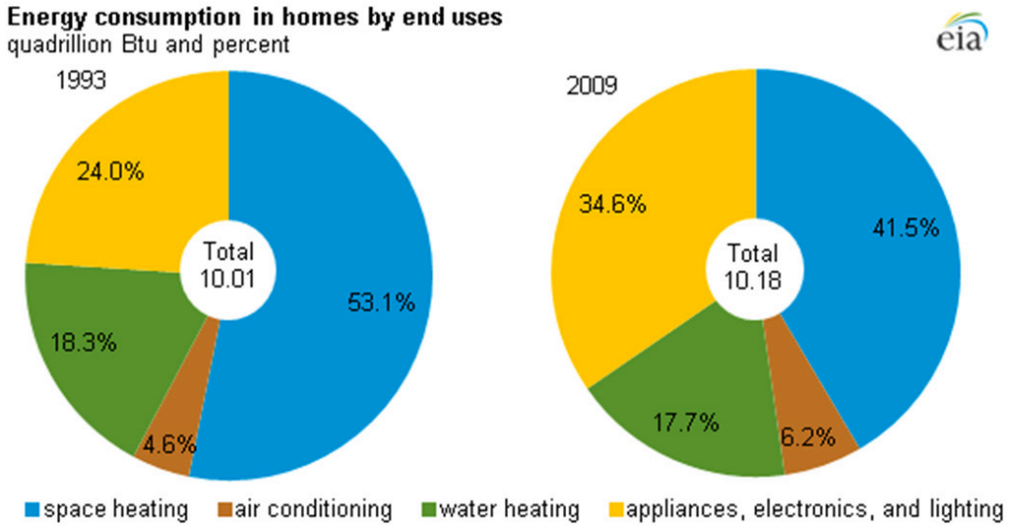
Ion Energy Solutions

The Most Powerful Utility Data in the World in MultiFamily

Multi-family Housing and thermostats

Utility costs represent the single largest controllable cost in an apartment community



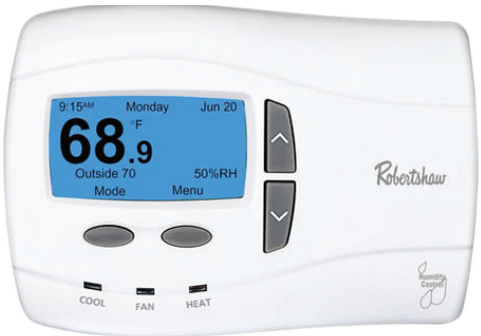
US energy Information administration: http://www.eia.gov/todayinenergy/detail.cfm?id=10271

Space heating is the largest energy expenses in the average US home, accounting for about 41.5 percent of energy bills. The percentage of average household's energy use that goes to cooling is about 6.2 percent.

A thermostat is one of the most effective tools to help control the costs of heating and cooling.

1) Turning the thermostat down about one degree saves about 2 percent on your heating bill. Turning the thermostat down five degrees saves about 10 percent.

2) A programmable thermostat lets you easily lower the temperature when no one is home, and overnight. You could save as much as 20% on your heating costs.



ION Smart Thermostat helps drive utility cost DOWN and net operating income UP

Example 1

Washington DC 158 apartments this property has a central boiler producing hot water in the winter and a chiller producing chilled water in the summer. The water was pumped to fan coil units in the apartments. An ION Smart thermostat was installed in each apartment. Property owner used run time data from the ION Smart thermostat to bill residents for heat in the winter and cooling in the summer.

Generated 20% saving on gas and electric to operate the central boiler and chiller

Example 2

Manhattan New York 1003 apartments this property has electric base board heaters. An ION thermostat was installed in almost every room in every apartment so that each individual electric base board heater would have its own control. Installed 2,400 Smart thermostats and 3,400 Smart MINIS (one on every baseboard heater)

Generated 30% savings on the electric bill during the winter

Example 3

Cheverly Maryland 60 apartments this property had individual gas fired hot air furnaces. An ION thermostat was installed in each apartment. Property owner used run time data from the ION Smart thermostat to bill residents for heat in the winter.

Generated 15% savings on the gas bill during the winter

Example 4

Lexington Kentucky 154 apartments this property has a central boiler producing hot water in the winter and a chiller producing chilled water in the summer. The water is pumped to fan coil units in the apartments. An ION Smart thermostat was installed in each apartment. Property owner used run time data from the ION Smart thermostat to bill residents for heat in the winter and cooling in the summer.

Generated 20% savings on the gas bill during the winter

Example 5

New Haven, Connecticut 500 apartments this property has a central fuel cell producing hot water in the winter and chilled water in the summer. The water is pumped to water based heat pumps in the apartments. An ION Smart thermostat was installed in each apartment. Property owner used run time data from the ION Smart thermostat to bill residents for heat in the winter.

Generated 20% savings on the gas bill during the winter

How can an ION Smart thermostat help a property owner to reduce utility cost?

The ION thermostat reduces utility costs by helping to change behaviors of property owners and residents. The behavior changes listed below achieve lower utility cost no matter what type of heating and cooling configuration is currently installed.

Six ways the ION thermostat reduces utility costs

1) Use the heating run time and cooling run time from the ION Smart thermostat to bill residents for heating and cooling. Note sub metering heating and cooling may not be allowed in all states .

2) The property owner can set a heat set point limit and send it wirelessly to the thermostat. The heat set point limit is a temperature above which the thermostat set point cannot be set. For example during the winter without a heat set point limit the resident could set the heat set point of the thermostat to 80 degrees F. Keeping the apartment temperature at 80 degrees F may seem excessive. By setting the heat set point limit to 75 degrees F the resident would not be able to request a temperature higher than 75 degrees. The heat set point limit can be set on an individual thermostat basis so special cases for elderly or invalid tenants can be accommodated.

3) The property owner can set a cool set point limit and send it wirelessly to the thermostat. The cool set point limit is a temperature below which the thermostat set point cannot be set. For example during the summer without a cool set point limit the resident could set the cool set point of the thermostat to 65 degrees F. Keeping the apartment temperature at 65 degrees F may seem excessive. By setting the heat set point limit to 72 degrees F the resident would not be able to request a temperature lower than 72 degrees. The cool set point limit can be set on an individual thermostat basis so special cases for elderly or invalid tenants can be accommodated.

4) The property owner can set a simple schedule and send it wirelessly to the thermostat. The simple schedule is two time periods per day.

    a. Morning time period has three attributes a) time of day for example 6:00 am b) starting set point temperature for the morning time period for example 70 degrees F and c) heat set point limit temperature for the morning time period for example 74 degrees F. In this example at 6:00 am the set point of the thermostat is automatically set to 70 degrees F. At any time during the morning time period the resident can change the set point from the front panel of the thermostat to any temperature but not higher than the heat set point limit (74 degrees F) for the morning time period. Some residents may change the heat set point from the front panel to less than the initial heat set point for example 65 degrees F. During the morning time period the resident can change the heat set point from the front panel of the thermostat any number of times; up or down. The morning time period ends when the night time period starts.

    b. Night time period has three attributes a) time of day for example 10:30 pm, b) starting heat set point temperature for the night time period for example 68 degrees F and c) heat set point limit temperature for the night time period for example 72 degrees F. At any time during the night time period the resident can change the set point from the front panel of the thermostat to any temperature but not higher than the heat set point limit (72 degrees F) for the night time period. Some residents may change the heat set point from the front panel to less than the initial heat set point for example 65 degrees F. During the night time period the resident can change the heat set point from the front panel of the thermostat any number of times; up or down. The night time period ends when the morning time period starts.

5) When a resident moves out then the property manager can use the web interface to set the apartment to vacant set points. Vacant set points might be defined as

    a. Morning start time 6:00 am, starting heat set point 60 degrees F, set point limit 68 degrees

    b. Night start time 7:00 pm, starting heat set point 58 degrees F, set point limit 60 degrees F

    The high set point limit (68 degrees F) during the morning time period allows maintence people and contractors to have heat while they are in the apartment to perform maintence and turn over tasks. They only need to change the set point while they are in the apartment and they do not have to emember to set it back.

6) The ION system allows the property owner to plot room temperature, heating set point temperature, outdoor temperature, and outdoor temperature all on one graph. In addition to the graph the property manager can rank all apartments by heating or cooling run time. These web based software tools can be used for a number of uses

    a. help explain to a resident why a residents heating or cooling bill is so high

    b. help understand one apartments heating and cooling performance

    c. help detect space heaters

    d. help detect open windows

    e. identify users who are using excessive heating or cooling

Description of the ION Smart Thermostat

The ION thermostat is a line powered thermostat. The ION Smart thermostat gets 24 volt AC power from the existing wires that are attached to the source of the heating/cooling.

The ION Smart thermostat does not have a battery.

The ION Smart thermostat can replace almost any existing thermostat.

There is a radio in each ION Smart thermostat. The radio operates in the 2.4 gig Hz radio frequency just like WIFI. WIFI does not interfere with the radio that transmission from the ION Smart thermostat.

The ION Smart thermostat receives the time of day from the radio network when the thermostat is turned on.

Initial settings can be downloaded over the radio network to set up the ION Smart thermostat.

Separate set points and set point limits are maintained for heating and cooling on the ION Smart thermostat. The heating set point limit is the highest temperature that the resident is allowed to enter. The cooling set point limit is the lowest temperature that the resident is allowed to enter.

The ION Smart thermostat supports two schedule modes

1) Simple schedule a two time periods each day (morning start time and night start time) with associated temperature set point and limit.
2) Fully custom schedule with four separate time periods each of the seven days per week (28 separate time periods)

Every 15 minutes the ION thermostat sends the following information over the radio network.

1) Current mode (OFF, HEAT, or COOL)
2) Current RUN status (NOT ACTIVE, HEATING or COOLING)
3) Current room temperature
4) Current heat set point
5) Current heat set point limit
6) Current cool set point
7) Current cool set point limit
8) Current heat run time in seconds
9) Current cool run time in seconds

The thermostat installer can press two buttons to see if the thermostat is joined to the radio network or not.

ION Smart thermostats can be controlled from a user friendly web page from any computer using a browser.