

■ Energy Audit Data Collection Form

Site Data										
Building Name	Address	Building Square Footage (ft ²)	Age of Building (years)	Date of Last Major Renovation	Purpose of Building	Number of Floors	Daily Operational Hours (e.g., M-F 8-6, Sa 10-4)	Days of Use per Week	Name of Utility Company	Total Number of Occupants
Organizational Information										
Name of Organization	Name of Contact			Position						
	Contact E-mail			Phone Number						

Please check all that apply:

- This building is leased.
- This building is owned.
- The organization receives monthly bills based on accurate meter readings.
- Meters are read regularly by on-site staff.
- Bills are compared to monthly meter readings on a regular basis.
- A Building Automation System or Energy Management Control System is in place and used to track utility data regularly.
- The building is sub-metered.
- The building has automated 15-minute interval or SMART meters.

If the building is leased:

When is the lease up for renewal (date/year)? _____

How long does the lease contract last (years)? _____

SAVING ENERGY IN COMMERCIAL BUILDINGS | Energy Audit Data Collection Form

Heating, Ventilation, and Air Conditioning Systems								
What type of HVAC system does the building have (e.g., constant volume, multi-zone, VAV, etc.)?	What fuel type does this system use?	How is the HVAC system controlled (e.g., manually, DDC system, etc.)?	What are the operational setpoints?	What type of chilled water system does the building have, where relevant (e.g., rotary screw chillers with cooling towers, etc.)?	How old is the chilled water system?	What is the capacity of the system?	What are the operational setpoints?	Do any of these systems have weather optimization sensors? If so, which systems and what brand of sensor?

Who is responsible for managing and trouble-shooting the control system? _____

Are there any recurring or major occupant complaints about being too hot, too cold, etc.? _____

What energy efficiency efforts have been completed, started, or planned? _____

Are any capital improvement projects planned? If so, what are they and how will they affect the energy use of the building?

Please select what is currently installed at the building:

<input type="checkbox"/> Ground source heat pumps	<input type="checkbox"/> Segregated recycling	<input type="checkbox"/> Energy-efficient lighting	<input type="checkbox"/> Other: Please specify
<input type="checkbox"/> Solar hot water	<input type="checkbox"/> Co-mingled recycling	<input type="checkbox"/> Lighting controls	_____
<input type="checkbox"/> Solar PV panels (electric)	<input type="checkbox"/> Composting	<input type="checkbox"/> Insulation	_____
<input type="checkbox"/> Wind turbines	<input type="checkbox"/> Anaerobic digestion	<input type="checkbox"/> Underfloor heating	_____
<input type="checkbox"/> Micro-hydro	<input type="checkbox"/> Sustainable procurement	<input type="checkbox"/> On-demand hot water heater	_____
<input type="checkbox"/> Geothermal	<input type="checkbox"/> Energy-efficient windows	<input type="checkbox"/> Weather-optimized heating sensor	_____
<input type="checkbox"/> Gray-water systems	<input type="checkbox"/> Green/living roof	<input type="checkbox"/> Low-flush toilets	_____
<input type="checkbox"/> Efficient HVAC systems	<input type="checkbox"/> Rainwater harvesting	<input type="checkbox"/> Waterless urinals	_____
<input type="checkbox"/> External shading	<input type="checkbox"/> Porous pavement	<input type="checkbox"/> Low-flow faucets	_____

SAVING ENERGY IN COMMERCIAL BUILDINGS | Energy Audit Data Collection Form

PLUG LOADS									
Equipment Type	Manufacturer	Model or Size	Total Number	Wattage	Hours of Use per Day	Days of Use per Year	Total kWh	How is Equipment Controlled?	Description, Observations, or Notes
<i>Vending machine</i>									
<i>Computer</i>									
<i>Printer</i>									
<i>Computer Screen</i>									
<i>Refrigerator</i>									

Please specify where you feel there is room for improvement either in efficiency measures or renewable energy technologies:

Please check off the information that is being provided to NREL:

- Copy of utility bills
- Screen shot of EMCS or DDC control system
- Copies of previous energy audit reports
- Copies of action plans or capital improvement plans
- Copies of any M&V plans
- Copies of an O&M contract (if outsourced)
- Copies of nameplates from HVAC and chiller equipment

Building Envelope				
Building Element	Condition (Excellent, Good, Poor)	Type	Observations	Possible Energy Saving Opportunities
<i>Windows</i>				
<i>Doors</i>				
<i>Roof</i>				
<i>Walls</i>				
<i>Floors</i>				

Operations and Management

Does the organization have an environmental policy? _____

Does the organization have an energy policy? _____

Does the organization have an environmental or energy manager? _____

Does the organization review these policies on an annual basis and establish reduction targets? _____

Do organizational stakeholders or shareholders value environmental and social responsibility? _____

Conversion Table

To convert from cubic feet (CCF) to million British thermal units (MMBtu), multiply the CCF by 0.1. To convert from therms of natural gas to Btu multiply the therms by 100,000. Other conversions are shown below:

Energy Content of Various Fuels	
1 kilowatt hour of electricity	3,412.14 Btu
1 cubic foot of natural gas	1,008 to 1,034 Btu
1 therm of natural gas	100,000 Btu
1 gallon of crude oil	138,095 Btu
1 barrel of crude oil	5,800,000 Btu
1 gallon of residual fuel oil	149,690 Btu
1 gallon of gasoline	125,000 Btu
1 gallon of diesel	129,500 Btu
1 gallon of ethanol	84,400 Btu
1 gallon of methanol	62,800 Btu
1 gallon of kerosene or light distillate oil	135,000 Btu
1 gallon of middle distillate or diesel fuel oil	138,690 Btu
1 gallon of liquefied petroleum gas (LPG)	95,475 Btu

Air Handling Unit Data Collection Form

Air Handling Unit (Number, Description, Zones Served) _____

AHU Schedule: _____

Zone Temp. Setpoint Heating: _____

Zone Temp. Setpoint Cooling: _____

Supply Air Fan (Hp, Eff, PF, Volt, Amps, RPM): _____

Return Air Fan (Hp, Eff, PF, Volt, Amps, RPM): _____

Static Pressure Setpoint: _____

Static Pressure Reset (y/n): _____

VFD Info: _____

Discharge Air Setpoint (°F): _____

Discharge Air Reset (y/n): _____

AHU Supply Air cfm: _____

Outside Air cfm: _____

Outside Air Economizer (y/n): _____

Pre-heat Coil (y/n): _____

Cooling Coil (y/n): _____

Heating Coil (y/n): _____

Valve Info: _____

_____ (two-way/three-way?)

Damper Info: _____

_____ (Act?, Mod?)

Damper Count: _____

Temperature Sensor Count: _____

Control Points: _____

AHU Notes:

Air Handling Unit (Number, Description, Zones Served) _____

AHU Schedule: _____

Zone Temp. Setpoint Heating: _____

Zone Temp. Setpoint Cooling: _____

Supply Air Fan (Hp, Eff, PF, Volt, Amps, RPM): _____

Return Air Fan (Hp, Eff, PF, Volt, Amps, RPM): _____

Static Pressure Setpoint: _____

Static Pressure Reset (y/n): _____

VFD Info: _____

Discharge Air Setpoint (°F): _____

Discharge Air Reset (y/n): _____

AHU Supply Air cfm: _____

Outside Air cfm: _____

Outside Air Economizer (y/n): _____

Pre-heat Coil (y/n): _____

Cooling Coil (y/n): _____

Heating Coil (y/n): _____

Valve Info: _____

_____ (two-way/three-way?)

Damper Info: _____

_____ (Act?, Mod?)

Damper Count: _____

Temperature Sensor Count: _____

Control Points: _____

AHU Notes:

SAVING ENERGY IN COMMERCIAL BUILDINGS | Air Handling Unit Data Collection Form

	Fan Description	Manufacturer	Model / Serial #	Horsepower (HP)	Eff. (%)	Power Factor (PF)	VFD HZ	Hours / year	Supply Air CFM	Outside Air CFM	Supply Air Temp (F)	Return Air Temp (F)	Zone Temp (F)
AHU 1	Supply Air Fan (SAF)___												
	Return Air Fan (RAF)___												
AHU 2	SAF ___												
	RAF ___												
AHU 3	SAF ___												
	RAF ___												
AHU 4	SAF ___												
	RAF ___												
AHU 5	SAF ___												
	RAF ___												
AHU 6	SAF ___												
	RAF ___												
AHU 7	SAF ___												
	RAF ___												
AHU 8	SAF ___												
	RAF ___												
AHU 9	SAF ___												
	RAF ___												

National Renewable Energy Laboratory

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 Office of Energy Efficiency and Renewable Energy
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Chiller Data Collection Form

Chiller # _____
Manufacturer: _____
Model #: _____
Serial #: _____
Size: _____
CHWS (F): _____
CHWR (F): _____
Chilled Water Reset (y/n): _____

CWS (F): _____
CWR: _____
Condenser Water Reset (y/n): _____

Refrigerant: _____
Number of Chillers: _____
Daily, Weekly, Schedule: _____

Chiller # _____
Manufacturer: _____
Model #: _____
Serial #: _____
Size: _____
CHWS (F): _____
CHWR (F): _____
Chilled Water Reset (y/n): _____

CWS (F): _____
CWR: _____
Condenser Water Reset (y/n): _____

Refrigerant: _____
Number of Chillers: _____
Daily, Weekly, Schedule: _____

Chiller # _____
Manufacturer: _____
Model #: _____
Serial #: _____
Size: _____
CHWS (F): _____
CHWR (F): _____
Chilled Water Reset (y/n): _____

CWS (F): _____
CWR: _____
Condenser Water Reset (y/n): _____

Refrigerant: _____
Number of Chillers: _____
Daily, Weekly, Schedule: _____

Cooling Tower # _____
 Manufacturer: _____
 Size: _____
 Number: _____
 Cond. Water Supply Temp: _____
 Temp Reset (y/n): _____
 Fan Info: _____

 Pump Info: _____

Cooling Tower # _____
 Manufacturer: _____
 Size: _____
 Number: _____
 Cond. Water Supply Temp: _____
 Temp Reset (y/n): _____
 Fan Info: _____

 Pump Info: _____

Cooling Tower # _____
 Manufacturer: _____
 Size: _____
 Number: _____
 Cond. Water Supply Temp: _____
 Temp Reset (y/n): _____
 Fan Info: _____

 Pump Info: _____

Primary Pump # _____
 Serial #: _____
 Model #: _____
 Motor HP: _____
 Motor Eff, PF, RPM: _____
 VFD %: _____
 Discharge Pressure (psi): _____
 Suction Pressure (psi): _____
 Impeller Size: _____
 Pump Efficiency: _____
 Total Flow (GPM): _____
 Daily, Weekly, Schedule: _____

Primary Pump # _____
 Serial #: _____
 Model #: _____
 Motor HP: _____
 Motor Eff, PF, RPM: _____
 VFD %: _____
 Discharge Pressure (psi): _____
 Suction Pressure (psi): _____
 Impeller Size: _____
 Pump Efficiency: _____
 Total Flow (GPM): _____
 Daily, Weekly, Schedule: _____

Primary Pump # _____
 Serial #: _____
 Model #: _____
 Motor HP: _____
 Motor Eff, PF, RPM: _____
 VFD %: _____
 Discharge Pressure (psi): _____
 Suction Pressure (psi): _____
 Impeller Size: _____
 Pump Efficiency: _____
 Total Flow (GPM): _____
 Daily, Weekly, Schedule: _____

Secondary Pump # _____
Serial #: _____
Model #: _____
Motor HP: _____
Motor Eff, PF, RPM: _____
VFD %: _____
Discharge Pressure (psi): _____
Suction Pressure (psi): _____
Impeller Size: _____
Pump Efficiency: _____
Total Flow (GPM): _____
Daily, Weekly, Schedule: _____

Secondary Pump # _____
Serial #: _____
Model #: _____
Motor HP: _____
Motor Eff, PF, RPM: _____
VFD %: _____
Discharge Pressure (psi): _____
Suction Pressure (psi): _____
Impeller Size: _____
Pump Efficiency: _____
Total Flow (GPM): _____
Daily, Weekly, Schedule: _____

Secondary Pump # _____
Serial #: _____
Model #: _____
Motor HP: _____
Motor Eff, PF, RPM: _____
VFD %: _____
Discharge Pressure (psi): _____
Suction Pressure (psi): _____
Impeller Size: _____
Pump Efficiency: _____
Total Flow (GPM): _____
Daily, Weekly, Schedule: _____

Domestic Hot Water System Data Collection Form

Domestic Hot Water System # _____

Type: _____

Fuel Input: _____

Manufacturer: _____

Model #: _____

Serial #: _____

Tank Size: _____

Number: _____

Tank Insulation R-value (hr-ft²-°F/Btu): _____

Efficiency: _____

Setpoint Temperature: _____

Recirculation Pump (size, flow rate, controls):

Additional Info:

Domestic Hot Water System # _____

Type: _____

Fuel Input: _____

Manufacturer: _____

Model #: _____

Serial #: _____

Tank Size: _____

Number: _____

Tank Insulation R-value (hr-ft²-°F/Btu): _____

Efficiency: _____

Setpoint Temperature: _____

Recirculation Pump (size, flow rate, controls):

Additional Info:

Domestic Hot Water System # _____

Type: _____

Fuel Input: _____

Manufacturer: _____

Model #: _____

Serial #: _____

Tank Size: _____

Number: _____

Tank Insulation R-value (hr-ft²-°F/Btu): _____

Efficiency: _____

Setpoint Temperature: _____

Recirculation Pump (size, flow rate, controls):

Additional Info:

Domestic Hot Water System # _____

Type: _____

Fuel Input: _____

Manufacturer: _____

Model #: _____

Serial #: _____

Tank Size: _____

Number: _____

Tank Insulation R-value (hr-ft²-°F/Btu): _____

Efficiency: _____

Setpoint Temperature: _____

Recirculation Pump (size, flow rate, controls):

Additional Info:

■ Heating System Data Collection Form

Heating System # _____
 Type: _____
 Fuel Input: _____
 Manufacturer: _____
 Model #: _____
 Serial #: _____
 Size: _____
 Number: _____
 Efficiency: _____
 Supply Temp. or Steam Press.: _____
 Temp. Rest (y/n): _____
 Additional Info: _____

Pump # _____
 Serial #: _____
 Model #: _____
 Motor HP: _____
 Motor Eff, PF, RPM: _____
 VFD %: _____
 Discharge Press. (psi): _____
 Suction Press. (psi): _____
 Impeller Size: _____
 Pump Efficiency: _____
 Total Flow (GPM): _____
 Daily, Weekly, Schedule: _____

Heating System # _____
 Type: _____
 Fuel Input: _____
 Manufacturer: _____
 Model #: _____
 Serial #: _____
 Size: _____
 Number: _____
 Efficiency: _____
 Supply Temp. or Steam Press.: _____
 Temp. Rest (y/n): _____
 Additional Info: _____

Pump # _____
 Serial #: _____
 Model #: _____
 Motor HP: _____
 Motor Eff, PF, RPM: _____
 VFD %: _____
 Discharge Press. (psi): _____
 Suction Press. (psi): _____
 Impeller Size: _____
 Pump Efficiency: _____
 Total Flow (GPM): _____
 Daily, Weekly, Schedule: _____

Heating System # _____
 Type: _____
 Fuel Input: _____
 Manufacturer: _____
 Model #: _____
 Serial #: _____
 Size: _____
 Number: _____
 Efficiency: _____
 Supply Temp. or Steam Press.: _____
 Temp. Rest (y/n): _____
 Additional Info: _____

Pump # _____
 Serial #: _____
 Model #: _____
 Motor HP: _____
 Motor Eff, PF, RPM: _____
 VFD %: _____
 Discharge Press. (psi): _____
 Suction Press. (psi): _____
 Impeller Size: _____
 Pump Efficiency: _____
 Total Flow (GPM): _____
 Daily, Weekly, Schedule: _____

Motors Data Collection Form

Motor Characteristics	Units	Value
Location	-	
Manufacturer	-	
Model / Serial #	-	
Horsepower (HP)	HP	
Voltage	Volt	
Full Load Current	Amp	
Speed	RPM	
Efficiency	%	
Power Factor (PF)	%	
Enclosure Type	-	
Operational Hours	hr/yr	
Fan Belt Info		
VFD Speed	Hz	
Recorded Voltage	Volt	
Recorded Current	Amp	
Notes:		

Motor Characteristics	Units	Value
Location	-	
Manufacturer	-	
Model / Serial #	-	
Horsepower (HP)	HP	
Voltage	Volt	
Full Load Current	Amp	
Speed	RPM	
Efficiency	%	
Power Factor (PF)	%	
Enclosure Type	-	
Operational Hours	hr/yr	
Fan Belt Info		
VFD Speed	Hz	
Recorded Voltage	Volt	
Recorded Current	Amp	
Notes:		

Motor Characteristics	Units	Value
Location	-	
Manufacturer	-	
Model / Serial #	-	
Horsepower (HP)	HP	
Voltage	Volt	
Full Load Current	Amp	
Speed	RPM	
Efficiency	%	
Power Factor (PF)	%	
Enclosure Type	-	
Operational Hours	hr/yr	
Fan Belt Info		
VFD Speed	Hz	
Recorded Voltage	Volt	
Recorded Current	Amp	
Notes:		

Motor Characteristics	Units	Value
Location	-	
Manufacturer	-	
Model / Serial #	-	
Horsepower (HP)	HP	
Voltage	Volt	
Full Load Current	Amp	
Speed	RPM	
Efficiency	%	
Power Factor (PF)	%	
Enclosure Type	-	
Operational Hours	hr/yr	
Fan Belt Info		
VFD Speed	Hz	
Recorded Voltage	Volt	
Recorded Current	Amp	
Notes:		

■ Plug Load Equipment Data Collection Form

Building																		
Floor	Desktop Computer	Laptop Computer	CRT Monitor	LCD Monitor	Desktop Printer	Network Printer/Copier	Fax/Scanner	Projector	TV	Mini-fridge	Large Fridge	Vending Machine	Micro-wave	Coffee-maker	Water Cooler	Desktop Fan	Personal Heater	Notes:

■ Plug Load Equipment Specifications

Building					Notes:
Equipment Type	Manufacturer	Model Number	Wattage	Percentage In Use	
Desktop Computer					Computer power settings:
Laptop Computer					Computer power settings:
CRT Monitor					
LCD Monitor					
Desktop Printer					
Network Printer/Copier					
Fax Scanner					
Projector					
TV					
Mini-fridge					
Large Fridge					
Vending Machine					
Microwave					
Coffee Maker					
Water Cooler					
Desktop Fan					
Personal Heater					
Other					

Grid-Tied Photovoltaics Data Collection Form

Grid-Tied PV	Value	Units	Comments
Building number			
Site or building annual electricity consumption (or attach one year of bills)		kWh/year	
Electric peak load		kW	
Date and time of peak			
Rate schedule details (or attach rate schedule)			
Array Location Flat, sloped roof, or ground?			
Roof fall-line azimuth		N=0, S=180	
Roof dimensions		ft of length, width, etc.	
Roof description		roof type (shingle, built-up, metal, membrane)	
Roof install date		mm/dd/year	
Shading profile (or attach pathfinder sheet)	Alt		
	Azi		
Distance from roof to inverter location		ft or m	
Unshaded area available for PV array(s)		ft ² or m ²	
Description of slope, soil, etc.			
Distance/description of line from array to inverter plant		ft or m	
Description of location of interconnect and distance from inverter plant			
Voltage at interconnect		volt	
Frequency		assume 60Hz	
Number of phases		1 or 3	
If three phases, what is the configuration?		Delta or wye	
Capacity of main breaker, busbar, service at interconnect		amp	
Design wind speed		m/sec	
Design seismic zone			
Design snow load		lb/ft ²	
Other information?			

Water Specifications Data Collection Form

Building				
Water Type	Manufacturer	Model Number	Flow Rate	Notes
Drinking Fountain				Wattage:
Faucet				Aerator:
Toilet				
Urinal				
Shower				
Cooling Tower				