source in addition to the primary unit. The reserve heating source could be electric or propane or natural gas.

Balancing - Process of measuring and adjusting equipment to obtain desired flows. Applies to both air side and water side systems.

Ballast - Power-regulating device that modifies input voltage and controls current to provide the electrical conditions necessary to start and operate gaseous discharge lamps.

Blower door - A device used by energy auditors to pressurize a building to locate places of air leakage and energy loss.

Boiler - Pressure vessel designed to transfer heat (produced by combustion) or electric resistance to a fluid. In most boilers, the fluid is water in the form of liquid or steam.

B.P.I. – Building Performance Institute. Provides training, certification, accreditation, and quality assurance programs for building performance.

British thermal unit (Btu) - A unit of energy equivalent to the amount of heat required to raise the temperature of 1 pound of water 1 degree Fahrenheit. Btu See British thermal unit.

Calibration - Process of adjusting equipment to ensure that operation is within design parameters.

Carbon dioxide - Colorless, odorless, incombustible gas formed during respiration, combustion, and organic decomposition. Increasing amounts of carbon dioxide in the atmosphere are believed to contribute to the global warming phenomenon.

Carbon monoxide - Colorless, odorless, poisonous gas formed during incomplete combustion of fuel.

CAV - See constant volume

COP - See coefficient of performance.

cellulose Insulation - A type of insulation composed of waste newspaper, cardboard, or other forms of waste paper.

Central plant - Centrally located equipment that satisfies a building's cooling and heating loads.

CERCLA Comprehensive Environmental Response, Compensation and Liability Act - (1980) an EPA regulation. Also known as the Superfund law.

CFCs - See chlorofluorocarbons.

cfm - Cubic feet per minute.

Chiller - Mechanical device that generates cold liquid, which is circulated through cooling coils to cool the air supplied to a building.

Chlorofluorocarbons - Chemical compounds consisting of carbon, hydrogen, chlorine, and fluorine, once used widely as aerosol propellants and refrigerants. Believed to deplete the atmospheric ozone layer.

Coefficient of performance (COP) - A measure of efficiency in which a higher value designates a more efficient system. example, Chiller efficiency measured in Btu output (cooling) divided by Btu input (electric power), measured at full or part load.

Coil, condenser - A heat exchanger used to condense refrigerant from a gas to a liquid.

Coil, cooling - Heat exchanger used to cool air under forced convection with or without dehumidification. May consist of a single coil section or several coil sections assembled into a bank.

Coil, fan - A device that combines a heat exchanger and a fan in a single unit that conditions air by forced convection.

Coil, heating - Heat exchanger that heats air under forced convection. May consist of a single coil section or several coil sections assembled into a bank.

Color rendering index (CRI) - A measure ranging from 0 to 100 of the accuracy with which a light source renders different colors in comparison to natural light, which has a measure of 100.

Combustion air - Air that supplies the oxygen required to burn fuel.

Commissioning - The quality assurance process that ensures design intent is met for new facilities or major rehabilitation.

Compact fluorescent light (CFL) – A smaller version of standard fluorescent lamps which can directly replace standard incandescent lights. These lights consist of a gas filled tube, and a magnetic or electronic ballast.

Condenser - Heat exchanger in a refrigeration system that expels building heat absorbed in the evaporator.

Conditioned air - Air that serves a space and that has had its temperature and/or humidity altered to meet design specifications.

Constant volume (CAV, constant air volume) - Type of air-handling system that supplies the conditioned space at a constant air flow and modulate heating and cooling by varying the air temperature.

Controls - An instrument or set of instructions for operating or regulating building systems.

Control, pneumatic - A control that utilizes air pressure to vary equipment operation.

Control, set back - The practice of reducing the thermostat set point during unoccupied times.

Cooling tower - Device that dissipates heat from water-cooled systems through a combination of heat and mass transfer, whereby the water to be cooled is distributed in the tower and exposed to circulated ambient air.

COP - See coefficient of performance

CRI - See color rendering index.

Cycling - The non-continuous operation of equipment.

Dampers - Single- or multiple-blade devices, either manually or automatically opened or closed, that control the flow of air.

Deadband - A setting in the lighting control that provides a time delay, signaling the lights to switch off only if the light level is somewhat above the setting, or on only if the level is somewhat below the setting.

DEHP - Di (2-ethylhexyl) phthalate, an insulator used to replace PCBs in ballast capacitors starting in 1979. DEHP is listed as a hazardous waste in its pure form, but, according to RCRA, it is no longer considered hazardous. Once used in a lighting ballast.

Delta T – Design temperature for a heating and/or cooling system calculated by determining the maximum difference in temperature between the inside (conditioned) and outside temperature as figured in degrees Fahrenheit.

Demand charges - Fees levied by a utility company for electric demand.

Demand, electric - Electrical power delivered to a system at a given time or averaged over a designated period. Expressed in kilowatts.

Demand ventilation - Method of controlling the amount of outdoor air intake based on carbon dioxide levels in a space.

Desiccant - A material that absorbs moisture from its surrounding environment.

Direct expansion system - Cooling system in which the refrigerant runs in the cooling coil to cool the air directly; that is, there is no water loop between the refrigerant and the air to be cooled.

Domestic hot water - All hot water consumed in a building that is used for purposes other than heating a space.

Double-wide home – a manufactured home which is twenty feet or more wide and are towed to their site in two separate units, which are then joined together.

Downsizing - Process of reducing the size (capacity) of equipment so that it operates efficiently at design load conditions.

Diffuser, HVAC - A device that distributes conditioned air to a space.

Diffuser, lighting - A device that distributes light produced by lamps into a space.

Ductwork - The distribution system for air in HVAC systems. It is usually made of sheet metal or fiberglass

EER - Energy Efficiency Ratio - Cooling capacity (Btu/hr) divided by total input power (watts) requirement.

Efficacy - The ratio of lamp lumen output to total lamp power input expressed in lumens per watt.

Efficiency - Ratio of power output to input.

Energy audit - A survey that shows how much energy you use in your house or apartment. It will help you find ways to use less energy. Would also include a blower door test and an inspection of the building envelope and ductwork for air leaks and an inspection of the heating and cooling equipment for operating efficiency.

Energy management system (EMS) - The control system that monitors the environment and energy usage in a building and alters equipment operation to conserve energy while providing occupant comfort.

EMS - See energy management system.

Energy management system (EMS) - The control system that monitors the environment and energy usage in a building and alters equipment operation to conserve energy while providing occupant comfort.

ENERGY STAR rated - EPA's trademark symbolizing excellence in energy efficiency.

Envelope, building - The outer shell of a building, including walls, roof, windows, and doors.

Evaporator - Heat exchanger in a refrigeration system that absorbs heat from chilled water or building air, thus reducing the supply temperature.

Exhaust air - Air removed from a building and not reused.

Fans AHU - See air-handling unit.

Fan, cooling tower - Fans that are used to draw air through the cooling tower to carry away water vapor.

Foam (insulation) - A high R-value insulation product usually made from urethane that can be injected into wall cavities, or sprayed onto roofs or floors, where it expands and sets quickly.

Footcandle (fc) - Unit of illuminance equal to 1 lumen per square foot.

Fouling - The buildup of a film that reduces heat transfer.

Foundation - The supportive structure of a building.

Gasket - Material used to seal a joint against leakage.

Glazing - Glass set or made to be set in frames.

Glazing system - A configuration of materials with a transparent or translucent element designed to admit sunlight.

GPM - Gallons per minute. A measure of water flow rate.

Geothermal heat pump or ground source heat pump - A type of heat pump that uses the ground, ground water, or ponds as a heat source and heat sink, rather than outside air. Ground or water temperatures are more constant and are warmer in winter and cooler in summer than air temperatures. Geothermal heat pumps operate more efficiently than "conventional" or "air source" heat pumps.

Heat exchanger - A device that transfers heat from one fluid to another.

Heat-exchange area - Area where heat is transferred from one medium to another.

Heat gain - The rate at which heat enters or is generated within a space at a given instant.

Heat, latent - The heat required to change the state of matter from a liquid to gas or gas to liquid.

Heat pump - Heat pump utilize the vapor compression refrigeration cycle the same that a DX unit or chiller does. naturally flows from warmer to cooler areas. The difference is that a heat pump can reverse the direction of heat flow which

Heat, sensible - The heat required to change temperature without changing state of matter. This temperature change can occur by exposure to radiation, friction between two objects, chemical reaction, or contact with a hotter object.

Heating and Cooling AHU - See air-handling unit.

HID - High-intensity discharge.

Hp - Horsepower. A unit of mechanical power.

Humidistat - A device that responds to humidity changes and controls equipment by seeking a setpoint.

HVAC - Heating, ventilating, and air-conditioning.

IAQ - Indoor air quality.

IEEE - Institute of Electrical and Electronic Engineers.

IES - Illuminating Engineering Society.

Illuminance - Commonly called light level, the light intensity arriving on a surface measured in footcandles.

Impeller - The rotating element of a fan or pump used to circulate the air or water.

Infiltration - Air that leaks into a building through the building shell.

Insulation - Materials that prevent or slow down the movement of heat.

Internal rate of return (IRR) - Compound interest rate at which the total discounted benefits equal total discounted costs for a particular investment.

IRR - See internal rate of return.

Kilowatt (kW) - Unit of power equal to 1,000 watts.

Kilowatt-hour (kWh) - Unit of electric consumption equal to the work done by 1 kilowatt acting for 1 hour.

Lighting ballast - Power-regulating device that modifies input voltage and controls current to provide the electrical conditions necessary to start and operate gaseous discharge lamps.

Load - The demand upon the operating resources of a system. In the case of energy loads in buildings, the word generally refers to heating, cooling, and electrical (or demand) loads.

Load, cooling - Cooling (typically measured in Btu/hr or tons) required to maintain an indoor design temperature.

Lumen - Unit measurement of the rate at which a light source produces light per unit time.

Luminaire - Complete lighting unit, consisting of one or more lamps together with a housing, the optical components to distribute the light from the lamps, and the electrical components (ballast, starters, etc.) necessary to operate the lamps.

Luminance - Commonly referred to as brightness, the light leaving a surface measured in footlamberts. It considers both illuminance on the surface and reflectance of the surface.
luminance ratio The ratio between the luminances of any two areas in the visual field. This is a measure of the uniformity of luminance.

Manual J - The standard method for calculating residential cooling loads developed by the Air-Conditioning and Refrigeration Institute (ARI) and the Air Conditioning Contractors of America (ACCA) based largely on the American Society of Heating, Refrigeration, and Air-Conditioning Engineer's (ASHRAE) "Handbook of Fundamentals."

Maintenance - An ongoing process to ensure equipment operates at peak performance.

Meter - A device used to measure and display or record data

Nitrogen oxides - Chemical compounds that contain nitrogen and oxygen. They react with volatile organic compounds in the presence of heat and sunlight to form ozone and are a major precursor to acid rain.

Occupancy sensor - A device that detects heat (passive infrared) or a shift in the frequency of reflected ultrasonic sound waves, to control operation of lights or equipment accordingly.

Off-peak - Refers to a utility rate schedule that designates the time of day when energy and demand costs are typically less expensive.

On-peak - Refers to a utility rate schedule that designates the time of day when energy and demand costs are typically more expensive.

Packaged unit - A self-contained HVAC unit that provides heating and/or cooling to a building space.

PTAC (packaged terminal air conditioner) – PTACs heat and cool and typically installed through the wall. Room air conditioners are also through the wall heat and cool units with smaller dimensions. Both styles of units are most commonly used in hotel/motel rooms but are also perfect for offices, sunrooms, room additions, and garages

Part-load - Condition when equipment operates at less than full capacity to meet the demand placed upon it.

Part-load conditions - Time when equipment is operating at less than design loads; represents the majority of the time equipment is operating.

Part-load performance - Equipment efficiency at less than full capacity.

Payback - See payback, simple.

Payback, simple - Also known as payback. Measurement of the elapsed time between an initial investment and the point at which accumulated savings are sufficient to offset the initial investment.

PCB Polychlorinated biphenyl - A substance used as an insulator in the capacitor of fluorescent and HID magnetic ballasts prior to 1970. PCBs have been labeled as carcinogenic and can cause skin, liver, and reproductive disorders.

Peak (cooling) load - Maximum cooling required to maintain an indoor design temperature under the most adverse summertime outdoor air conditions.

Photocell - A device that responds electrically to the presence of light.

Power factor - Ratio of real power to total apparent power.

Power quality - The degree to which voltage and current wave forms conform to a sinusoidal shape and are in synchronous phase with one another. Poor power quality can have negative impacts on electrical equipment.

PPM Parts per million - A unit of concentration

Pressure drop - The loss in pressure experienced by flowing water or air due to friction and obstructions.

Pump, chilled-water - Device that circulates chilled water.

Pump, condenser-water - Device that circulates condenser water.

Radiator - Device that provides warmth to a space through radiant or convective heat provided by either steam or hot water.

RCRA - Resource Conservation and Recovery Act, an EPA Regulation.

Recommissioning - Recommissioning ensures system functionality. It is an inclusive and systematic process intended not only to optimize how equipment and systems operate, but also to optimize how the systems function together.

Reflector - A device installed in luminaires used to direct light from a source via specular or diffuse reflection.

Refrigerant - Substance, such as CFCs, HCFCs, HFCs, air, ammonia, water, or carbon dioxide, used to provide cooling by evaporation and condensation.

Reset, chilled water - The practice of increasing chilled water temperature to obtain higher chiller efficiency.

Reset, condenser water - The practice of decreasing condenser water temperature to obtain higher chiller efficiency.

Rightsizing - The process of correctly sizing equipment to the peak load.

Room air conditioner – an air conditioning unit that is installed in a window.

Roof curb - A raised and reinforced area on a roof for mounting equipment.

Rooftop unit - Air-handling equipment such as packaged units located on the roof.

Seasonal energy-efficiency ratio (SEER) - Cooling capacity (Btu/hr) divided by total input power (watts) requirement where both are seasonal averages.

SEER - See seasonal energy-efficiency ratio.

Scaling - See fouling.

Schedule - A control sequence that turns equipment on and off.

Setpoint - Desired temperature, humidity, or pressure in a space, duct, etc.

Sheave - (Pronounced shiv.) Pulley.

Shell, building - See envelope, building.

Space - The distinct area to which conditioned air is delivered.

Steam trap - A device that separates air and condensed water from steam.

Strainer screen - Filtering device used in water side systems to protect equipment from dirt, rust, and other particles.

Sulfur dioxide - A heavy, colorless, pungent air pollutant formed primarily by the combustion of fossil fuels such as coal. It is a respiratory irritant and a precursor to the formation of acid rain.

TAB - See testing, adjusting, and balancing.

Testing, adjusting, and balancing (TAB) - The process of adjusting HVAC system components to supply air and water flows at design or revised specifications.

Thermostat - A device that responds to temperature changes and controls equipment by seeking a setpoint accordingly.

Timeclock - The control device used to turn equipment on and off at set times of the day.

Ton - Unit of cooling capacity equal to 12,000 Btu/hr.

Transformer - A device that reduces the incoming line voltage, usually to a standard level, so that it may be used to operate electrical equipment in a building.

Tubes, condenser - Heat exchanger tubes through which condenser water is pumped to allow heat transfer between the condenser water and the refrigerant.

Tubes, evaporator - Heat exchanger tubes through which chilled water is pumped to allow heat transfer between the chilled water and the refrigerant.

Tune-up, building - The purposeful sequence of maintenance and operational improvements, undertaken at a specific point in time, designed to reduce energy use, heating loads, and cooling loads of existing facilities.

Variable air volume (VAV) - A type of air-handling system that provides air at a constant temperature and varies the air quantity to each zone to match the variation in room load.

Variable-speed drive (VSD) - A device used to adjust the speed of an AC motor to match load requirements.

VAV - See variable air volume.

VCP - See visual comfort probability.

Visual comfort probability (VCP) - A rating given to lighting systems expressed as the percentage of people who will find light output acceptable in terms of glare due to direct light from luminaires.

Voltage, volts - International system unit of electric potential or the amount of electrical flow, also referred to as electromotive force.

VSD - See variable-speed drive.

Water side systems - Equipment used to heat, cool, and transport water to building HVAC systems.

W/sf - Watts per square foot.