

Wastewater Sector Energy Intensity and Resilience

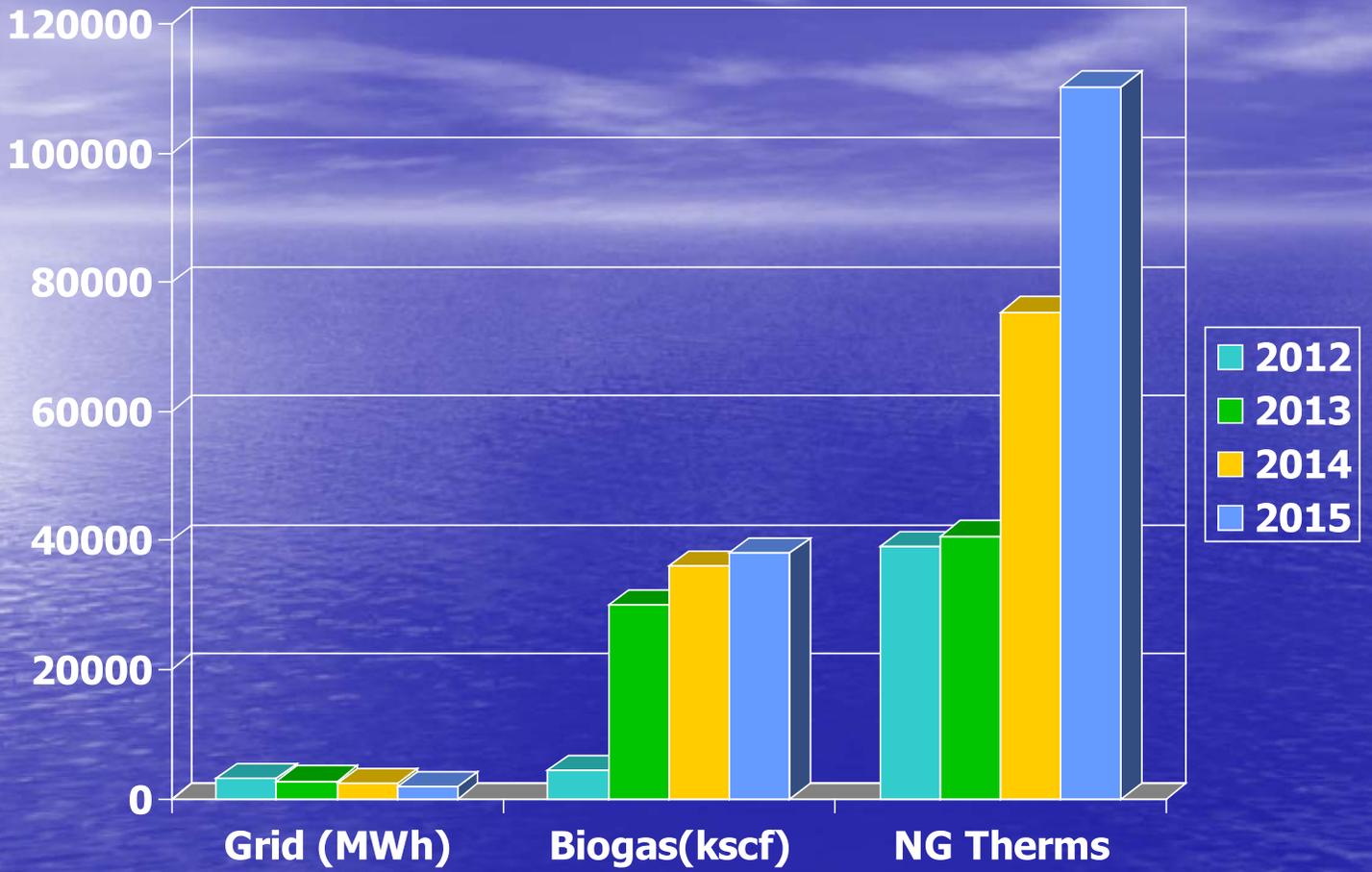
Ithaca Area WWTF Path to
Community Energy

Discussion Topics

- What is energy intensity at a WWTF?
- Showcase Program – Aeration System Improvements
- Community Carbon to Energy
- Town\Gown Relationship
- Resiliency and the NY Prize

Energy Intensity

- Intensity Reduction versus Fuel Dependence
- Shifting load to biogas derived electric and heat
- Poor performance in reducing energy intensity – Natural Gas use increased
- Lots of external variables-Flows and Cold



Why Increase?

- Increased heating space with new trucked residual disposal facility.
- Need to look at greater HVAC controls in new building.
- Turn off air circulation system during off hours
- Change location of thermostats
- Automatic turn off when doors open and close to admit customers

Why Increase II?

- New Digester mixing means more active volume to heat
- New trucked residual receiving center means increase in volume into digester to be heated
- 2015 winter coldest in several decades- February coldest ever

Showcase Project-Aeration

- Second only to pumping energy requirements for most suspended growth plants
- Old system used centrifugal blowers with no dissolved oxygen level controls
- Loaded vs Unloaded dissolved oxygen requirements very different
- Potential to reduce electrical requirements for aeration by 50%=125 Hp

Community Carbon to Energy

- Anaerobic Digesters coupled with a flexible trucked residuals receiving center provide foundation
- Work with local food processing companies to find carbon intensive residuals to feed digesters
- Examples include septage, grease, other plant biosolids, hydrolysate, glycol, still bottoms and other dairy residuals

Community Carbon to Energy

- Currently derive nearly 40% of biogas from trucked residuals
- Receive approximately 4 million gallons per year of trucked residuals
- Digesters still not fully loaded
- Other carbon sources still available for harvesting

Town/Gown and Community Energy

- Two Campuses are served by Ithaca Area WWTF- Ithaca College and Cornell University
- Both have food waste and other carbon intensive waste
- Energy to Lead Grant for \$1million to process food waste and manure from Cornell in the works

Food Waste

- Cornell has over 900 tons of food waste
- Cornell has been collecting and composting for several years
- Contamination with non-digestible a problem
- Grant application would provide source separation and pulping to clean and process for the digester
- Biogas production would supply another 500,000 kWhrs per year

Manure

- On campus teaching dairy barn produces approximately 2million gallons per year
- Land spreading has become a problem
- Use of sand as bedding a problem for digesters
- Grant app would allow for the purchase of sand separation equipment
- Biogas produced could yield another 500,000 kWhrs

Energy Resiliency and the NY Prize

- Superstorm Sandy and Tropical Storms Irene and Lee devastated large parts of NYS
- Governor created NYSERDA program to utilize microgrid concepts to create more resiliency for critical facilities
- WWTF could serve as node for a local microgrid in Ithaca

NY Prize Feasibility Study

- Ithaca successful in obtaining \$100k first phase one funding for feasibility study
- Results of study are promising
- Increase in biogas will drive new CHP
- Use of open space around plant can support around 430 kW of solar PV
- Grid connect is feasible and local utility, NYSEG, is supportive

NY Prize Phase 2

- Phase 2 will provide funding for detailed design with a 15% local match
- Details for the application are still pending
- Our project would provide electricity to schools, public works facilities, bus garage and other proximal customers
- Could lead to heating district or biosolids drying as well

Conclusions

- There is a nexus between our path to net zero and community energy
- DOE Better Plants drives us to be more holistic in our processing of data with regards to energy intensity
- Community carbon can improve Town/Gown relationships
- NY Prize creates greater grid resilience