ORANGE WATER AND SEWER AUTHORITY

A public, non-profit agency providing water, sewer and reclaimed water services to the Carrboro-Chapel Hill community.

MEMORANDUM

TO: **Natural Resources and Technical Systems Committee**
Terri Buckner (Chair)
Dave Moreau
Heather Payne
Ruchir Vora
John Young (*ex officio*)

THROUGH: Ed Kerwin

FROM: Ruth Rouse

DATE: March 13, 2015

SUBJECT: March 17, 2015 NRTS Committee Meeting: Energy Management Planning

The NRTS Committee will meet on Tuesday, March 17, 2015 from 5:30 to 7:00 PM in the OWASA Boardroom. Pat Davis, Sustainability Manager, will present information for the development of the Energy Management Plan:

- Review and discuss baseline energy data
- Discuss potential goals and objectives for the Energy Management Plan
- Next steps

Attachment #1 is a draft Technical Memorandum (TM) titled *Baseline Assessment of Energy Use; Overview of Energy Management Strategies to Date; and Potential Goals and Objectives for Energy Management* which summarizes the baseline assessment of energy use at OWASA and includes a general discussion about establishing goals and objectives for the Energy Management Plan. The TM provides specific examples of goals and objectives established by other organizations.

We look forward to seeing you on March 17.

Ruth C. Rouse

Ruth Rouse, AICP
Planning and Development Manager

c: OWASA Board of Directors
Robert Epting, OWASA General Counsel

Attachment 1: Draft TM *Baseline Assessment of Energy Use; Overview of Energy Management Strategies to Date; and Potential Goals and Objectives for Energy Management*

Energy Management Plan Technical Memorandum #1 (DRAFT)

Baseline Assessment of Energy Use; Overview of Energy Management Strategies to Date; and Potential Goals and Objectives for Energy Management

(March 13, 2015)

1.0 Purpose

To obtain the Natural Resources and Technical Systems (NRTS) Committee's feedback and guidance concerning the baseline assessment of energy use at OWASA; overview of energy management strategies to date; and background information regarding potential goals and objectives for OWASA's Energy Management Plan project.

We seek the Committee's feedback as to:

(a) the usefulness, format, and content of the information in this Technical Memorandum (TM);
(b) potential goals and objectives for our energy management efforts, including guidance regarding specific, measurable targets and timetables for energy use reductions, possible use of renewable energy, and associated reductions in greenhouse gas emissions (GHGs); and
(c) additional information that the Committee needs in support of this effort.

2.0 Background

Development of an Energy Management Plan is Strategic Initiative #5 of OWASA's *Strategic Plan for Fiscal Years 2014 – 2017*. On January 22, 2015 the Board of Directors approved a Project Charter to help guide our efforts, and directed that staff receive input and guidance from the NRTS Committee prior to presenting information, analyses, and recommendations to the Board.

The first phase of the project is completion of a baseline assessment of energy use; documentation of energy management strategies to date; and background information regarding potential goals and objectives for the Plan. This TM addresses these three topics.

3.0 Baseline Assessment of Energy Use

This section summarizes historical energy use information for Calendar Years (CY) 2005 through 2014 for three primary areas: (a) use of purchased electrical energy; (b) use of natural gas; and (c) use of fuel for vehicles, work equipment, and standby power generators. This baseline analysis will help inform decisions regarding program goals and objectives, as well as support our efforts to track, analyze, and report on the progress of our energy management efforts.

In this section, electricity use is reported in kilowatt-hours (kWh) and natural gas use is reported in therms. One therm has the energy equivalency of about 29.31 kWh. Total energy use for all facilities and for fuel use in our vehicles, standby generators, etc. is also provided, and is reported in Million British Thermal Units (MMBTUs), thereby enabling a comparison of the relative use of our different energy sources. A BTU measures the heating value, or energy content, of fuel. One BTU is the amount of energy needed to heat one pound of water by one degree Fahrenheit.

3.1. Use of Purchased Electricity

Figure 1 shows historical electrical energy use across all OWASA facilities, by major functional area. This graph incorporates monthly billing data for OWASA's more than 50 different electrical service accounts. Energy use for the reclaimed water system was not separately metered until last year; therefore, that use is included in the energy use totals shown for the Wastewater Treatment and Recycling function. The reclaimed water system was placed in service in April 2009.

Figure 1. Electrical Energy Purchases, By Calendar Year (CY), By Major Functional Area

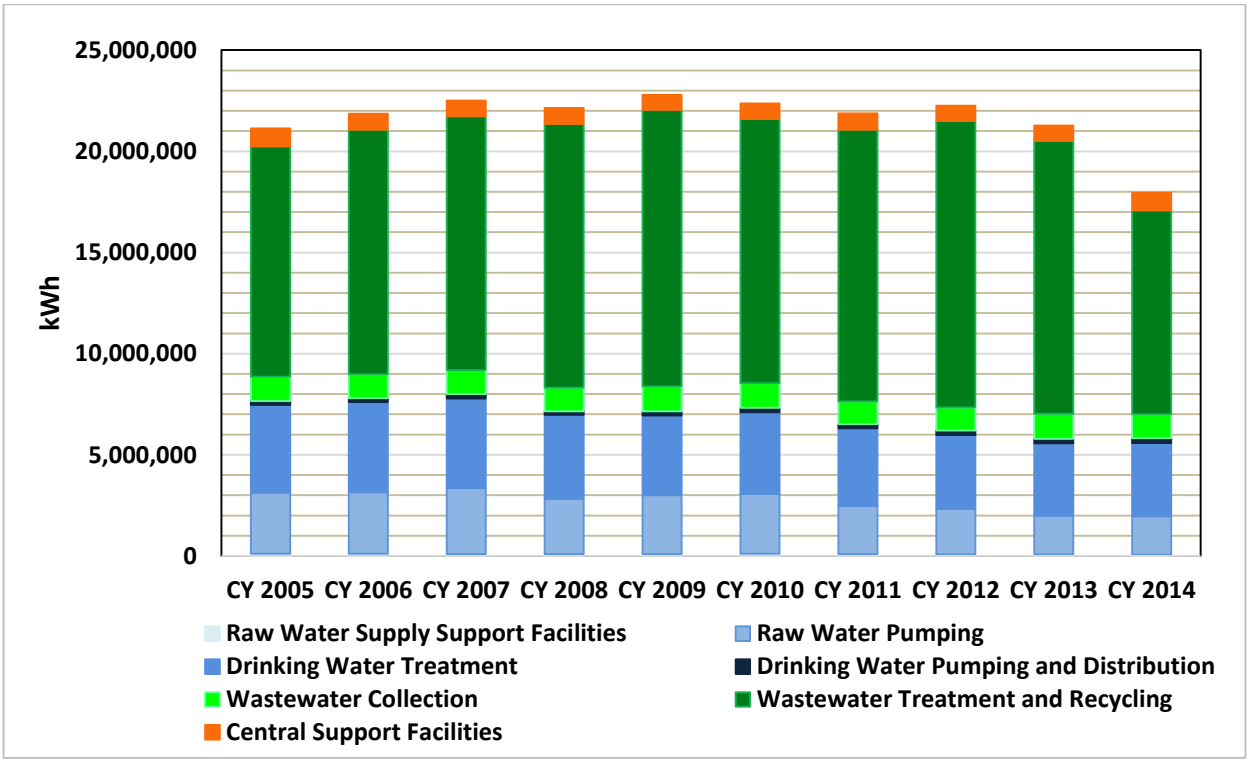
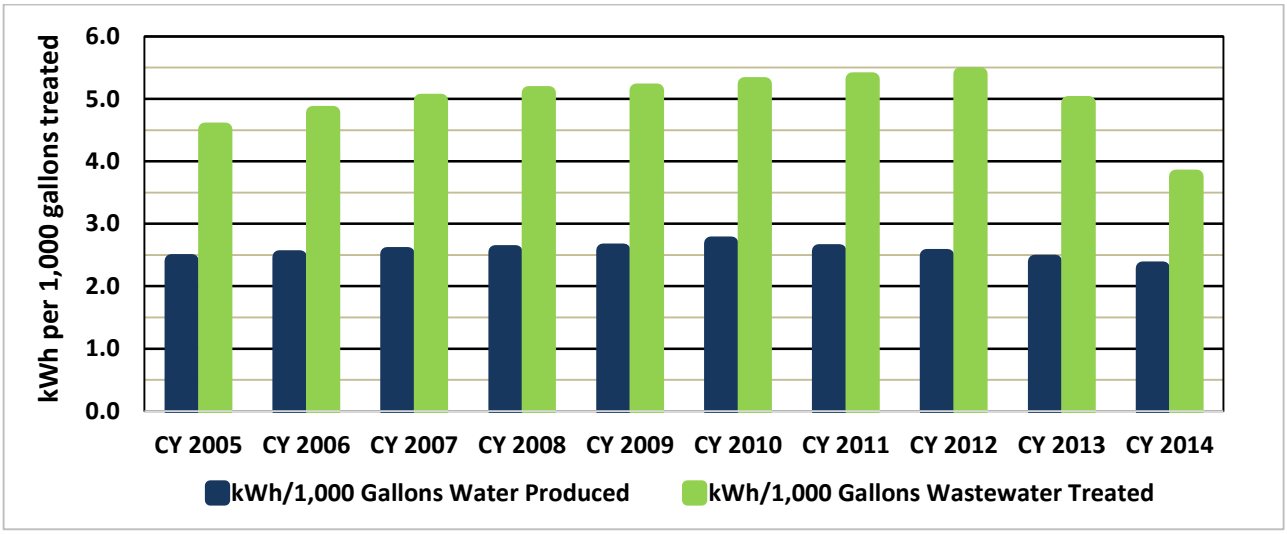


Figure 2 shows electrical energy use per 1,000 gallons – or ***energy use intensity (EUI)*** – for our water supply and treatment operations, and our wastewater collection, treatment and recycling operations, (including the reclaimed water system, as noted above).

This EUI analysis only reflects energy use at our facilities directly associated with water and wastewater pumping, piping, and treatment. It does not take into account the energy use for the Administration Building, Operations Center, or lake offices and recreation facilities, since energy use at those support facilities is not directly affected by changes in water and wastewater demands.

Figure 2. Electrical Energy Use Intensity, By Calendar Year (CY) for Water and Wastewater Service



Key observations from Figures 1 and 2 are:

- ✓ In CY 2014, wastewater collection, treatment and recycling and reclaimed water pumping accounted for 63% of our total annual electrical energy use, and water supply, treatment, and distribution accounted for 32%. Only about 5% of our annual electricity use is for support facilities (Administration Building, Operations Center, and offices and buildings at our lakes).

- ✓ Our total electrical energy use in CY 2014 was 15% lower than in CY 2005. It was 19% lower than in CY 2012, when we experienced our highest use of electricity.

- ✓ EUI for wastewater collection, treatment and recycling in CY 2014 was 17% lower than in CY 2005, and 30% less than the high of CY 2012. The primary reason for the savings has been the recent installation of the new energy efficient blowers, mixers, and aeration system at the Mason Farm Wastewater Treatment Plant (WWTP).

- ✓ The major reductions in energy use for wastewater collection, treatment and recycling occurred despite the addition of several new energy-using processes at the WWTP since 2005. These include the ultraviolet light disinfection system; filter facilities; rotary press for biosolids dewatering, reclaimed water pumping facilities, and odor control improvements.

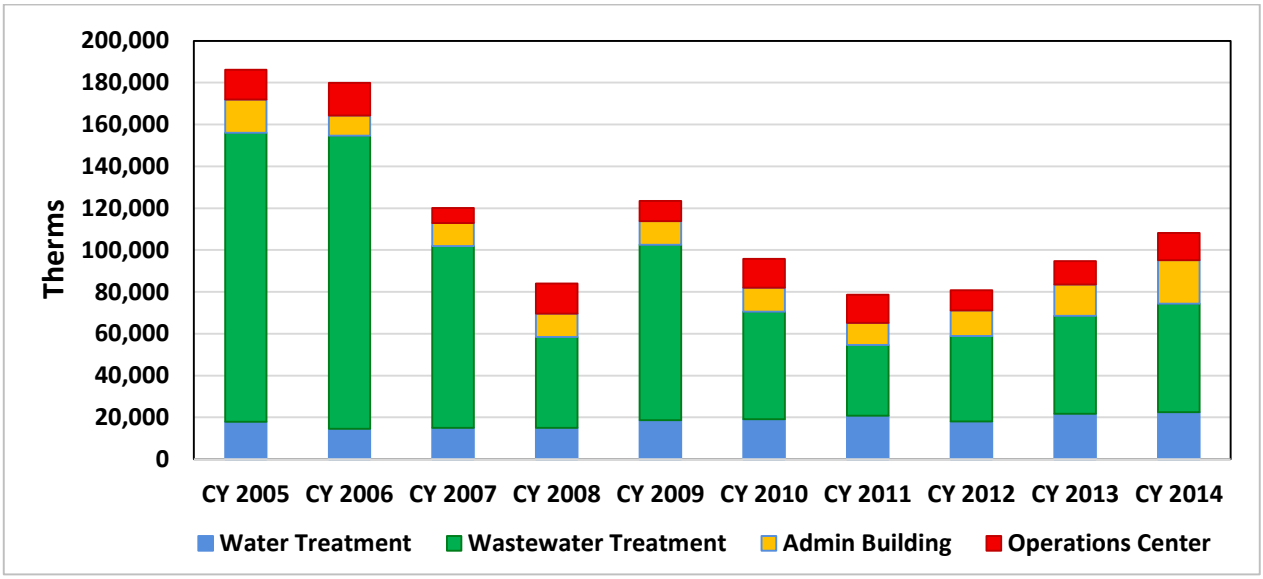
- ✓ Water supply and treatment EUI for CY 2014 is about 5% lower than CY 2005, and 15% less than the high of CY 2010. This reduction likely reflects energy savings associated with the installation of new, more efficient pumps and pump controllers, such as variable frequency drives (VFDs).

- ✓ CY 2014 EUI for water supply and treatment was 2.29 kWh/1,000 gallons produced and EUI for wastewater collection, treatment and recycling was 3.76 kWh/1,000 gallons treated. The combined annual total EUI for CY 2014 was more than 17% lower than the prior year, and nearly 24% lower than CY 2010, which had the highest combined EUI for any of the past ten years.

3.2 Use of Natural Gas

Figure 3 shows historical natural gas use across the major functional areas, based on monthly billing data for our eight different natural gas accounts. We use natural gas primarily for space and hot water heating purposes; therefore, our use is more directly affected by changes in temperature than changes in water demand and volume of wastewater treated.

Figure 3. Natural Gas Purchases, By Calendar Year (CY), By Major Functional Area



Key observations from the above graph are:

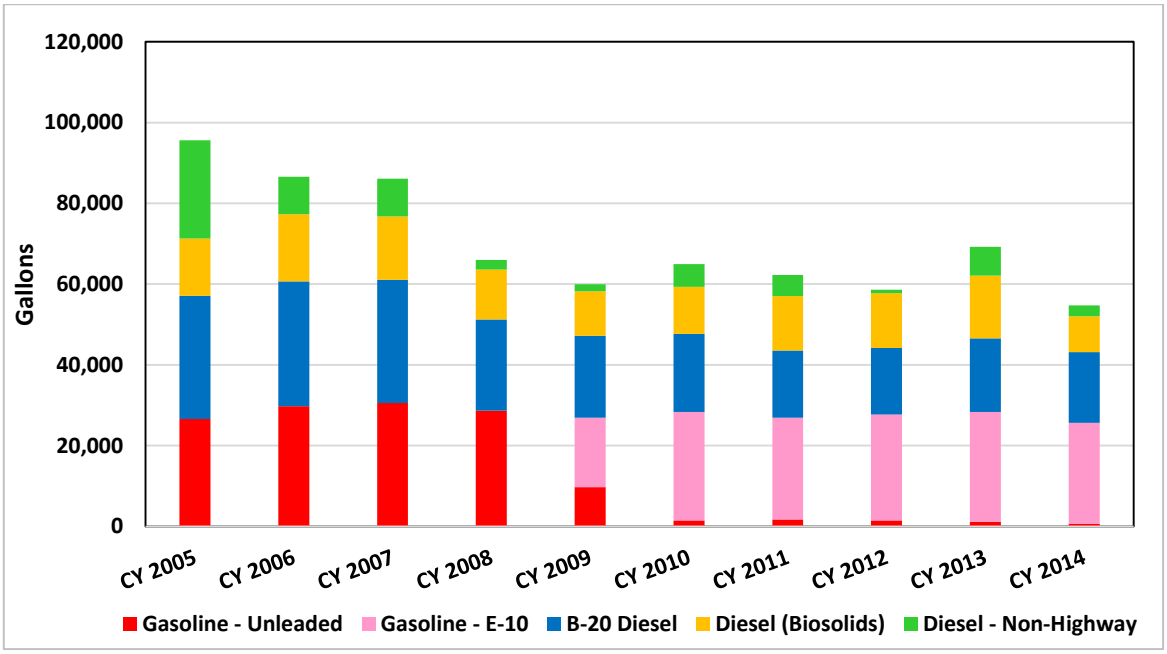
- ✓ The wastewater collection, treatment and recycling functions account for about 48% of our total annual natural gas use. Water supply, treatment, and distribution accounts for about 22% and central office and operations facilities use the remaining 30%.

- ✓ In CY 2005 and CY 2006, natural gas use was considerably higher at the WWTP as a result of plant construction activities that impacted our storage and use of biogas to heat the digesters.

3.3 Fuel Purchases for Vehicles, Work Equipment, and Standby Power Generators

Figure 4 shows historical gallons of fuel purchases for our vehicles, major work equipment, and standby power generators.

Figure 4. Fuel Use for Vehicles and Equipment, By Calendar Year (CY)
(Use is assumed to occur in year fuel was purchased. CY 2006 and 2007 include partial estimates for Diesel.)



Key observations from this graph are:

- ✓ Our overall use of fuel for vehicles has been declining. Contributing factors are (a) we are dewatering more biosolids and using contract services for transport and spreading of liquid biosolids; therefore, we are using less diesel fuel for hauling liquid biosolids, and (b) we have reduced truck miles driven as a result of operational efficiencies (such as radio-read metering and use of mobile computing technology to receive and complete field service orders).

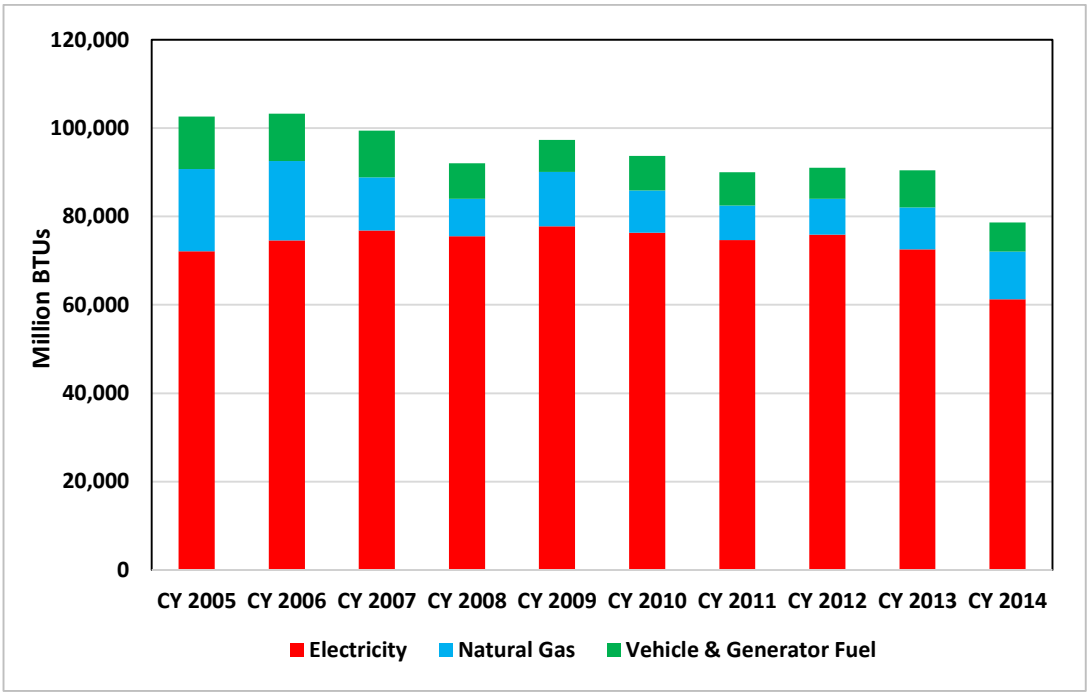
- ✓ The non-highway diesel gallons shown for CY 2005 are very high because it reflects the fuel purchase we made to initially fill a new 20,000 gallon diesel fuel storage tank at the WWTP.

- ✓ In CY 2009, we began to purchase E-10 gasoline in place of regular gasoline. E-10 gasoline has a lower BTU value than regular gasoline; therefore, fuel economy declines. The U.S. Environmental Protection Agency reports that use of E-10 reduces vehicle fuel efficiency by 1.5 to 3%.

3.4 Summary of Total Energy Use

Figure 5 shows total annual energy consumption by energy source, in MMBTUs. A key observation is that our electrical energy use accounts for 85 to 90% of our total annual energy consumption.

Figure 5. Total Energy Use, By Calendar Year (CY), in Million BTUs

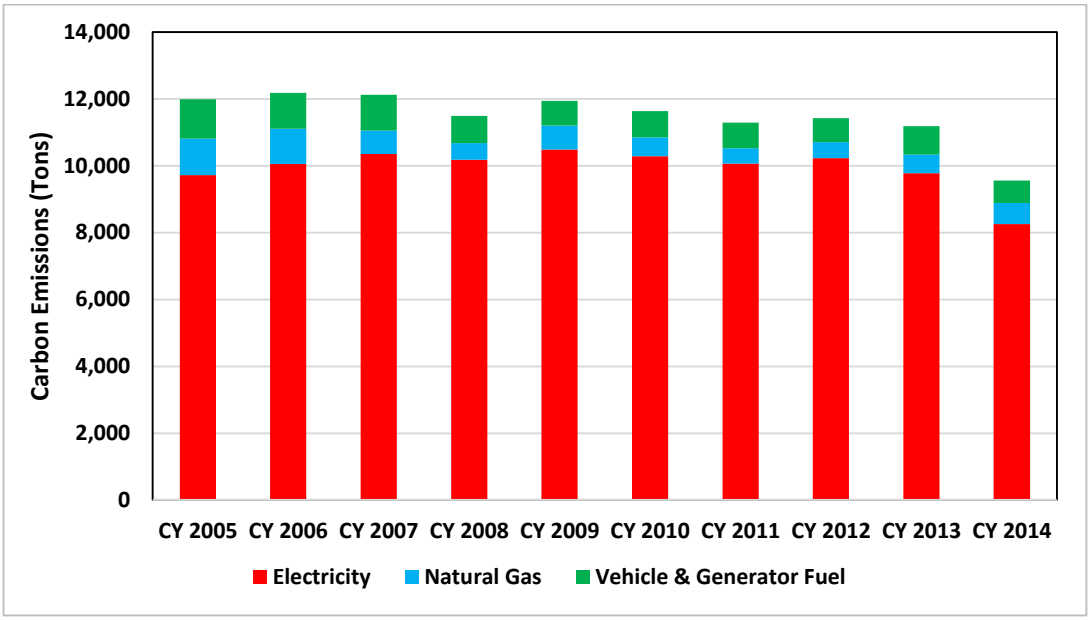


3.5 Summary of GHG (Carbon) Emissions Associated With Our Energy Use

Figure 6 shows total annual GHG emissions – expressed in carbon dioxide equivalents (CO_2e) – associated with our use of energy. As discussed in the Project Charter, this analysis includes Scope 1 and Scope 2 emissions, excluding direct emissions from our water and wastewater treatment processes. Scope 1 sources are owned or controlled by OWASA, and for this analysis include emissions from our fuel use for generators, natural gas-fueled equipment, and our vehicles. Scope 2 emissions occur outside of our facility boundaries, such as emissions caused by the production of the electricity we use.

In addition to not including emissions from our treatment processes, the GHG emission estimates shown in Figure 6 do not include Scope 3 emissions, which are associated with activities such as employee travel in personal vehicles, travel in airplanes for business use, or emissions generated by the manufacture and transport of goods purchased by OWASA.

Figure 6. Total Carbon Emissions From Our Use of Energy Use, By Calendar Year (CY), in Tons



3.6 Selecting a "Baseline" Year for Our Plan

A best practice in energy management is to establish a baseline period against which future progress is to be measured. There is no standard method for determining the appropriate baseline year, and there are many examples of different baseline years that agencies have set for their energy management and GHG emission reduction programs.

The U.S. Environmental Protection Agency's 2012 guidance on GHG accounting and reporting states that Federal agencies are to use Fiscal Year 2008 as their baseline year. However, the agency's guidance for the proposed Clean Power Plan specifies 2005 as the baseline year.

At the local level, the Town of Chapel Hill and San Jose, California have set 2005 as their baseline year. The University of North Carolina at Chapel Hill and Elon University have set 2008 as the baseline, whereas Duke University and Stanford University use 2007.

There is no clear choice as to what our preferred baseline should be. Calendar Years 2005 and 2006 were non-drought years; however, our WWTP (which accounts for the majority of our electrical energy use) was undergoing construction during that period. Calendar Years 2009 and 2010 were also non-drought years, and may be an appropriate baseline period.

The Project Charter references Calendar Year 2010 as the baseline, and staff recommends that year be established as our baseline.

4.0 Overview of Energy Management Strategies to Date

This section summarizes a number of important energy management measures we have implemented to reduce energy use and costs. These include general management strategies as well as site-specific energy efficiency improvements.

4.1 General Energy Management Strategies

- ✓ We track energy use and costs, and meet annually with Duke Energy to review electrical energy usage and applicable rate schedules for each of our accounts. Where possible, we make adjustments to ensure we are being charged the most economical rates for each of our accounts. As a result of these reviews, we recently worked with Duke Energy to change the power feed arrangements at the WWTP, which enabled us to avoid an annual cost increase of more than a $60,000.

- ✓ We seek financial support for our energy efficiency efforts. Two examples are the receipt of a $6.56 million, 20-year, no-interest loan from the North Carolina Clean Water State Revolving Fund for our recent energy efficiency improvements at the WWTP, and receipt of a $168,000 custom financial incentive payment from Duke Energy for that same project. We have also obtained no-cost and low-cost energy auditing services through Duke Energy, the State Energy Office, and the North Carolina Waste Reduction Partners Program.

- ✓ We shift pumping operations to off-peak periods when possible to reduce electricity costs. This strategy does not reduce total energy use, but it helps reduce our peak demand on Duke Energy's generation capacity, and provides cost savings under Duke Energy's time-of-day electrical rates.

- ✓ As our customers have become more efficient in their use of water, we save energy throughout our water and wastewater pumping and treatment operations. Our water line renewal and replacement program has enabled us to operate our system with minimal water losses due to leaks, thereby further reducing our energy requirements for water supply, treatment, and distribution.

- ✓ During condition assessment field work for our comprehensive asset management program, we identify pumps and motors in need of corrective maintenance. We include funding to address those needs in our annual budget and capital improvements program.

- ✓ We buy the most fuel-efficient vehicles that meet our service needs, provided that can be done at a reasonable cost.

- ✓ We have obtained energy audits and studies to help inform and guide our energy efficiency investments. Examples of these are:

  University Lake Raw Water Pump Station: Pump Station Evaluation for Addition of a One (1) MGD Raw Water Pump. August 2006. McKim & Creed.

  Cane Creek Raw Water Transmission Facility Improvements. February 1, 2002. Hazen and Sawyer. This study included an evaluation of the existing 2-speed raw water pumps at Cane Creek Reservoir.

HVAC Energy Survey Report for Orange Water and Sewer Authority. December 31, 2007. State Energy Office and NCSU Industrial Extension Service.

Lighting Energy Survey Report for Orange Water and Sewer Authority. December 31, 2007. State Energy Office and NCSU Industrial Extension Service.

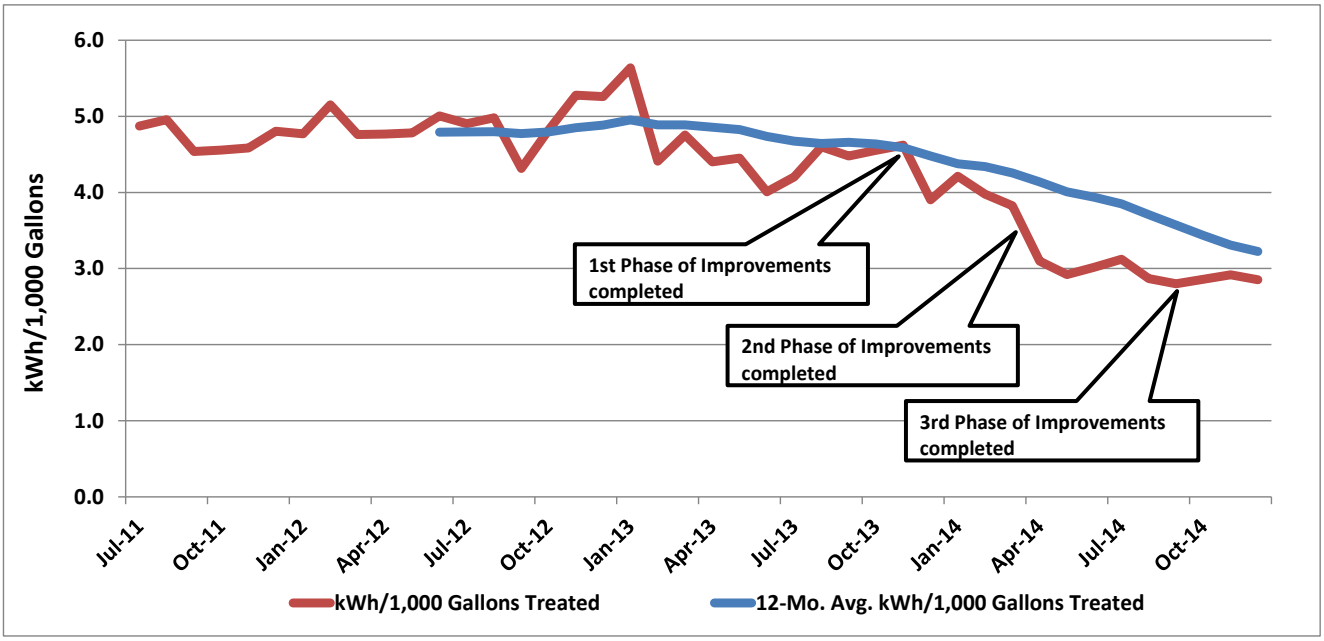
Mason Farm Wastewater Treatment Plant Hydraulic and Treatment Capacity Study. March 2010. Hazen and Sawyer.

OWASA Biogas Utilization Study. August 24, 2011. Brown and Caldwell.

4.2 Examples of Some of Our Energy Efficiency Improvements

✓ In September 2014, we completed installation of a fine bubble diffused aeration system, energy efficient blowers and mixers at the Mason Farm WWTP. As shown in Figure 7, these improvements have reduced energy use intensity at the WWTP by about 30%, which is an ***annual energy savings of more than 3 million kWh***.

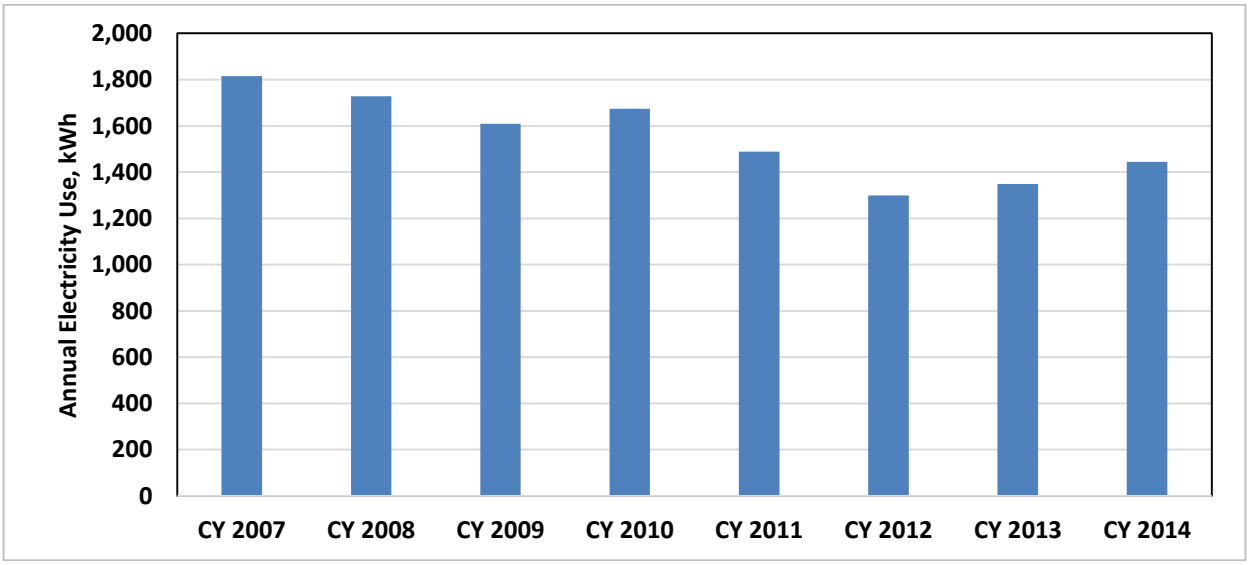
Figure 7. Mason Farm WWTP Electrical Energy Use Intensity: July 2011 – December 2014



✓ We save energy by meeting certain non-drinking water demands with reclaimed water instead of drinking water. We estimate that *it takes about 35% less energy to meet water demands with reclaimed water instead of drinking water* from our reservoirs and WTP. At the current reclaimed water demand level of about 0.65 million gallons per day, this equates to an ***annual energy savings of about 190,000 kWh***.

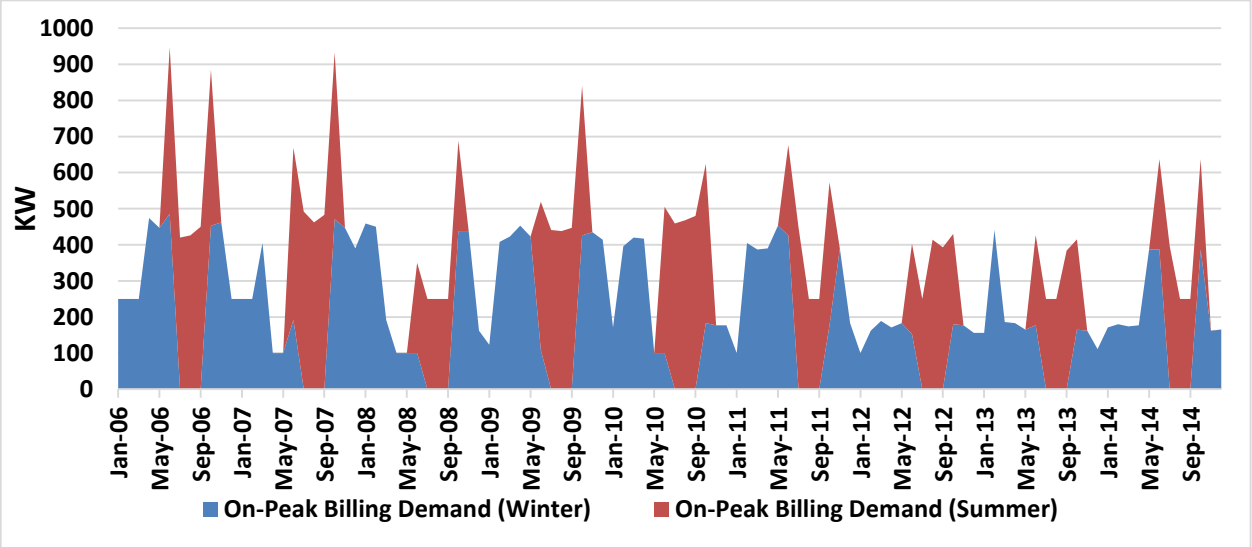
✓ We have installed energy efficient pumps, motors and motor controls at many of our facilities. Examples are the variable speed, horizontal split case pump at the WTP, the VFD for Finished Water Pump #7, and replacement of the Heritage Hills Wastewater Pumping Station, which has resulted in ***annual energy savings of almost 10,000 kWh***, or 20%. (See Figure 8.)

Figure 8. Annual Electrical Energy Use at Heritage Hills Wastewater Pumping Station



✓ We also installed a new, low-flow pump and VFD at University Lake which has enabled us to better optimize system-wide raw water pumping across a wide range of demand conditions. As shown in Figure 9, installation of that pump has helped us reduce peak power demands at the Cane Creek Raw Water Pumping Station.

Figure 9. Peak Electricity Demand at Cane Creek Raw Water Pumping Station



- ✓ In September 2002 we implemented a system to recycle treated process water back to the head of the WTP. This system has enabled us to reduce raw water withdrawals and energy requirements for pumping by about 7%. At current raw water withdrawal rates and energy use, the ***estimated annual energy savings is more than 130,000 kWh***.

- ✓ Since 2004, we have eliminated four wastewater pumping stations (Lloyd Street, Starlite Drive, Cleland Drive, and North Forest Hills) by extending the gravity sewer system. The ***estimated annual energy savings has been about 18,500 kWh***.

- ✓ We have installed more efficient lights and lighting controls at several facilities, including the Administration Building, Operations Center, WWTP, and WTP. We replaced several lights on a portion of the exterior basins at the WTP, and eliminated several fixtures that were no longer needed.

- ✓ Several of our information technology improvements have improved the energy efficiency of our operations. Some key strategies have been:

  - ✓ Servers, personal computers, monitors, printers and copiers are Energy Star rated.

  - ✓ Through server virtualization, we have significantly reduced the amount of equipment in our server room. Excluding the phone system (which we cannot presently virtualize) we have reduced the number of physical servers from 24 to 8. This has reduced electrical consumption for the servers and also reduced the waste heat generated which reduces our server room cooling requirements.

  - ✓ We have deployed mobile technology so field personnel can remotely access our Geographic Information System and asset information in the field, and receive and complete service and work orders electronically. These improvements help reduce our costs, use of vehicle fuel, and use of paper, printing, and copying.

  - ✓ We have implemented an automated call system that we use to notify customers that their accounts are overdue and they could be disconnected for non-payment. Since implementation, the average monthly cutoffs have fallen from about 160 per month to 80 per month. That represents 80 fewer trips in a crew truck to turn water off and then turn water back on. This reduces fuel use and carbon emissions, and reduces costs.

4.3 Renewable Energy and Green Fleet Strategies

- ✓ We use a portion of the methane gas at the WWTP as fuel for up to two boilers that provide heat for the anaerobic digesters at the plant.

- ✓ We use B-20 diesel (regular diesel blended with 20 percent biodiesel) in many of our trucks. We also piloted the use of B-100 biodiesel fuel in one of our biosolids tanker trucks. However, that trial was discontinued due to problems with fuel quality.

- ✓ We have three gas-electric hybrid vehicles in our fleet.

5.0 Background Information Regarding Potential Goals and Objectives for Energy Management

The Board-approved Charter for the Energy Management Plan (EMP) states that we will address the following objectives, which are organized along the three pillars of sustainability: social performance, environmental performance, and financial performance.

Social Performance: Our EMP will impact the people and communities we serve.

1) Strategies will be evaluated against their impacts on the community.
2) We will inform and engage our customers and stakeholders in our energy planning efforts.
3) We will inform and involve our employees in our energy management efforts.

Environmental Performance: Our EMP will help us preserve natural resources; conserve energy, water, and other natural resources; minimize waste and pollution emissions, and reduce our environmental impacts.

4) We will seek to reduce our energy use per million gallons per day of water, wastewater, and reclaimed water used in our community compared to our 2010 baseline energy use (or other baseline year as determined appropriate and for which historical data is available).
5) Energy management, energy efficiency, and renewable energy alternatives will be evaluated against their relative effect on energy use and GHG emissions.
6) Where practical, we will implement energy management strategies that enhance the reliability and resiliency of our water, wastewater, and reclaimed water facilities and operations.

Financial Performance: The economic well-being of our customers and our community depend on our ability to manage energy services, use, and costs so that we can ensure high quality and reliable services at an acceptable financial cost to our customers.

7) Energy management, energy efficiency, and renewable energy alternatives will be evaluated against their relative life-cycle financial costs (capital and operating and maintenance costs).
8) The selected set of strategies will represent a reasonable balance of financial considerations with our social and environmental performance objectives.
9) To ensure that the selected strategies are cost-effective for our community, the selected mix of measures will have a positive financial payback.
10) We will seek funding support for our program, such as: federal, state, and foundation grants; energy utility incentives; revenues from renewable energy credits and carbon trading; etc.

As we evaluate opportunities to improve energy efficiency, invest in renewable energy projects, and reduce our carbon footprint, we must consider and decide how we will balance all of these important but oftentimes conflicting values. We will also need to decide how we will value environmental and social benefits as we evaluate cost-effectiveness. We hope one important outcome of the Plan will be to establish an evaluation and decision-making framework which we can use to guide our energy management efforts.

The performance goals we establish for the Plan will be very important, as they will drive our future energy management activities and continuous improvement efforts. Therefore, they need to be clear and measurable, and also serve as a basis for tracking, measuring, evaluating, and reporting on our progress.

The Board may wish to provide some initial guidance as to *potential* goals and targets for our Plan, then revise and finalize those after considering information about the scope, costs, and benefits of alternative energy management strategies that we will be evaluating in the coming months.

As we move forward with this effort, some key policy questions for the Board's consideration are:

1. Should we establish time-bound targets for (a) reductions in our use of non-renewable energy and generation of related greenhouse gas emissions, and (b) the percentage of our energy needs that should be met from renewable energy sources? Is there a preferred technical basis for establishing those targets?

Examples of Goals and Objectives Established by Other Agencies

Portland Water Bureau set a goal of reducing annual use of electricity by 5% by July 2012 compared to the 2005-2008 baseline period.

American Water has a goal of reducing Energy Use Intensity by 8% compared to a 2008-2010 baseline. It also has a goal of reducing greenhouse gases by 16% from a 2007 baseline. The target completion date is 2017.

Southern Nevada Water Authority has established the following goals:

- *have a 100% alternative-fueled vehicle fleet by 2015*
- *20% of energy needs to be met by renewable sources by 2015*

Tampa Bay Water (FL) has a goal of meeting 10% of its energy needs through alternative energy sources within the next 10 years.

Encina Wastewater Authority (CA) has established a Target Energy Independence goal to self-generate 95% of the total WWTP electrical needs by 2020, and to beneficially use all the biogas produced at the WWTP.

The East Bay Municipal Utility District (California) established a goal of meeting all of its WWTP energy needs with biogas by 2010. The WWTP is now a net energy producer that sells renewable energy to the grid after meeting all the plant's power demands.

Several States, local governments, and other countries have based their reduction targets on specific science-based assessments, such as that done by the International Panel on Climate Change (IPCC). The IPCC has concluded that the following GHG reductions are needed to stabilize global CO_2 levels to 450 parts per million:

- *40% below 1990 levels by 2020*
- *80% to 95% below 1990 levels by 2050*

2. Should we establish guidelines for applicable financial payback thresholds for different types of energy efficiency and renewable energy investments?

3. Should our financial evaluations include consideration of the "social cost of carbon"? If so, how will we determine what that value should be? *(The Federal Interagency Working Group on Social Cost of Carbon has addressed this question in a May 2013 report "Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis – Under Executive Order 12866.")*

4. As we consider funding requirements for energy efficiency and renewable energy strategies and compare those against other competing operating and capital needs, what are the criteria and relative weights we will use for that evaluation?

Examples of Evaluation Criteria Established by Other Agencies

- *Initial capital cost*
- *Financial performance over the life of the project (rate of return; net present value)*
- *Degree to which strategy helps resolve an existing or expected problem*
- *Degree to which strategy has been proven at a scale relevant to our operations*
- *Extent to which strategy reduces greenhouse gas emissions*
- *Impact on the community and public visibility*
- *Impact on employees*
- *Extent to which project contributes to energy cost stabilization*

5. Should we allow other parties to construct, own, and operate renewable energy facilities on OWASA lands or facilities, such as a rooftop solar photovoltaic (PV) system at the Administration Building or a biogas-to-energy project at the WWTP, provided we have the option to purchase the system at a future date? *(We have never done this; however, it is a strategy that many other utilities have implemented.)*

Examples of Goals and Objectives Established by Other Agencies

Phoenix (AZ) has a goal of meeting 15% of its electrical energy requirements with renewable energy by 2025. The city plans to achieve this through renewable energy installations that are either city-owned or city-sponsored

6. As one strategy for offsetting our carbon emissions, should we consider "purchasing" renewable energy on the open market (such as through NC GreenPower), or otherwise pay other parties to reduce their carbon emissions?

Examples of Goals and Objectives Established by Other Agencies

Tualatin Valley Water District (Oregon) has a goal of purchasing green power for 100 percent of the electrical energy requirements for its operations.

6.0 Next Steps

Staff will revise this TM to address comments, questions, and guidance from the NRTS Committee. If needed, we will have a follow-up meeting with the Committee to review and discuss the revised TM prior to submittal to the Board of Directors.

After this TM is finalized, staff will proceed to evaluate alternative strategies for meeting proposed goals and objectives established by the Board. Those alternatives will be summarized in TM #2, which will be presented in draft form for review and guidance from the Committee.

In accordance with the community engagement plan for this project, staff will post this document on our website, and provide it to stakeholders on our project distribution list. We will include information about the date and time at which this will be discussed by the Committee and Board of Directors, and ways that interested citizens can provide the questions, comments, and feedback regarding our efforts.

Acronyms Used in Technical Memorandum #1

BTU	British Thermal Unit (a measure of the heating value, or energy content, of fuel. One BTU is the amount of energy needed to heat one pound of water by one degree Fahrenheit.)
B-20	A blend of diesel fuels that consists of 20% biodiesel and 80% petroleum diesel (B-20 is the most common biodiesel blend in the United States)
CO_2	Carbon Dioxide, a naturally occurring chemical compound that is also a major greenhouse gas
CY	Calendar Year
E-10	A blend of gasoline composed of 10% ethanol and 90% gasoline (E-10 is classified as "substantially similar" to gasoline by the U.S. Environmental Protection Agency (EPA) and is legal for use in any gasoline-powered vehicle; however, it does not qualify as an alternative fuel under the Energy Policy Act of 1992)
EMP	Energy Management Plan
EUI	Energy Use Intensity (for this report, Energy Use Intensity refers to the units of energy required per 1,000 gallons of drinking water produced and wastewater treated)
GHG	Greenhouse Gases, which are gases that trap heat in the atmosphere (for this report, GHGs are expressed in carbon dioxide equivalents)
kWh	Kilowatt-hour, which is a unit of energy equivalent to one kilowatt of power expended for one hour of time
MMBTU	One million British Thermal Units
NRTS	Natural Resources and Technical Systems Committee
OWASA	Orange Water and Sewer Authority
TM	Technical Memorandum
VFD	Variable Frequency Drive
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant