Unanswered Questions from U.S. EPA Local Climate & Energy Webcast: Energy Efficiency in Water and Wastewater Facilities October 30, 2013

Questions in bold were asked during the webcast.

Questions for All Speakers

1. *Do the utilities noted in the presentations have a dedicated organization within their structure for Energy Efficiency Programs? Or is it a "side job" for a particular group?*

   It's a side job for the Capital Projects Manager and the Executive Director of the facility.

2. *In California, there is a need to establish carbon credits. Is there any familiarity with that?*
   EPA's Region 9 website includes information on climate change topics relevant for California: http://www.epa.gov/region9/climatechange/index.html.

3. *Do you have any energy audit procedures for wastewater plants that can be conducted by the plant's personnel instead of hiring a consultant? We have small utilities that cannot afford a consultant.*

   Since GLSD has received Utility Incentives to help fund the energy work, the evaluations are only accepted from Utility accepted vendors.

   The Energy Assessment Tool described on one of the slides in the presentation is an excellent tool to start with.

4. *What are the pros and cons of using ENERGY STAR Portfolio Manager to measure and track?*

   EPA's ENERGY STAR Portfolio Manager can be used to track and assess energy use at water and wastewater facilities over time to help decisions makers understand annualized energy performance trends. Using energy consumption information for all fuels and a few operating characteristics, Portfolio Manager calculates energy performance metrics listed below on a "per flow" basis through the Custom Report feature of the tool. Furthermore, Wastewater Treatment Plants can receive an ENERGY STAR score on EPA's 1 to 100 ENERGY STAR energy performance scale. This score expresses the performance of your wastewater treatment plant relative to similar facilities around the US. A score of 50 signals that your performance is in the middle of your peer group – half of similar facilities are more efficient and half are less efficient. A score of 75 indicates that your facility is more efficient than 75% of similar facilities, in other words, you perform in the top quartile for your peer group. The score is based on your as-billed energy consumption, and is normalized to adjust for weather and a few operating characteristics, which are plant design flow rate, average influent and effluent biological oxygen demand (BOD5), fixed film trickle filtration process (y/n), and nutrient removal (y/n). ENERGY STAR certification is not available for wastewater treatment plants. The ENERGY STAR score,

as a performance benchmark, is not available for drinking water systems. To benchmark performance for drinking water systems, a comparison to the national median is available.

Water or Wastewater Energy Performance Metrics:

- ENERGY STAR Score (Wastewater)
- National Median Site EUI (kBtu/gpd)
- National Median Source EUI (kBtu/gpd)
- Percent Better than National Median Site EUI
- Percent Better than National Median Source EUI
- Site EUI (kBtu/gpd)
- Source EUI (kBtu/gpd)
- Weather Normalized Site EUI (kBtu/gpd)
- Weather Normalized Source EUI (kBtu/gpd)
- Weather Normalized Site Electricity Intensity (kWh/gpd)
- Weather Normalized Site Natural Gas Intensity (therms/gpd)
- Site EUI - Adjusted to Current Year (kBtu/gpd)
- Source EUI - Adjusted to Current Year (kBtu/gpd)

Water or Wastewater Greenhouse Gas Emissions (ghg emissions based on facility energy consumption - not fugitive emissions or other emissions):

- Total GHG Emissions Intensity (kgCO2e/gpd)
- Direct GHG Emissions Intensity (kgCO2e/gpd)
- Indirect GHG Emissions Intensity (kgCO2e/gpd)
- Biomass GHG Emissions Intensity (kgCO2e/gpd)

Water or Wastewater Cost Performance Metrics:

- Investment in Energy Projects, Cumulative ($/GPD)
- Estimated Savings from Energy Projects, Cumulative ($/GPD)

Questions for Jim Horne (EPA)

1. ***Do you have recommendations on who should be on the energy team?***

That's a very good question. I think it depends to a certain degree on the size of the utility. But, to the extent possible, you should have people with very strong operations experience. Also, if you have people with a financial background, they should be considered as well.

The other point that I would make is that in many communities, the person that actually sees and pays the energy bill for the utility is not at the utility. They may be the town clerk or somebody like that. So, especially when you get into a position of analyzing what your current energy

usage and costs are, if those people are available and they perform that kind of function, I strongly advise that you put them on your team as well.

2. *Are there any tools available for assessing return on investment for energy and or capital improvements without an audit? To clarify, if you are a small facility and cannot afford a full or complete external energy audit, is there a tool for assessing ROI of improvements that complement those efforts that are above and beyond low hanging fruits?*

   The Energy Assessment Tool for small systems highlighted on one of the webinar slides is a very good tool for doing this, and does not require the presence of an outside auditor. However, all utilities are encouraged to check with sources like their energy producer or state energy office to see if any low or no cost audit assistance is available.

3. *It seems that this effort is a perfect place to emphasize the importance of asset management. Asset management will undoubtedly save communities resources and reduce their environmental footprint—and certainly contribute to the communities sustainability—any thought given to including asset management?*

   I agree. Examining energy efficient alternatives as part of an asset management program makes sense, but even if the utility has not done a formal asset management program, tools like EPA's Energy Management Guidebook can be used.

4. *What do you consider small and medium wastewater systems? More specifically, my water facility averages 35 - 40 MGD with a peak capacity of 72 MGD. Our wastewater facility is an 80 MGD facility. What size would these facilities be considered?*

   We would consider both of these facilities to be large.

5. *Does every EPA region have this emphasis on energy efficiency?*

   Information on the "key issues" in your EPA region can be found at http://www.epa.gov/epahome/whereyoulive.htm by clicking on your state or region. Information on the EPA Administrator's overarching priorities for EPA is available at: http://www2.epa.gov/aboutepa/epas-themes-meeting-challenge-ahead.

Questions for Michael DiBara (Massachusetts Department of Environmental Protection) & Richard Weare (Greater Lawrence Sanitary District)

1. ***How were you able to justify solar and wind?***

   In our case, we had an ARRA grant that paid 100 percent of it. So, the good news for us was that as soon as we turned the switch on, we were cost-effective.

2. ***Lots of great improvements, but a 30-year payback doesn't seem particularly attractive. What amount of your capital investments were necessary regardless? Or rather, what was the marginal capital increase due to pursuing EE? Would that improve your simple payback?***

   On the efficiency side, just to give you an idea, the majority of efficiency requirements or opportunities on those 14 facilities averaged a 4-year payback on the efficiency side. So when you bundle the efficiency with the other clean energy projects, it was – as you were aware, 11 years – when we take all the projects together. So, the advantage was with bundling the efficiency—the high return measures—with renewables. It's important to take advantage of all the different incentives that are available and look at your energy projects on a cash-flow basis. Many energy projects can pay for themselves – by using the anticipated savings and revenue streams from various incentive programs to cover the capital costs of the upgrade (i.e., becoming cash flow positive from the start).

   GLSD has only considered improvements with a payback of less than 6 years, but has actually only implemented ones that have a payback of 3 years or less.

3. *If I heard it correctly, could GLSD provide a little more detail on how they worked with the utility company for rebate on the force main project?*

   GLSD did not apply for a utility incentive for the force main project, and the table included in the presentation did not show any utility offer. For other projects that are identified, GLSD has our consultant look at the cost and kWh savings of the project. This information is presented to the utility which usually has their consultant review the savings and if acceptable determines the incentive they will offer.

4. *What are the maintenance costs for the PV system?*

   GLSD entered into an agreement with the firm that built our solar arrays to purchase solar power from a project they are building. As part of that agreement, the firm inspects the solar arrays twice per year and inspects the inverters and checks the torque of the wire connections and uses an infrared camera to look for hot spots or loose connections.

5. *How were the RECs sold? An exchange?*

   An energy vendor is used to sell the RECs on the open market.

6. *What size PV systems were installed in Massachusetts?*

   GLSD's system is 410kW. In general, as part of the ARRA assistance funding, PV systems ranged from 16 kW (Falmouth – Long Pond Water Treatment Facility) up to 1,585 kW (Pittsfield Wastewater Treatment Facility). In total, 4,484 kW of solar PV was installed at 18 facilities.

7. *What was the cost (expenditure) to get these savings?*

   An ARRA grant funded the capital cost at GLSD and GLSD let the contract out as a Design-Build project.

8. *If a city is in the process of replacing its water pollution control plant, would any of these recommendations be applicable? I suppose instead such a city might just prioritize making the new plant as energy-efficient as possible?*

   The City can direct their designers to utilize energy efficient equipment.

9. *Do you sell the Class A Fertilizer?*

   Yes, but GLSD has an operating firm operating the heat drying facility and part of their responsibility is to market and sell the Class A fertilizer.

10. *Has the electric billing structure been deregulated where your utility can purchase energy on the open market? If so, how much has that played in electrical savings?*

    Yes, Massachusetts electricity deregulation began in March of 1998. Energy deregulation has enabled consumers to purchase their energy supply from an Energy Services Company of their choice. In general, substantial cost savings can be achieved through alternate energy suppliers based on the market conditions.

11. *Are you using any of your renewable energy in the WWTP?*

    All GLSD energy produced by the solar array is used at the plant, which reduces the cost of purchased power. GLSD also is purchasing other solar produced power, as indicated in the answer to #4.

12. *Which dual-fuel boiler company did GLSD work with?*

    Webster Burner provide the dual fuel burners in a standard boiler.

13. *I noticed that kWH savings are noted for future projects and electricity, it would be great if they converted these savings into GHG reductions as well.*

    This is not available at this time.

Questions for Bob Freeman & Brendan Held (EPA Region 4)

1. ***In the scenario just described where there were concerns about energy savings leading to budget cuts, what was the communication strategy used to prevent the facility from losing the***

money saved?

At the end of the structured phase of the R4-TN Department of Environment and Conservation (TDEC) Energy Initiative, a recognition ceremony was held for the seven utility participants in Nashville. The R4 Regional Administrator, the TDEC Commissioner, Nashville Mayor Dean, Fayetteville Mayor Underwood, and representatives from each utility were there. The event was reported in the Nashville and regional newspapers, and covered by the Nashville television media. The utilities were encouraged throughout that effort to view their energy cost savings as a revenue stream that should be reinvested in their infrastructure and utilized to implement additional energy improvement, bringing even more savings. Most of the utilities embraced that approach; the plant staff in Columbia voiced concern that "city hall" may just see their energy cost savings as an opportunity to cut the plant's operating budget. Fortunately, the Columbia plant staff has been able to gain approval to reinvest at least a sizable portion of their savings to purchase and install additional monitoring and control equipment that will equip them to achieve addition optimization of their aeration system, which will provide additional energy and cost savings.

This issue is a critical element in the process of encouraging public utilities to engage seriously in managing their energy – it does not contribute to permit compliance; it does not typically solve existing plant problems; and it may require additional operator focus/attention. If the energy and associated costs saved at the plant do not produce some benefits at the plant it is more difficult to 'sell' the concepts.

2. *What are they paying per kw/hr?*

   The energy usage costs per kWh generally vary between $0.065 and $0.08 – not including demand charges, which are calculated and shown separately on electrical bills in the Tennessee Valley Authority service areas. If demand charges are added to the usage charges and divided by the total kWh used, the resulting <u>total electrical cost per kWh used averages between $0.08 and $0.10</u>. (Demand charges are typically 25% up to 45% of the usage charge.)

3. *Do you know of any recent data or studies showing energy costs as a percentage of the total utility O&M budgets? The 30% mentioned earlier today would be on the high end, right? What would a median or average utility be—maybe 10 % of O&M budget? (Still it is a very large expense, of course). Appreciate any thoughts on this. Thanks.*

   I have gone back to some of the utilities we worked with in TN and have the following numbers:

Fayetteville TN – Design Q – 3.3 mgd	Actual Q –1.6 mgd	Energy % -- 28% total budget
Columbia, TN – Design Q – 10 mgd	Actual Q – 5 mgd	Energy % -- 29% total budget
Franklin, TN – Design Q – 14 mgd	Actual Q – 10 mgd	Energy % - 18.2% total budget

   These numbers are based on actual energy costs and total O&M costs for 2011.