

ESE Board

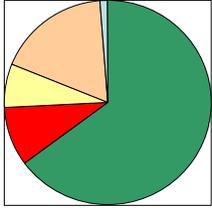
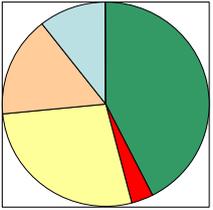
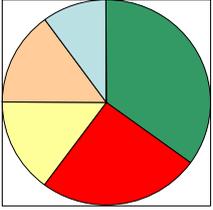
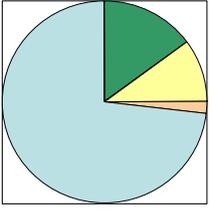
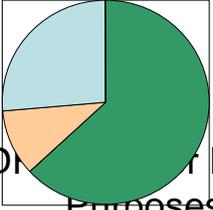
Municipal Energy Working Group

Municipal Audit Guidelines

Developed By Margaret Dillon, SEEDS

DRAFT - For Discussion
Purposes Only

Dominant System Loads

| | | | | |
|-----------------------|---|---|---|--|
| Office |  |  | <p>Heating Cooling Electric Lighting</p> | <p>Enclosure Equipment</p> |
| Library no cooling |  |  | <p>Heating Electric Lighting</p> | <p>Enclosure HVAC System Lighting</p> |
| Library |  |  | <p>Heating Cooling Ventilation Lighting Electric</p> | <p>HVAC System Enclosure Lighting</p> |
| Pump House |  |  | <p>Water Pumping Heating / Ventilation</p> | <p>Pumps & Motors Enclosure Controls</p> |
| Transfer Station |  |  | <p>Heating Elect</p> | <p>Enclosure Equipment Controls</p> |

Discussion
Purposes Only

Example Town – Population about 2500

Building Space Functions



Community Services



Government



Roads



Police



Fire



Waste Transfer



Waste Water
Six Buildings



Library



Garage

Standard Energy Uses by Building Types / ASHRAE; Codes; Ventilation; Lighting...



Offices; Day Care;
Community Center



Offices and Community Hall



Garage



H&S Offices



Health & Safety



Warehouse



Laboratory & Office



Library/Museum



Garage

Range of Building Sizes (ASHRAE Commercial categories and audit 'costing' strategies)



10,168ft²



10,898ft²



11,250ft²



4,248ft²



4,691ft²



1,800 ft²



2,973 ft²



6,450 ft²



665ft²

Total All Six Buildings

2008 Sample Town Building Energy Indexes

can be helpful, but sometimes just weird: ex Pumping water – small buildings:
HUGE energy use! or LARGE town hall buildings, with small, limited occupancy

2B
Oil: 4567 gallons
Elec: 20,160KWH
72KBtu/ft2



4
Oil: 4057 gallons
Elec: 19,428KWH
57.4KBtu/ft2



5
LP: 5,122 gallons
Elec: 21,120KWH
48.4KBtu/ft2



3
LP: 2,033 gallons
Elec: 19,750KWH
59.6KBtu/ft2



8
Oil: 817 gallons
Elec: 7,290KWH
29.4KBtu ft2



6*
Kerosene: 934 gallons
Elec: 18,731KWH
45KBtu/ft2



1
LP: 2200 gallons
Elec: 130,968KWH
***289KBtu/ft2**



2A
Oil: 2654 gallons
Elec: 44,000KWH
80.4KBtu/ft2



7
Oil: 152 gallons
Elec: 459KWH
33.8KBtu/ft2



Town Building Air Leakage Rates

Newer Construction Rarely Better (in truth – often worse performers) BUT Politically Hard to Fix the Very Old and Very New. Take Away: Pay a little more from the start or Pay a lot more forever). Most wasteful, yet not always most cost effective to fix.



Newest construction – expense still controversial



Beloved, old, heated storage, wasteful relatively minimal use¹¹

Town Building 2008 Greenhouse Emissions

Future Priority #1? – Will this be the “next” mandate or funding stream?



Town Building 2008 Utility Costs

Biggest EE Opportunity: How do you decided where to start?



Prioritize by Highest Costs - Dollar\$ and Greenhouse Gas Emissions



Note: Wastewater treatment plant ranked #1 4 out 5 categories and largest energy/dollar consumer – yet wasn't part of Benchmarking Project or original audit scope. I had to insist on including it in the site visits.



Summary of Prominent Opportunities

ECM come as a Mix!

Insulation
Heating Equipment
Distribution & Controls
HR Ventilation

Insulation
Glazing / Air Sealing
Equipment/Distribution
Lighting

HR Ventilation
Insulation

Air Sealing

Air Sealing
Insulation

Air Sealing
Insulation
H Equipment

Pump motor efficiencies?
Insulation Air sealing / HRV

HVAC Controls
Air Sealing & Insulation

Air Sealing
glazing
insulation

Necessary Audit Expertise

**Com T HVAC and
Control Systems
Envelope
Lighting Systems**

**Com T HVAC and
Control Systems
Envelope/ Historic**

**Warehouse/Garage
Type HVAC systems
Envelope**

**Envelope
Res T HVAC**

**Envelope
Res T HVAC
Moisture Loads**

**Warehouse/Garage
Type HVAC systems
Envelope**

**Electrical
Pumps and Motors
Envelope
Res HVAC**

**Com HVAC
Envelope
Historic
Lighting**

**Envelope
RT Heating Equip**

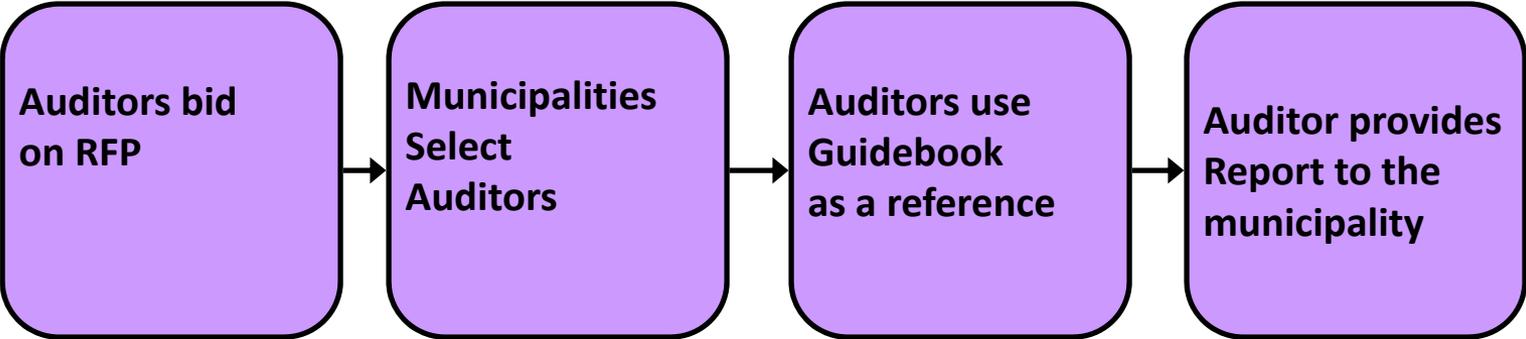
Municipal Audit Field Guide

Potential Process

Municipal Use of Guidebook



Auditor Use of Guidebook



Need to define “parameter” and “audit elements”

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