Municipal Energy Planning

An Energy Efficiency Workbook

Version 1.0

Prepared by

University of Wisconsin-Cooperative Extension

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DISCLAIMER

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This guidebook was prepared for those individuals charged with making sure local units of government run as efficiently as possible. It has been written for local elected officials, administrators, and municipal staff interested in developing plans to make their operations more energy efficient.

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FOR ADDITIONAL COPIES

This guidebook will be made available on-line at:
www.bioenergyforum.com
www2.uwsuper.edu/sustainability

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WHAT IS THIS WORKBOOK?

This workbook provides a step-by-step guide for developing an energy efficiency (or energy conservation) plan for municipal governments. Municipal facilities and operations use considerable amounts of energy and most commonly rely on fossil fuels such as natural gas, oil, and coal. Rising fuel costs, along with energy security and environmental concerns, are driving governments to improve the energy efficiency of their buildings and operations.

Community Resource Development educators from the University of Wisconsin-Extension developed this workbook to address an educational need of elected officials and municipal staff to improve the energy efficiency of their facilities and operations.

This workbook provides a blueprint for developing an energy efficiency plan and includes instruction on the following topics:

- Getting started;
- Assessing current energy use and identifying energy issues;
- Evaluating the potential for municipal energy efficiency and conservation;
- Developing energy goals and evaluating options;
- Developing action plans;

By using this workbook as a guide and following the steps outlined in each of its sections, any municipality should be able to develop a usable energy efficiency plan.

Above: Energy efficient lighting and motion sensor – Barron County Courthouse, WI

With almost 3,000 new fluorescents and hundreds of new motion sensors installed, Barron County is saving $21,000 per year in electricity costs. The payback time on this project was less than two years.

GETTING STARTED

As with any initiative or planning process it's critical that you start off on the right foot. Typically, you increase your odds of success if you effectively assess and prepare for the situation you are about to walk into. Below are a few questions your energy team should answer before getting started and as you begin preparing your planning process.

Assessment Checklist

- Why are you here?
- Who provided the leadership to initiate energy planning?
- Have you clarified the time commitment and set a goal for finishing the plan?
- Do you have a firm commitment from policy makers, administrators, and other key energy stakeholders? Is everyone on board?
- There are a lot of plans being developed by municipalities – financial plans, strategic plans, and comprehensive plans; how can you make the case that this, too, is important? How does it tie in with these other plans?
- What is the scope of this plan? Is this plan about saving energy or are there other goals you wish to address as well? If yes, what other types of goals (environmental, economic development, etc…) does the plan seek to address?
- Can you link your energy plan with other community goals? For example, if your community has a green jobs initiative, can you partner with job training providers during the installation of energy efficiency measures or purchase materials from local suppliers?
- Are you developing a specific action plan that will serve as a roadmap to greater energy efficiency or a more general policy document that is intended to guide decision making on matters related to municipal energy use?

Before moving ahead, consider broadening your understanding of what energy planning is all about. The figure below is a planning framework from the EPA's Energy Program (http://www.energystar.gov/index.cfm?c=guidelines.guidelines_index). The diagram illustrates the circular nature of energy planning (or any type of strategic planning for that matter). Once the plan is developed and actions are undertaken it's critical to monitor the

effectiveness of those actions, make adjustments as needed, recognize and celebrate successes, and then periodically re-assess the situation to develop another plan if needed.

FIGURE 1 EPA ENERGY STAR PLANNING PROCESS

A key point to remember is that the people who will be tasked with implementing the plan should probably be at the table developing the plan itself. Again, this is true for most strategic planning processes but especially so for energy planning. If the plan is not doable or doesn't have significant buy-in from those it impacts the most, then the chances of the plan succeeding are probably slim.

Below are several key steps to consider when it's time to launch the planning process itself.

Preparing for Energy Efficiency Planning

1. Identify and clearly state the purpose (or charge) of the planning group. For example, our charge is to "develop a plan to reduce County energy consumption by 20% by the year 2011 using 2008 as a baseline." Or, our purpose is to "develop an energy policy for the City which addresses facility, transportation, and purchasing decision-making."

2. Share this mission (or charge) with the other key stakeholders (policy makers, administrators, etc…) and make sure everyone is in agreement.

3. Identify potential champions of this planning process and other key stakeholders you'll need on your team in order to be successful. Who are they? Identify potential consultants or other outside expertise and invite them in to find out what they offer. Who are they?
4. Develop a plan to approach and recruit your team members.
5. Spend adequate time developing a detailed (and flexible) planning process that will guide your efforts as you get started. Share this document and gather feedback on it to create buy-in into the process.
6. Examine municipal energy plans from around the State and the U.S. (see the 'What Other Communities are Doing section for links to examples)
7. Develop an outline of what your energy plan will look like.
8. Start with a clear end point in mind and choose a date to finish by.
9. Get to work.

Below is an example of what Chippewa County, WI, did in the process of "getting started" with energy planning. A committee "charge" such as this provides good direction for the planning effort (provided by Dan Masterpole, Chippewa County)

1) Define the purpose of the committee
This is an ad hoc study and advisory committee. The committee is advisory to the County Administrator. The committee has been created to: Document energy consumption and direct costs associated with county operations, and Develop an energy conservation plan with recommendations for consideration by the County Administrator and/or the County Board.
2) Define Duties and Responsibilities
Compile information regarding the types of energy consumed in county operations and service delivery. Compile and review study designs or evaluation frameworks now available to counties and other public institutions to document current and anticipated energy consumption and costs.

Select a method or evaluation framework.

Compile and review the current policies, methods, and management approaches now used in Chippewa County to conserve energy.

Compile and evaluate examples of management approaches and specific techniques now used by other counties or municipalities in Wisconsin, and elsewhere, to conserve energy.

Using the knowledge gained, develop a written energy conservation plan which could be used to limit the county's energy use and to monitor its energy costs and consumption over time. Ideally, the energy conservation plan should include:

- A set of goals and objectives for energy use and conservation that would apply to county operations that is measurable and attainable.
- A specific listing of management options and implementation strategies that are recommended to measure, manage, and, if possible, reduce energy consumption from courthouse facilities, satellite facilities, and the county vehicle fleet.
- A five (5) year budget that projects anticipated costs and funding sources that will be pursued to implement the program recommendations.
- An ongoing monitoring program with assigned duties and responsibilities.

FIGURE 2 SAMPLE ENERGY COMMITTEE CHARGE

GENERAL INTRODUCTION

The purpose of this section in your energy plan is to provide context for what you are doing and why. You may want to describe your governmental unit/operations in a short paragraph or two. How does this plan connect with past or current efforts related to the sustainability, the environment, taxpayer savings, or resource management?

Next, you may want to describe what the specific context and goals are for this energy planning process. Every community is different and therefore will begin the energy planning process under a unique set of circumstances. Some municipalities may be starting from scratch and others may have decades of experience planning for incremental energy improvements.

Suggested Content for Plan Introduction

- What's the background for the plan?
- How does this plan relate to fiscal policy, environmental, and economic goals?
- Which departments consume how much energy?
- What is the Greenhouse Gas "footprint" associated with municipal energy use?
- What is the breakdown in energy consumption across facilities and vehicles?
- Where does your energy come from?
- How is current energy use and cost monitored?
- Describe the planning method including planning team or other committees involved in the effort; involvement of diverse segments of your staff and/or community in the process and why.
- What is the scope of the plan – what will it cover and what will be in the plan?

SAMPLE ENERGY PLAN EXECUTIVE SUMMARY

This section should provide a brief summary of what you did and what you found out. The reader should be able to scan the executive summary and have knowledge of:

- How this plan came about
- What the purpose of the plan was
- How the plan was developed
- Who was involved
- What the plan calls for
- How the plan is being/will be implemented
- Results of the planning effort to date

CURRENT ENERGY USE AND FUTURE GROWTH

It is nearly impossible to plan a route to your destination on a trip, or a path to your energy future, if you don't know your starting point. This key step entails identifying all the energy uses of your organization and recording a history of this energy use. A full year of data is essential to a useable baseline, two years or more of data will be more helpful. Once the baseline is established, it is important to continue regular updates to the data so you can identify opportunities, savings, and anomalies. There are several ways you can gather the data to establish your baseline:

- For natural gas, electricity, LP, oil, diesel, and gasoline you may be able to ask your supplier for a two or three year history of your purchases. If possible, get the data in an electronic spreadsheet with monthly breakdowns.
- A second way to compile the data is to pull the files of your utility and fuel invoices for the past couple years, create a spreadsheet and manually enter the data from the invoices.
- A third option, if your energy is supplied by a utility that is participating in Wisconsin Focus on Energy, is to seek assistance from the FOE Schools and Government Program. A consultant may be able to assist you in collecting all the data and putting it into a usable format.

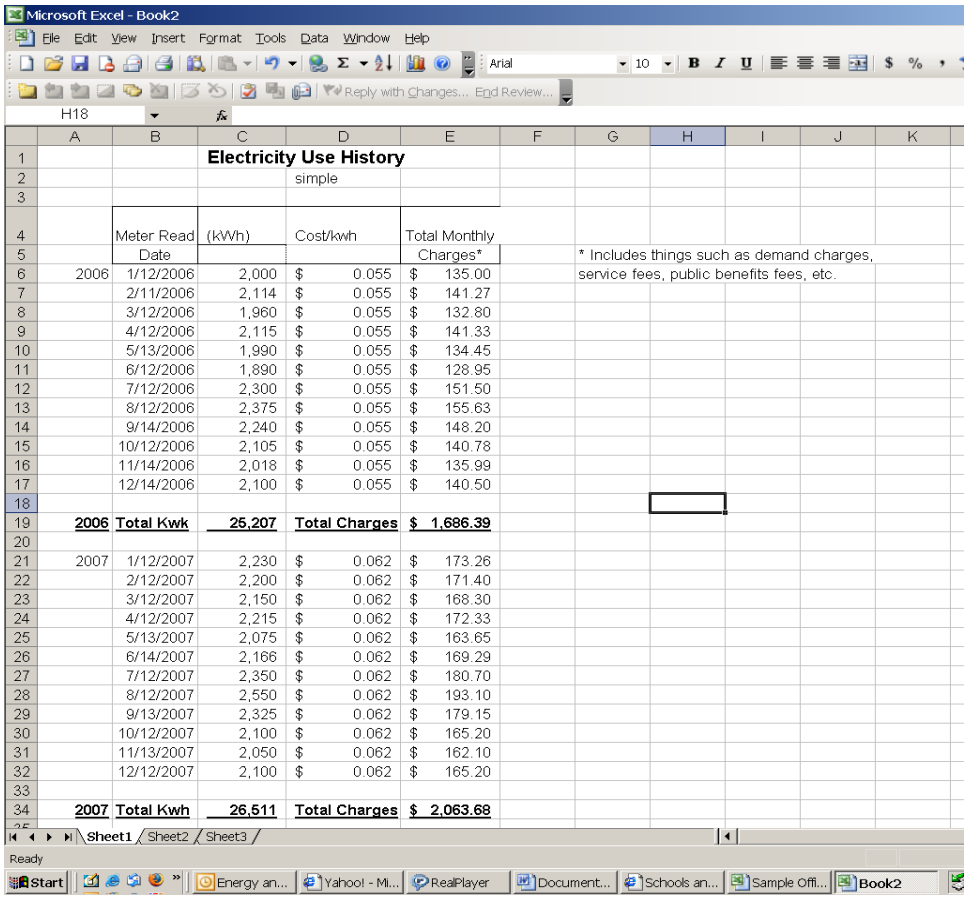
One of the challenges for any larger municipality will be identifying all the energy users. For example, a county may have the county courthouse, an annex or services building, county jail, garages, and remote office buildings. You may have separate account listings for outdoor lighting, signs, utility functions such as water pumps, and many other miscellaneous energy users. Vehicle fleets for street and highway departments, police and safety, parks and recreation, forestry and natural resources, aging programs, staff travel, and many other transportation components may fall under several departments, all of which may be billed separately.

As you get started in gathering your data you may run into numerous terms you are unfamiliar with such as 'heating-degree-days' or 'peak demand'. The U.S. Energy Information Agency has a good energy glossary that you can access online at: http://www.eia.doe.gov/glossary/index.html. Other references in this workbook also have good definitions and explanations of various terms. Utilize these resources because as in

many professions, the way certain terms are used in the energy field is often not the way the words are defined in your standard dictionary.

You will find below example spreadsheets for several energy types including energy used for facilities and energy used for transportation. Use the example given or modify it to better meet your specific needs. If you'd like to be able to compare your facility energy usage to other similar municipalities you will need additional information such as square footage of buildings, demand charges, and heating and cooling degree days. The U.S. EPA Energy Star program will allow you to benchmark your facility energy use in comparison to similar sized facilities across the U.S.

Electrical Use. This spreadsheet shows a very basic set of data that would be a start in tracking your electrical use. You would be able to see changes from one year to the next, though it would be very difficult to attribute those changes to any particular causes. The next spreadsheet offers more details and opportunity for analysis.



Microsoft Excel - Book2

File Edit View Insert Format Tools Data Window Help

H18

	A	B	C	D	E	F	G	H	I	J	K
1			**Electricity Use History**								
2				simple							
3											
4		Meter Read	(kWh)	Cost/kwh	Total Monthly						
5		Date			Charges*		* Includes things such as demand charges,				
6	2006	1/12/2006	2,000	$ 0.055	$ 135.00		service fees, public benefits fees, etc.				
7		2/11/2006	2,114	$ 0.055	$ 141.27						
8		3/12/2006	1,960	$ 0.055	$ 132.80						
9		4/12/2006	2,115	$ 0.055	$ 141.33						
10		5/13/2006	1,990	$ 0.055	$ 134.45						
11		6/12/2006	1,890	$ 0.055	$ 128.95						
12		7/12/2006	2,300	$ 0.055	$ 151.50						
13		8/12/2006	2,375	$ 0.055	$ 155.63						
14		9/14/2006	2,240	$ 0.055	$ 148.20						
15		10/12/2006	2,105	$ 0.055	$ 140.78						
16		11/14/2006	2,018	$ 0.055	$ 135.99						
17		12/14/2006	2,100	$ 0.055	$ 140.50						
18											
19	**2006**	**Total Kwk**	**25,207**	**Total Charges**	**$ 1,686.39**						
20											
21	2007	1/12/2007	2,230	$ 0.062	$ 173.26						
22		2/12/2007	2,200	$ 0.062	$ 171.40						
23		3/12/2007	2,150	$ 0.062	$ 168.30						
24		4/12/2007	2,215	$ 0.062	$ 172.33						
25		5/13/2007	2,075	$ 0.062	$ 163.65						
26		6/14/2007	2,166	$ 0.062	$ 169.29						
27		7/12/2007	2,350	$ 0.062	$ 180.70						
28		8/12/2007	2,550	$ 0.062	$ 193.10						
29		9/13/2007	2,325	$ 0.062	$ 179.15						
30		10/12/2007	2,100	$ 0.062	$ 165.20						
31		11/13/2007	2,050	$ 0.062	$ 162.10						
32		12/12/2007	2,100	$ 0.062	$ 165.20						
33											
34	**2007**	**Total Kwh**	**26,511**	**Total Charges**	**$ 2,063.68**						

Sheet1 Sheet2 Sheet3

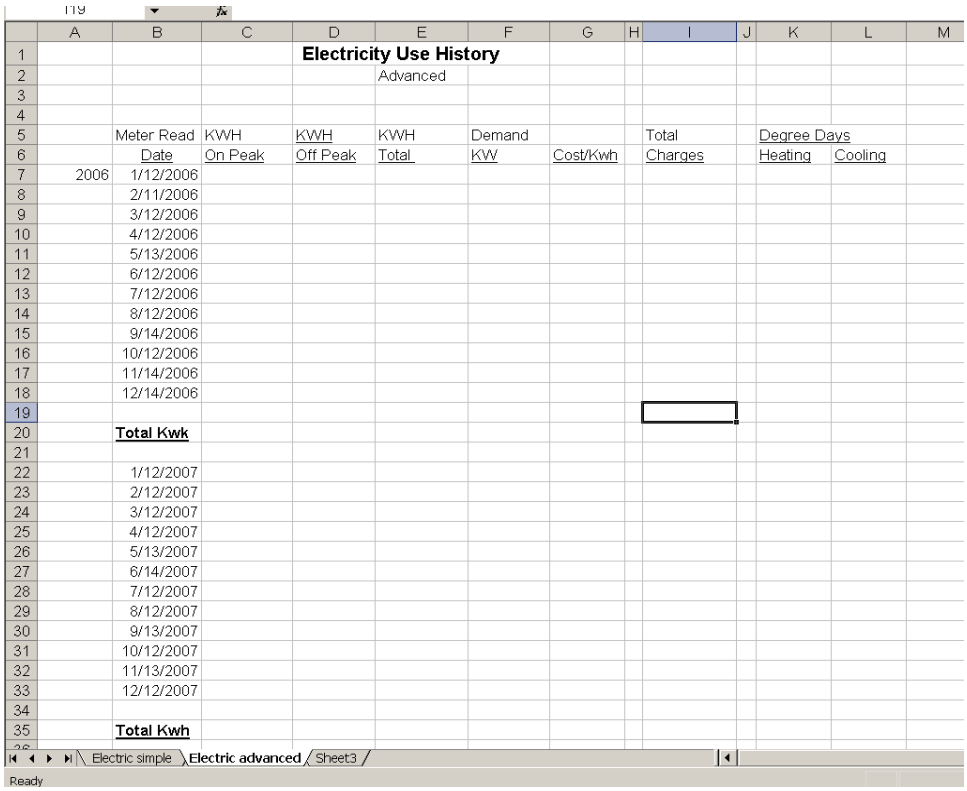
Ready

Start | Energy an... | Yahoo! - Mi... | RealPlayer | Document... | Schools an... | Sample Offi... | Book2

FIGURE 3 BASIC ELECTRICITY USE SPREADSHEET

The Electric Use History spreadsheet below adds several additional data points that would assist in an analysis of the facilities electric usage. Municipal and commercial utility accounts may have higher rates during high demand periods or may receive a discount for power used during off hours such as night-time heat storage. They also often pay base rates per kWh **plus** a cost based on "demand charges" – "the 15 minute interval during the billing cycle during which your facility had the highest average demand for power." The sheet below includes columns for Heating Degree Days and Cooling Degree Days which are often included on your energy bill. They are essentially calculated numerical values based on the daily weather that help you compare one period to another.

(HDD & CDD defined: See a good definition of HDD & CDD at Wikipedia at the following link. http://en.wikipedia.org/wiki/Heating_degree_day or at the Energy Information Agency site noted above. To find HDD and CDD for your location see http://www.degreedays.net/)



	A	B	C	D	E	F	G	H	I	J	K	L	M
1				**Electricity Use History**									
2					Advanced								
3													
4													
5		Meter Read	KWH	KWH	KWH	Demand			Total		Degree Days		
6		Date	On Peak	Off Peak	Total	KW	Cost/Kwh		Charges		Heating	Cooling	
7	2006	1/12/2006											
8		2/11/2006											
9		3/12/2006											
10		4/12/2006											
11		5/13/2006											
12		6/12/2006											
13		7/12/2006											
14		8/12/2006											
15		9/14/2006											
16		10/12/2006											
17		11/14/2006											
18		12/14/2006											
19													
20		**Total Kwk**											
21													
22		1/12/2007											
23		2/12/2007											
24		3/12/2007											
25		4/12/2007											
26		5/13/2007											
27		6/14/2007											
28		7/12/2007											
29		8/12/2007											
30		9/13/2007											
31		10/12/2007											
32		11/13/2007											
33		12/12/2007											
34													
35		**Total Kwh**											

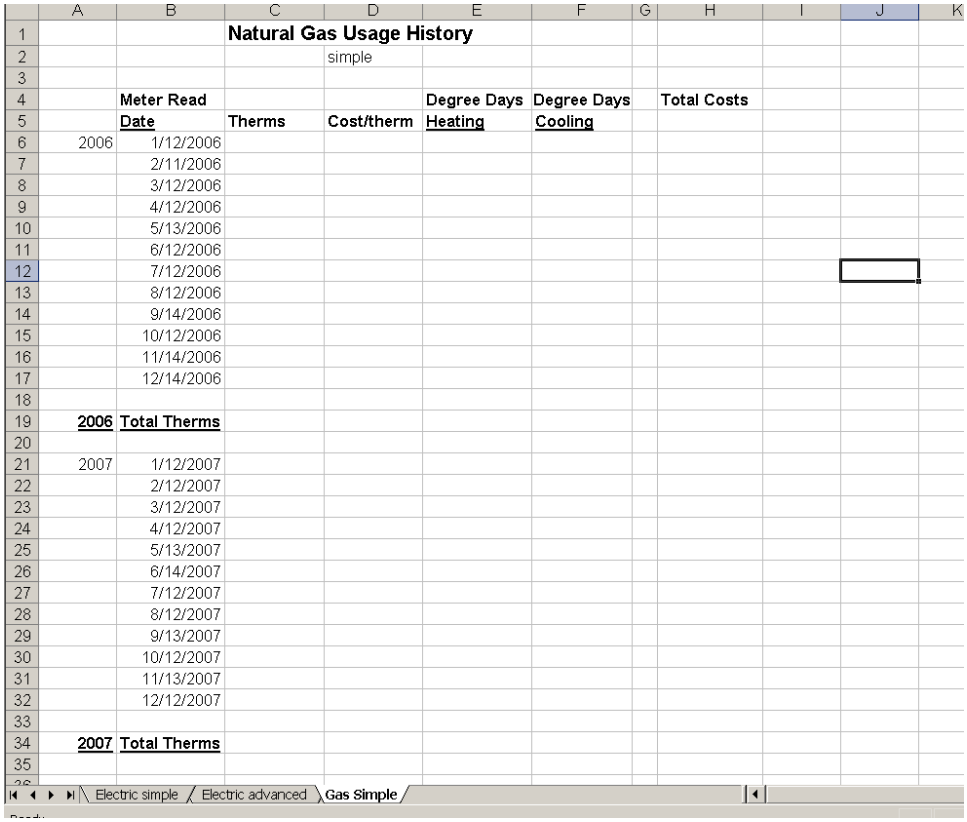
Electric simple | Electric advanced | Sheet3

Ready

FIGURE 4 MORE COMPLEX ELECTRICITY USE SPREADSHEET

Natural Gas Use. The following spreadsheet for Natural Gas Usage takes the basic data needed to compare usage and costs from one period to another. Natural gas is typically sold

by the Therm - a unit of heat equal to 100,000 British thermal units. Heating and Cooling Degree Days enable you to compare usage while factoring in changes in weather.



	A	B	C	D	E	F	G	H	I	J	K
1			**Natural Gas Usage History**								
2				simple							
3											
4		**Meter Read**			**Degree Days**	**Degree Days**		**Total Costs**			
5		**Date**	**Therms**	**Cost/therm**	**Heating**	**Cooling**					
6	2006	1/12/2006									
7		2/11/2006									
8		3/12/2006									
9		4/12/2006									
10		5/13/2006									
11		6/12/2006									
12		7/12/2006									
13		8/12/2006									
14		9/14/2006									
15		10/12/2006									
16		11/14/2006									
17		12/14/2006									
18											
19	**2006**	**Total Therms**									
20											
21	2007	1/12/2007									
22		2/12/2007									
23		3/12/2007									
24		4/12/2007									
25		5/13/2007									
26		6/14/2007									
27		7/12/2007									
28		8/12/2007									
29		9/13/2007									
30		10/12/2007									
31		11/13/2007									
32		12/12/2007									
33											
34	**2007**	**Total Therms**									
35											

Electric simple | Electric advanced | Gas Simple

FIGURE 5 BASIC NATURAL GAS USE SPREADSHEET

The two graphs below are presented as examples from Chippewa County. They represent natural gas usage and costs for 2006, 2007, and the first half of 2008. Establishing a good baseline of energy consumption may require examining several years of usage if the figures vary considerably from year to year.

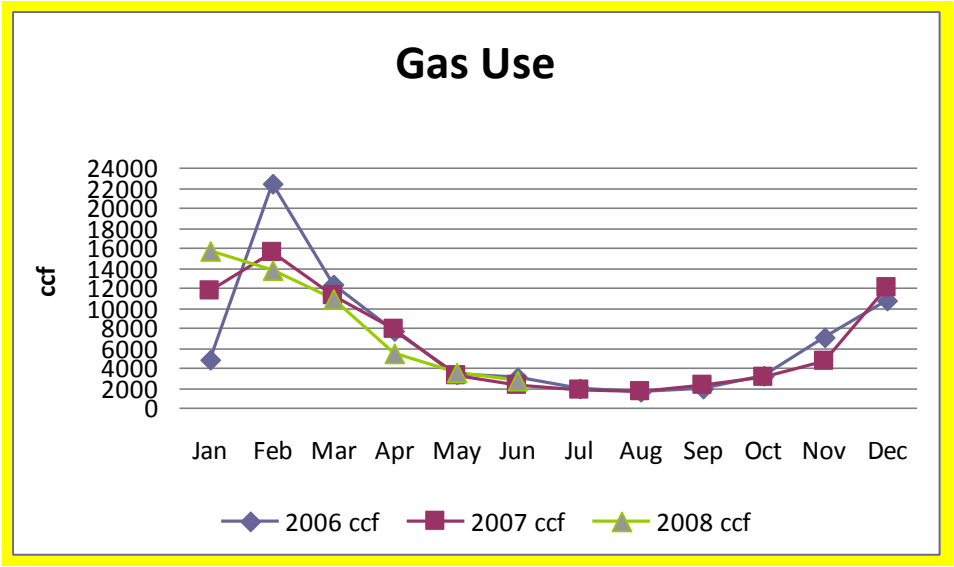


FIGURE 6 NATURAL GAS USE FOR CHIPPEWA COUNTY, WI

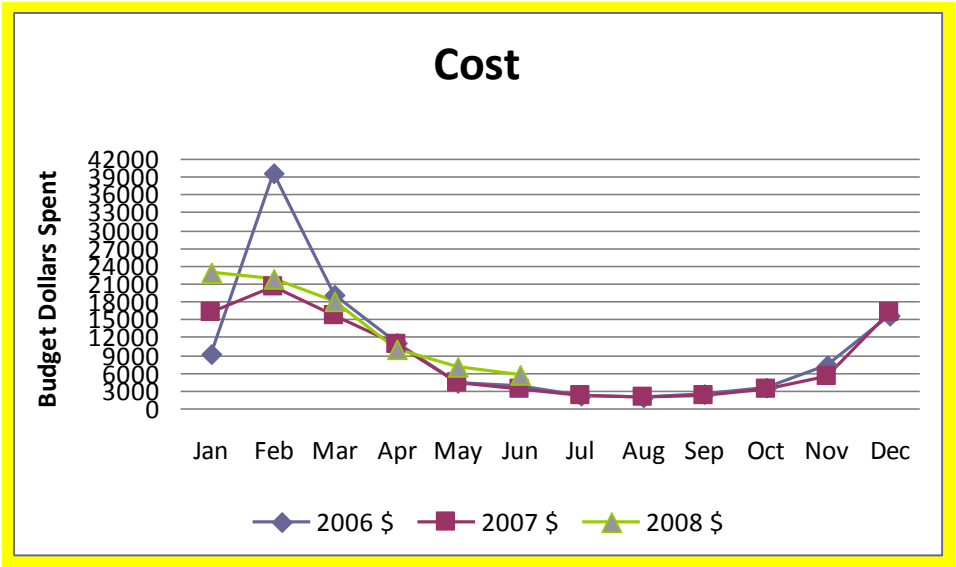
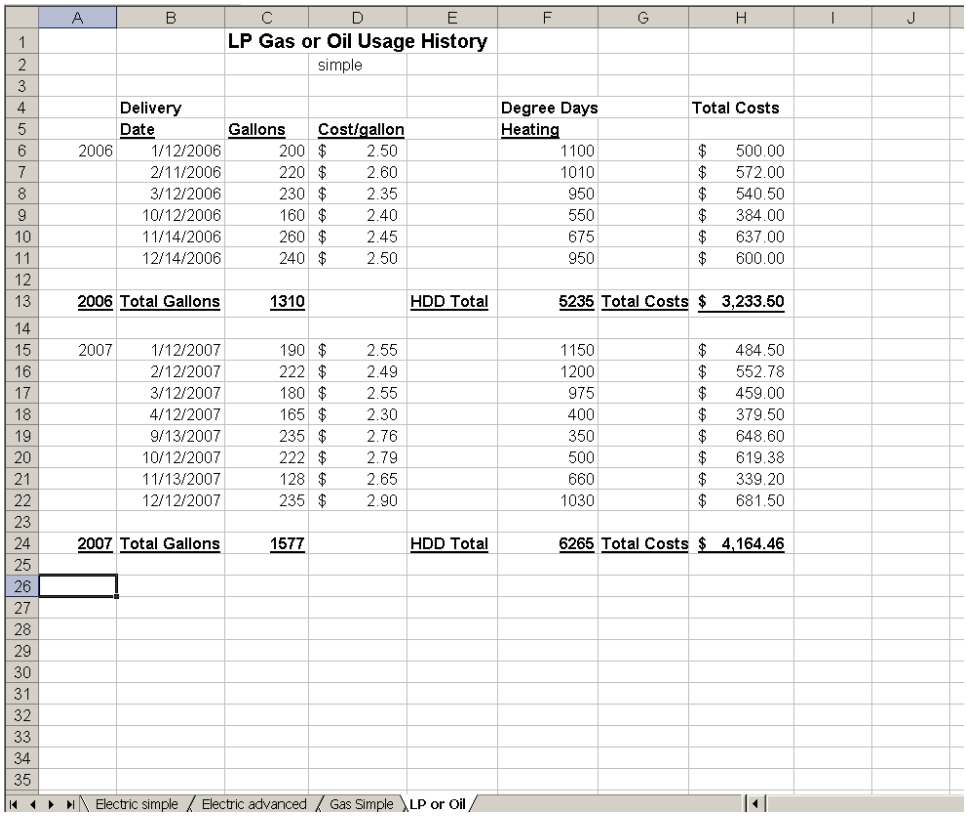


FIGURE 7 NATURAL GAS COSTS FOR CHIPPEWA COUNTY, WI

Fuel Oil and LP Use. Fuel oil and LP gas are generally delivered by truck. A facility may be on a 'keep full' schedule where the delivery company tries to anticipate your usage and then delivers fuel as you need it. You could also have a facility where they deliver only when requested. The billing may be per delivery, spread out monthly during the heating season, or spread out into even payments throughout the year. For your history, you need the amount of fuel delivered to each of your facilities and the cost. It is more difficult to analyze

monthly usage due to less regular deliveries and surplus fuel in your storage tank. Heating Degree Days are a useful piece of data for comparisons between periods.



	A	B	C	D	E	F	G	H	I	J
1			**LP Gas or Oil Usage History**							
2				simple						
3										
4		**Delivery**				**Degree Days**		**Total Costs**		
5		**Date**	**Gallons**	**Cost/gallon**		**Heating**				
6	2006	1/12/2006	200	$ 2.50		1100		$ 500.00		
7		2/11/2006	220	$ 2.60		1010		$ 572.00		
8		3/12/2006	230	$ 2.35		950		$ 540.50		
9		10/12/2006	160	$ 2.40		550		$ 384.00		
10		11/14/2006	260	$ 2.45		675		$ 637.00		
11		12/14/2006	240	$ 2.50		950		$ 600.00		
12										
13	**2006**	**Total Gallons**	**1310**		**HDD Total**	**5235**	**Total Costs**	**$ 3,233.50**		
14										
15	2007	1/12/2007	190	$ 2.55		1150		$ 484.50		
16		2/12/2007	222	$ 2.49		1200		$ 552.78		
17		3/12/2007	180	$ 2.55		975		$ 459.00		
18		4/12/2007	165	$ 2.30		400		$ 379.50		
19		9/13/2007	235	$ 2.76		350		$ 648.60		
20		10/12/2007	222	$ 2.79		500		$ 619.38		
21		11/13/2007	128	$ 2.65		660		$ 339.20		
22		12/12/2007	235	$ 2.90		1030		$ 681.50		
23										
24	**2007**	**Total Gallons**	**1577**		**HDD Total**	**6265**	**Total Costs**	**$ 4,164.46**		
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										

Electric simple | Electric advanced | Gas Simple | LP or Oil

FIGURE 8 BASIC LP GAS OR OIL USAGE HISTORY

This section has introduced several ways to compile an Energy Use History for your facilities. Having an accurate history of energy use is the first step in developing a plan to manage energy use and costs. With this baseline data you are in a position to start setting energy goals, identifying opportunities for savings and planning for likely price scenarios. For example, if you know that your average natural gas usage over the past three years has been 20,000 therms and you know that natural gas prices are projected to rise 50% this year over last (from $.70 up to $1.05 per therm) you can estimate the impact on your budget. ($.35 x 20,000 = $7,000) You would also be in a better position to analyze the potential cost savings of an energy upgrade project.

Vehicle Fleets and Energy Use

The variety of municipal fleets make this category of your energy history a little more of an individual project. Another challenge is that different municipalities track their vehicle use

in different ways. Here are some of the questions you will want to find answers to as you put this piece of the puzzle together.

- If your municipality or various departments within it purchase fuel in bulk or on contract, get the annual purchase data (gallons, fuel type and cost) and a monthly breakdown if available. For a starter this may be the extent of your vehicle fleet energy use history.

To get a better sense of the fleet situation, here are additional questions to ask:

- What types of vehicles do you have in the fleet? I.e. trucks, snowplows, vans, cars, police vehicles, fire trucks, ambulances, front end loaders, street sweepers, etc.
- Group by types of vehicles or by departments, and identify numbers, fuel types, and annual mileage and mpg ratings.
- Does staff use personal vehicles for work travel? Can you get information on reimbursed miles traveled from your accounting office?

Future Growth in Energy Demand

An accurate energy history is a good start in your energy planning. Equally important may be a projection of what the future holds based on plans adopted or in process. If you know that your county has planned a new 50,000 square-foot office building that will come on budget in 2010, you will want to have a plan for the energy demand and costs of the new facility. Many firms can now use energy modeling to identify options for energy savings and also give managers a good estimate of energy use once the building is occupied. New developments and new roads or streets will require snow removal and other maintenance that requires energy. Your history may give you energy cost estimates of typical maintenance per mile of roadway or perhaps per acre of parking lot.

The biggest unknown in projecting energy costs is what the price for various forms of energy will be in 5 or 10 years. There are conflicting crystal balls in the world. Some industry groups are suggesting we have plenty of domestic or at least North American oil and natural gas to meet our needs for years to come. On the other end of the spectrum are the Peak Oil advocates who suggest we have reached peak global production of oil and we are near peak global production of natural gas. Their scenarios suggest that the general trend line for these two primary energy sources will be to steadily higher prices. Some suggest that sharply higher prices will be the norm until we adopt alternatives to fossil fuels. With an energy use history and knowledge of organization plans you are in a better position to develop a Municipal Energy Plan that will prepare your government for whichever scenario comes true.

Additional Resources for developing your Energy Use History

The Wisconsin Focus on Energy Program and its Schools and Government Program offer information, assistance, and incentives for municipalities in participating utility territories. See the web site for more information:

http://www.wifocusonenergy.com/Business/Schools-and-Government/

The Focus on Energy Program developed an excellent training program called Practical Energy Management (PEM) for Commercial Buildings. The course includes a good resource folder and a CD with numerous outstanding spreadsheet templates for developing energy use histories, analyzing equipment upgrades, renovations, and sound energy planning. See the web site for further information and for schedules of future courses.

http://www.wifocusonenergy.com/Business/Commercial-Business/CPEM/sixsteps.aspx

The federal government also has a nationally recognized program on energy efficiency – Energy Star. They have a resource called 'Guidelines for Energy Management'. It suggests a process similar to the PEM process and has links to numerous free resources. http://www.energystar.gov/index.cfm?c=guidelines.guidelines_index

Another federal source of energy efficiency and renewable energy information is the US Department of Energy. http://www.energysavers.gov/

A third federal source is the U.S. Energy Information Agency. The agency specializes in energy data and analysis. The agency web page contains a wealth of data and an excellent glossary of energy terms. http://www.eia.doe.gov/glossary/index.html

The Energy Center of Wisconsin is another good in-state resource. They conduct courses around the state on energy efficiency, assist businesses and governments to develop plans and analyze opportunities, and they have an excellent resource library available online that includes some excellent case studies. http://www.ecw.org

The U.S. Green Building Council is a private organization that promotes and certifies green architecture and construction. There are hundreds of tools on their website and examples of 'green buildings' from around the country. They have developed certification programs called Leadership in Energy and Environmental Design (LEED) that are becoming a standard in green building and energy efficient design. http://www.usgbc.org

Left: A "typical" older, larger, less efficient boiler - Ashland, WI County Courthouse.

Right: Energy efficient Munchkin boilers - Telegraph Herald, Des Moines, IA.

The Telegraph Herald cut its energy costs by 49% by replacing a pair of three- million BTU boilers with four Munchkin 399 modulating, high-efficiency boilers.

KEY ENERGY ISSUES FACING MUNICIPALITIES

The purpose of this section is to raise a few additional questions for you to consider as you develop your plan. Dozens of books have been written in the past few years, and thousands of web pages discuss energy issues and offer optimistic or fatalistic scenarios for our energy future. The intent of an energy plan is to control what you are in a position to control and to identify some opportunities to address whatever future scenario unfolds.

Key issues related to energy often fall into a few categories: cost, availability, and reliability.

Cost: Obviously this category has gotten our attention over the past couple years and has had a negative impact on most municipal budgets. An energy plan can help you prepare for the next time the prices for energy start going sky high.

Availability: The summer of 2008 saw some long lines for gasoline in the southeastern U.S. For those old enough to remember, it was very reminiscent of the oil shocks in the 1970's. Preparing an energy plan that includes several scenarios for availability challenges may help your municipality weather future disruptions. If one source of energy is in tight supply or unavailable what could you use as a substitute? What retrofits or infrastructure additions would be needed to take advantage of a substitute?

Reliability: This issue is most often related to electric supply. The crisis in California a few years ago provided vivid examples of the effects of brownouts and other reliability problems. Perhaps the two greatest things a municipality can do to affect reliability are to reduce overall energy use and reduce peak demand.

Municipalities also have responsibilities to their citizens. Cost, availability, and reliability will impact everyone. For vulnerable populations who may not be able to afford cost increases the impact will be more severe. By being proactive with education and assistance with weatherization and other conservation efforts a municipality may lessen the disruption from future energy supply or cost issues.

Municipalities can role model energy conservation for a community. News stories that share efforts and successes with the public will help spread the word. Open houses or tours of successful efforts will give citizens concrete examples of things they could do. Bottom line, by being more efficient the municipality is being more responsible with the taxpayers' funds.

WHAT OTHER COMMUNITIES ARE DOING

The following sample plan documents include both energy efficiency as well as community sustainability examples.

Sample Energy Plan Documents

Chequamegon Bay – Alliance for Sustainability
http://www.allianceforsustainability.org/afs_files/pdf/strategicplan/SCI_Strategic_Plan.pdf

La Crosse – City/County – joint plan
http://www.sustainablelacrosse.com/PDF/jointPlan.pdf

Waukesha County

http://www.waukeshacounty.gov/page.aspx?SetupMetaId=19474&id=19424 **(The plan is broken into several sections)**

(Here is a powerpoint of the whole thing)
http://www.waukeshacounty.gov/uploadedFiles/Media/PDF/Parks_and_Land_Use/Sustainability/Leading%20to%20Sustain%20final.pdf

City of Madison –
http://www.cityofmadison.com/mayor/documents/GreenCapitalReport_1.pdf

UW-SP & City of Stevens Point – a link to a list of subcommittees
http://www.uwsp.edu/sustainability/TaskForce/subcommittees.aspx

City of Milwaukee – Green Team Report
http://www.ci.mil.wi.us/ImageLibrary/Groups/cityGreenTeam/documents/88841_HiRes.pdf

Camden County, NJ

The County Green Initiative Action Plan identifies recommended action items to be undertaken in 2008 based upon the 12 objectives adopted by the Freeholder Board in April 2007. ENERGY EFFICIENCY ACTIONS -Pg: 5
http://www.camdencounty.com/government/offices/parks/livinggreen.html

Jackson Hole WY

Jackson Hole Energy Efficiency Action Plan – Fall 2007
http://www.ci.jackson.wy.us/content/index.cfm?fuseaction=showContent&contentID=78&navID=79

Various

UW-Extension's Solid Hazardous Waste Education Center provides a publication that includes links to several dozen energy planning efforts across the U.S. Search for Government Green Buildings Program for an inventory of programs addressing energy efficiency in municipal buildings.
http://www4.uwm.edu/shwec/publications/publications.cfm

The National Association of Counties "Green Counties" initiative includes a growing database of county energy plans from across the U.S.
http://www.naco.org/Content/NavigationMenu/County_Resource_Center/New_Technical_Assistance/Green_Government_Initiative1/Green_Government_Initiative.htm

Sample Building Codes

Boulder County, CO

http://www.bouldercounty.org/newsroom/templates/?a=1153&z=1

Boulder County BuildSmart promotes and encourages high performing, sustainable development and redevelopment in the unincorporated areas of Boulder County.

Eagle County, CO

http://www.eaglecounty.us/commDev/ecobuild.cfm

The ECObuild regulations were adopted to promote energy and material efficient building design and construction practices. ECObuild applies to all new construction, as well as additions/reconstruction over 50% of the existing floor area, and exterior energy uses such as snowmelt, spas, and pools.

Case Study: Energy Efficiency in County Buildings—Whatcom County, WA

In 1998, Craig Cummings, Facilities Maintenance Lead, began to improve the energy efficiency, and lower the energy costs, of one building after another in Whatcom County, WA. While energy audits are often recommended, Craig did not complete one before beginning his push for change. He already had prior knowledge of electrical systems and energy efficiency, and decided to pursue what he knew first: lighting. In the process of replacing the old T-12 lamps and ballasts on the County Courthouse, he not only saved the county money on utility bills, but brought improved lighting quality to county workers, and lower maintenance and replacement costs.

But it wasn't easy. First he had to persuade county decision makers of the benefits of making the change. To do this, he gathered information on current county energy costs, projected energy savings after the change, calculated the Return on Investment and Payback period, and included the cost sharing contribution of the local utility, which had a program to support business and government energy efficiency measures. Effectively, Craig, his data, and the success of his "low-hanging fruit" choice of lighting were the political process required to start, prove, and expand the move to greater energy efficiency within the county. His current energy efficiency project includes lighting and other measures in a 4-story county building expected to cost between $45,000 and $48,000, of which the local utility is paying half. The payback period is expected to be 3 years.

The process in Whatcom County demonstrates several recommendations of many, if not most, programs to promote change:

- Find a change agent (or a group of them)
- Gather necessary information and base decisions on what you find
- Find partners such as local utilities

- Be persuasive and persistent in raising the issues
- Start small and document successes
- Use successes to build momentum

As of 2008, Craig Cummings has moved the process from just replacing old lighting in one building to replacements in all county buildings (still occurring), and to transforming one building's HVAC system into a computer-run system, thanks to the continued support of the local utility. He feels it is important to keep projects manageable in size—one aspect (lighting, HVAC, etc.) of one building at a time. He recommends starting with the worst and biggest energy drain first for most immediate and dramatic results (savings), as well as the greatest persuasive power when seeking funding for additional efficiency measures.

ENERGY EFFICIENCY CHECKLIST[2]

Local governments can promote energy efficiency and conservation through energy policies, municipal operations, and by providing energy leadership in local communities. Each of these opportunities is briefly described below. **See the Appendix for an Energy Efficiency Checklist** of ideas for municipalities to consider as they develop strategies to become more energy efficient.

Energy Policies. Energy policies can address energy efficiency and conservation in addition to other dimensions of energy including water usage, green purchasing, renewable energy, green jobs, etc…

Energy Use for Government Facilities. Local governments can be significant energy end users in their own buildings and facilities, from public schools to wastewater treatment plants to City Hall. These facilities provide an opportunity to "lead by example" by improving energy efficiency, reducing CO2 emissions, and cutting government energy bills.

Energy Leadership in Local Communities. Local governments can play an important role

[2] Adapted from *California Long-Term Energy Efficiency Strategic Plan*, *Fairfax County, VA "Cool Counties" Policy and Program Template for Local Governments; US-Forest Service Chequamegon-Nicolet National Forest Green Team*

in influencing the energy attitudes and actions of their citizens and businesses. This can take on many forms, including public education, energy efficiency and renewable energy programs, climate change, and other sustainability related initiatives.

POTENTIAL OF ENERGY EFFICIENCY

What is actually achievable? The most practical answer to this question is probably gained by calling around and asking similar sized communities how much energy savings they have been able to accrue through their energy efficiency measures. Another good resource is Focus on Energy which provides case studies of examples from all across Wisconsin. The National Counties Association also provides case studies.

At the municipal level, concrete results of energy efficiency and conservation are commonplace. They may be divided into categories as follows, along with examples:

- **Facilities**. Chippewa Falls Schools implemented a plan to turn off computers saved the district more than $30,000

- **Lighting**. The City of Oshkosh recently changed 2,900 traffic lights to efficient Energy Star LEDs, which use 90% less energy and last 5-10 years longer than normal street lights. City officials estimate they will save $40,000 and more than 700,000 kilowatt hours each year.

- **Transportation**. Dakota County, MN replaced 3 half-ton pickups with hybrid trucks of the same size. This action has saved an estimated 1,430 gallons of gas per truck annually, a savings that will pay back the investment in 5 years or less.

There are two questions that municipal leaders and civic volunteers should ask themselves at this point. First, *what kinds of outcomes are possible* in the realm of energy conservation for this municipality? Some "big thinking" is in order here, without the braking effect of listing and describing all the reasons these ideal solutions can't be reached.

Secondly, *what is feasible* from among the energy conservation solution set? Given the mandates and constraints affecting local government and community partners, what proposed solutions have a high probability of being achieved? Mandates and constraints may be considered from the universe of political, economic, social and technological considerations.

The first question places an ambitious outer limit on goal-setting, while the second injects a dose of practical reality. With concerted effort, the actual energy conservation outcomes attainable may be pushed to a place between these two extremes. It is the community's challenge to figure out what hindering forces need to be overcome, and what helping forces can be employed as allies in reaching the agreed-upon efficiency and conservation goals.

Example: Savings by Increasing Efficiency at Dane County Buildings

Building	Cost of Improvements	Dollars Saved per Year	Return on Investment	Megawatt-hours Saved
Detoxification Center	$16,350	$2,633	16%	31.1
Badger School	$42,550	$9,547	24%	37.4
Job Center	$5,500	$2,667	50%	59
Human Services	$47,350	$9,501	20%	135.1
Badger Prairie	$324,740	$59,672	18.5%	255.8
City-County	$413,000	$61,480	14.8%	1,216
Public Safety	$70,500	$17,000	24%	227.6
Zoo	$9,120	$4,618	50%	58.7
Coliseum	$246,755	$46,040	18.5%	478.1
TOTAL	$1,175,865	$213,158	18%	2,498.8

Source: 10/10/01 memo to Bonnie Hammersley from Rob Everhart, Energy Specialist, WI Focus on Energy

ENERGY GOALS FOR YOUR MUNICIPALITY

The purpose of this section is to help your municipality develop realistic energy efficiency goals and objectives for its facilities and operations. A word of caution: everyone has their own definition of goals and objectives. Here are ours.

Goals are broad-based statements describing things you want to accomplish. Goals should also be measurable so that you can determine if you are making progress toward their achievement. Goals answer the question – what are you trying to achieve?

For each of your goals, there should be some related objectives that are even more specific, measurable steps that need to be attained in order to reach your goals. Objectives answer the question – how will you achieve your goals?

Finally, there should be a list of activities that are very specific and measurable actions that need to be taken to achieve each objective. This is usually called an "action plan" or implementation plan. Activities answer the questions: what will be done, who will do it, and by when will it be done?

One way of writing your municipality's energy efficiency goals and/or objectives is by using the SMART formula. This acronym provides the following characteristics of well-devised goals and objectives.

S *Specific*, having enough detail to adequately focus on the goal or objective

M *Measurable*, having some outcome that shows change in the number of units (e.g., kilowatt-hours of electricity used, energy dollars expended) or that shows relative change in baseline conditions (e.g., a percentage or index change)

A *Ambitious*, stretching and challenging the municipality to go beyond the status quo

R *Realistic*, something achievable with the time, personnel, and other resources Available

T *Time-bound or time-sensitive*, sets a time period for goal completion, or reflects a sequential order among goals

When developing goals, you should ask yourself what types of energy savings do you wish to achieve over time, both in the short term and long term? Also, how will you monitor progress toward achieving your goals, and who will be responsible for doing this?

Sample Energy Efficiency Goals or Objectives

- Reduce energy consumption by 10% by 2010
- Reduce overall energy use in municipal buildings by 15% by 2012
- Increase the average miles per gallon across the fleet of all municipal vehicles by 25% by 2015
- Hybrid-electric vehicles will constitute 25% of the municipality's vehicle fleet by 2020
- Reduce annual electrical energy usage in municipal buildings by 2,000,000-kilowatt hours by 2012
- Reduce energy consumption per square foot in municipal buildings by 30% from 2009 levels by 2020
- Energy usage in municipal buildings will decline by 15% form 2010 levels by 2020
- Reduce the annual total number of gallons of gasoline and diesel fuel used by municipal fleet vehicles by 50,000 gallons from 2008 levels by 2018
- Achieve a 20% reduction of electrical purchases by the year 2015 from baseline year 2004
- Achieve a return on investment of 20% on all new capital projects that support energy efficiency beginning in 2009 (each dollar invested in energy efficiency projects will return 20 cents per year in reduced operating costs)

Write the energy efficiency **goals for your municipality** below in the space provided:

Goal 1: _____

Goal 2: _____

Goal 3: _____

ASSESSING ENERGY EFFICIENCY OPTIONS

Solutions to demand-side management of municipal energy may be classified into two general approaches. ***Energy efficiency approaches*** consider how the physical plant or other physical assets including vehicles under management by the municipal government can yield more productive output per unit of energy input. **Energy efficiency is the science of saving energy and is primarily about applying more sophisticated technology to reduce energy use.**

Behavioral approache*s* address how people who are part of the energy management system – ideally <u>all</u> employees and stakeholder groups – act in their use of electronic devices, heating & lighting, and transportation. **Behavioral approaches are about people acting smarter in order to conserve energy.** The first approach implies there are technological fixes available, including the retrofitting of existing infrastructure, the construction of newer, more efficient buildings, and the purchase of high-efficiency vehicles and equipment. The second approach implies that people's behavior can be shaped by providing incentives for and removing barriers to energy-saving behavior.

Local governments may want to assess many of their own options themselves. They may also want to contract with an energy service provider to do a comprehensive energy audit of their facilities to identify a list of projects along with estimated costs and energy savings associated with each measure. For Focus on Energy eligible municipalities there are also resources available to identify energy efficiency improvements.

See the Appendix for examples of how an energy team might think about assessing their Energy Efficiency Options using a matrix. The energy team should decide together which criteria to use to evaluate different energy options they generate.

Also provided in the Appendix is a Facility Maintenance Planning Form and Process. It is a tool which can be used to assess your options once you have gotten to the point of identifying specific improvements to make including good cost estimates.

RECOMMENDATIONS AND ACTION PLANS

Each municipality will want to develop an action plan that works for their own organization. Depending on the organization, the format of the plan will vary considerably. Below is just one example of how to format an energy efficiency action plan. It is taken from Madison's "Building a Green Capitol City: A Blueprint for Madison's Sustainable Design and Energy Future" plan.

Example: Action Plan format used by City of Madison

A1. Impact Madison's Existing Building Infrastructure
A1.1) Municipal pilot projects to showcase energy efficiency, renewable energy and other green building practices

What: Recommended pilot projects include:

1. Madison Municipal Building (the 6th highest energy user of the City with MGE showing a $89,820 energy bill in 2002);
2. Monona Terrace Convention Center (high visibility, newer building that might achieve LEED™-EB fairly easily and inexpensively);
3. Dudgeon School (historic building, with high community profile and use);
4. Four City parking garages w/ highest energy use (parking garages can be particularly wasteful with lighting energy so lighting retrofits could quickly provide sizeable dollar savings);
5. City-County Building (partner with the county).

Why: Pilot projects demonstrating early program success and practical "how to" solutions will provide credibility to the program and encourage ardent participation. Targeting the Madison Municipal Building impacts staff, gets them involved and experienced, and requires annual review for US Green Building Council.

How: Require that LEED™ for Existing Buildings (LEED™-EB) be met, at the certified level at minimum initially, but raise the level over time. Use the *Advanced Buildings Guidelines* for the energy portion of LEED™. Measure and monitor over time, review, and report building performance results, as compared to similar existing buildings that have not been retrofitted to meet LEED™

ENERGY EFFICIENCY, POLLUTION, & ECONOMIC DEVELOPMENT

This section of your plan provides an opportunity to elaborate on the rationale for energy planning, as well as to look beyond energy efficiency planning to related forms of energy planning including renewable energy development and economic development.

The figure below helps describe the relationship between energy efficiency improvements and economic and community development. On the left of the figure is "Energy Efficiency Improvements." These types of investments do three things: 1) they reduce fossil fuel use; 2) they reduce energy costs over the long haul; and 3) they increase demand for energy efficiency businesses.

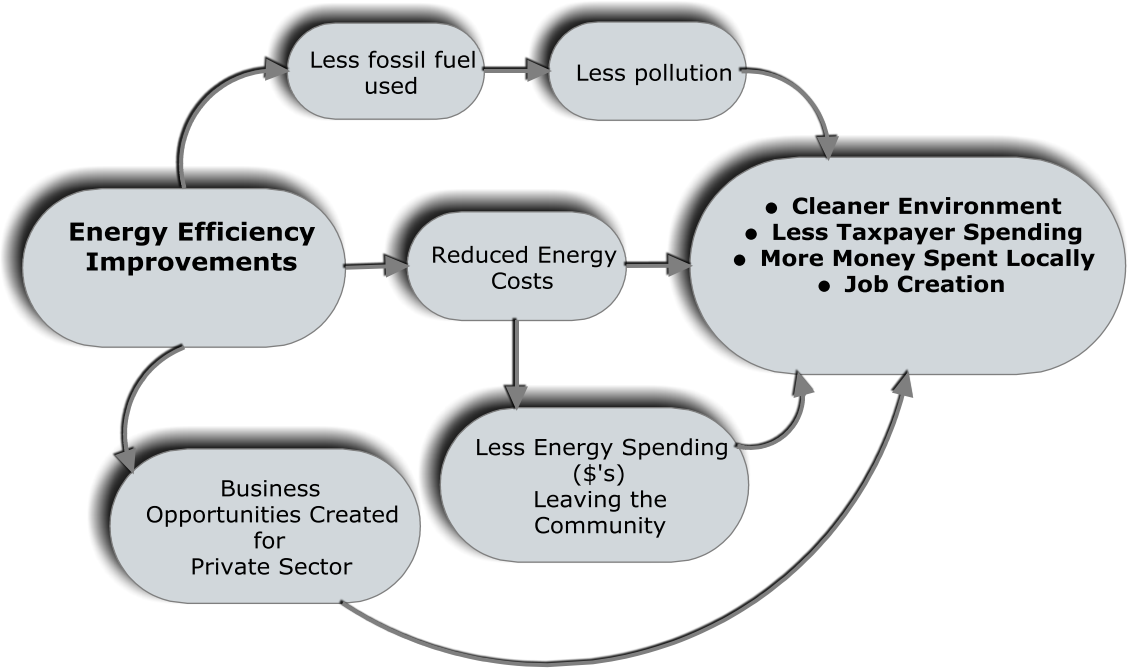


FIGURE 9 THE BENEFITS OF ENERGY EFFICIENCY

Energy efficiency improvements lead to less fossil fuel use because the demand for energy is reduced. This in turn leads to a reduction in pollution which does two things: 1) It results in a cleaner environment and 2) It strengthens the economy by reducing the "cost" of

cleaning the environment by decreasing pollution levels thereby avoiding environmental mitigation spending.

Of course energy efficiency measures directly reduce the amount of money that local government must spend on energy. When local governments reduce energy costs then that money can be returned to taxpayers or spent on other programs and services where those taxpayer dollars are re circulated in the local economy instead of sent out of state as is the case with purchasing imported fossil fuels.

Finally, energy efficiency increases investment in local businesses which provide energy efficiency services. These businesses include engineers, planners, architects, other consultants, suppliers, and contractors. Investments in energy efficiency therefore support local job creation and expansion of local businesses. Taxpayer spending on energy efficiency projects is put in the pockets of local companies during project implementation. These same companies or others may also be involved in servicing these energy saving technologies over time.

Beyond these logical connections between energy efficiency, environmental benefits, and economic development there are other reasons for local governments to actively pursue energy efficiency policies and programs. These reasons have to do with economic development and quality of life. For example;

- Demonstrated commitment to energy efficiency and renewable energy investments may attract entrepreneurs who can develop innovative businesses in a particular community. Economic development strategies are increasingly focused on methods to attract such individuals to their communities.

- Energy efficiency has been shown to increase worker productivity thereby increasing business profitability. How? Because buildings that are more energy efficiency tend to be more comfortable, have better air circulation, better lighting, and create the conditions for higher productivity.

Good luck with your energy efficiency plan. As you move ahead and discover useful tools and resources please consider sharing them with us to include in future versions of this guidebook. Please email suggested revisions to andrew.dane@ces.uwex.edu.

APPENDICES

Energy Efficiency Options Matrix
Facility Maintenance Planning Form and Process
Energy Efficiency Checklist

ENERGY EFFICICIENCY OPTIONS MATRIX

This table provides *an example* of how to organize the dozens of energy efficiency ideas you are likely to generate. Once you have organized your ideas it becomes easier to choose which ones you want to plan around. You can come up with your own criteria to evaluate each of the energy-related options (far left column). The spreadsheet can help identify which options have the most support, as well as help identify how to sequence activities when it comes to action planning. Note: This is only a partial list of options.

Energy Efficiency Options	General description	Comments	Is this a priority to consider immediately?	Is this a priority to consider for next 12 months?	Is this a priority to consider beyond next 12 months?	Cost (est.)	Annual Savings	Return on Investment	Energy/Emissions Savings	Strengths/Weaknesses	Grants/Funding Options	County Examples & Resources
Buildings and Facilities												
Develop a green building policy												
Require LEED certification												
Require energy star appliances												
Vehicles/Transportation												
Phase in more energy efficient vehicles												

Facility Maintenance Planning Form and Process

Below is an example of a process for identifying and prioritizing facility upgrades. The next two pages introduce the tool and the third pages show a sample spreadsheet that you can develop for your site.

The following Excel spreadsheet is a tool for planning building maintenance, repair, renovation, upgrades and sustainability improvements over a long term. It helps estimate annual expenses and facilitates priority setting that fits with fiscal constraints. Expensive repair/replacements such as new roofs can be targeted to a specific fiscal year and funds can be set aside over a period of years to meet the need. The regular use of the tool can provide important data to support planned improvements rather than responding only to crisis's. The tool can be used in a number of ways. Here is one suggestion on how to use it.

1. At least once per year someone familiar with the facilities should conduct a complete walkthrough analysis of each building, both interior and exterior. It is helpful to have building users accompany the person doing the audit. Every room in the facility is inspected from floor to ceiling and all apparent needs are recorded. Additional notes are made regarding the need, urgency, and the codes on the form can be used to categorize needs.

2. The first time a building is audited after years of crisis management the list will likely be long and the costs will out strip any possible funding levels. A next step in using the form is to estimate the costs for each item listed. Suppliers, contractors and experienced maintenance people can assist in developing costs. For high cost items a bid may be needed to have an accurate cost figure.

3. Once all the items on the list have a cost associated with them the next step is to try to prioritize items, place them into tentative fiscal year periods and start to look at projected annual expenses. This is the part of the process that is a bit of an art. One must balance urgency, short and long term needs, avoided costs, political considerations, and a host of other considerations. The codes at the end of the form can help sort this data, and the user is encouraged to add other codes that are important to their organization and situation.

4. When this much of the process is complete you will have a lengthy spreadsheet with estimated budget needs for at least the next five years. Longer-term projections may be made for such items as new roofs, heating systems and other large ticket items. The tool is shared with management and those responsible for fiscal and budgetary matters. Obviously, these people may wish to adjust the priorities of the items and shift fiscal years for some items. As they do so they should be encouraged to consider the codes in their decisions.

5. Once an audit is completed and agreed upon it provides a blueprint for the maintenance activities in the current fiscal year. It is also a flexible tool that may require periodic adjustment as the realities of actual costs and unforeseen items arise. A contingency fund is a good idea, and should costs come in under estimates some items could be completed near the end of a fiscal year that were listed in the following year. Conversely, if costs come in high some items on the current fiscal year may need to be bumped to the next year.

6. The process should be reviewed and updated at least once each year, preferably around the same time of the year.

Code Explanations: Any item may fit several code categories.

1. Mandatory (safety code requirements) This type of item is often brought to your attention by fire inspections, food safety inspections or similar outside reviews. An energy audit or annual HVAC inspection may also reveal some of these items. Electrical wiring and excessive use of extension cords are common examples.

2. Energy/Water Conservation – short term payback. Short-term here can be defined by the organization, but often refers to efforts that will provide a simple payback of less than 24 months. Changing out incandescent or T-12 fluorescent lighting are typical examples.

3. Energy/Water Conservation – long term payback. This is generally defined as items with more than a 24 month simple payback. Replacing furnaces or boilers, windows or similar items often fall in this category.

4. Aesthetics/renewal/replacement. This category includes items that maintain an appropriate atmosphere in the facility. The type of facility and the public image required will help determine how often rooms are painted, or carpets replaced, or furniture upgraded.

5. Comfort/ work conditions. Items in this category impact worker and customer comfort and satisfaction. Heating and cooling systems and room lighting are frequent examples.

6. Master Plan. If the organization has a master plan for facilities, that plan may include renovations, changes of the functions of an area, building additions and other major changes.

7. Functional or Program Need. Physical changes needed to meet the programmatic needs that the space serves.

8. Sustainability Initiatives. Many organizations are starting to follow the Principles of The Natural Step, or the Leadership in Energy and Environmental Design (LEED) guide, or other guidelines for sustainability. Coding items on the list that have an impact toward these goals will help quantify sustainability efforts. Examples could include installing light sensors to save energy, or installing a recycling station.

C. Continuous yearly work. The code is for those regular maintenance needs of areas that often can be neglected in organizations without a plan. Examples include: carpet shampooing, tile sealing and finishing, and annual servicing of HVAC equipment.

D. Done. It is a boost to your efforts when you can mark items on the list as complete. It is a good idea to include the actual cost as reference for future year plans.

P. Partially Complete. For a variety of reasons some projects, particularly large ones may be only partially completed within a fiscal year. Again keep track of costs on the form for future ref

H. On hold until ___. This code may be used when bids come in way over estimates, or when priorities change. At the time of the next annual review these items should be re-evaluated, coded accordingly and placed in an appropriate fiscal year.

Draft Spreadsheet Form	**Hometown Municipality**				
	A five-Year Plan for renovation	**and repair of the**			
	City Hall				
	updated ___ 2009				
		Current			
Building/Area	**Item**	**Status**	**Code**	**Cost Est.**	**Bid**
	Examples:				
council chambers	*replace old lighting with T-8 fixtures*	*planning*	*2,4,5*	*$ 5,000*	
			Total FY09	**$ 5,000**	
mayor's office	*new energy star computer*	*ordered*	*3,4,8,*	*$ 1,500*	*$1,449*
			Total FY10	**$ 1,500**	
boiler room	*replace boiler with 90% efficient units*	*d*	*3,4,8*	*$ 34,000*	*$35,900*
			Total FY 11	**$ 34,000**	
			Total FY 12		
			Total FY 13		

Codes

1. Mandatory (Safety code Requirements)
2. Energy/Water Conservation - short term payback
3. Energy/water Conservation - long term payback
4. Aesthetics/renewal/replacement
5. Comfort/work conditions
6. Master Plan
7. Functional or program need
8. Sustainability initiative

C. Continuous yearly work

D. Done

P. Partially Complete

H. On hold until ?

ENERGY EFFICIENCY CHECKLIST

Energy Efficiency - Policies

POLICIES Has your municipality adopted policy to address the following? Check "yes" or "no" or "not applicable" for each of the following:			
1. Energy Efficiency Policies	Yes	No	Not Applicable
a. Promote waste reduction	☐	☐	☐
b. Promote energy efficiency in municipality owned and operated facilities	☐	☐	☐
c. Promote green building certification for new county facilities (e.g. LEED or equivalent)	☐	☐	☐
d. Promote employee energy conservation	☐	☐	☐
e. Promote energy conservation through energy-efficient outdoor lighting design in public development and replacement projects	☐	☐	☐
f. Promote energy-conserving landscaping on publicly owned properties	☐	☐	☐
g. Promote environmental performance contracting	☐	☐	☐
h. Promote clean, distributed energy projects (power generated on site rather than transmitted) Ex: wood fired boilers etc.	☐	☐	☐

Energy Efficiency – Programs and Operations

Programs & Operations Has your municipality adopted programs or operations to address the following? Check "yes" or "no" or "not applicable" for each of the following:			
1. Energy Efficiency Programs and Operations	Yes	No	Not Applicable
a. Waste reduction programs. Examples include: recycling; composting; reuse; source reduction (source reduction = use of durable, reusable and remanufactured products; products with no, or reduced, toxic constituents; and products marketed with no, or reduced packaging)	☐	☐	☐
b. Energy efficiency in municipally owned and operated facilities • All new buildings are designed to include energy efficient and low emission equipment. (Energy Star ® compliant appliances; heating and cooling equipment and systems (zoned by floor and section of building); direct digital control for night-time temperature setbacks, variable-frequency drives for fan/motors, use fresh air cooling when outside temperatures allow); lighting fixtures; electronics; commercial food services e.g., vending machines; energy efficient hand dryers; energy efficient copiers. • Renovations of existing buildings are designed to reduce energy consumption. (Energy Star ® compliant appliances; heating and cooling equipment; lighting fixtures; electronics; commercial food services; e.g., vending machines; energy	☐	☐	☐

efficient hand dryers; energy efficient copiers. • All new buildings are designed to be at least 30% more efficient than the ADHRAE standards. Examples to achieve this include: life cycle cost analysis; energy use tracking; energy review of new designs; incorporating day lighting designs in new buildings.			

c. New buildings are designed using green building certification guidelines (e.g., LEED or equivalent) Examples: High R-value etc.	☐	☐	☐
d. Energy conservation through energy efficient lighting designs • Indoor lighting – examples include: incorporating day lighting designs in new buildings; using compact fluorescent light bulbs in place of incandescent bulbs; LED EXIT lights; energy efficient fluorescent tubes and balasts; occupancy sensors in private offices, conference rooms, storage rooms, bathrooms; zoned lighting controls (light only occupied areas in evenings and weekends; retrofit and/or upgrade older lighting systems with newer energy efficient systems; remove some bulbs in lights near windows or non-work areas. • Outdoor lighting – examples include: energy efficient street lights; energy efficient traffic lights (LED); energy efficient holiday lights (LED); put outdoor lights on timers, motions sensors	☐ ☐	☐ ☐	☐ ☐
e. Use of energy efficient landscaping practices	☐	☐	☐

on publicly owned properties			
f. Employee Habits include: AC up four degrees from 72 to 76; space heaters Energy Star only; task lights CFL bulbs only; turn off all computers, monitors (avg. savings of $30/unit/year) and other electrical items prior to leaving building; turn off monitors if not using for 15 minutes; turn off lights when not in use and at the end of the day; personal appliances limited to common areas; recycle; save and use good on one side paper for printing or duplex print.	☐	☐	☐

Energy Efficiency Education - Policies

POLICIES Has your municipality adopted policy to address the following? Check "yes" or "no" or "not applicable" for each of the following:			
2. Education and Outreach Policies	**Yes**	**No**	**Not Applicable**
a. Promote the education of staff on the Local Government's efforts toward energy efficiency to save taxpayer dollars and reduce greenhouse gas emissions. Examples: post utility bills in employee areas of each building to show energy reduction over time; place stickers near light switches as reminders.	☐	☐	☐
b. Promote the education and outreach to the community and businesses about the Local Government efforts toward energy efficiency to save costs and reduce greenhouse gas emissions, as well as best practices that can be implemented in the home or business.	☐	☐	☐
c. Promote education and outreach to schools about the Local Government efforts to save costs and reduce greenhouse gas emissions, as well as best practices that can be	☐	☐	☐

implemented in the school.			
d. Facilitate energy efficiency lecture series for schools and local government; bring in experts to teach students about energy efficiency; support energy workforce development in Tech Colleges, promote Energy Star.	☐	☐	☐

Energy Efficiency Education – Programs and Operations

PROGRAMS & OPERATIONS Has your municipality adopted programs or operations to address the following? Check "yes" or "no" or "not applicable" for each of the following:			
2. Education and Outreach Programs and Operations	Yes	No	Not Applicable
a. Employee education campaigns about internal efforts and programs as well as best practices to be implemented in the workplace to save costs and reduce greenhouse gas emissions. Examples include: energy efficiency education; fleets/vehicles/equipment education and water conservation education	☐	☐	☐
b. Education of residents and businesses about Local Government efforts to be implemented to save costs and reduce greenhouse gas emissions. Examples include: energy efficiency education; fleets/vehicles/equipment education; land use education; transportation education; water conservation education	☐	☐	☐
c. Education and outreach to schools about Local Government efforts to be implemented to save costs and reduce greenhouse gas emissions. Examples include: energy efficiency education; fleets/vehicles/equipment education; land use education; transportation education;	☐	☐	☐

water conservation education			

Energy Efficiency – Fleet Vehicles

POLICIES Has your municipality adopted policy to address the following? Check "yes" or "no" or "not applicable" for each of the following:			
3. Fleets/Vehicles/Equipment Policies	Yes	No	Not Applicable
a. Promote fuel economy goals for fleet operations.	☐	☐	☐
b. Promote driver behavior and/or incorporate technologies to reduce vehicle engine idling and other best practices.	☐	☐	☐
c. Promote use of alternative fueled, electric, hybrid, or plug-in hybrid drive vehicles with lower greenhouse gas emissions within fleet.	☐	☐	☐
d. Promote retrofitting and re-powering of fleets and equipment to maximize fuel efficiency and greenhouse gas emissions reductions.	☐	☐	☐

Energy Efficiency – Fleet Vehicles

PROGRAMS & OPERATIONS Has your municipality adopted policy to address the following? Check "yes" or "no" or "not applicable" for each of the following:			
3. Fleets/Vehicles/Equipment Programs and Operations	Yes	No	Not Applicable
a. Establish a fleet fuel use tracking program to find areas needing improvement. Examples	☐	☐	☐

include: report fuel use by class against an established standard; report use by vehicle against a class standard.			
b. Engine idling reduction. Examples include: Institution of enforceable engine idling regulations; incorporation of systems to power accessories with vehicle engine off (e.g., APU, battery powered systems, share power systems; improve efficiency of weigh station operations to reduce idling; driver education and outreach program; automatic idle shut-offs; orientation for new drivers and periodic refresher information on idle reduction techniques. c. Best Practices Examples: accelerate and decelerate evenly; observe posted speed limits; keep tires properly inflated; use cruise control whenever possible and terrain is appropriate; use AC selectively; remove excess weight; plan and consolidate trips; carpool; reduce the need to travel with technologies when possible; select the right size vehicle for the travel.	☐	☐	☐
d. Purchase low greenhouse gas emitting vehicles to replace existing or "retiring" conventional, fossil-fuel vehicle.	☐	☐	☐
e. Engine retrofits or re-powers of fleets to maximize use of advanced engine technologies and low greenhouse gas emitting fuels.	☐	☐	☐

Energy Efficiency – Water Conservation

POLICIES Has your municipality adopted policy to address the following? Check "yes" or "no" or "not applicable" for each of the following:			
4. Water Conservation Policies	Yes	No	Not Applicable

a. Promote the education of staff about Local Government efforts to conserve water through "wise water use" policies.	☐	☐	☐
b. Promote development of a local and/or "regional water conservation policy and plan, where applicable.	☐	☐	☐

PROGRAMS & OPERATIONS Has your municipality adopted policy to address the following? Check "yes" or "no" or "not applicable" for each of the following:			
4. Water Conservation Programs and Operations	**Yes**	**No**	**Not Applicable**
Water Conservation Education Program a. Education and communication campaign about Local Government efforts and programs and best practices to be implemented to "use water wisely" by providing specific water conservation tips. Some Examples: ▪ GENERAL WATER CONSERVATION TIPS o Repair leaks promptly o Install water-saving devices o Plant water-conserving plants o Minimize lawn watering ▪ INDOOR CONSERVATION TIPS o Conserve water in the bathroom o Conserve water in the kitchen ▪ OUTDOOR CONSERVATION TIPS o Let grass grow taller as taller grass is more drought resistant o Plant in the fall or spring when watering requirements are less o Use pool covers to reduce evaporation o Use mulch around plants to conserve water o Repair leaky hose connections	☐	☐	☐