Walk-through Energy Audit Form

Adapted by Shirley Thompson from Manitoba Hydro

What is an Energy Audit?

An energy audit is a procedure to identify how energy is being used in a facility and help identify practical and cost effective energy saving measures that will reduce energy use and lower operating costs. Energy audits typically produce energy savings of 10 to 35 %, depending on what energy savings measures have already been under taken. Almost every facility building in Canada can add some energy efficient measures and save energy dollars.

Types of audits

There are several different types of energy audits that are used to help evaluate the potential for energy savings. The two types of energy audits mentioned in this guide are the simple and detailed walk-through audits. The simple walk-through audit also known as the screening audit will highlight the main uses of energy use in the facility and will point out the most evident ways to save energy. The detailed "walk-through" or comprehensive audit, will provide an in-depth analysis of the energy use of a facility and a detailed energy saving implementation plan. The systems that are evaluated include the building envelope, lighting, domestic hot water, heating ventilation and air conditioning (HVAC) and controls. The two other types of energy audits that are often refereed to as the benchmark, bootstrap or yardstick audit and the engineering audit. The engineering audit includes detailed analysis of specific systems within a facility and provides information ranging from general recommendations to detailed engineering plans and costs, depending on the detail required.

Do You Need an Energy Audit to Save Energy?

It is not always necessary to start with a detailed energy audit but conducting your own simple "walk-through" audit will help you identify energy losses which can be corrected at little or no additional costs through maintenance, operational actions, or purchasing choices. If a more detailed technical analysis seems necessary then this initial energy audit will provide the important preliminary data necessary for the more detailed analysis.

Getting Started

Whether you conduct your own simple audit or have a professional conduct a detailed audit for you, the first thing you will need is at least 12 months of energy information (electricity and natural gas, propane or oil). You can get this from your utility company, your fuel supplier or from your energy bills. This information is valuable as it can tell you how much energy is used for baseload equipment such as hot water, lighting and office equipment and how much energy is used for heating and air conditioning. Energy worksheets have been provided in the Facility Building "Walk-Through" energy audit form later in this section. You can record the information on the sheets provided or plot them on graph paper which ever seems best.

The Simple Walkthrough Audit

Obtain a copy of the building plans or a sketch of the layout of each floor, then walk through the facility and identify all the equipment and processes that use or cause the use of energy. You will need lots of time to do this properly so allow yourself at least 4 –5 hours. Make a list of the size and location of all energy using equipment such as motors, appliances and lights. Include information such as operating hours and temperatures, condition of insulation and weather-stripping, locations of gaps around doors and windows etc. To help you identify potential energy reduction measures, ask yourself the following questions.

- Do the lights or equipment need to be on as long as they are?
- Can the operating temperature be reduced?
- Can smaller more efficient equipment be installed?
- Can insulation be added?
- Can windows and doors be improved or should they be replaced?
- Can you Turn it off, Turn it down or Tune it up?

From actual energy audits it has been shown that approximately 80% to 85% of the energy used in a church is used for heating and ventilation. The balance of the energy is used for fans, water heating, lighting, motors, cooking equipment and office equipment.

Typical use of Energy for a small facility building in Northern Ontario/Manitoba

Heating:		Cooling:	Baseload:	
Heating	76.8%	AC 0.8%	Hot Water	2.8%
Ventilation	7.8%		Lighting	4.2%
Car plugs	0.2%		Motors	2.7%
			Pilot Lights	0.02%
			Cooking	1.8%
			Misc. Equipment	3.2%

Facility Building "Walk-Through" Energy Audit Form

Date:_____

The first step in an energy audit is to record all energy consumption from utility bills for the last 12-months. Then walk through the facility and identify all the equipment and processes that use or cause the use of energy. Note size of the equipment, operating hours and temperatures, condition of insulation and weather-stripping, gaps around doors and windows etc. Ask yourself questions such as the following to help you identify potential energy reduction measures: Does the equipment need to run as long? Can the operating temperature be reduced? Can smaller more efficient equipment be installed? Can insulation be added? Can windows and doors be improved or should they be replaced? Can electrical equipment be operated at off-peak hours?

Can you Turn it off, Turn it down or Tune it up?

If a more detailed technical analysis seems necessary then this initial energy audit will provide the important preliminary data necessary for the detailed analysis.

General Information

(Please circle units used where applicable)

Facility Name:_____

Mailing Address:_____

Town:_____ Postal Code:_____

Name of Facility Operator:_____

Title:_____

Phone Number:_____ Fax Number:_____

Name of person completing this form:_____

Title:_____

Phone Number:_____ Fax Number:_____

Brief Description of Function or Use of Facility:_____

_____

_____

Total Floor area of Facility (sq. m./sq. ft.):_____

Facility Building "Walk-Through" Energy Audit Form
Electrical Worksheet

Complete one form for each electric meter in your facility. The completed form is necessary, as part of the information needed to establish your energy usage and Greenhouse Gas (GHG) baselines. This information will also provide you with a much better understanding of what your actual energy costs are.

Facility Name:_____

Meter Descriptor (Entire Facility, Area, Equipment, Etc.): _____

Service - Phase(s): _____ Voltage: _____

Utility Company Name: Kenora Hydro?

Account Number: _____

Hydro Rate Class (e.g. General Service Small – Non Demand): _____

Year: _____ No. Of Months: _____ First Month: _____

Provincial Tax (%): _____GST (%): _____City Tax (%): _____

Electrical Data

(A-Adjusted, R-Company Read, E-Estimated, V-Verified, M- Manual Estimated)

Month/Year or Date Meter Read	Demand		Electrical Consumption (kWh)	Total Cost $	Reading Type (A,R,E,V,M)
	Actual (kVA)	Billed (kVA)			
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
Totals					

Facility Building "Walk-Through" Energy Audit Form

Natural Gas / Propane Worksheet

Complete one form for each natural gas or propane meter in your facility. The completed form is necessary, as part of the information needed to establish your energy usage and GHG baselines. This information will also provide you with a much better understanding of what your actual energy costs are.

Facility Name:_____

Units Of Metering - Imperial (Mcf, ccf): _____Or Metrics (Cubic Metres - m^3): _____

Utility Company Name: _____

Account Number: _____ Rate Code: _____

Fuel Use (Entire Facility, Area, Equipment, Etc.): _____

Year: _____ No. Of Months: _____ First Month: _____

Provincial Tax (%): _____GST (%): _____City Tax (%): _____

Natural Gas / Propane Data

(A-Adjusted, R-Company Read, E-Estimated, V-Verified, M- Manual Estimated)

Month/year or Date meter read	**Natural Gas / Propane Consumption Units_____**	**Total Cost $**	**Reading Type (A,R,E,V,M)**
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
Totals			

Facility Building "Walk-Through" Energy Audit Form

Bulk Fuel Worksheet

Complete one form for each bulk fuel (propane, oil, coal, wood, etc.) used in your facility. The completed form is necessary, as part of the information needed to establish your energy usage and GHG baselines. This information will also provide you with a much better understanding of what your actual energy costs are.

Facility Name:_____

Fuel Company Name: _____

Fuel Type: _____ Fuel Delivery Units (litres, tonnes cords etc): _____

Account Number: _____ Fuel cost / Unit: _____

Fuel Use (Entire Facility, Area, Equipment, Etc.): _____

Year: _____ No. Of Months: _____ First Month: _____

Provincial Tax (%): _____GST (%): _____City Tax (%): _____

Fuel Type _____

Month/Year Fuel Delivered	**Monthly Fuel Consumption Units_____**	**Total Cost $**
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
Totals		

Facility Building "Walk-Through" Energy Audit Form

Lighting

Facility:_____ **Location of Lights:**_____

Please use a new sheet for each area, location or room in the facility.

Existing lights and controls

	Type 1	Type 2	Type 3	Type 4
Type of fixtures (see legend):				
Number of fixtures:				
Number of lamps per fixture:				
If fluorescent indicate length of lamps (2 ft, 3ft, 4ft, 8ft):				
Watts per fixture: (Include ballast wattage if known)				
Fixture height from work surface(ft/m)				
Foot-candle level (if known) – measured at work surface - foot candles				
Present operation of lights - hours/day				
Present operation of lights - days/week				
Present operation of lights – weeks/year				
Present operation of lights - hours/day				
Present operation of lights - days/week				
Present operation of lights - weeks/year				

Present light levels: Bright _____ Adequate _____ Dim_____

Reflectance of walls and ceilings: Good _____ Average _____ Poor _____

Can lights be switched on and off as desired? Yes_____ No___ Comment:_____

Can lower wattage lamps be installed? Yes_____ No____ Comment:_____

Can existing lamps/fixtures be retrofitted? Yes__ No___ Comment:_____

Is there an automatic timer? Yes_____ No____ Is it set properly? Yes_____ No_____

Is there an occupancy sensor? Yes___ No___ If No, can an occupancy sensor be installed? Yes ___No __

Energy Action Plan Ideas:_____

_____

Lighting Legend

A.- Incandescent B.- Fluorescent T-12 C.- Fluorescent T-12 HO (High Output)

D.- Compact Fluorescent E.- Mercury Vapour F.- Fluorescent T-12 VHO (VH Output)

G.- High Pressure Sodium H.- Low Pressure Sodium I.- Metal Halide (White Light)

J.- Fluorescent T-8 K.- Quartz Halogen L.- Exit lamp - incandescent

M.- Exit lamp - compact fluor. N.- Exit lamp - LED O. Other-specify _____

Facility Building "Walk-Through" Energy Audit Form

Envelope

Facility:_____**Direction Wall Faces**_____

For each wall area of facility (front, sides and back of a building) please use one sheet.

Windows (Please circle appropriate Yes or No)

Are storm windows used?	Number of glazings	Description of window type (double hung, slider, casement, etc)	Do windows open?	Window fit (poor, fair, good)	Number of windows
Yes No			Yes No		
Yes No			Yes No		
Yes No			Yes No		

Doors (Please circle appropriate Yes or No) **(**Please circle units used)

Are storm doors used?	Is door Insulated?	Description of door type (overhead, insulated metal, wood, etc)	Condition of door (warped, cracked)	Door Fit (poor, good)	Number of doors
Yes No	Yes No				
Yes No	Yes No				
Yes No	Yes No				

Number/Location of broken or cracked windows:_____

_____

Description of door or window repairs or replacements needed (including door closers):_____

_____

Caulking: _____ft/metres required

Weather-stripping: _____ft/metres required

Inside (Please circle appropriate Yes or No)

Insulation	Insulated ?	Present Thickness	Insulation Types
Location			
Ceiling (Attic)	Yes No		
Walls	Yes No		
Basement/Crawlspace walls	Yes No		
Floor / slab	Yes No		

Location of drafts (use strip of tissue to locate):e.g. doors, windows, elec. outlets, attic hatches cracks etc.

_____

_____

Is attic ventilation installed? Yes _____ No ____ Comments_____

Energy Action Plan Ideas:_____

_____

_____

Facility Building "Walk-Through" Energy Audit Form

Water System

Facility Name:_____

Please fill in one sheet for each tank of hot water

System Components (Please circle units used)

Type of water heater, energy (fuel) used:_____

_____

Tank storage capacity: _____gallons/litres Number of tanks:_____

Recovery rate: _____gallons/litres per hour Size of heating element:_____

Temperature setting: _____ºC/ºF

Make, Model, Age: _____

Tank insulation (Type/Thickness): if known_____

Is tank equipped with a Heat Trap? Yes _____No _____

Location, description of other heaters, if any: _____

_____

Length of heated uninsulated distribution piping: _____feet/metres

Hot Water Temperatures *(Please circle units used)*

At showerhead: _____ºC/ºF. At faucet nearest tank: _____ºC/ºF

At dishwasher: _____ºC/ºF. At washing machine: _____ºC/ºF

At other location: (_____):_____ºC/ºF

Showerheads, faucets, toilets, Other (Please circle units used)

Showerheads: Rate of flow: _____gal./litres/minute

Average use/day: _____minutes/shower

Faucets: Rate of flow: _____gal./litres/minute

Number of Toilets: _____Tank Size: _____gallons/litres Times used/week:_____

Dishwasher: Capacity: _____gallons/litres. :Times used/week:_____

Washing Machine Capacity: _____gal./litres Times used/week: :_____

Have cool water washing machines been tried? Yes _____ No _____Comment_____

Energy Action Plan Ideas: _____

_____

_____

_____

_____

Facility Building "Walk-Through" Energy Audit Form
Heating Ventilating and Air Conditioning (HVAC)

Facility Name:_____

Please use another sheet id required

Air Conditioning

Number of units:_____

Make, type, size, location of each:_____

_____

Frequency of servicing:_____ Date of last servicing:_____

Has the HVAC system been "balanced"? Yes _____No _____

Heat Pumps

Number of units:_____

Make, type, size, location of each:_____

_____

Do they have auxiliary heating? Yes _____ No _____

If so, do they have controls that minimizing use of that heating? Yes _____ No _____

Frequency of servicing:_____ Date of last servicing:_____

Central Heating Plant and System (Please circle units used)

Location:_____

Type of fuel used:_____

Type of system (e.g., hot water, steam, warm air)_____

If you have a steam system, when were the traps last checked?_____

Number of zones:_____

Age of boiler or furnace:_____Type, condition of insulation on boiler:_____

Age of burner:_____Is domestic hot water heated by the boiler?_____

Steam pressure _____(Psi) Or hot water temperature _____ (ºC/ºF)

Type and condition of insulation on air ducts or on distribution piping: _____

Frequency of testing/cleaning adjustment:_____Date of last test/service:_____

Results of test (e.g., combustion efficiency %):_____

Facility Building "Walk-Through" Energy Audit Form

Heating Ventilating and Air Conditioning (HVAC)

Facility Name:____

Please use another sheet id required

Temperature set back schedule

Day of Week Group Meets	Group’s name (Scouts, Cubs, Choir etc.)	Room Name	Time of use of room		Can temperature be set back during unoccupied times?	Set back temperature ºC
			Start-time	Stop-time		
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	
					Yes No	

Facility Building "Walk-Through" Energy Audit Form

HVAC - Continued

Facility Name:_____

Please use a new sheet for each zone, area, or room in the facility.

Controls/Use (Please circle units used)

Location(s) and description of thermostats:_____

Location of setback clock/setback thermostat:_____

Cold weather thermostat setting: _____ºC/ºF. Is temperature setback at night and on weekends?_____

If Yes what are setback times and temperatures for: nighttime _____ weekend_____

Is temperature setback automatic _____or manual?_____

Hot weather thermostat setting: _____ºC/ºF. Is temperature setup at night and on weekends?_____

If Yes what are setup times and temperatures for: nighttime _____ weekend_____

Is temperature setup automatic _____or manual?_____

How many hours a week and weeks per year is the system used?

Hours & weeks in hot weather_____Hours & weeks in cold weather_____

When is system turned on/off in relation to daily occupancy (i.e., before, after, by how long)?

_____

Which areas are too hot?_____

Which areas are too cold?_____

Fans (Supply, Return, Exhaust, Circulating etc.) (Please circle appropriate Yes or No)

Function: (supply, return etc)	Area served:	Fan operating hours			Can fans be cycled to reduce operating times?
		hours / day	days / week	weeks/ year	
					Yes No
					Yes No
					Yes No
					Yes No
					Yes No
					Yes No
					Yes No

Energy Action Plan Ideas:_____

_____

Facility Building "Walk-Through" Energy Audit Form

Office Machines And Equipment

(Computers, printers, photocopiers, etc)

Facility Name:____

Please use more sheets if required

Office machine:

Machine type, location____

Wattage (nameplate watts, or amps x volts):__________________________________

Is it left on overnight?____________________Over weekends?____________________

Daily hours of operation:______________Hours per day it could be turned off:____________

Office machine:

Machine type, location____

Wattage (nameplate watts, or amps x volts):__________________________________

Is it left on overnight?____________________Over weekends?____________________

Daily hours of operation:______________Hours per day it could be turned off:____________

Office machine:

Machine type, location____

Wattage (nameplate watts, or amps x volts):__________________________________

Is it left on overnight?____________________Over weekends?____________________

Daily hours of operation:______________Hours per day it could be turned off:____________

Office machine:

Machine type, location____

Wattage (nameplate watts, or amps x volts):__________________________________

Is it left on overnight?____________________Over weekends?____________________

Daily hours of operation:______________Hours per day it could be turned off:____________

Office machine:

Machine type, location____

Wattage (nameplate watts, or amps x volts):__________________________________

Is it left on overnight?____________________Over weekends?____________________

Daily hours of operation:______________Hours per day it could be turned off:____________

Office machine:

Machine type, location____

Wattage (nameplate watts, or amps x volts):__________________________________

Is it left on overnight?____________________Over weekends?____________________

Daily hours of operation:______________Hours per day it could be turned off:____________

Facility Building "Walk-Through" Energy Audit Form

Machines And Equipment

Facility Name:____

Please use another sheet if required

Refrigeration and Freezing (Please circle units used)

Type, age, energy used:______________

Compressor rating: ___________hp; age: ______years Present temperature: ºC/ºF____________________

Hours per day of use:__________Weeks per year equipment is used____________

Do doors close completely, by themselves?____________Condition of door seals:____________

Refrigeration and Freezing (Please circle units used)

Type, age, energy used:______________

Compressor rating: ___________hp; age: ______years Present temperature: ºC/ºF____________________

Hours per day of use:__________Weeks per year equipment is used____________

Do doors close completely, by themselves?____________Condition of door seals:____________

Refrigeration and Freezing (Please circle units used)

Type, age, energy used:______________

Compressor rating: ___________hp; age: ______years Present temperature: ºC/ºF____________________

Hours per day of use:__________Weeks per year equipment is used____________

Do doors close completely, by themselves?____________Condition of door seals:____________

Cooking (Range, oven, grill, etc) (Please circle units used)

Type, age, energy used:____________________________Temperature now used: ºC/ºF__________

Is this the lowest possible temperature? Yes _____No ___Is equipment turned off when possible?________

Are exhaust hoods installed over all cooking equipment? Yes __________No __________

Cooking (Range, oven, grill, etc) (Please circle units used)

Type, age, energy used:____________________________Temperature now used: ºC/ºF__________

Is this the lowest possible temperature? Yes _____No ___Is equipment turned off when possible?________

Are exhaust hoods installed over all cooking equipment? Yes __________No __________

Cooking (Range, oven, grill, etc) (Please circle units used)

Type, age, energy used:____________________________Temperature now used: ºC/ºF__________

Is this the lowest possible temperature? Yes _____No ___Is equipment turned off when possible?________

Are exhaust hoods installed over all cooking equipment? Yes __________No __________

Facility Building "Walk-Through" Energy Audit Form

Miscellaneous Equipment

Facility Name:_____

Please use another sheet if required

Washer Dyer (If applicable**)**

Type, age, energy used:_____

Temperature now used: Hot_____Warm_____Cold_____

Are machines fully and properly loaded? Yes _____No _____

Can lower washing/rinse water temperatures be used ? Yes _____No _____

Dish Washing (If applicable**)**

Type, age, energy used:_____

Temperature now used: Hot_____Warm_____Cold_____

Are machines fully and properly loaded? Yes _____No _____

Can lower washing/rinse water temperatures be used ? Yes _____No _____

Dish Washing (If applicable**)**

Type, age, energy used:_____

Temperature now used: Hot_____Warm_____Cold_____

Are machines fully and properly loaded? Yes _____No _____

Can lower washing/rinse water temperatures be used ? Yes _____No _____

Car Plugs (Car, Block or Car & Block Heaters.) (Please circle appropriate Yes or No)

Function: (Car, block car & block)	Description of parking lot served:	Plug operating hours			Can plugs be cycled to reduce operating times?
		hours / day	days / week	weeks/ year	
					Yes No
					Yes No
					Yes No
					Yes No
					Yes No
					Yes No

Notes

This sheet is provided for those customers who wish to calculate the estimated energy and dollar savings from lighting improvements.

Lighting Energy Saving Calculation Worksheet (Optional)

	Lamp Type	Wattage per Fixture Lamps & Ballasts* (W)		(kW)		Fixture Quantity		Annual Hours of Operation (hrs.)		Energy Usage (kWh)
Existing Lighting System (e.g. T-12, Inc., Merc. Vap. etc.)			/	1000	X		X		=	
A										
Proposed Lighting System (e.g. T-8, CFL, HID etc.)			/	1000	X		X		=	
B										

Total Energy Savings (kWh)	=	
Average Cost per kWh	X	$ 0.045**
Total Energy Savings	=	$

Energy savings = (Existing Total in kWh – Proposed Total in kWh) x Average Cost per kWh.

Notes

* Refer to Nominal Wattage Table Section 3 (page 8) of Application Guide for details (Divide total wattage by 1000 to get kilowatts).
**Contact your Energy Service Coordinator for the average cost that is correct for your facility ($0.045 can be used for an average facility).

Energy Savings may vary depending on the building's heating system and location of lighting.

Guide to Improve Energy efficiency measures for Buildings

Most people know the three R's of recycling – Reduce, Reuse, Recycle, but in terms of saving money on energy bills they stand for:

- **reduce operating time** (lights, gas pilots in summer, ventilation systems turned off when unoccupied, connecting fans to light switches or occupancy sensors)
- **reduce operating temperature** (hot water, refrigerators and freezers, heating systems, ventilation systems
- **reducing operating losses** (drafts, lights, insulation, appliances).

Basically, reduce time, temperature and loses. This checklist provides a list of things to do by area/system.

Building Envelope (reducing losses)

1. Install triple glazed units when repairing frames.
2. Install low emissivity glazing.
3. Install permanent storm windows.
4. Reduce glass area (wall up/close off) on north side.
5. Orient windows to south for heating and lighting.
6. Consider use of daylight through windows.
7. Install solar shading (shades, blinds.
8. Install insulated doors.
9. Install vestibules.
10. Wall up/close off unneeded openings.
11. Install insulation to poorly insulated attics/roofs, ceiling, walls, floor (R20 in walls, R40 in ceilings).
12. Reduce infiltration around doors and windows and through walls
    a) caulk around doors and windows
    b) Add/repair the weather stripping around doors and windows
    c) install inside plastic film on windows
    d) Repair cracks in walls

Heating (operating times and temperatures)

1. Replace inefficient boilers.
2. Use modular units.
3. Decentralize system.
4. Downsize system.
5. Replace inefficient burners.
6. Install automatic flue dampers.

7. Replace pilot lights with electronic ignition.
8. Preheat combustion air/make up water with waste heat.
9. Recover waste heat from exhaust air, flue gas, laundry, kitchen, engine exhaust, condenser, cooling tower.
10. Convert to radiant heat.
11. Reduce temperature during regular occupied time (20-21^{o}C)
12. Setback temperature during unoccupied time (15-18^{o}C)
13. Install de-stratification fans to reduce air stratification temperature

Cooling (operating times and temperatures)

1. Replace inefficient chillers.
2. Install package unit air conditioners for specific load requirements.
3. Install economizer cycles.
4. Utilize evaporative/dehumidification cooling.
5. Manifold chillers in parallel and sequence.
6. Isolate off-line chillers and cooling towers.
7. Replace air-cooled condensers with cooling towers.
8. Install heat pipe heat recovery unit.
9. Install plate and frame heat exchanger.
10. Convert mechanical chiller to absorption.
11. Ensure coils and heat exchangers are kept clean
12. Increase temperature during regular occupied time (22-24^{o}C)
13. Allow higher temperatures during unoccupied time (24-26^{o}C)

Ventilation Distribution (3rs)

1. Slow fans down to reduce air flow
2. Reduce air stratification.
3. Convert to variable air volume.
4. Insulate pipe and ductwork.
5. Install automatic dampers.
6. Consider zoning modifications.
7. Reduce outside air percentage. Use ASHRAE guidelines of 20 cfm per person
8. Shut off /reduce heat to lobbies, stairwells, hallways.
9. Reduce/eliminate air to unoccupied areas.

10. Utilize outside air for free cooling.
11. Eliminate simultaneous heating and cooling.
12. Ensure exhaust fans are turned off when supply fans are turned off
13. Reduce hours of operation during unoccupied time
14. Ensure filters are clean
15. Ensure fresh are dampers are operating properly

Lighting (3rs)

1. Convert incandescent to fluorescent or high-Intensity discharge.
2. Replace incandescent lamps with compact fluorescents
3. Replace incandescent exit lamps with LED exit fixtures
4. Convert mercury vapor to metal halide or sodium vapor.
5. Modify fixtures (add reflectors, lower height). Employ task lighting.
6. Replace fluorescent lamps with T-8 lamps and electronic ballasts
7. Install occupancy sensors (infrared, ultrasonic).
8. Install time-of-day controls.
9. Install automatic daylight dimmers.
10. Install day lighting.
11. Install local switches.

Domestic Hot Water (3Rs)

1. Install low-flow showerheads.
2. Install low-flow faucets.
3. Install flow regulators
4. Install self-shutoff faucets.
5. Decentralize hot water heating.
6. Add piping and tank insulation.
7. Install booster heaters for hot water in lieu of central system use.

Kitchen

1. Install makeup air supply for exhaust
2. Install timer for exhaust
3. Install heat reclamation system for exhaust heat.

4. Add/improve insulation.

Utility Plant Systems

1. Reduce steam distribution pressure.
2. Increase boiler efficiency.
3. Insulate boiler piping.
4. Install economizers.
5. Install air preheaters.
6. Install blow down controls.
7. Modernize boiler and chiller controls.
8. Ensure steam traps are in good working order. Inspect annually.

Electrical Equipment (Reduce time and temperature)

1. Convert to energy efficient (EE) motors on burnout.
2. Install variable-speed motors.
3. Replace oversized motors with properly sized EE motors.
4. Install multi-speed motors.
5. De-energize equipment when not in use
6. Reduce loads when not required/ Reduce hours of operation
7. Install capacitors or synchronous motors to increase power factor.
8. Reduce transformer losses by proper loading and balancing.
9. Ensure drive belts have the proper tension

Controls (Reduce time and temperature)

1. Install temperature/pressure reset devices.
2. Install stop/start devices.
3. Install night setback devices.
4. Replace hand valves with automatic valves.

Car Plugs (Reduce operating time)

1. Cycle car plugs 50% off/ 50% on to save demand and energy.
2. Install timer to turn car plugs off when nor required
3. Install car plug management system.