Metro Nashville District Energy System

District Energy System
Program Options Report:
Appendix B.3 Additional Model Assumptions

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Submitted to:

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1.1 Utility Costs

1. Utility cost data for electricity, water, and chemicals is derived from the DES FY18 Budget – Attachment C – Five-Year Capital Plan (Thermal Engineering Group, Inc. (TE), June 23, 2017).
2. Utility cost inputs are as follows:
    a. Electricity:
        i. Electricity Tariff is $0.1027 USD/kWh
        ii. Electricity Usage is 0.9 kWh/ton-hour
        iii. The Projected Fuel and Water Use Efficiency Adjustment (FEA) as a percentage of the projected electricity cost per ton-hour is added. This percentage is 1.8%.
    b. Water:
        i. Water Tariff is 3.8443 USD/1000 gal
        ii. Water Usage is 2.143 gal/ton-hour
        iii. The Projected Fuel and Water Use Efficiency Adjustment (FEA) as a percentage of the projected water cost per ton-hour is added. This percentage is 14.9%.
    c. Chemicals:
        i. Chemicals Cost is $0.0026 USD/ton-hour
        ii. Chemicals Cost is approximated by dividing the projected FY18 Chemicals Cost by the FY17 Chilled Water consumption ($166,400 / 64,115,837 ton-hours)

1.2 Maintenance Costs:

1. Based on FVB's experience, maintenance costs are projected at $14,160 per year for the EGF Expansion model, and $3,540 per year for the TES Expansion model.
    a. Both models project maintenance costs rising at 3.3% per year.

1.3 Insurance Costs:

1. Insurance costs are projected as a percentage of capital assets. Based on projected FY18 Budget data, insurance costs are approximately 0.04% of capital assets.

1.4 Required Annual Replacement Capital Expenditures (CAPEX):

1. Annual replacement CAPEX for the EGF Expansion model is determined by calculating the estimated baseline CAPEX per ton of installed capacity from the FY18 Budget, and multiplying this number by 5,000, the intended amount of installed expansion capacity.
    a. Based on FVB's experience, annual replacement CAPEX for the TES Expansion is approximately one half of the required annual replacement CAPEX for the EGF Expansion.
2. In both the EGF Expansion model and the TES Expansion model, the annual replacement CAPEX cost is expected to begin five years after commissioning.

1.5 Depreciation:

1. The estimated life of the capital assets required for expansion is forty years. They are depreciated according to this timeline.