Clean Energy Generation Opportunities in New York WWTP’s

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End User Engagement

- Partner with strategic End Users to advance technical solutions using CHP as a cost effective and resilient way to ensure American competitiveness
- Utilize local fuels and enhance energy security. CHP TAPs offer fact-based, non-biased engineering support to manufacturing, commercial, institutional and federal facilities and campuses.

Stakeholder Engagement

- Engage with strategic Stakeholders, including regulators, utilities, and policy makers, to identify and reduce the barriers to using CHP to advance regional efficiency.
- Promote energy independence and enhance the nation’s resilient grid. CHP TAPs provide fact-based, non-biased education to advance sound CHP programs and policies.

Technical Services

- As leading experts in CHP (as well as microgrids, heat to power, and district energy) the CHP TAPs work with sites to screen for CHP opportunities as well as provide advanced services to maximize the economic impact and reduce the risk of CHP from initial CHP screening to installation.
What Is Combined Heat and Power (CHP)?

- Form of Distributed Generation (DG)
- An integrated system
- Located at or near a building / facility
- Provides at least a portion of the electrical load and
- Uses thermal energy for:
  - Space Heating / Cooling
  - Process Heating / Cooling
  - Refrigeration/Dehumidification

**Conventional System**
- 94 units Fuel → Power Plant 32% efficiency (Including T&D) → 30 units Electricity → Total Efficiency ~ 50%
- 56 units Fuel → Onsite Boiler 80% efficiency → 45 units Heat

**CHP System**
- 100 units Fuel → CHP 75% efficiency → 10 units Electricity → Total Efficiency ~ 75%
- 45 units Heat

Source: www.energy.gov/chp
CHP System Components

- Prime Mover
- Heat Recovery
- Thermal Technology
- Accessory Devices
- Switchgear
- Interconnection
- Fuel Supply
- Controls/M&V
CHP TAP WWTP Analysis

Plant Energy Use
Electricity: 64,000 MWh
Natural Gas: 40,000 MMBtu
ADG: 156,000 MMBtu
80,000 MMBtu used
76,000 MMBtu flared

Option 1: All ADG at the site is consumed either by the CHP system or boilers (1.2 MW CHP)

Option 2: System based on the minimum addressable thermal (1.7 MW CHP)
What Are the Benefits of CHP?

- CHP is **more efficient** than separate generation of electricity and heating/cooling.
- Higher efficiency translates to **lower operating costs** (but requires capital investment).
- Higher efficiency **reduces emissions** of pollutants.
- CHP can also provide **energy reliability** particularly important at WWTPs.
- On-site electric generation can **reduce grid congestion** and avoid distribution costs.
Resiliency

- Behind the meter CHP reduces electric demand of WWTP’s
- When installed with black start and island mode capabilities CHP can provide uninterrupted power in the event of grid outages, allowing for continued operation of critical infrastructure
- 11 billion gallons of untreated and partially treated sewage flowed into waterways due to loss of power at metropolitan NY and NJ WWTPs in the aftermath of Super Storm Sandy


- Transforming wastewater treatment plants to emphasize the capture of beneficial products is a key component of the circular economy.
- WWTPs represent much of the capacity for organics materials management in New York, present tremendous opportunity for reducing GHG emissions.

*CJWG is comprised of representatives from Environmental Justice communities statewide, including three members from New York City communities, three members from rural communities, and three members from urban communities in upstate New York, as well as representatives from the State Departments of Environmental Conservation, Health, Labor, and NYSERDA.*
NYSERDA Funded CHP at WWTPs

- Over 10 projects at 7 different facilities with installed capacity of 4.8 MW
- **Consumed 2,141 MMcf biogas to produce 100 GWH**
- Predominantly RICE prime mover providing base load generation, exporting to grid, with HW heat recovery for digester heating and space heating.

- **Baseline WWTP Emissions** (grid electricity and natural gas combustion, CHP FCEtherm 40%, Boiler Eff. 80%) = 641,803 tons CO2e
- **Emissions from NYSERDA WWTP CHP systems** = 378,386 tons CO2e
- CHP Portfolio delivered 263,416 tons CO2e savings over system life to date.
  - 20,263 tons CO2e / yr
  - 4,221.4 tons CO2e / yr / MW

Source: https://der.nyserda.ny.gov/map/
Of the 600+ WWTP in NY, 136 utilize anaerobic digestion and produce biogas / methane. These WWTPs with anaerobic digestion produce 24,782 MCF of biogas daily. Currently over 60 MW of CHP at WWTP’s around NYS.

- Technologies include reciprocating engines, turbines, fuel cells as well as direct drive blowers and pumps with heat recovery
- Sizes range from 200 kW to 16 MW

Nine (9) large WWTPs (> 5 MGD) without known beneficial use of biogas, produce enough biogas to accommodate an additional 9 MW

- Potential emissions reductions of 218,106 tons CO2e / year
Project Snapshot:
CHP at Wastewater Treatment Plants

Oneida County Sewer District Water Pollution Control Plant
Utica, NY

Application/Industry: Wastewater Treatment Plant
Capacity: 600 kW (additional 400 kW in progress)
Prime Mover: Microturbine
Fuel Type: Biogas
Thermal Use: Process and building heat
Installation Year: 2019

Highlights:
- Additional 400 kW of capacity received 75% funding from NY Environmental Facilities Corporation (EFC) Green Infrastructure Grant.
- Installation of the anaerobic digester replaced existing sludge incinerators that operated on fuel oil, resulting in significant operating cost and emissions (CO$_2$, SO$_2$, Mercury) reductions.
- Facility accepts source separated organic (SSO) waste from Oneida-Herkimer County Recycling center, diverting waste from landfill and increasing biogas production.
Project Snapshot:
CHP at Wastewater Treatment Plants

North River Wastewater Treatment Plant
Harlem, NY

Application/Industry: Wastewater Treatment Plant
Capacity: 12 MW
Prime Mover: Reciprocating Engine
Fuel Type: Biogas & Natural Gas
Thermal Use: Process and building heat
Installation Year: 2022

Highlights:
- The facility is replacing ten (10) existing fuel oil engines with five (5) dual fuel (biogas and natural gas) reciprocating engines.
- This project is anticipated to reduce annual GHG emissions by nearly 50% (approximately 26,000 MT CO₂ / yr).
- Facility is also performing an LED lighting upgrade anticipated to deliver emissions reductions of 1,000 MT CO₂ / yr.

Project Snapshot: CHP at Wastewater Treatment Plants

Rockland County Wastewater Treatment Plant
Orangeburg, NY

Application/Industry: Wastewater Treatment Plant
Capacity: 633 MW
Prime Mover: Reciprocating Engine
Fuel Type: Biogas
Thermal Use: Process and building heat
Installation Year: 2021

Highlights:
- CHP system installed in order to make use of excess biogas that historically was flared.
- Project includes gas treatment system in order to extend engine life. System removes moisture, particulates, hydrogen sulfide (H₂S), and siloxane.
- Before CHP the facility flared nearly 60% of the biogas produced. CHP operation is anticipated to reduce flared biogas to < 8%.

https://der.nyserda.ny.gov/reports/view/performance/?project=2380
Growth of Hybrid DER Systems

- Hybrid DER approaches offer the opportunity for technologies to complement one another
- Hybrid systems combine characteristics of individual technologies
  - CHP – provides baseload energy
  - Solar – variable renewable generation can now be “firmed”
  - Storage – adding flexibility
- Allows CHP to be a key part of the move toward a distributed/renewable grid
Project Snapshot:
CHP at Wastewater Treatment Plants

St. Cloud Nutrient, Energy, and Water Recovery Facility
St. Cloud, MN

Application/Industry: Wastewater Treatment Plant
Capacity: 633 MW
Prime Mover: Reciprocating Engine
Fuel Type: Biogas & Natural Gas
Thermal Use: Process and building heat
Installation Year: 2021

Highlights:
- CHP system installed to make use of biogas produced from treatment process.
- Facility has operated many days at Net Zero, where all energy needed is produced on-site and from community solar. The biogas fueled CHP system is responsible for > 75% of onsite power generation.
- Facility utilizes Lystek process to produce Class A Biosolids that is bagged and sold for use as fertilizer.


Food Waste Diversion

- NYS Food Donation and Food Scraps Recycling Law went into effect January 1, 2022¹
- Requires large generators of food scraps (> 2 tons / week on avg.) required to donate edible food and recycle remaining scraps if within 25 miles of organics recycler
- Co-digestion of WWTP sludge along with food waste or fats, oils, and grease (FOG) can enhance biogas production from anaerobic digestion by 50 – 185% and 100 – 410% respectively²
- Expanding number of AD’s accepting food scraps is a win-win
  - Increased diversion of organic waste from landfills, reducing fugitive methane emissions
  - Increased biogas production and low carbon, onsite power generation and thermal resource from CHP
  - WWTP’s can recoup system installation costs with tipping fees associated with accepting food scraps

¹https://www.dec.ny.gov/docs/materials_minerals_pdf/foodscrapsleg.pdf
CHP for Grid Support

- CHP can be deployed now to make use of available resources (biogas) to reduce energy consumption.
- Significant increases in grid demand are anticipated as more vehicles and building heating systems are electrified resulting in increased cost for electricity.
- Anticipate increased need for dispatchable resource that can ramp up to meet variations in facility demand or respond to Utility, ISO, or market signals.
- CHP provides energy flexibility, isolating facilities from future increases in utility costs.
**CHP TAP Role: Technical Assistance**

**Screening and Preliminary Analysis**
- Quick screening questions with spreadsheet payback calculator; Advanced technical assistance to explore equipment or operational scenarios.

**Feasibility Analysis**
- Perform 3rd Party reviews of site feasibility assessments: Estimates on savings, installation costs, simple paybacks, equipment sizing, and type.

**Investment Grade Analysis**
- Perform 3rd Party reviews of Engineering Analysis. Review equipment sizing and choices.

**Procurement, Operations, Maintenance, Commissioning**
- Review specifications and bids.
High level assessment to determine if site shows potential for a CHP project

- **Quantitative Analysis**
  - Energy Consumption & Costs
  - Estimated Energy Savings & Payback
  - CHP System Sizing

- **Qualitative Analysis**
  - Understanding project drivers
  - Understanding site peculiarities

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### DOE TAP CHP Screening Analysis

**Annual Energy Consumption**

<table>
<thead>
<tr>
<th></th>
<th>Base Case</th>
<th>CHP Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchased Electricity, kWh</td>
<td>88,250,160</td>
<td>5,534,150</td>
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<tr>
<td>Generated Electricity, kWh</td>
<td>0</td>
<td>82,716,010</td>
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<tr>
<td>Onsite Thermal, MMBtu</td>
<td>426,000</td>
<td>18,872</td>
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<tr>
<td>CHP Thermal, MMBtu</td>
<td>0</td>
<td>407,320</td>
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<tr>
<td>Boiler Fuel, MMBtu</td>
<td>532,500</td>
<td>23,590</td>
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<tr>
<td>CHP Fuel, MMBtu</td>
<td>0</td>
<td>969,845</td>
</tr>
<tr>
<td>Total Fuel, MMBtu</td>
<td>532,500</td>
<td>993,435</td>
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</table>

**Annual Operating Costs**

<table>
<thead>
<tr>
<th></th>
<th>Base Case</th>
<th>CHP Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchased Electricity, $</td>
<td>$7,060,013</td>
<td>$1,104,460</td>
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<tr>
<td>Standby Power, $</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Onsite Thermal Fuel, $</td>
<td>$3,195,000</td>
<td>$141,539</td>
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<tr>
<td>CHP Fuel, $</td>
<td>$0</td>
<td>$5,819,071</td>
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<tr>
<td>Incremental O&amp;M, $</td>
<td>$0</td>
<td>$744,448</td>
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<tr>
<td>Total Operating Costs, $</td>
<td>$10,255,013</td>
<td>$7,809,514</td>
</tr>
</tbody>
</table>

**Simple Payback**

- Annual Operating Savings, $    | $2,445,499  |
- Total Installed Costs, $/kW    | $1,400  |
- Total Installed Costs, $/k     | $12,990,000 |
- Simple Payback, Years          | 5.3       |

**Operating Costs to Generate**

- Fuel Costs, $/kWh            | $0.078  |
- Thermal Credit, $/kWh         | ($0.037)   |
- Incremental O&M, $/kWh        | $0.009  |
- Total Operating Costs to Generate, $/kWh | $0.048  |
## CHP screening analysis

### Step 2 - Site Operating Schedule

<table>
<thead>
<tr>
<th>Month</th>
<th>Monthly Hours</th>
<th>MMBtu</th>
<th>MMBtu Load</th>
<th>MMBtu Load/Hr</th>
<th>Seasonal Thermal Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>705</td>
<td>1,065</td>
<td>905</td>
<td>1.28</td>
<td>Winter MMBtu/hr</td>
</tr>
<tr>
<td>February</td>
<td>633</td>
<td>1,427</td>
<td>1,213</td>
<td>1.92</td>
<td>3,405 MMBtu/hr</td>
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<tr>
<td>March</td>
<td>705</td>
<td>1,485</td>
<td>1,262</td>
<td>1.79</td>
<td>1.8 MMBtu/hr</td>
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<tr>
<td>April</td>
<td>681</td>
<td>939</td>
<td>798</td>
<td>1.17</td>
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</tr>
<tr>
<td>May</td>
<td>705</td>
<td>2,002</td>
<td>1,702</td>
<td>2.41</td>
<td>1.7 MMBtu/hr</td>
</tr>
<tr>
<td>June</td>
<td>681</td>
<td>1,539</td>
<td>1,309</td>
<td>1.92</td>
<td>6,696 MMBtu/hr</td>
</tr>
<tr>
<td>July</td>
<td>537</td>
<td>1,226</td>
<td>1,042</td>
<td>1.94</td>
<td>1.6 MMBtu/hr</td>
</tr>
<tr>
<td>August</td>
<td>705</td>
<td>1,022</td>
<td>869</td>
<td>1.23</td>
<td></td>
</tr>
<tr>
<td>September</td>
<td>681</td>
<td>834</td>
<td>709</td>
<td>1.04</td>
<td>1.7 MMBtu/hr</td>
</tr>
<tr>
<td>October</td>
<td>705</td>
<td>1,246</td>
<td>1,059</td>
<td>1.50</td>
<td>3,220 MMBtu/hr</td>
</tr>
<tr>
<td>November</td>
<td>681</td>
<td>1,372</td>
<td>1,166</td>
<td>1.71</td>
<td>1.7 MMBtu/hr</td>
</tr>
<tr>
<td>December</td>
<td>537</td>
<td>1,513</td>
<td>1,286</td>
<td>2.40</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7956</td>
<td>15,670</td>
<td>13,320</td>
<td>1.67</td>
<td></td>
</tr>
</tbody>
</table>

**Displaced Thermal Efficiency:** 85.0%

### Additional Analysis

<table>
<thead>
<tr>
<th>Billing days per month</th>
<th>31</th>
<th>28</th>
<th>31</th>
<th>30</th>
<th>31</th>
<th>30</th>
<th>31</th>
<th>31</th>
<th>30</th>
<th>31</th>
<th>30</th>
<th>31</th>
<th>365</th>
</tr>
</thead>
</table>

**Electricity Bill Data**

- Monthly Electric Use kWh
  - Jan: 314,896
  - Feb: 415,658
  - Mar: 399,882
  - Apr: 288,952
  - May: 553,359
  - Jun: 518,596
  - Jul: 514,023
  - Aug: 500,416
  - Sep: 380,979
  - Oct: 469,093
  - Nov: 489,757
  - Dec: 453,181
  - Total: 5,298,792

- Monthly Peak Demand kW
  - Jan: 905
  - Feb: 902
  - Mar: 948
  - Apr: 926
  - May: 1,097
  - Jun: 1,083
  - Jul: 1,131
  - Aug: 1,133
  - Sep: 1,092
  - Oct: 989
  - Nov: 953
  - Dec: 915
  - Total: 9,988

- All-in Monthly Cost (Commodity plus T&D)
  - Jan: $33,471
  - Feb: $40,725
  - Mar: $38,031
  - Apr: $32,339
  - May: $43,026
  - Jun: $57,081
  - Jul: $61,210
  - Aug: $56,314
  - Sep: $55,570
  - Oct: $46,210
  - Nov: $44,281
  - Dec: $48,463
  - Total: $556,722

**Average 'all-in' $/kWh**

- Jan: 0.1063
- Feb: 0.0980
- Mar: 0.0951
- Apr: 0.1119
- May: 0.0778
- Jun: 0.1101
- Jul: 0.1191
- Aug: 0.1125
- Sep: 0.1459
- Oct: 0.0985
- Nov: 0.0904
- Dec: 0.1069
- Total: 0.1051

**Fuel Bill Data**

- Nat Gas
  - Monthly Fuel Use (Therm)
    - Jan: 10,648
    - Feb: 14,274
    - Mar: 14,846
    - Apr: 9,390
    - May: 20,020
    - Jun: 15,395
    - Jul: 12,257
    - Aug: 10,224
    - Sep: 8,337
    - Oct: 12,464
    - Nov: 13,716
    - Dec: 15,134
    - Total: 156,705
  - Monthly Fuel Cost
    - Jan: $8,429
    - Feb: $9,863
    - Mar: $10,219
    - Apr: $4,631
    - May: $10,417
    - Jun: $7,532
    - Jul: $5,674
    - Aug: $5,145
    - Sep: $4,815
    - Oct: $6,738
    - Nov: $11,094
    - Dec: $11,809
    - Total: $96,368
  - Average Cost of Fuel /MMBtu
    - Jan: $7.9163
    - Feb: $6.9098
    - Mar: $6.8833
    - Apr: $4.9317
    - May: $5.2036
    - Jun: $4.8929
    - Jul: $4.6293
    - Aug: $5.0322
    - Sep: $5.7759
    - Oct: $5.4057
    - Nov: $8.0885
    - Dec: $7.8031
    - Total: $6.1496

**Addressable Thermal Load Fuel MMBtu**

- Jan: 1,065
- Feb: 1,427
- Mar: 1,485
- Apr: 939
- May: 2,002
- Jun: 1,539
- Jul: 1,226
- Aug: 1,022
- Sep: 834
- Oct: 1,246
- Nov: 1,372
- Dec: 1,513
- Total: 15,670

**Step 3 - Displaced Thermal Equipment Efficiency**

- Displaced Thermal Efficiency: 85.0%
CHP screening analysis

CHP Operating Schedule based on Thermal Loads

- Average Addressable Thermal Load (MMBtu/hr) / Thermal Load Factor (%)
  - Winter/Shoulder: 1.61 MMBtu/hr, 89.8%
  - 12 months: 1.67 MMBtu/hr*, 88.9%

- Minimum Addressable Thermal Load (MMBtu/hr) / Thermal Load Factor (%)
  - Winter/Shoulder: 1.04 MMBtu/hr, 100%
  - 12 months: 1.04 MMBtu/hr, 100%

4a - Select CHP Operating Schedule: 12 Months
4b - Select Addressable Thermal Load: 1.04 MMBtu/hr
Thermal Load Factor: 100.0%

*Average Addressable Load based on Shoulder Month;
**Average and Minimum Addressable Load based on 12 Months
## Prime Mover Driven CHP Performance Assumptions

**Table 1. Comparison of CHP Characteristics for Typical Systems** [1, 2]

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Reciprocating Engine</th>
<th>Gas Turbine</th>
<th>Microturbine</th>
<th>Fuel Cell</th>
<th>Steam Turbine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size Range</td>
<td>10 kW-10 MW</td>
<td>1 MW-500 MW</td>
<td>30 kW-330 kW</td>
<td>5 kW-2.8 MW</td>
<td>100 kW-250 MW</td>
</tr>
<tr>
<td>Electric Efficiency</td>
<td>30-42%</td>
<td>24-36%</td>
<td>25-29%</td>
<td>38-42%</td>
<td>5-7%</td>
</tr>
<tr>
<td>Overall Efficiency</td>
<td>77-83%</td>
<td>65-71%</td>
<td>64-72%</td>
<td>62-75%</td>
<td>80%</td>
</tr>
<tr>
<td>Total Installed Cost</td>
<td>$1,400-$2,900</td>
<td>$1,300-$3,300</td>
<td>$2,500-$3,200</td>
<td>$4,600-$10,000</td>
<td>$670-$1,100 [4]</td>
</tr>
<tr>
<td>O&amp;M Cost ($/kWh)</td>
<td>0.9-2.4</td>
<td>0.9-1.3</td>
<td>0.8-1.6</td>
<td>3.6-4.5</td>
<td>0.6-1.0</td>
</tr>
<tr>
<td>Power to Heat Ratio</td>
<td>0.6-1.2</td>
<td>0.6-1.0</td>
<td>0.5-0.8</td>
<td>1.3-1.6</td>
<td>0.07-0.10</td>
</tr>
<tr>
<td>Thermal Output</td>
<td>2,000-6,100</td>
<td>3,400-6,000</td>
<td>4,400-6,400</td>
<td>2,200-2,600</td>
<td>30,000-50,000</td>
</tr>
<tr>
<td>Fuel Pressure</td>
<td>1-75</td>
<td>100-500 (may require fuel compressor)</td>
<td>50-140 (may require fuel compressor)</td>
<td>0.5-45</td>
<td>n/a</td>
</tr>
<tr>
<td>Part Load Efficiency</td>
<td>Good at both part- and full-load</td>
<td>Better at full-load</td>
<td>Better at full-load</td>
<td>Better at full-load</td>
<td>Good at both part- and full-load</td>
</tr>
<tr>
<td>Type of Thermal Output</td>
<td>LP steam, hot water, space heating, chilled water</td>
<td>LP-HP steam, hot water, process heating, chilled water</td>
<td>LP steam, hot water, chilled water</td>
<td>LP steam, hot water, chilled water</td>
<td>LP-HP steam, hot water, chilled water</td>
</tr>
<tr>
<td>Fuel</td>
<td>Can be operated with a wide range of gas and liquid fuels. For CHP, the most common fuel is natural gas.</td>
<td>Hydrogen, natural gas, propane, methanol</td>
<td>Steam turbines for CHP are used primarily where a solid fuel (e.g., coal or biomass) is used in a boiler.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[https://betterbuildingssolutioncenter.energy.gov/chp/resources-publications](https://betterbuildingssolutioncenter.energy.gov/chp/resources-publications)
CHP e-Catalog

https://chp.ecatalog.ornl.gov
A Feasibility Analysis Typically Involves:

- Electrical load profiling
- Thermal load profiling
- Unit sizing
- Thermal use determination (what to do with the heat)
- Installation cost estimations
- Financial calculations (simple payback, ROI, etc.)
- Cost/savings information compared to what your facility would pay if the CHP system were not installed
Biogas Use Options – CHP vs. Boilers

NYC DEP - Port Richmond

60 MGD Design, 28 MGD Average (2015)
84,000 MMBtu per year Biogas Production

Scenario 1
PV Solar\(^2\) = 1,600,000 kWh/yr (10% of electric load)
Biogas Boilers\(^3\) = 58,000 MMBtu (47% of heat load only)

Scenario 2
Biogas CHP = 7,385,697 kWh/yr (46% of electric load)
+ 33,600 MMBtu (27.2% of heat load)

26,000 MMBtu flared annually under Scenario 1

\(^1\) NYC DEP – 2018
\(^3\) 385000CF x 365 Days x 600 Btu x 80% boiler x 75% LF. Est Biogas = 70% of total load. Facility boilers are dual fuel (Biogas & NG).
Example Hourly Analysis

Average load: 4,897 kW
Maximum load: 8,485 kW
Minimum load: 3,227 kW
Total Electricity Usage: 3,526,104 kWh
Actual Electricity Generated: 3,192,811 kWh
Actual Electricity Generated: 90.5%
System Efficiency: 77%
CHP Operating Hours: 720 hr
Operating hours %: 100%
CHP system size: 4,897 kW
Heat rate: 12,793 Btu/kWh
Number of units: 1
Minimum engine load allowed: 50%
Funding Sources

- Environmental Facilities Corporation - Green Innovation Grant Program – Energy Efficiency
  - Round 12 of funding closed July 29, 2022. Applicants must complete a Consolidated Funding Application (CFA)
    - DEC has indicated there are significant funds available, stay tuned for new round of funding
  - Qualifying projects must provide power to a Publicly Owned Treatment Works (POTW) and may include wind, solar, micro-hydroelectric, and biogas CHP
  - Projects may receive up to 50% of total eligible costs, or 75% if in environmental justice area.

1 - https://efc.ny.gov/gigp
IRA Tax Credits

**Inflation Reduction Act**

- **Base & Bonus Rates**
  - The base rate for the ITC is 6%.
  - The bonus rate for the ITC is 5 times the base rate (30%)
  - Taxpayers receive the bonus rate for meeting the prevailing wage and apprentice requirements. Projects under 1 MW are exempted.

- **Applicability to ‘Non-Profit’ Municipal WWTPs**
  - Organizations exempt from tax under subtitle A of the Internal Revenue Code are “applicable entities” for direct payments. If the facility is exempt, they would be eligible for a direct production payment. The Treasury Department will have to create some regulations and procedures allowing taxpayers to make direct pay claims.

Plus 10% Points: Domestic Content Bonus

- To meet the domestic content requirement the facility must use 100% domestic iron and steel and a specified percentage of domestic manufactured products, which changes by year: 2023: 40%, 2024: 40%, 2025: 45%, 2026: 50%, 2027 and later: 55%

Deadline for the sec. 48 ITC to January 1, 2025.

Tech Neutral Credits (sec. 45Y, 48E)

- Only zero-emissions facilities placed in service after December 31, 2024, are eligible for the technology-neutral PTC or ITC
- The technology-neutral credits phase out as greenhouse gas emission reduction targets in the electric sector are reached.
- The applicable year means the later of the calendar year in which electric sector greenhouse gas emissions are equal to or less than 25% of 2022 emissions or 2032.

Additional Resources Addressing Tax Credits

Midwest Cogeneration Association (MCA). please visit the following MCA Webinar recording of a David Gardinar’s presentation on IRA/ITC Tax Credits related to CHP
https://attendee.gotowebinar.com/recording/8658387316124991833

Visit the Combined Heat and Power Alliance (CHP Alliance) website for information on tax credits.

Summary

- CHP is a proven technology which is commercially available and has a history of deployment in tandem with other renewable technologies.
- CHP is an essential component of the transition to carbon free energy systems.
  - CHP gets the most out of a renewable fuel source
  - High overall utilization efficiencies
  - Integration with and support of renewables and storage
- WWTPs are an ideal site for these technologies
  - Base load application with both electric and thermal needs
  - Critical infrastructure in need of resiliency which CHP provides
  - Incorporation of food scraps diverts waste from landfills, satisfying NY Food Scraps Law, and enabling increased biogas (power and heat) production
Next Steps

Contact CHP TAP for assistance if:

- You are interested in having a “no-cost” Qualification Screening performed to determine if there is an opportunity for CHP on-site.
- If you have an existing CHP plant and are interested in expanding the plant.
- If you need an unbiased 3rd Party Review of a CHP proposal.
Thank You

Questions?

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A program sponsored by

U.S. Department of Energy
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