



Wastewater Thermal Energy

Presented to the Mitigation Working Group's
Buildings Sub-Group meeting

April 28, 2021

District of Columbia Water and Sewer
Authority



- One of nation's largest utilities
 - 1,200 employees
 - \$640 million annual operating budget
 - 2.2 million people served
 - 32 MW average power usage
- Drinking water purchased from Washington Aqueduct (USACE)
- Water distribution and wastewater collection for District of Columbia
- Wastewater treatment for DC region
- Independent, nonprofit governmental Authority – Act of Congress 1996
- Excellent performance record

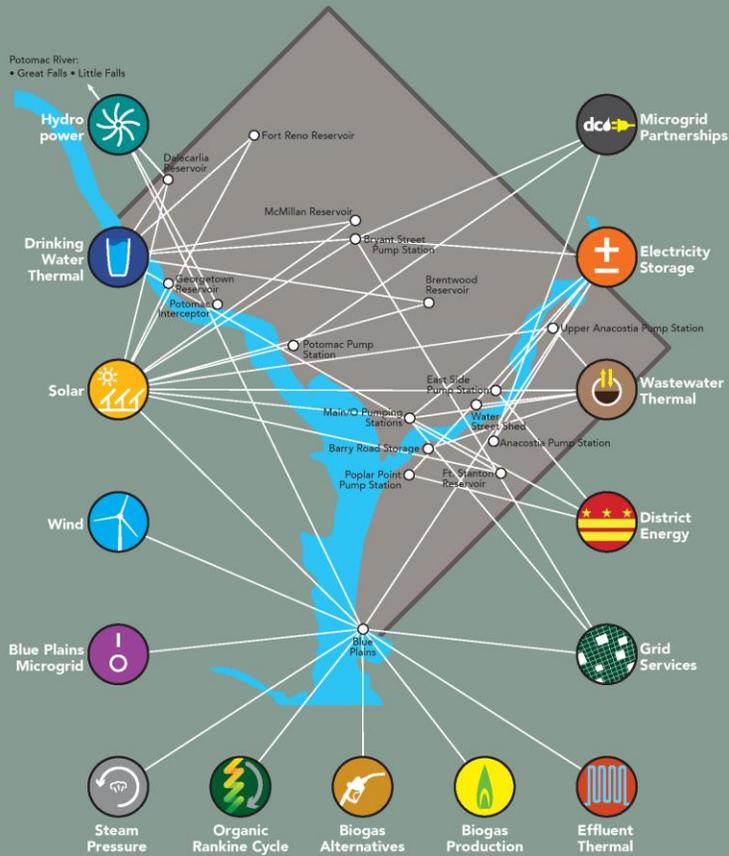


DC Water Energized

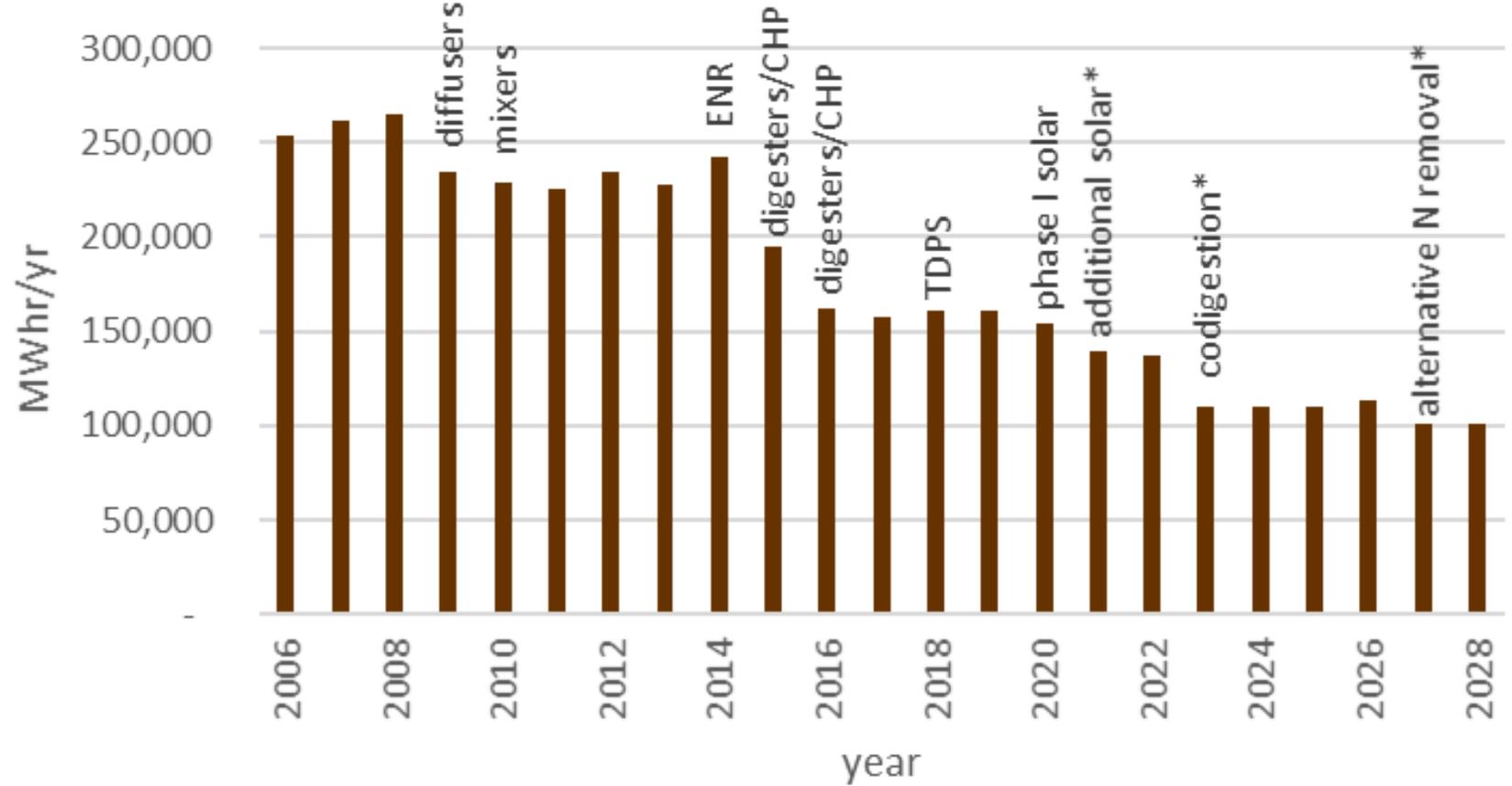
dc ENERGIZED

DC Water's Energy Opportunities

DC Water has identified opportunities to add renewable generating capacity, enhance energy resiliency, and reduce carbon emissions in the District. This map highlights potential locations.



Blue Plains Grid Power Draw





1. Generate Revenue





Potential Benefits

Economic

- No furnace, no cooling tower
- High efficiency heat transfer: COP up to 8
- Operational savings of up to 80%

Environmental

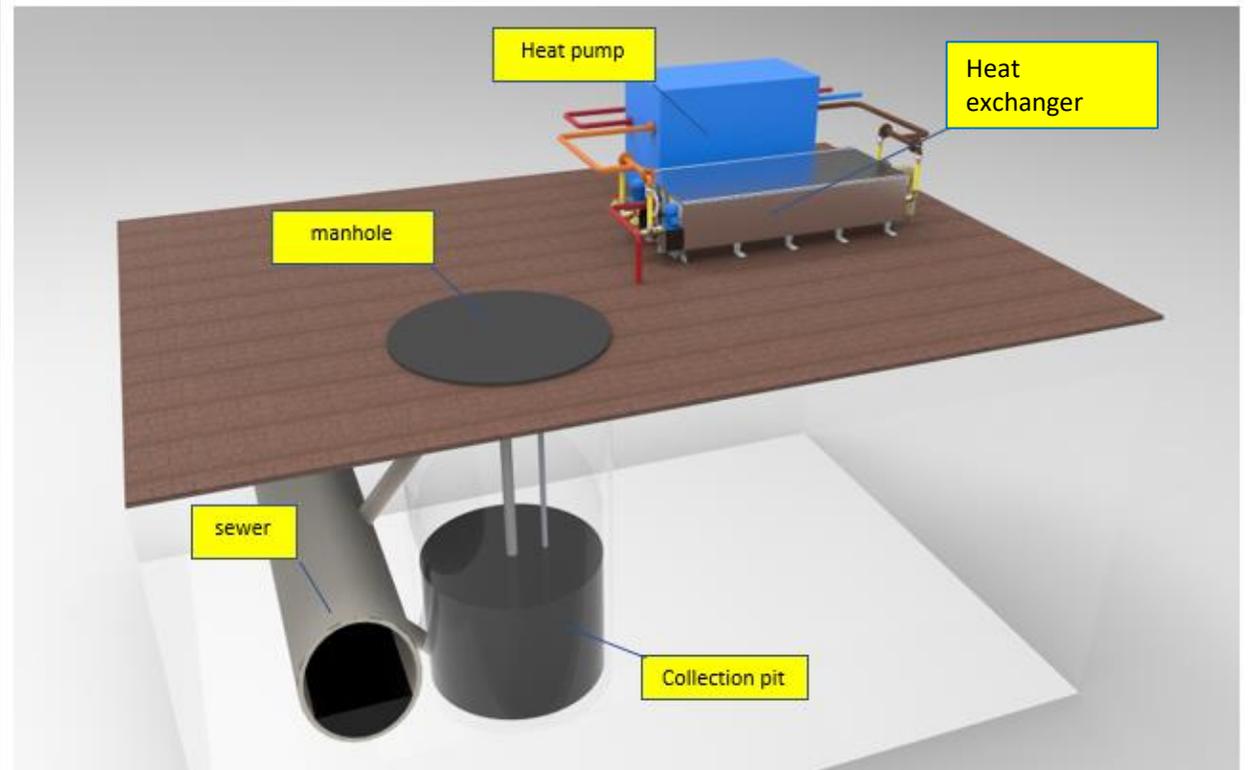
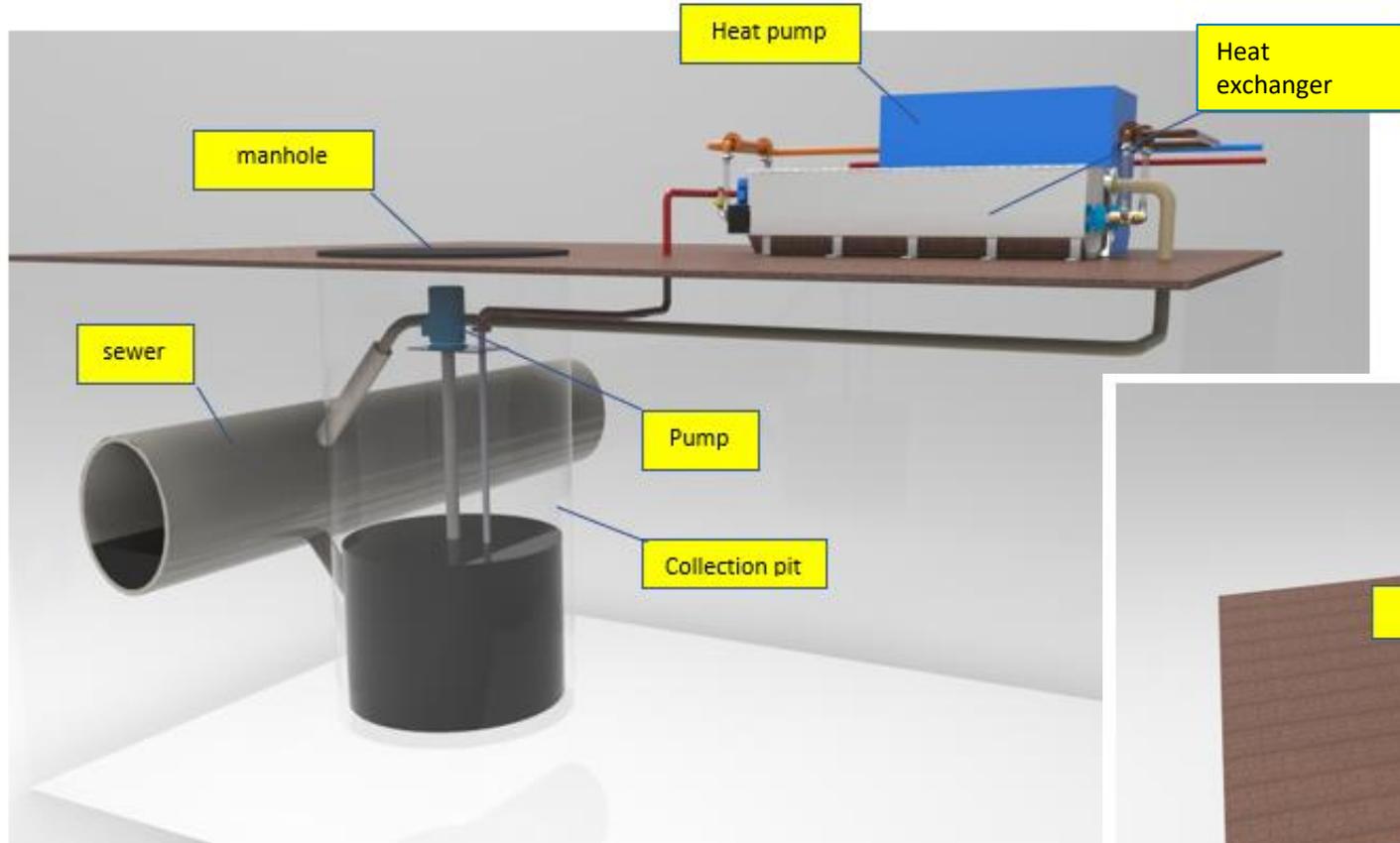
- Reduced energy consumption
- Switch from direct-fossil-fired to electric grid for heat
- Eliminates consumptive fresh water use for cooling

Development

- Rooftop space: extra apartments, pool, etc.
- Simplified maintenance



How It Works





Wastewater Thermal Energy – Buildings in Operation



American
Geophysical
Union



DC Water Headquarters



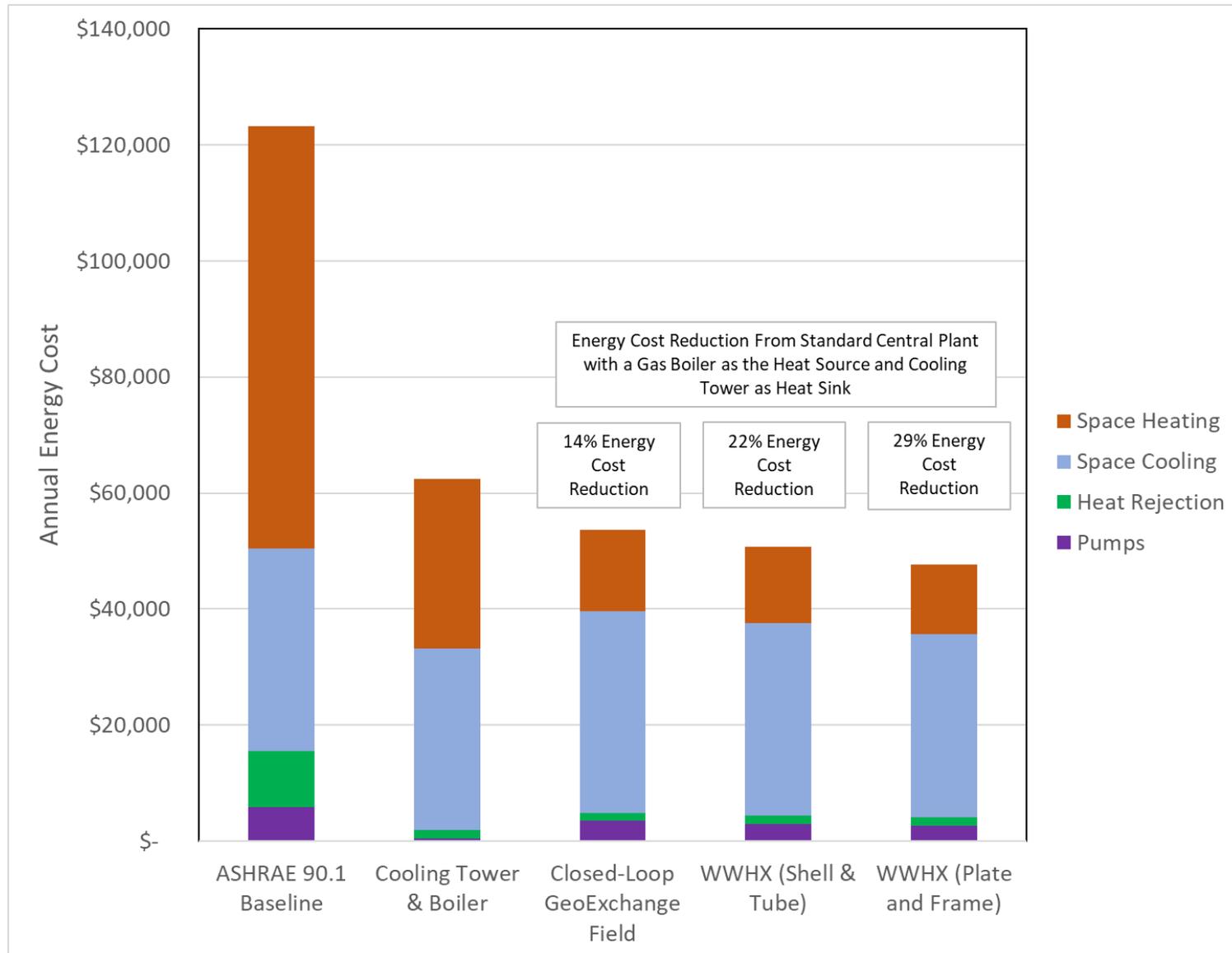
- Completed 2018
- Houses admin/public functions of DC Water
- Built on top of sewage pump station
- 150,000 square feet





HQO Efficiency

Design choices cut energy cost in **half** from already energy-efficient code requirements



With wastewater as the heat source/sink, energy cost dropped an **additional 29%**

And- the building could be **fully electrified** even where a geothermal field was impossible



Resource Size

Each 1,000,000 gallons/day
yields ~1 MW thermal energy

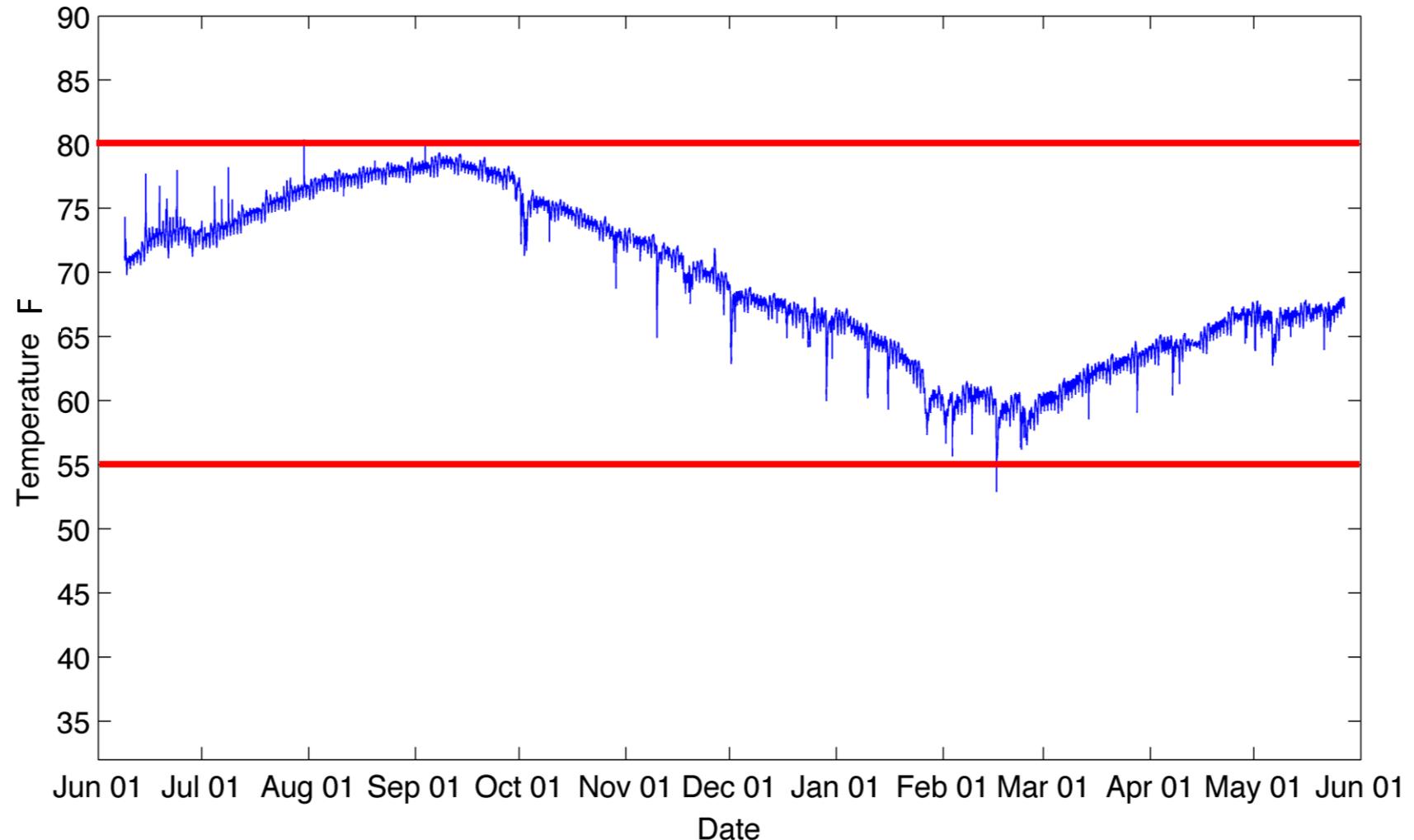
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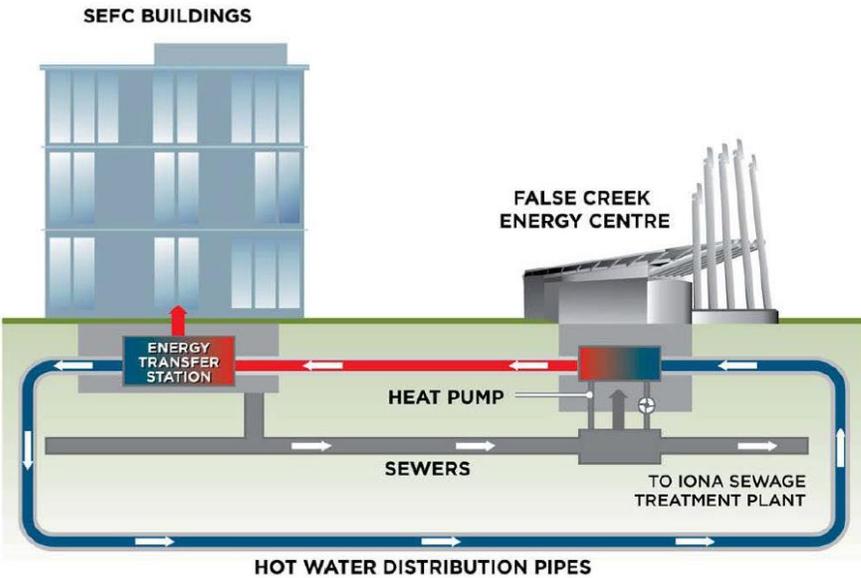
100 MW for each 1,000,000
people

In DC, that's 200 MW, or at
least **25,000,000 square feet** of
conditioning

Plus, potentially more energy
at the treatment plant – up to
3-4x

2015-16 Full Temperature Cycle, AMI-01_M36266





FALSE CREEK ENERGY CENTRE - How it works





Wastewater Thermal Energy – To The Future



Valsana Hotel in Arosa, Switzerland uses a combination of wastewater and geothermal for 100% of its heat.



In Denver, a 250-acre development will get 90% of its thermal energy from the sewer underneath.



Maryland made wastewater thermal energy eligible for renewable energy credits in 2021.



SE False Creek, in Vancouver, Canada, is an entire neighborhood heated by wastewater.



King County, Washington is working with private partners to develop WWTE systems.

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