



CITY OF WAUWATOSA
MEMORIAL CIVIC CENTER
7725 WEST NORTH AVENUE
WAUWATOSA, WI 53213
Telephone: (414) 479-8917
Fax: (414) 479-8989

Wauwatosa Energy and Recycling Advisory Committee Annual Report to the City for Calendar Year 2017

March 2018

2018 Committee Members

Chuck Rohrer (Chair), Mike Arney (Vice Chair), Steve Ostrenga (Secretary), Timm Heck, Andy Korb, Lynn Morgan, Steven Hagman, Alderperson Nancy Welch (Council Liaison – voting member), Chuck Pomeranke (City Liaison – non-voting), Marion Sodnik (City Liaison – non-voting)

Energy Highlights

Our goal is to reduce usage of energy and CO₂ emissions from a 2010 benchmark year by an average of 20% by 2020. Here is our overall progress to date:

- Electricity – down 11%
- Natural gas – down 24%
- Gasoline – down 8%
- Diesel – Up 1%
- CO₂ – Down 12%

Due to new equipment, remodeled spaces, and improved control strategies, the Municipal Complex is experiencing the following improvement since 2010:

- Electricity - Down 23%
- Natural Gas - Down 43%

The Police Station is experiencing the following improvements since 2010:

- Electricity - Down 23%
- Natural Gas - Down 45%

This represents an annual savings of \$104,300 on utility bills on these two buildings. Much more can be done with these buildings and with other buildings in the City's portfolio.

Accomplishments 2017

- City installed Police Station lighting upgrades.
- City improved control of buildings.
- City joined Green Tier Legacy Communities. Committee scored our sustainability.
- Tracked energy use for City buildings and vehicles

- Advised City about recycling for events
- Exhibited at the 7th Tosa Green Summit, with a recycling game for residents.
- Began a roadmap to meeting the 20% energy reduction goal by 2020.

Recycling

The City's solid waste diversion rate for 2017 is almost unchanged from previous years at 33%. This means 33% of household refuse plus street sweepings is recycled. The Committee recommends an awareness campaign to better inform residents about how each type of item should be disposed.

Energy

The lighting that we recommended has been installed at the Police Station. The City has made huge improvements in energy efficiency in the Civic Center and Police Department. A planned remodeling of the Department of Public Works (DPW) Building should lead to improved energy efficiency there as well. We continue to gather and report on energy-use and cost data to assist with City decision-making.

Plans for 2018

In 2018 we will continue to work with our City liaisons to assist with facility management and energy use as well as solid waste/recycling/composting processes.

1. Assist with determining feasibility of adding solar panels to government buildings
2. Assist with a plan to convert all street lights to high-efficiency LED
3. Identify in better detail what is recyclable, and communicate that to City residents in order to improve the diversion rate.
4. Complete plan for 20% energy reduction by 2020 (already done)
5. Participate in Green Tier Legacy Communities (<http://greentiercommunities.org/>) and improve sustainability score.

Energy Use

The Committee has prepared an annual energy use spreadsheet of City facilities and vehicles. We are using the annual energy usage information to track our progress towards the goal of an average 20% reduction from 2010 levels in all areas by 2020.

The highlights of the spreadsheet are

1. The weather in 2017 was milder than normal, requiring less heating and less cooling. The weather in 2017 was milder than the weather in 2010, helping to bring us closer to our energy goals.
2. Energy costs for 2017, including electricity, natural gas, diesel, and gasoline, totaled \$1.36 million, down from \$1.5 million in 2010. Cost has decreased due to conservation and a decline in the price of most types of energy.
3. We are behind target with electricity use reductions. Overall they are down 11% since 2010. While a downward trend is noted, accelerated progress is needed to meet the 20% goal by 2020.

4. Natural gas usage is down 24% from 2010. This represents real progress, no matter the weather. Further improvements should be implemented to be certain our goal can be met even during a cold year.
5. Gasoline usage is showing improvement with a 8% decline since 2010. We recommend that fuel efficiency be taken into consideration on any vehicle purchase to help meet our goal.
6. Diesel usage is up 1% from 2010. Diesel usage spikes during snow events, and it is possible that we use more diesel fuel for garbage collection with the new automated trucks. Increased roadwork and tree trimming have also contributed to the increased consumption. We encourage the City to look into diesel usage and create a strategy for reduction.
7. CO₂ emissions are down about 12% from 2010. This is good progress but is behind the level needed to meet the 20% goal.

The summary table from the report follows:

	HDD	CDD	KWH	Therms	Gasoline	Diesel	Dollars	CO2 Tons
2010	6,183	944	9,538,796	258,700	96,266	91,890	\$1,514,995	10,725
2011	6,633	793	9,136,848	253,225	94,670	93,689	\$1,650,433	10,392
2012	4,746	1,041	8,993,549	207,404	96,288	93,958	\$1,651,593	10,034
2013	7,233	688	8,679,293	268,624	91,341	103,216	\$1,724,667	10,207
2014	7,616	464	8,878,545	300,852	88,088	111,957	\$1,750,699	10,612
2015	6,468	622	8,850,347	237,108	85,097	97,590	\$1,452,050	10,029
2016	6,068	991	8,807,278	210,261	87,949	97,361	\$1,374,577	9,865
2017	5,906	769	8,471,286	196,238	88,551	92,683	\$1,364,956	9,482

In the table, HDD refers to heating degree days, a measure of how much heating was required. Similarly, CDD refers to cooling degree days, a measure of how much cooling was necessary. KWH is the kilowatt-hours of electricity. The therms column refers to total natural gas usage. Gasoline and diesel are shown in gallons of fuel. The dollars column refers to the total energy expenditure for all types of energy in the table. CO₂ Tons column refers to the estimated emission of greenhouse gasses, in tons of CO₂ equivalent. The sources for the CO₂ calculation are <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator> for all but diesel fuel. For diesel fuel emissions, a factor of 22.2 lb CO₂ / gallon from CarbonFund.org was applied.

The spreadsheet is available in Microsoft Excel format by request of the Committee.

Energy Goal

The Committee set a goal of a 20% across-the-board energy use reduction from 2010 levels by 2020. We have noticed that we've made better progress with some types of energy than with others. Therefore, we decided to convert all forms of energy to MMBTU and set a new goal of a 20% reduction in total MMBTU. The new goal allows for a larger reduction in some types of energy and smaller reductions in other types. The following table, taken from our Energy and CO₂ Summary spreadsheet, represents a new set of goals for 2020:

	2010 MMBtu	2017 Consumption	2017 MMBtu	2017 Percent Achieved	Percent Goal	2020 MMBtu Goal	2020 Goal in Typical Units	Savings Needed to meet Goal
Electric	32,546	8,471,286	28,904	-11	-30	22,782	6,677,081	1,794,205
Natural Gas	25,870	196,238	19,624	-24	-28	18,626	186,264	9,974
Unleaded	11,598	88,551	10,668	-8	-10	10,438	86,641	1,910
Diesel	12,630	92,683	12,739	1	0	12,630	91,887	796
Total	82,644		71,935	-13		64,477		

The “Percent Goal” column shows a new goal for each type of energy that will allow for a 20% reduction in total energy consumption. The goal numbers can be adjusted as long as the 2020 MBTU goal stays at or below 66,000. The Committee is providing a roadmap for achieving the goal in the next section of the report.

Roadmap to 20%

The Energy Subcommittee has determined a set of actions which will enable the City to achieve the 20% energy reduction goal. They are summarized in the table on page 6. Note that the numbers in the table are estimates. The Committee has chosen conservative estimates of savings and payback. For example, Los Angeles achieved a seven year payback on their installation of LED streetlights, while our estimate is for a 15 year payback. We recommend the City obtain bids, add in available incentives, calculate a more accurate estimate of savings, and then commence with the projects. We can best meet our goals if the projects are completed before the end of 2019.

The following is a summary of each type of energy and actions the Committee recommends to the City.

Electric

The goal of saving an additional 1,794,205 KWH can be met by converting the remainder of the streetlights to LED (approximately 4600 fixtures). Other improvements will be found in efforts already underway, and a lighting upgrade to the library. We also recommend adding solar photovoltaic panels to the Public Works Building and Civic Center for an additional savings of 1,156,000 KWH

Natural Gas

The City can save an additional 9,974 therms of natural gas to meet the goal through continued improvements to building controls, including planned remodeling of the Public Works Building. There could be additional opportunities for savings by improving the boiler controls at the fire stations and insulating the Muellner Building at Hart Park.

Unleaded Gasoline

The Committee recommends that the City continue choosing highly efficient vehicles when replacements are made. This should continue the trend of reduced use of unleaded fuel, yielding savings of 2000 gallons.

Diesel

The City has not seen any savings in Diesel fuel since we began tracking usage in 2010. This is due mainly to the increased level of roadwork and other projects the City is undertaking in comparison to previous years. The new garbage trucks with robotic lift arms use more fuel but save labor costs. Snowfall events cause a lot of diesel consumption as well. The Committee established a modest goal of saving 796 gallons of diesel per year to return us to our 2010 consumption. The Committee advises that over 10,000 gallons of diesel per year can be saved by eliminating 26 garbage pickups. Labor, vehicle cost, wear, and maintenance costs will also be reduced. Further benefits will be reduced congestion on the roads and increased safety by eliminating trips by large trucks through the streets and alleys of the City. The City should undertake a study to weight these benefits against any negative consequences of reduced garbage collection, and study municipal composting.

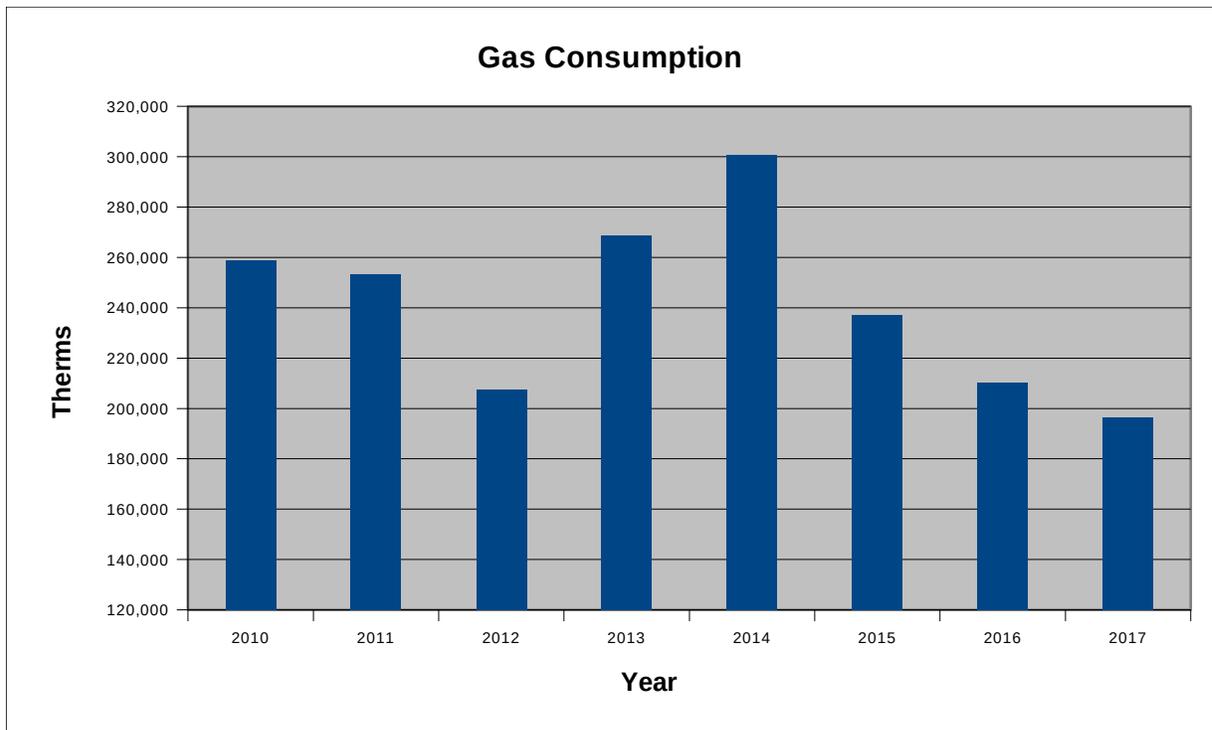
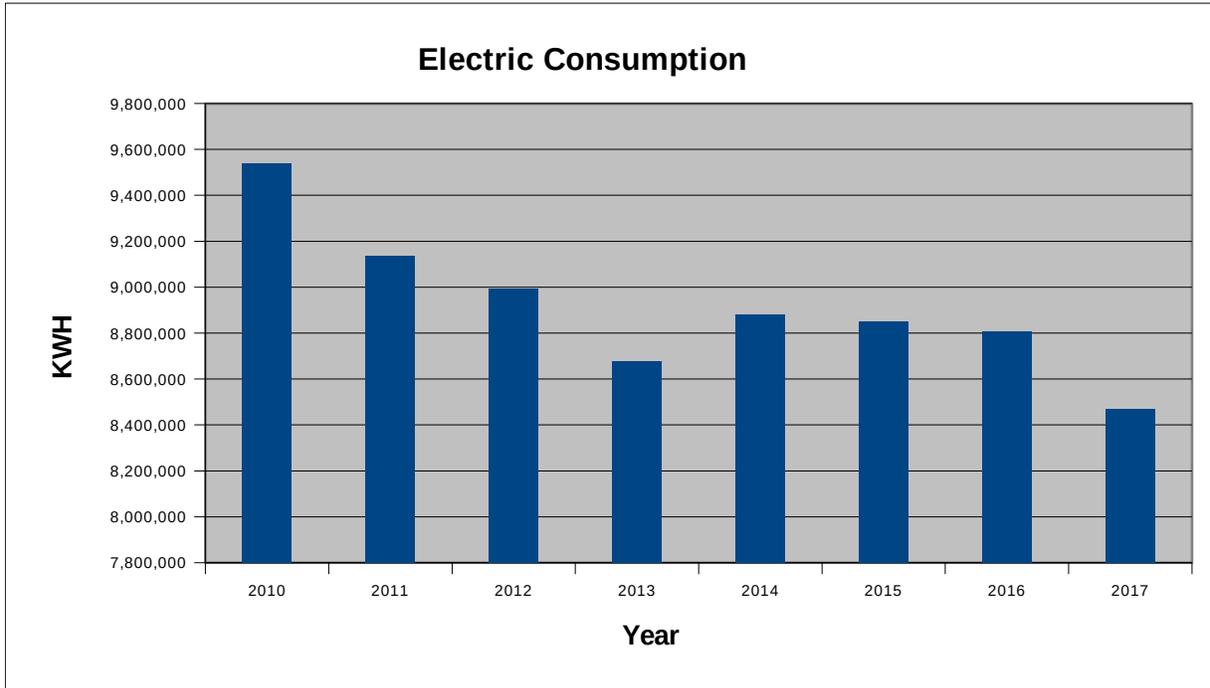
Summary of Recommendations

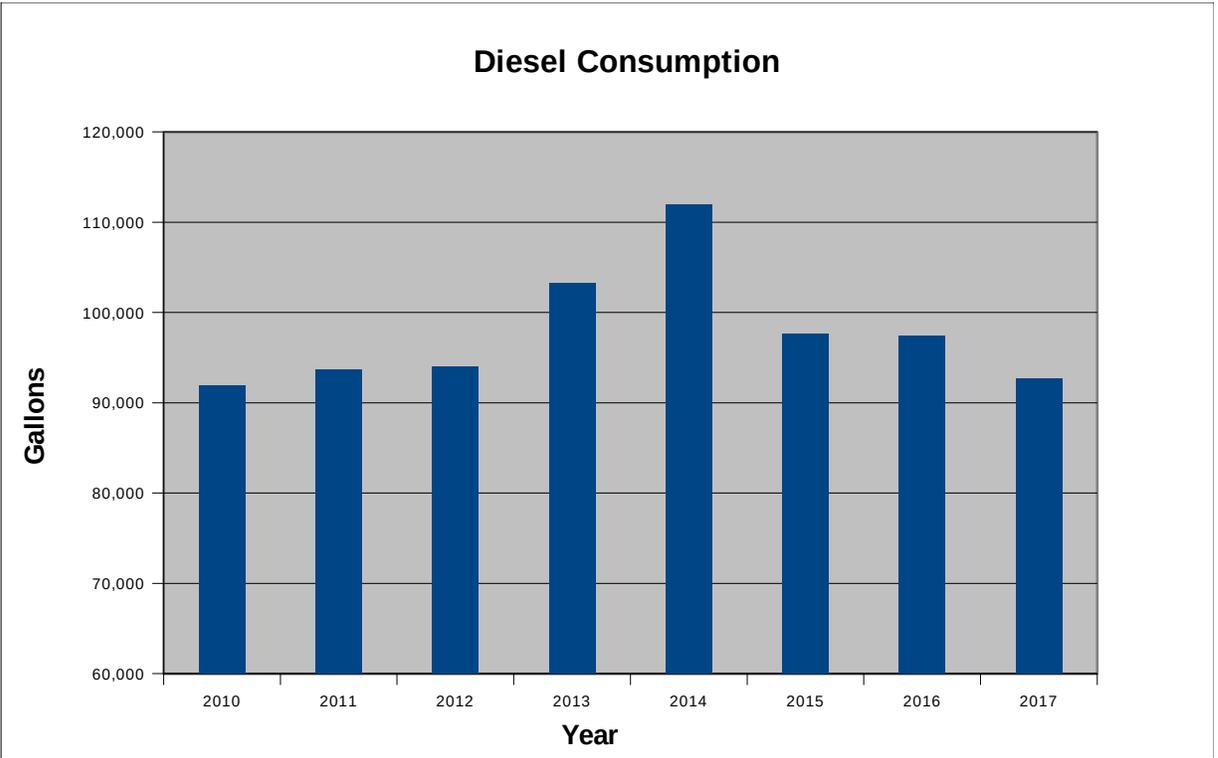
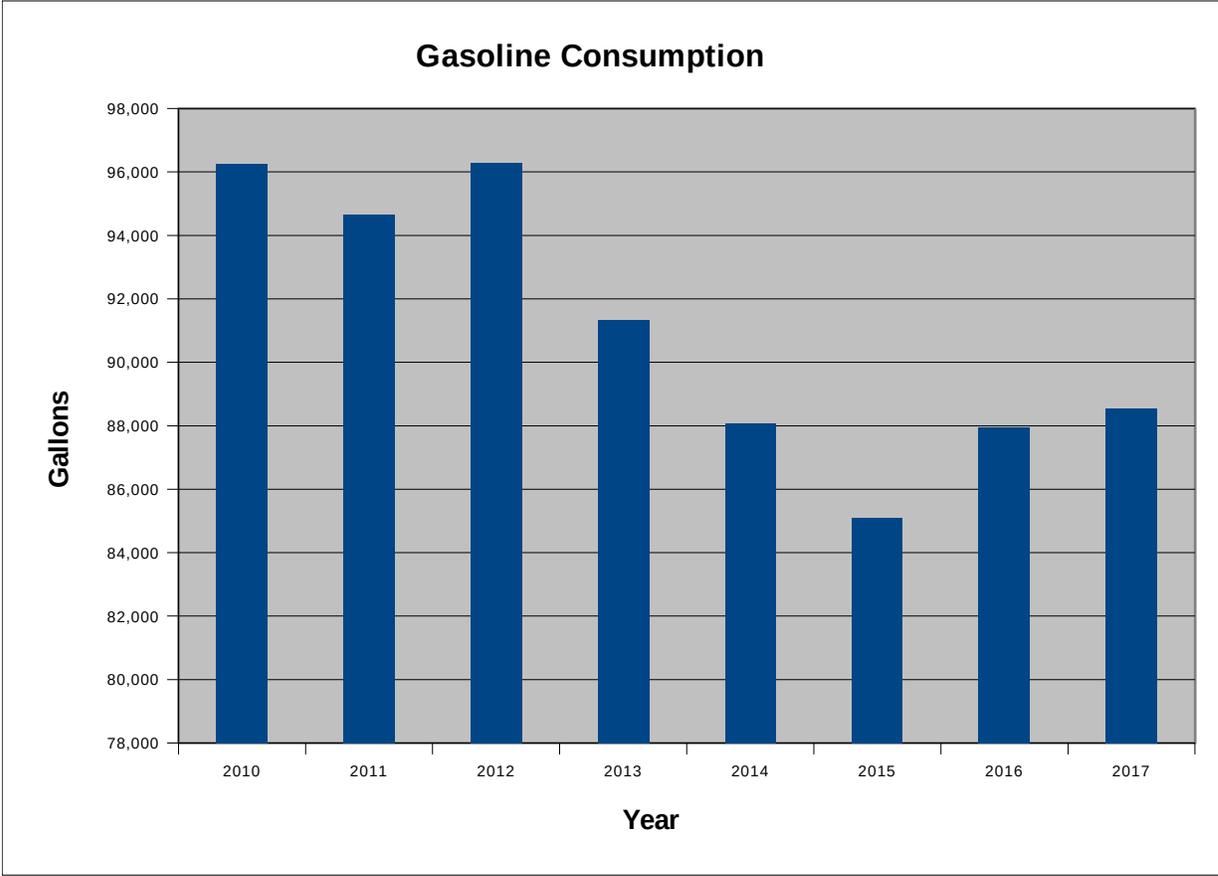
The following list is a summary of the major actions the Committee recommends that the City undertake in 2018. These recommendations will help the City meet the goals of improving the recycling diversion rate and achieving 20% energy savings by 2020.

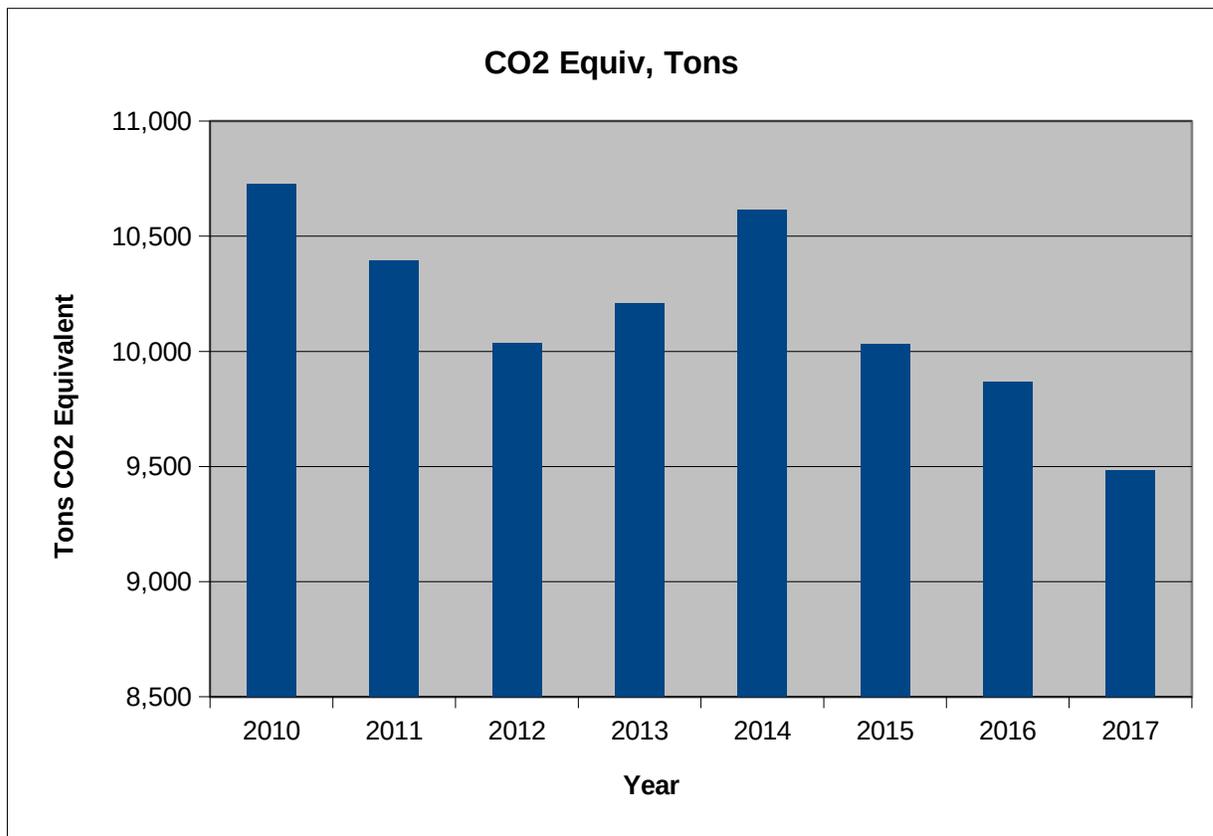
1. Improve communication about where different types of refuse should be disposed of or recycled.
2. Replace the remaining 4600 street light fixtures with efficient LED lights.
3. Install a total of 1+ MW of solar panels on City Hall and the Public Works Building.
4. Study the elimination of some garbage pickups to reduce diesel consumption.
5. Support composting pilot programs.

Electric	KWH Savings	Estimated Cost	Annual Dollar Savings	Payback Period, Years	Notes
Streetlights to 100% LED	1,500,000	\$1,600,000	\$105,000	15.24	Cost is based on converting 4600 lights at \$350 per light. About 50% energy savings from conversion. City is already considering a performance contract. Used 7 cents per KWH due to time-of-day discounts on electricity for street lighting. Maintenance savings not considered here, but could be substantial. Payback estimate is very conservative. Los Angeles achieved a 7 year payback.
PW Remodel (est 20% savings)	109,000	\$0	\$11,990	0.00	Replacing old lighting, HVAC and building upgrades with remodel
Add solar to DPW Bldg – 1 MW	1,000,000	\$1,750,000	\$110,000	15.91	Estimate based on size of roof at \$1.75/watt installed. Possible incentives would reduce the cost.
Add solar to Civic Cntr	156,000	\$273,000	\$17,160	15.91	Estimate based on size of roof at \$1.75/watt installed. Possible incentives would reduce the cost.
Library Lighting Upgrade	144,000	\$70,000	\$15,840	4.42	
Retro-commission City Hall	140,000	\$15,000	\$15,400	0.97	Already underway
City Hall Lighting Retrofit	144,000	\$37,000	\$15,840	2.34	Already underway
PD Lighting Retrofit (est 5%)	35,000		\$3,850	0.00	Completed Late 2017
Retro-commission PD	64,770	\$7,000	\$6,211	1.13	Almost complete
Total Possible Electric	3,292,770				
Natural Gas		Estimated Cost	Annual Dollar Savings	Payback Period, Years	Notes
DPW Remodel (est 20% savings)	9,525	\$0	\$6,096	0.00	
Retro-commission City Hall	2,500	\$3,000	\$1,600	1.88	Already underway
FD Boilers off in summer	1,000	\$0	\$640	0.00	
Muellner Building Insulation					
Total Possible Gas	13,025				
Unleaded		Estimated Cost	Annual Dollar Savings	Payback Period, Years	Notes
Continue w/ high efficiency vehicle replacements	2,000	\$0	\$5,000	0.00	Continue current program of purchasing efficient vehicles
Diesel		Estimated Cost	Annual Dollar Savings	Payback Period, Years	Notes
Eliminate 26 garbage pick-ups	10,000	\$0	\$25,000	0.00	Conservative estimate of diesel used for 26 pickups. Also saves labor and wear on trucks

2017 Energy Consumption Graphs







Mission Statement

The committee’s mission shall be to advise the City staff and Common Council on matters involving:

- A) City energy consumption, including tracking and benchmarking usage and emissions, recommending goals, suggesting evaluating possible capital projects and their effect on energy, and evaluating possible capital projects and their effect on energy, and evaluating alternative energy solutions. The goal shall be to reduce the usage, cost and emissions of City energy consumption, comparing calendar year energy consumption and emission measurements to goals and benchmarks.

- B) Recycling, solid waste, and yard waste collection and processing, including tracking and benchmarking of landfill diversion, recommending goals, suggesting and evaluating possible capital projects and their effect on recycling, and evaluating alternative recycling solutions. The goal shall be to increase the amount of recycling and landfill diversion, by comparing calendar—year measurements to goals and benchmarks.

- C) Community outreach initiatives that help to educate residents and businesses on energy use and recycling initiatives that work to maintain the quality of life in Wauwatosa.