

# **WATER CONSERVATION** **reduces greenhouse gas** **emissions (GHGs)**

Orange Water and Sewer Authority



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

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# Summary

- All drinking water and wastewater are pumped in our community. Most of the energy for pumping comes from fossil fuels.
- Burning fossil fuel releases GHGs such as carbon dioxide (CO<sub>2</sub>).
- A typical family uses about 4,000 gallons of OWASA water and sewer service per month.

# Summary, continued

- GHGs from OWASA providing 4,000 gallons of service per month equal 267 lbs. of CO<sub>2</sub>/year.
- In 2002, residential water/sewer use averaged about 6,000 gallons/month.
- GHGs from 6,000 gallons of water/sewer service per month equal about 401 lbs. of CO<sub>2</sub>/year (50% more).

# Water, energy and GHGs

All water and wastewater must be pumped:

- Water from our lakes is pumped to the treatment plant.
- Drinking water is pumped from the treatment plant to tanks (water then flows down from tanks to homes, etc.).
- Wastewater is pumped over ridges at various places to reach the wastewater treatment plant.
- In the wastewater treatment plant, wastewater is pumped to treatment tanks which are elevated for flood protection.

We also use energy in water disinfection and other treatment processes.

# Electricity use for water and sewer service

Electricity use by OWASA directly for:

<i>Water service:</i>	<i>2.29 kWh*/1,000 gallons</i>
<i>Sewer service:</i>	<i><u>3.76</u> kWh*/1,000 gallons</i>
<i>Total:</i>	<i>6.05 kWh*/1,000 gallons</i>

*\* kWh means kilowatt hour*

OWASA also uses:

- natural gas to heat buildings and
- gasoline, diesel, biodiesel, etc. in vehicles and equipment used to operate and maintain our facilities.

However, these energy uses do not vary with the volume of water and sewer service.

# **Pumping takes substantial energy because water is heavy**

A cubic foot of water weighs 62.4 lbs.

1,000 gallons weigh 8,342 lbs (over 4 tons)

A million gallons weigh 4,171 tons.

# Residential water and energy use

- Water/sewer use at a single-family residence in our community is typically about 4,000 gallons per month (48,000 gallons per year).
- OWASA's electricity use to provide 4,000 gallons of water/sewer service totals 290 kWh per year (directly related to pumping and treating water and wastewater).

# Water, energy use and GHGs

Most of the energy for pumping water and wastewater comes from fossil fuels that produce CO<sub>2</sub>.

Duke Energy produces 0.92 of a pound of CO<sub>2</sub> for each kilowatt hour (kWh) produced.

# **GHGs from residential water and sewer use**

- To provide 4,000 gallons of water and sewer service per month to a typical household, OWASA uses about 290 kWh/year as indicated above.
- The resulting GHGs equal 267 pounds of CO<sub>2</sub> per year, not counting GHGs from hot water use by customers.

# GHGs from water/sewer use

Water/sewer use per month	Related electricity use by OWASA per year	GHGs in equivalent pounds of CO2
2,000 gallons	145 kWh	134 lbs.
3,000 gallons	218 kWh	200 lbs.
4,000 gallons (typical residential use)	290 kWh	267 lbs.
5,000 gallons	363 kWh	334 lbs.
6,000 gallons	436 kWh	401 lbs.

# Saving water saves energy!

## Energy savings?

Conservation measure	Pumping untreated water	Water treatment	Water distribution	Heating water	Wastewater treatment
Fixing leak	yes	yes	yes	no	no
Outdoor conservation	yes	yes	yes	no	no
Water-saving toilet	yes	yes	yes	no	yes
Water-saving showerhead, faucet or washer	yes	yes	yes	yes	yes

## Energy use assumptions

Water heater—electric	<b>0.2</b>	kWh per gallon
Water heater—gas	<b>0.5</b>	cubic feet of gas per gallon
Faucet	<b>50%</b>	of use is hot water
Shower	<b>60%</b>	of use is hot water
Dishwasher	<b>100%</b>	of use is hot water
Clothes washer	<b>25%</b>	of use is hot water
Leak	<b>10%</b>	of use is hot water

# National perspective

- The US EPA estimates national GHGs in 2010 equaled over 7 billion tons of CO<sub>2</sub>.
- Water and sewer services account for about 3% of our nation's energy use.
- Water conservation is a way that everyone can help reduce GHGs.

# Questions? Comments?

For more information, please see the Conservation section of our website, [www.owasa.org](http://www.owasa.org); or contact us at 919-968-4421 or [info@owasa.org](mailto:info@owasa.org).

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