

## **1) South Plant Gray Water for Cooling Water at Empire Generating:**

The District provides cooling water to Empire Generating in the Port of Rensselaer, in 2013 an average of 3.0 million gallons per day of final effluent was provided, with revenues received of \$351,600. The gray water system was commissioned on April 6, 2010 and is the **largest** productive / beneficial use of secondary effluent in NYS.

## **2) Waste Heat to Power Cogeneration / Green House Gas Reduction**

### ***A) General Environmental Benefits***

Utilizing the incinerator waste heat energy, the ORC electrical generator system utilizes "bio-mass" product as an energy generation source. This "green power" source reduces dependence on utility grid fossil-fuel powered electrical generation. In addition, proponents of biomass generated electricity note the following benefits:

- Biomass fuels "recycle" atmospheric carbon, minimizing global warming impacts since zero "net" carbon dioxide is emitted during biomass combustion, i.e. the amount of carbon dioxide emitted is equal to the amount absorbed from the atmosphere during the biomass growth phase.
- The recycling of biomass wastes mitigates the need to create new landfills and extends the life of existing landfills.

Biomass combustion produces less ash than coal, and reduces ash disposal costs and landfill space requirements. The biomass ash can also be used as a soil amendment in farm land.

### ***B) Specific Environmental Benefits of this Proposed Project***

With the continuing concerns of global warming due to the production of greenhouse gases, this project will have a significant environmental benefit. NYSERDA reports that 25.2% (1) of greenhouse gas is produced from the electric power generation sector. By using the renewable energy, available from the waste heat produced from sewage-sludge combustion, and reducing the historical consumption from the grid, the following potential reduction in Carbon Dioxide (CO<sub>2</sub>) could be achieved:

- Electrical production at 1.52 DTPH = 570 kW
- Hours of incineration per week = 112
- Potential electrical production per week = 63,840 kWh's
- Potential electrical production per year = 3,319,680 kWh's
- Average production of Carbon Dioxide (CO<sub>2</sub>) in NYS per kWh (2) = 0.86 pounds
- Potential reduction of Carbon Dioxide per year = 2,854,925 pounds or 1,425 tons
- Electrical production at 2.2 DTPH = 835 kW
- Hours of incineration per week = 77.4
- Potential electrical production per week = 64,629 kWh's
- Potential electrical production per year = 3,360,708 kWh's
- Average production of Carbon Dioxide (CO<sub>2</sub>) in NYS per kWh (2) = 0.86 pounds
- Potential reduction of Carbon Dioxide per year = 2,890,209 pounds or 1,445 tons

### 3) NYS DEC Beneficial Use Determination (BUD), Sewage Sludge Ash

The sewage sludge ash produced at the North and South Plant has a NYS DEC BUD and is mixed 50/50 with yard waste compost and is used at landfills as daily cover, the BUD also includes for use in roadway medians and at golf courses.

### 4) Overall Carbon Foot Print Reduction via Energy Efficiency

Energy efficiency upgrades have included energy efficient motors, variable frequency drives, process unit upgrades, lighting, HVAC etc., this has reduced consumption by 40% as it relates to kilowatt hours per million gallons treated, and a 40% decrease in CO<sub>2</sub>,

