Munich RE

Hartford Steam Boiler

Energy Tips

The Department of Environmental Protection states that 30 percent of energy used in buildings is inefficient or unnecessary.

A significant percentage of this energy use can be reduced. Here are tips for energy reduction for six usage categories.

Air Conditioning

Refrigeration System

Heating System

Boiler System

Water Heater

Lighting and Electrical System

Munich RE

Hartford Steam Boiler

Air Conditioning

Icing

Short Cycling

Dirty or Blocked Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Bubbles in Sight Glass

Excessive Fresh Air

Central Chilled Water System

Cooling During Unoccupied Hours

Old Sensors

Noisy

Dirty or Missing Cooling Tower Slats

Dirty Cooling Tower Sump

Cooling Tower Fans

Munich RE

Hartford Steam Boiler

Air Conditioning

Icing

Short Cycling

Dirty or Blocked Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Bubbles in Sight Glass

Excessive Fresh Air

Central Chilled Water System

Cooling During Unoccupied Hours

Old Sensors

Noisy

Dirty or Missing Cooling Tower Slats

Dirty Cooling Tower Sump

Cooling Tower Fans

High pressures resulting from icing can increase electrical demand by as much as 15 percent.

Munich RE

Hartford Steam Boiler

Air Conditioning

Limit starting air conditioning to no more than seven times per hour. This will help reduce motor failure and may help improve efficiency by as much as 20 percent.

Munich RE

Hartford Steam Boiler

Air Conditioning

Icing

Short Cycling

Dirty or Blocked Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Bubbles in Sight Glass

Excessive Fresh Air

Central Chilled Water System

Cooling During Unoccupied Hours

Old Sensors

Noisy

Dirty or Missing Cooling Tower Slats

Dirty Cooling Tower Sump

Cooling Tower Fans

Dirty or blocked outside coils may reduce cooling capacity by 7 percent and increase power consumption by 10 percent.

Munich RE

Hartford Steam Boiler

Air Conditioning

Icing

Short Cycling

Dirty or Blocked Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Bubbles in Sight Glass

Excessive Fresh Air

Central Chilled Water System

Cooling During Unoccupied Hours

Old Sensors

Noisy

Dirty or Missing Cooling Tower Slats

Dirty Cooling Tower Sump

Cooling Tower Fans

A properly maintained air conditioning unit will operate as originally designed with the highest efficiency and lowest operating costs.

Air Conditioning

Icing

Short Cycling

Dirty or Blocked Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Bubbles in Sight Glass

Excessive Fresh Air

Central Chilled Water System

Cooling During Unoccupied Hours

Old Sensors

Noisy

Dirty or Missing Cooling Tower Slats

Dirty Cooling Tower Sump

Cooling Tower Fans

Repairing leaks and recharging the air conditioning will help restore the system to its design rating. This can improve efficiency by as much as 15 percent.

Munich RE

Hartford Steam Boiler

Air Conditioning

Icing

Short Cycling

Dirty or Blocked Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Bubbles in Sight Glass

Excessive Fresh Air

Central Chilled Water System

Cooling During Unoccupied Hours

Old Sensors

Noisy

Dirty or Missing Cooling Tower Slats

Dirty Cooling Tower Sump

Cooling Tower Fans

Areas with constant flow air handlers that have comfort cooling controlled by room temperature alone may be wasting energy by bringing in too much hot or humid outside air. It is more efficient to monitor the carbon dioxide in the air and provide fresh air based on those levels.

Munich RE

Hartford Steam Boiler

Air Conditioning

Icing

Short Cycling

Dirty or Blocked Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Bubbles in Sight Glass

Excessive Fresh Air

Central Chilled Water System

Cooling During Unoccupied Hours

Old Sensors

Noisy

Dirty or Missing Cooling Tower Slats

Dirty Cooling Tower Sump

Cooling Tower Fans

Common chilled water set points are 42° F and supply air handling equipment set at 55° F. Variable temperature controls that adjust the settings to 48° and 58°, respectively, will meet demand at about 95 percent of the time, and can save about 15 percent on electrical costs.

Munich RE

Hartford Steam Boiler

Air Conditioning

System controls can reduce energy usage 10 to 30 percent. This reduction is achieved by limiting air conditioning operation during unoccupied hours.

Air Conditioning

Icing

Short Cycling

Dirty or Blocked Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Bubbles in Sight Glass

Excessive Fresh Air

Central Chilled Water System

Cooling During Unoccupied Hours

Old Sensors

Noisy

Dirty or Missing Cooling Tower Slats

Dirty Cooling Tower Sump

Cooling Tower Fans

Systems that use temperature sensors for mixed air, return air, outside air, supply air, hot water, or carbon dioxide should be recalibrated annually. Sensor calibration is an energy saving opportunity. Sensors that have drifted from correct set-points often waste energy.

Air Conditioning

Icing

Short Cycling

Dirty or Blocked Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Bubbles in Sight Glass

Excessive Fresh Air

Central Chilled Water System

Cooling During Unoccupied Hours

Old Sensors

Noisy

Dirty or Missing Cooling Tower Slats

Dirty Cooling Tower Sump

Cooling Tower Fans

Mechanical defects within an air conditioning compressor or condenser unit require more power to operate.

Munich RE

Hartford Steam Boiler

Air Conditioning

Icing

Short Cycling

Dirty or Blocked Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Bubbles in Sight Glass

Excessive Fresh Air

Central Chilled Water System

Cooling During Unoccupied Hours

Old Sensors

Noisy

Dirty or Missing Cooling Tower Slats

Dirty Cooling Tower Sump

Cooling Tower Fans

Cleaning the cooling tower slats can improve efficiency by 5 to 20 percent. Replacing wooden slats with polyvinyl chloride (PVC) splash fill can improve efficiency 25 to 30 percent, by adding more evaporative surface area.

Munich RE

Hartford Steam Boiler

Air Conditioning

Icing

Short Cycling

Dirty or Blocked Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Bubbles in Sight Glass

Excessive Fresh Air

Central Chilled Water System

Cooling During Unoccupied Hours

Old Sensors

Noisy

Dirty or Missing Cooling Tower Slats

Dirty Cooling Tower Sump

Cooling Tower Fans

Proper water treatment can reduce annual waste water requirements by hundreds of thousands of gallons. Clean surfaces can reduce pump energy usage by more than 5 percent.

Munich RE

Hartford Steam Boiler

Air Conditioning

Icing

Short Cycling

Dirty or Blocked Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Bubbles in Sight Glass

Excessive Fresh Air

Central Chilled Water System

Cooling During Unoccupied Hours

Old Sensors

Noisy

Dirty or Missing Cooling Tower Slats

Dirty Cooling Tower Sump

Cooling Tower Fans

Replace cooling tower fixed speed motors with Variable Frequency Drive (VFD) motors to help save money. Historical data from VFD manufacturers indicate savings up to 50 percent annually.

Munich RE

Hartford Steam Boiler

Refrigeration System

Icing

Dirty Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Sight Glass Bubbles

Short Cycling

Munich RE

Hartford Steam Boiler

Refrigeration System

Icing

Dirty Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Sight Glass Bubbles

Short Cycling

High pressures resulting from icing can increase electrical demand by as much as 15 percent.

Munich RE

Hartford Steam Boiler

Refrigeration System

Icing

Dirty Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Sight Glass Bubbles

Short Cycling

Obstructed condenser coils may reduce cooling capacity by 7 percent, increasing power consumption by 10 percent.

Refrigeration System

Icing

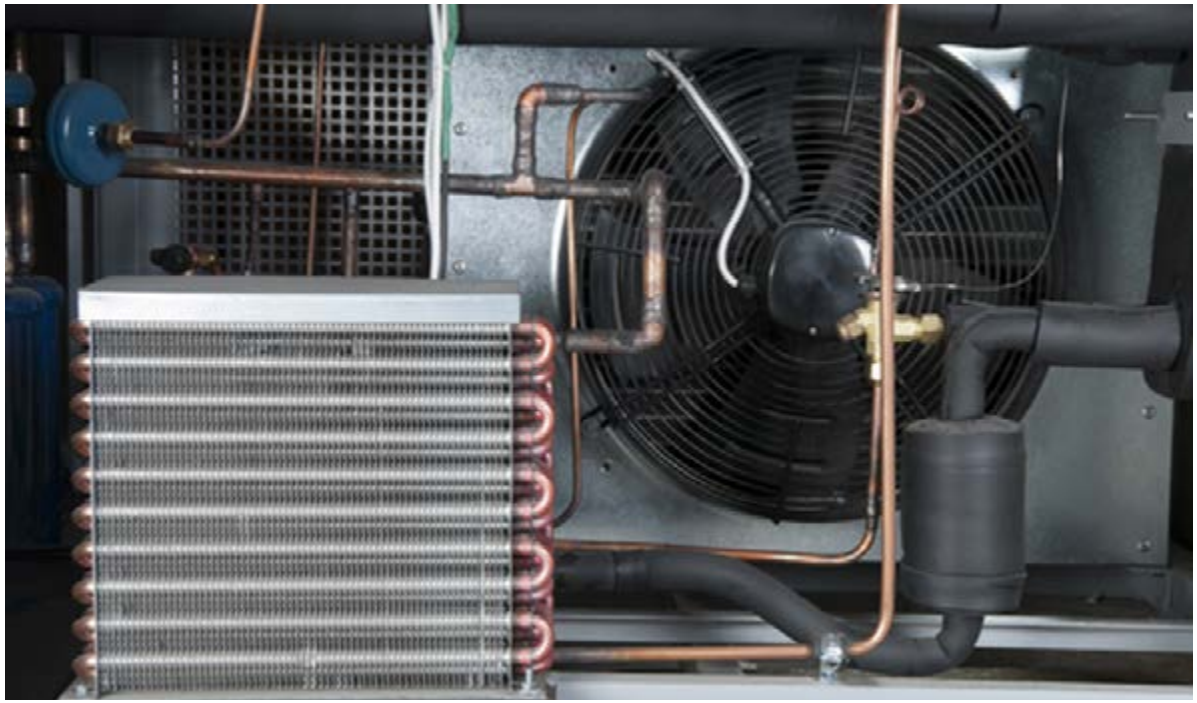
Dirty Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Sight Glass Bubbles

Short Cycling

A properly maintained refrigeration unit will operate as originally designed with the highest efficiency and lowest operating costs.



Refrigeration System

Icing

Dirty Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Sight Glass Bubbles

Short Cycling

Repairing leaks and recharging will help restore the system to its design rating. This can improve efficiency by as much as 15 percent.

Munich RE

Hartford Steam Boiler

Refrigeration System

Icing

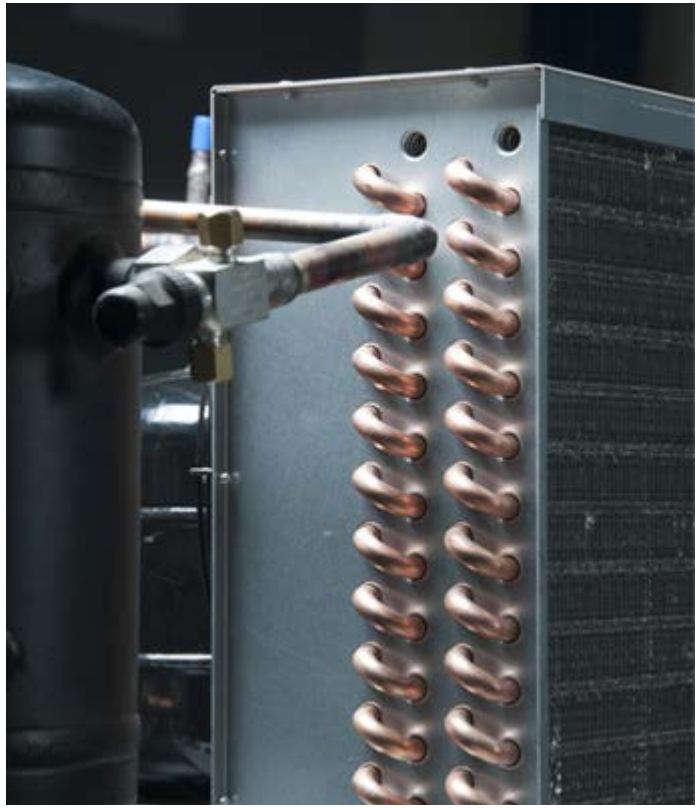
Dirty Coils (outside)

No Pre-season Maintenance

Low Refrigerant/Sight Glass Bubbles

Short Cycling

Limit starting to no more than seven times per hour. This will help reduce motor failure and may help improve efficiency by as much as 20 percent.



Munich RE

Hartford Steam Boiler

Heating System

Excessive Fresh Air

Old Sensors

Heating System

Excessive Fresh Air

Old Sensors

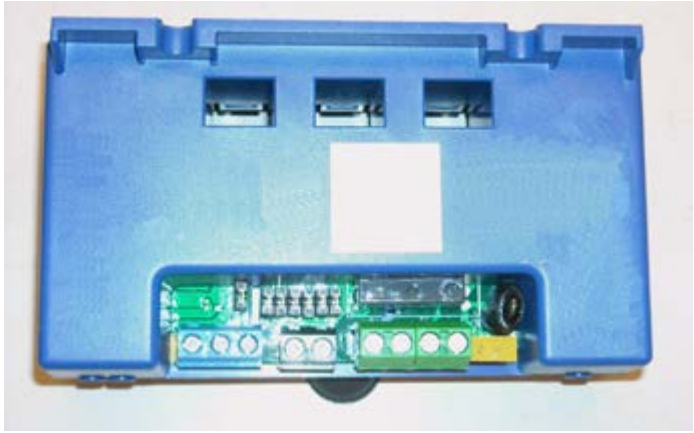
Areas with constant flow air handlers may be wasting energy by bringing in too much outside air. A more efficient design is to monitor carbon dioxide and provide fresh air based on those levels.

Heating System

Excessive Fresh Air

Old Sensors

Systems that use temperature sensors for mixed air, return air, outside air, supply air, hot water, or carbon dioxide should be recalibrated annually. Sensor calibration is an energy saving opportunity. Sensors that have drifted from correct set-points often waste energy.



Munich RE

Hartford Steam Boiler

Boiler System

No Stack Temperature Gage

Frequent On/Off Cycling

Soot

Steam Leaks

Water Leaks

Broken or Missing Refractory

Boiler Scale

Un-insulated Piping

Leaking Steam Trap

Munich RE

Hartford Steam Boiler

Boiler System

No Stack Temperature Gage

Frequent On/Off Cycling

Soot

Steam Leaks

Water Leaks

Broken or Missing Refractory

Boiler Scale

Un-insulated Piping

Leaking Steam Trap

Monitoring stack temperature helps identify adverse trends. Typically a 40° F increase in stack temperature (all other conditions being equal) correlates to a 1 percent drop in efficiency and a corresponding increase in fuel consumption.

Munich RE

Hartford Steam Boiler

Boiler System

No Stack Temperature Gage

Frequent On/Off Cycling

Soot

Steam Leaks

Water Leaks

Broken or Missing Refractory

Boiler Scale

Un-insulated Piping

Leaking Steam Trap

Boilers that cycle on and off excessively are energy wasters. Stored energy in the boiler is lost up the stack during purge cycles before and after firing.

Munich RE

Hartford Steam Boiler

Boiler System

No Stack Temperature Gage

Frequent On/Off Cycling

Soot

Steam Leaks

Water Leaks

Broken or Missing Refractory

Boiler Scale

Un-insulated Piping

Leaking Steam Trap

Products of combustion on the boiler's fireside surfaces adversely affect the unit's efficiency and can result in higher fuel costs. Heavy deposits may increase fuel costs by 5 percent or more. A properly tuned burner will help minimize soot, improving overall efficiency.

Munich RE

Hartford Steam Boiler

Boiler System

Steam and condensate leaks mean lost energy. This can result in higher fuel and water usage and costs.

Munich RE

Hartford Steam Boiler

Boiler System

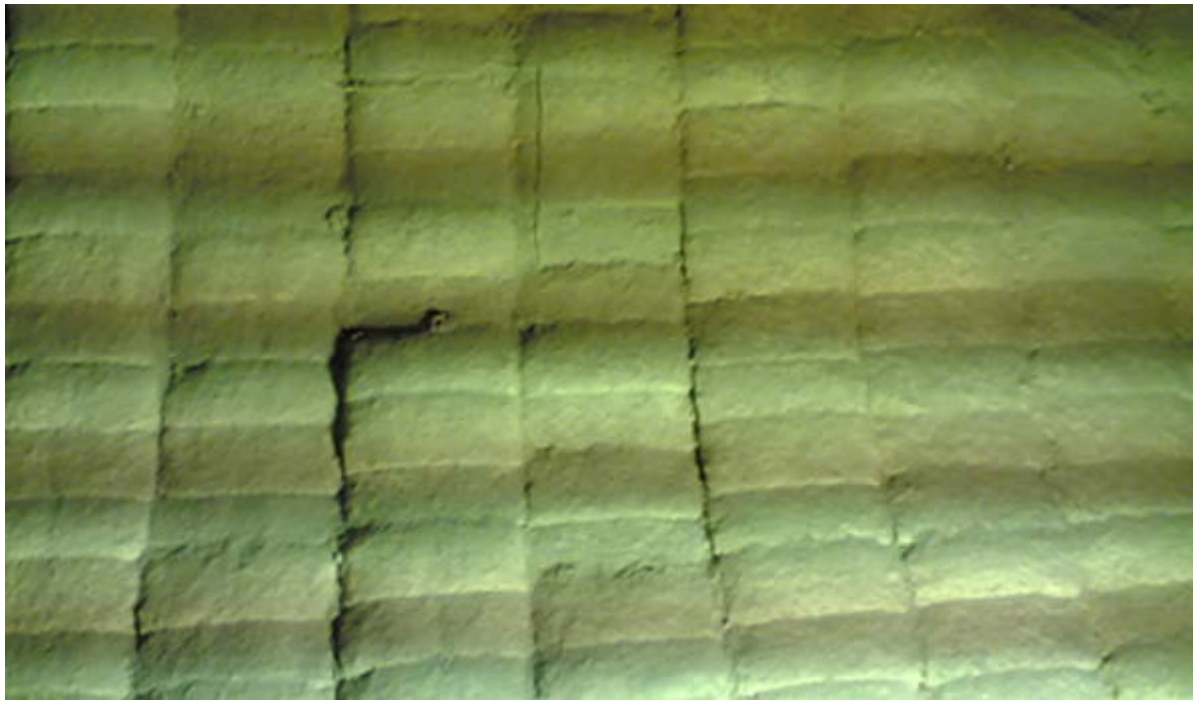
Heating system water leaks mean lost energy and can result in higher fuel and water usage.

Munich RE

Hartford Steam Boiler

Boiler System

Repairing refractory material will help maintain boiler efficiency and may improve fuel consumption.



Munich RE

Hartford Steam Boiler

Boiler System

No Stack Temperature Gage

Frequent On/Off Cycling

Soot

Steam Leaks

Water Leaks

Broken or Missing Refractory

Boiler Scale

Un-insulated Piping

Leaking Steam Trap

Boiler scale reduces heat transfer through boiler tubes. As little as 1/32 inches of scale in a firetube boiler may increase fuel consumption by as much as 7 percent. In addition, scale build-up can result in boiler tube failure.

Munich RE

Hartford Steam Boiler

Boiler System

No Stack Temperature Gage

Frequent On/Off Cycling

Soot

Steam Leaks

Water Leaks

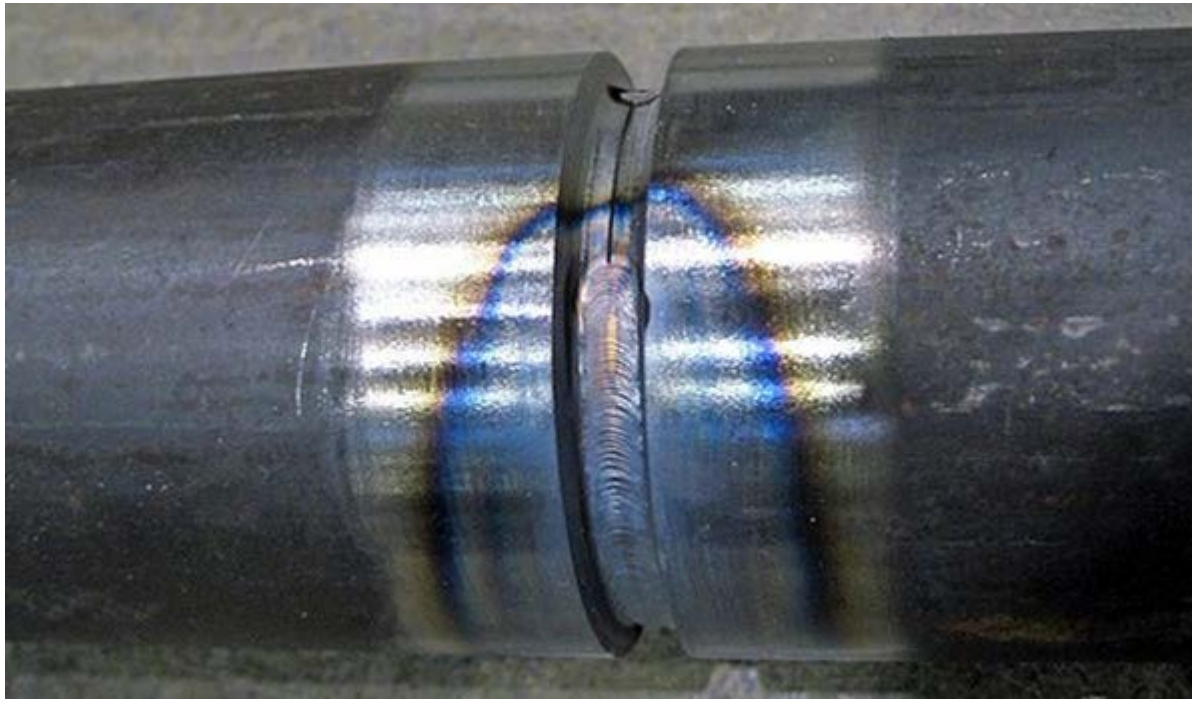
Broken or Missing Refractory

Boiler Scale

Un-insulated Piping

Leaking Steam Trap

Lack of insulation usually results in lost energy, an increase in the boiler load, and higher fuel usage. Don't forget the insulation after repairs are made



Munich RE

Hartford Steam Boiler

Boiler System

No Stack Temperature Gage

Frequent On/Off Cycling

Soot

Steam Leaks

Water Leaks

Broken or Missing Refractory

Boiler Scale

Un-insulated Piping

Leaking Steam Trap

Leaking steam traps waste a lot of energy. Repairing the trap will help decrease fuel consumption. Leaking steam traps also require additional water and water treatment expenses.

Munich RE

Hartford Steam Boiler

Water Heater

Plugged Drain Valve

Water Leaks

Water Heater

Plugged Drain Valve

Water Leaks

Scale or deposit accumulation can result in decreased efficiency, increased energy costs, and can cause premature failure of a water heater.

Water Heater

Plugged Drain Valve

Water Leaks

System water leaks mean lost energy and can result in higher energy and water usage and costs.

Munich RE

Hartford Steam Boiler

Lighting and Electrical System

Fluorescent T-12 Fixtures, Lighting

Emergency Exit Signs, Lighting

Incandescent Bulbs, Lighting

Unoccupied Areas, Lighting

Loose Connection, Electrical

Lighting and Electrical System

Fluorescent T-12 Fixtures, Lighting

Emergency Exit Signs, Lighting

Incandescent Bulbs, Lighting

Unoccupied Areas, Lighting

Loose Connection, Electrical

Replace fluorescent T-12 fixtures (1.5" diameter bulbs) with T-8 fluorescent fixtures/bulbs (1" diameter). T-8 lamps typically use 40 percent fewer watts, produce 40 percent less heat. This is important in warmer months when air conditioning is needed. These fixtures also output 10 percent more light. However, make sure the new light "color" is acceptable to the workplace or application.

Munich RE

Hartford Steam Boiler

Lighting and Electrical System

Fluorescent T-12 Fixtures, Lighting

Emergency Exit Signs, Lighting

Incandescent Bulbs, Lighting

Unoccupied Areas, Lighting

Loose Connection, Electrical

Make sure all emergency exit signs use Light-Emitting Diode (LED) lights. Replace any fixtures that use incandescent bulbs. Many older exit signs consume over 350 kilowatt-hours (kWh) and cost $28 each annually to operate. LED exit signs use approximately 44 kWh of electricity annually to operate and usually cost less than $4 annually to operate.

Munich RE

Hartford Steam Boiler

Lighting and Electrical System

Fluorescent T-12 Fixtures, Lighting

Emergency Exit Signs, Lighting

Incandescent Bulbs, Lighting

Unoccupied Areas, Lighting

Loose Connection, Electrical

Replace all remaining incandescent bulbs with Compact Fluorescent (CF) bulbs with equivalent lumens. Some ENERGY STAR® bulbs use 75 percent less energy, and save about $6 per bulb per year. Make sure the new light "color" is acceptable to the workplace or application. Also, make sure replacement bulbs are acceptable for lights that will be dimmed.

Lighting and Electrical System

Fluorescent T-12 Fixtures, Lighting

Emergency Exit Signs, Lighting

Incandescent Bulbs, Lighting

Unoccupied Areas, Lighting

Loose Connection, Electrical

Install occupancy sensor controls in places where lights are often left on, but the space is unoccupied. One U.S. utility found that occupancy sensors yielded average reductions in energy of about 30 percent. Conference rooms, restrooms, corridors, and storage areas may see savings greater than 70 percent.

Munich RE

Hartford Steam Boiler

Lighting and Electrical System

Fluorescent T-12 Fixtures, Lighting

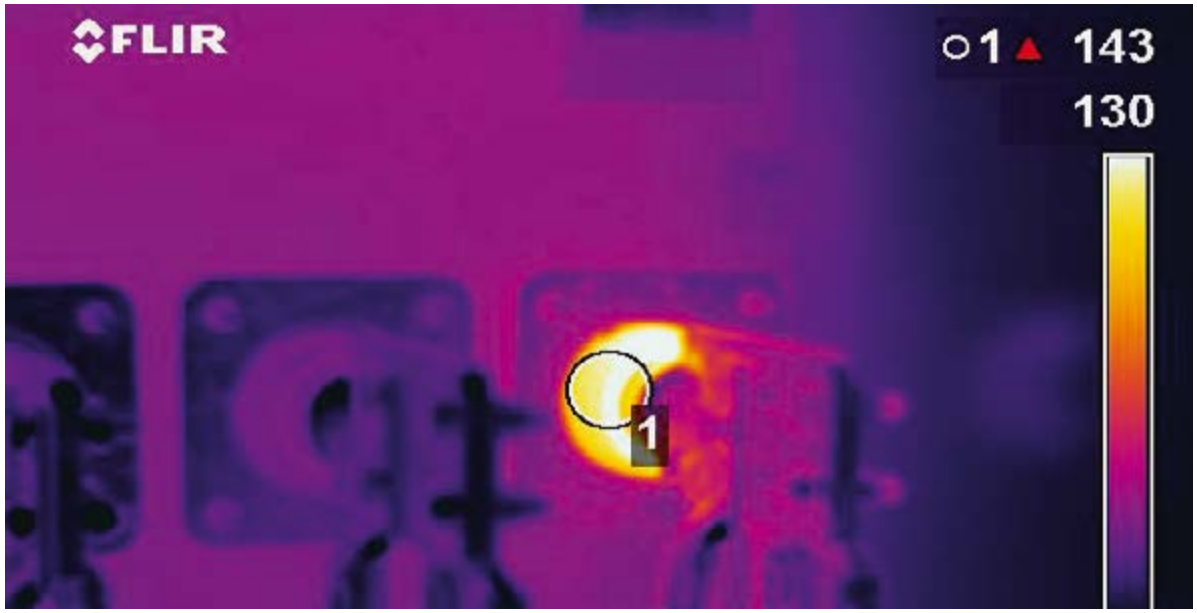
Emergency Exit Signs, Lighting

Incandescent Bulbs, Lighting

Unoccupied Areas, Lighting

Loose Connection, Electrical

Heat loss resulting from loose or corroded connections can also mean reduced operating efficiency and corresponding increased energy costs. These conditions can lead to a breakdown, failure, or even cause a fire. An infrared survey of the entire electrical system should be performed at least every three years.



NOT IF, BUT HOW