



## **Town of Black Mountain**

# **Strategic Energy Management Plan September 14, 2009**

**For more information and copies of this plan, please contact:**

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This Strategic Energy Management Plan was made possible through the efforts of many people, particularly:

Board of Aldermen:

Carl Bartlett, Mayor  
Mike Sobol, Vice Mayor  
Ruth Brandon  
Joan Brown  
Chuck McKeown  
Rosalie Phillips

Town Leadership Team:

Marcy O'Neal, Town Manager  
Steve Jones, Fire Chief  
Jim Orr, Recreation and Parks Director  
Kevin Pressley, Police Chief  
Rick Shreve, Finance Director  
Elizabeth Teague, Planning Director  
Bob Watts, Public Works Director

Land-of-Sky Regional Council, Waste Reduction Partners Program:

Bake Garman  
Russ Jordon  
Chris Dobbins

NC Division of Pollution Prevention and Environmental Assistance:

Terry Albrecht

WNC Green Building Council:

Matt Siegal

Progress Energy:

Selena Seabrook

## **EXECUTIVE SUMMARY**

The Town of Black Mountain has a long-standing record of efforts to protect the environment and improve energy efficiency.

The Town has adopted a policy to pursue improved energy efficiency by taking action as directed through the Strategic Energy Management Plan (SEMP).

The Town has pursued this strategic energy plan at the guidance of the North Carolina State Energy Office, and with the assistance of the Land of Sky Regional Council's Waste Reduction Partners. The Town's goals with this plan are to:

1. Continue improvements in efficiency to be good stewards of our environment and energy resources,
2. Reduce the energy consumption of town facilities and fleet operation,
3. Reduce costs for our citizens and tax-payers,
4. Position our agency to aggressively pursue partnerships and grant funding under the American Recovery and Reinvestment Act, and through the State Energy Office and other sources where appropriate.

Town Policies and Goals are in alignment with State and Federal legislation, and the Town has identified key elements and focus areas to pursue under the SEMP to implement these goals. These include data collection, plan development, education and project management of activities to reduce energy use.

## **INTRODUCTION**

The Town of Black Mountain has a long-standing record of being proactive concerning environmental protection and improving our community's energy efficiency. Town actions have included:

- Establishing a Tree Commission to protect trees within the public realm.
- Adopting a \$500 rebate on building permit fees for structures achieving Healthy Built Homes or LEED certification.
- Partnering with the WNC Green Building Council on a State Energy Office grant to promote green buildings. This initiative included a workshop series for contractors and developers and the creation of a "green building library" within our building inspections department.
- Adopting Phase II stormwater regulations that encourage Low Impact Development.
- Installing rain gardens and stormwater demonstration sites in municipal facilities and partnering with local colleges and nonprofits to install education signage on water quality protection.
- Adopting the 2008 Comprehensive Pedestrian Master Plan with CIP for sidewalks and greenways.
- Permitting a local biodiesel pump for Blue Ridge Biofuels and conducting a fleet analysis to look at opportunities for improved fuel efficiencies and use of alternative fuels. The Town has also purchased an electric powered vehicle for the fleet.
- Participating in the EPA's "Change-a Light-bulb" initiative.
- Endorsing the US Mayors' Resolution on Climate Protection Agreement.
- Conducting energy audits on various Town buildings in 2005 and 2007. Then updating these in June-August 2009. (Several initiatives under these audits have been pursued.)
- Installing solar power on the Town Emergency Services radio tower.
- Renovating an old building for the new Town Hall; using green technologies, including geothermal, insulation, motion-activated lighting, and stormwater capture.
- Revising land use regulations to allow conservation subdivision to promote sensitive design, preserve trees within parking lots to minimize urban heat effects, protect slopes and ridge tops and direct more dense development along major transportation corridors to promote transit and non-motorized transportation options.
- Conducting a Town-wide fleet assessment to evaluate fuel efficiency and identify ways to reduce use of fossil fuels.

Through this Strategic Energy Management Plan, the Town seeks to continue efforts to improve in energy efficiency and to build on our on-going commitment to be conscientious stewards of our local and national resources.

## **PURPOSE**

In a concerted effort, Congress, the North Carolina General Assembly, and local agencies have set out energy policy statements and objectives to actively improve energy practices in order to lower costs and reduce the emissions that contribute to environmental pollution.

Through this Strategic Energy Management Plan, the Town seeks to continue improvement in energy efficiency and to build on our on-going commitment to be conscientious stewards of our local and national resources.

This plan will serve as a guide to sound energy decision-making; improving the efficient use of energy, water and transportation systems, while maintaining high levels of service in all areas.

## **POLICY STATEMENT**

The Town of Black Mountain will continually improve our efficiency in the use of energy, water, and transportation systems for the betterment of our agency, our community and the natural environment. The Town will pursue initiatives and funding as directed in this Strategic Energy Management Plan (SEMP).

## **GOALS**

The Town has pursued this strategic energy plan at the guidance of the North Carolina State Energy Office and with the assistance of the Land of Sky Regional Council's Waste Reduction Partners. The Town's goals with this plan are to:

1. Continue improvements in efficiency to be good stewards of our environment and energy resources,
2. Reduce the energy consumption of town facilities and fleet operation,
3. Reduce costs for our citizens and tax-payers,
4. Position our agency to aggressively pursue partnerships and grant funding under the American Recovery and Reinvestment Act, and through the State Energy Office and other sources where appropriate.

## **KEY ELEMENTS OF THE PLAN**

The SEMP is not intended as merely a mandate to perform specific energy-related tasks, but instead presents a framework for making specific energy decisions. Key elements consist of:

- Data Collection — Accurate measurement and analysis of electricity, fossil based fuels, and water usage to benchmark and develop Key Performance Indicators (KPI), including a review of trends and costs.
- Plan Development — The Town Leadership Team, which consists of the Town's Department Heads and Town Manager, will review policies, programs, and projects as well as ways to encourage employee participation and innovation.
- Communication and Training -- Expanding employee and citizen awareness and education on the benefits of energy resource management and conservation via email, the media and the Town newsletter.
- Project Management -- Execute approved, prioritized projects of SEMP and implement process improvements, based on Cost Benefit Analysis (CBA) from Energy Assessments, Capital Improvement Plan (CIP) and Best Management Practices.

### **PLAN OF ACTION**

This Plan will present a balanced approach, communicating energy-efficient objectives and aligning with the direction and legislative requirements set for energy planning at the Federal and State government levels. The SEMP is meant to be a guide for decisions in all areas and activities of the Town.

### **Existing Conditions**

The Town of Black Mountain owns and operates eleven major buildings and several smaller auxiliary buildings, totaling approximately 100,000 square feet. The major buildings vary significantly in age and type. In addition to these buildings, the Town also maintains recreational and water department facilities, including a golf course, new swimming pool/bathhouse complex and a recreational park with multiple ball fields. These facilities help support the services necessary for over 8,000 permanent residents and many more seasonal residents. All buildings include parking areas.

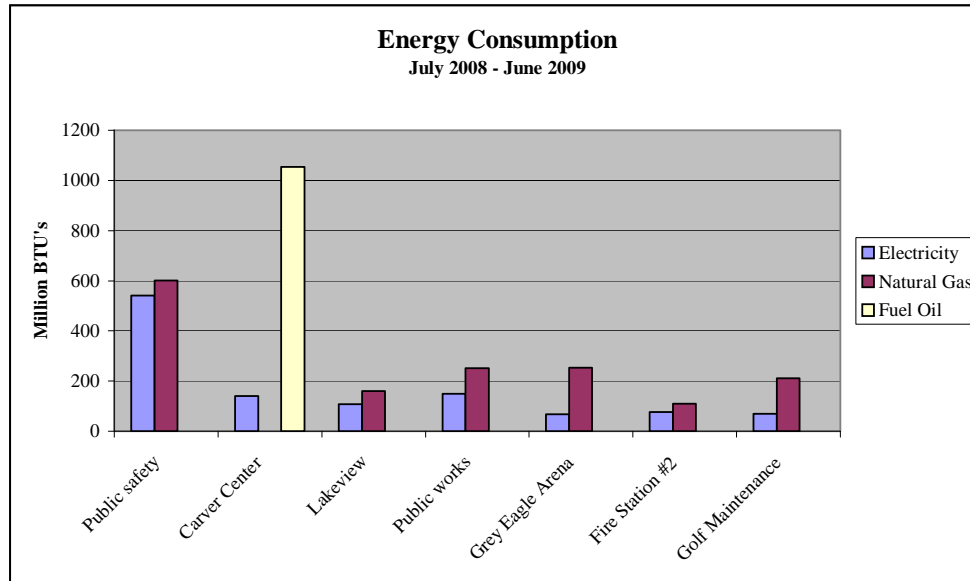
**Baseline Energy Consumption for Buildings (Table 1 and Charts 1A, 1B)**

A baseline was developed using July 2008 thru June 2009 cost and usage data (FY2009). The seven buildings listed in the table are the target buildings. Other buildings will be added in the future.

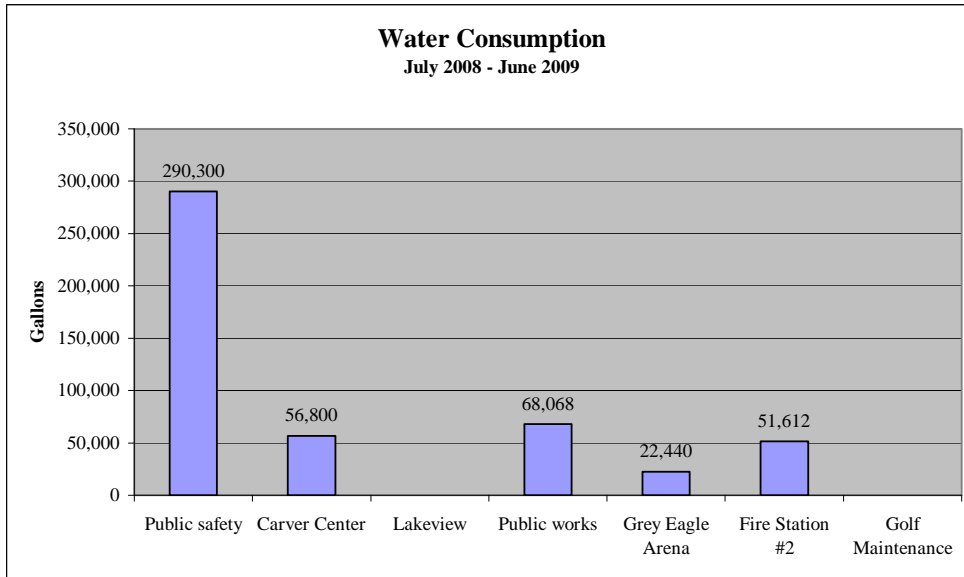
**Table 1**

Building	Million BTU's/yr.	Energy Cost \$/year	\$/mmbtu	KBTU/gsf	\$/gsf
Public Safety	1,141	\$19,559	\$17.14	49.6	\$0.85
Carver Center	1,196	\$21,077	\$17.62	78.7	\$1.39
Lakeview Center	268	\$5,601	\$20.91	67.0	\$1.40
Public Works	401	\$8,115	\$20.26	28.6	\$0.58
Grey Eagle Arena	321	\$5,923	\$18.46	38.2	\$0.71
Fire Station #2	184	\$3,739	\$20.27	46.1	\$0.93
Golf Maintenance	280	\$5,085	\$18.16	43.8	\$0.79
<b>TOTAL</b>	<b>3,791</b>	<b>\$69,099</b>	<b>\$18.23</b>	<b>50.5</b>	<b>\$0.92</b>

**Chart 1A**



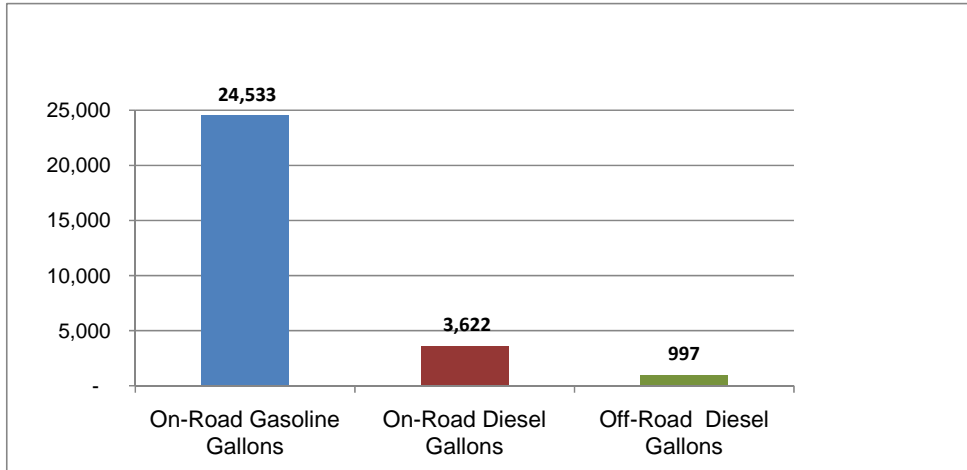
**Chart 1B**



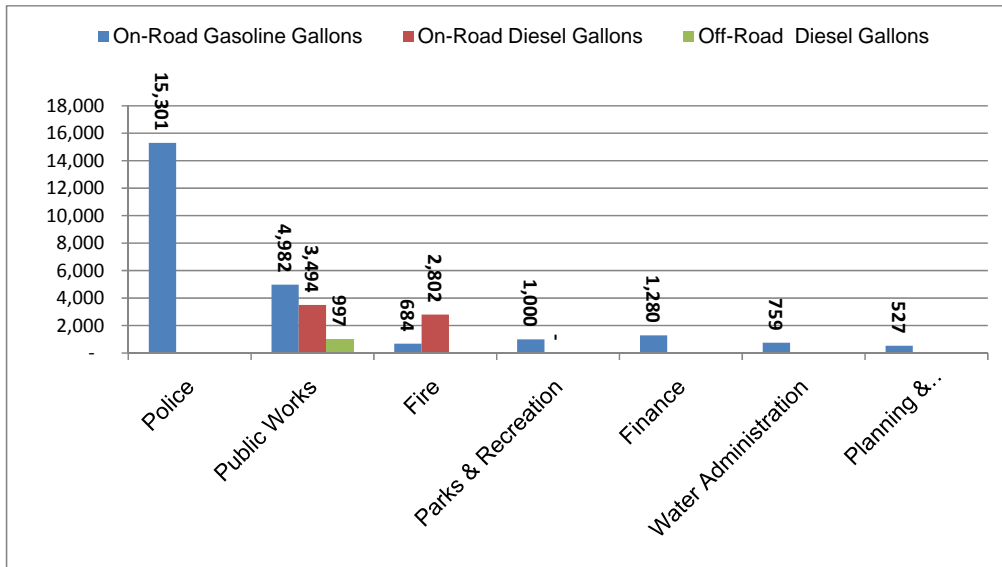
**Baseline Energy Consumption for Town Vehicles (Charts 2A and 2B)**

The Town’s fleet consists of 60 licensed on-road vehicles and 15 off-road equipments. A baseline for fuel consumption was developed using July 2008 through June 2009 usage data (FY 2009).

**Chart 2A – Fuel Usage in Gallons for FY 2009**



**Chart 2B – Fuel Usage in Gallons by Department for FY 2009**



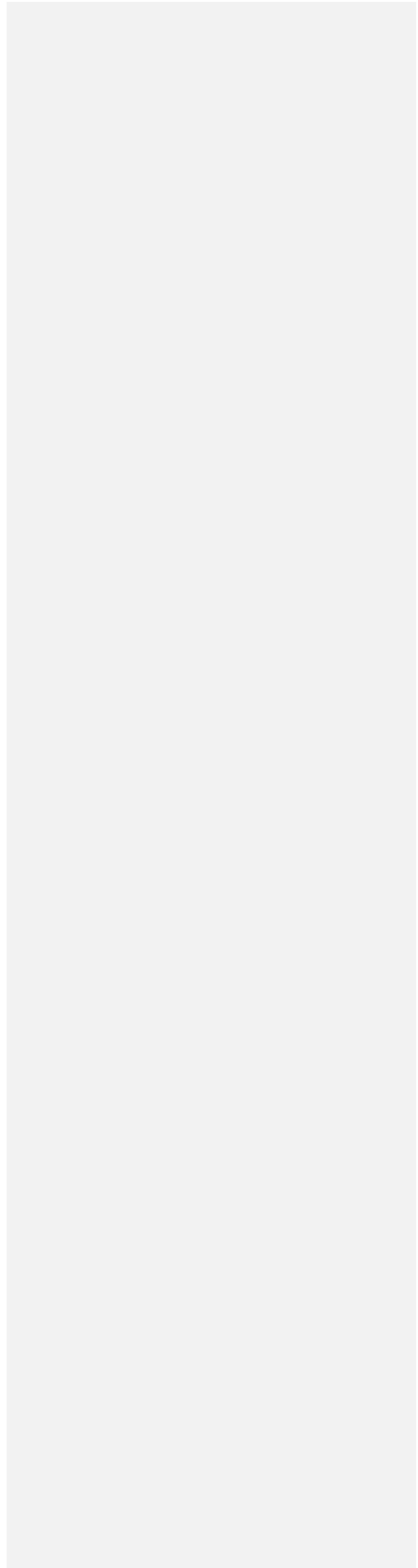
**Baseline Energy Consumption for Streetlights (Table 2)**

A inventory of all the street lighting in Town was conducted by Progress Energy. This inventory indicated that over 600 mercury vapor street lights are presently in use.



**Light Source Key**

SV	<b>Sodium Vapor</b>
M/H	<b>Metal Halide</b>
M/V	<b>Mercury Vapor</b>
Retrofit S/V	<b>S/V lamp in M/V Fixture</b>
Post	<b>Post Top Fixture</b>
MPS A Post	<b>Masterpiece Fixture</b>
MPS B Post	<b>Masterpiece Fixture</b>
E/C-U	<b>Enclosed Cutoff Fixture</b>
Enc	<b>Enclosed Fixture</b>
S/E	<b>Semi-Enclosed Fixture</b>
Tear drop	<b>Teardrop Fixtures on College St</b>



**Table 2 - Town of Black Mountain Streetlights Contracted with Progress Energy**

Account #	Total # of Lights on account	Total # of Mercury Vapor Lights	Fixture Lumens	Light Source	Quantity	Fixture Type	Watts Per Fixture Per Hour	Total Watts
097-602-3440	2	2	7,000	M/V	2	S/E	175	350
293-072-3446	15		5,800	S/V	5	S/E	70	350
			9,500	S/V	1	S/E	100	100
			22,000	S/V	1	Enc	200	200
			9,500	S/V	5	Enc	100	500
		3	7,000	M/V	3	S/E	175	525
462-692-3447	11		12,000	Retrofit S/V	4	Post	150	600
			9,500	S/V	1	Post	100	100
		6	7,000	M/V	6	S/E	175	1050
117-182-3444	811		12,000	Retrofit S/V	2	Enc	150	300
			12,000	Retrofit S/V	9	S/E	150	1350
			5,800	S/V	1	S/E	70	70
			28,500	S/V	3	Enc	250	750
			9,500	S/V	14	S/E	100	1400
			28,500	S/V	2	E/C-U	250	500
			9,500	S/V	2	Enc	100	200
			22,000	S/V	3	E/C-U	200	600
			9,500	S/V	6	Post	100	600
			9,500	S/V	5	E/C-U	100	500
			16,000	S/V	51	E/C-U	150	7650
			22,000	S/V	110	Enc	200	22000
			9,500	S/V	7	Post	100	700
		1	7,000	M/V	1	Enc	175	175
		595	7,000	M/V	595	S/E	175	104125
<b>Total # of S/L's</b>	<b>839</b>	<b>607</b>						
							<b>TOTAL WATTS</b>	<b>144695</b>

### **Implementation - Key Areas of Improvement and Town Action**

The Town has identified the following as key areas for improvement under the SEMP. These were chosen for their cost/benefit, feasibility, and eligibility for funding under the State Energy Office ARRA program; or their ability to be implemented within the Town's current budget, or through Capital Improvement Programming.

1. Lighting:
  - a. Convert to zone lighting in Public Works Building (completed)
  - b. Install motion activated lights in New Town Hall (completed)
  - c. Convert T12 fixtures to T8 energy efficient ballasts and lamps in the following:
    - i. Public Safety Building (on-going)
    - ii. Carver Community Center
    - iii. Lakeview Center
    - iv. Fire Station #2
    - v. Golf Maintenance Building
    - vi. Public Works Building
    - vii. Grey Eagle Arena
2. Reduce voltage start on wellhouse pumps (completed)
3. Where appropriate use 4 ten hour shifts instead of 5 eight hour shifts to reduce commuting (completed by Public Works).
4. Retrofit emergency exit light signs with LED signs on Town facilities that have not done so yet.
5. Replace Recreation Park Lighting through Performance Contract (Musco Lighting).
6. Implement Energy Saving Recommendations for Public Safety Building (WRP Report).
7. Implement Energy Saving Recommendations for Carver Community Center (WRP Report).
8. Follow a fleet improvement program to reduce use of fossil fuels (WRP Report).
9. Replace out-dated street-lighting with LED fixtures through Progress Energy Contract.
10. Determine feasibility of public/private partnership for use of solar hot-water and PV panel placement on Town buildings.

Focus A: Supply Side								
Strategy 1.	Purchase utilities at most economical rates							
Strategy 2.	Maximize utilization of incentive programs							
Past Year Activities (2007-2009)	Measurement		Savings		Cost	Jobs	Accountability	Funding Source
	Expected	Actual	Expected	Actual				

2009-2011 Activities	Measurement		Savings		Cost	Jobs	Assigned to	Funding Source
	Expected	Actual	Expected	Actual				
Review utility Billing Rates with each supplier, and quarterly invoice audit.							FIN Dept	
Review utility incentive programs for alternative funding sources for energy efficiency improvements and renewable energy opportunities.							FIN Dept	

2011-2013 Activities	Measurement		Savings		Cost	Jobs	Assigned to	Funding Source
	Expected	Actual	Expected	Actual				

Focus B: Demand Side								
Strategy 1.	Conduct energy audits to identify opportunities for conservation and establish trend line for spending							
Strategy 2.	Complete CBA for opportunities and appropriately prioritize projects based on probable benefit and available resources							
Strategy 3.	Develop Key Performance Indicators (KPIs) that clearly measure real energy and water conservation progress							
Strategy 4.	Replace Town lighting with LED type fixtures (incandescent EXIT light fixtures with LED type fixtures; ball field lights, Street-lights)							
Past Year Activities (2007-2009)	Measurement Expected Actual		Savings Expected Actual		Cost	Jobs	Accountability	Funding Source
Geo-thermal, motion-activated lighting, insulation in town Hall								
2009-2011 Activities	Measurement Expected Actual		Savings Expected Actual		Cost	Jobs	Assigned to	Funding Source
Implement computer shut off program								
Upgrade Recreation Park Lights to LED							Recreation and Parks	
Implement WRP Recommendations for Carver Community Center							Recreation and Parks	
Implement WRP Recommendations for Public Safety Building							Police and Fire	
2011-2013 Activities	Measurement Expected Actual		Savings Expected Actual		Cost	Jobs	Assigned to	Funding Source
Adopt LEED std for building new government buildings $\geq 5,000$ sq ft.								
Increase use of alternative funding mechanisms in lieu of direct appropriations for energy efficiency improvements consistent with good business practices.								

Focus C: Communication and Training								
Strategy 1.	Work with Town management and the Board of Alderman to adopt and publicize an Energy Management Policy							
Strategy 2.	Train employees to perform planned service and upgrades to maintain and improve the performance of facility equipment and vehicles to reduce energy waste.							
Strategy 3.	Educate employees on benefits of energy management and conservation at work and home via, email, the Town newsletter and handouts.							
Strategy 4.	Establish purchasing policies to ensure procurement of efficient equipment and energy star appliances.							
Past Year Activities (2007-2009)	Measurement		Savings		Cost	Jobs	Accountability	Funding Source
	Expected	Actual	Expected	Actual				

2009-2011 Activities	Measurement		Savings		Cost	Jobs	Assigned to	Funding Source
	Expected	Actual	Expected	Actual				
Develop an Town-wide Energy Management and Emission Reduction Policy	Resolution: Town Mgr implement				Salary			
Educate BOA, Town Mgr and Facilities on NC Energy legislation, State Energy resources & planning techniques								
Develop an Strategic Energy Plan	Adopted Plan		NA	NA	Salary		Planning Director	
Conduct Energy Management training sessions for Management and employees	Sign off sheet		NA	NA				
Develop energy & water conservation educational opportunities: 1) flyers and newsletter, 2) dept. mtgs., 3) electronic transmissions	Participation by all employees in energy conservation efforts						Permits Clerk	

2011-2013 Activities	Measurement		Savings		Cost	Jobs	Assigned to	Funding Source
	Expected	Actual	Expected	Actual				

**Focus D: Implement Fleet Management Program**

Strategy 1.	Reduce pollutant and/or greenhouse gas emission on fleet with diesel retrofits
Strategy 2.	Increase number of alternative fuel vehicles within fleet.
Strategy 3.	Adopt fleet maintenance and replacement schedule that maximizes vehicle efficiency

Past Year Activities (2007-2009)	Measurement		Savings		Cost	Jobs	Accountability	Funding Source
	Expected	Actual	Expected	Actual				
Zero emissions vehicle (ZEV) electric vehicle used for community police patrol.	Reduced pollutant, greenhouse gas emissions and petroleum fuel consumption.							
Fleet wide use of ultra low sulfur diesel (ULSD).	Reduced pollutant emissions.							
Biodiesel 10% blend with ULSD (B10) pilot in Public Works.	Reduced pollutant, greenhouse gas emissions and petroleum fuel consumption							
WRP Fleet Assessment Report	Improved fleet efficiencies.							

2009-2011 Activities	Measurement		Savings		Cost	Jobs	Assigned to	Funding Source
	Expected	Actual	Expected	Actual				
Seek grant opportunities to fund increased use of alternative fuels vehicles (AFV's), diesel retrofits and advanced fuel technologies.	Increased use of AFV's							
Implement the increased use of biofuels.	Reduced pollutant, greenhouse gas emissions and petroleum fuel consumption							
Standardize fleet preventative maintenance practices and documentation.	Improved vehicle safety, utilization and reporting.							
Utilize green fleet replacement criteria for vehicle procurement.	In creased AFV's							

**APPENDICES:**

**[Waste Reduction Partners Town-wide Energy Assessment, March 5, 2007](#)**

**[Waste Reduction Partners Report on the Carver Center, June 30, 2009](#)**

**[Waste Reduction Partners Report on the Public Safety Building, June 22, 2009](#)**

**[Waste Reduction Partners Report on Town Fleet Assessment, August 27, 2009](#)**

**Musco Lighting Replacement Summary for Recreation Park,**

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