

# Strategies for Coal-Free Generation and System Growth

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# District Energy St. Paul

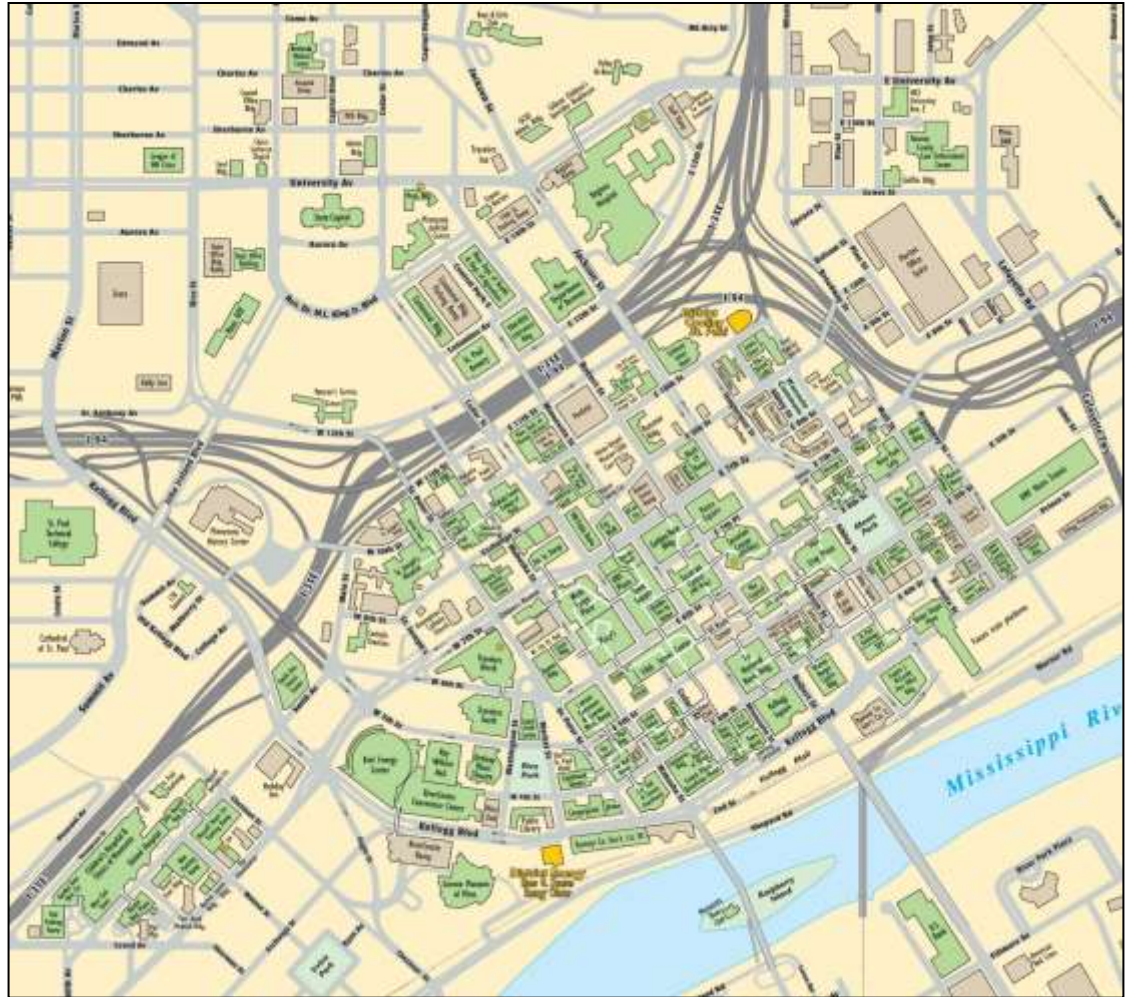


# Unique Business Structure

- 501(c)3 non-profit utility
  - No stockholders, cost-based rates
- Public-private partnership
  - city, county, state, federal agencies
  - BOMA, chambers of commerce, industry
- Competing for business
  - 80/60% market share for heating/cooling

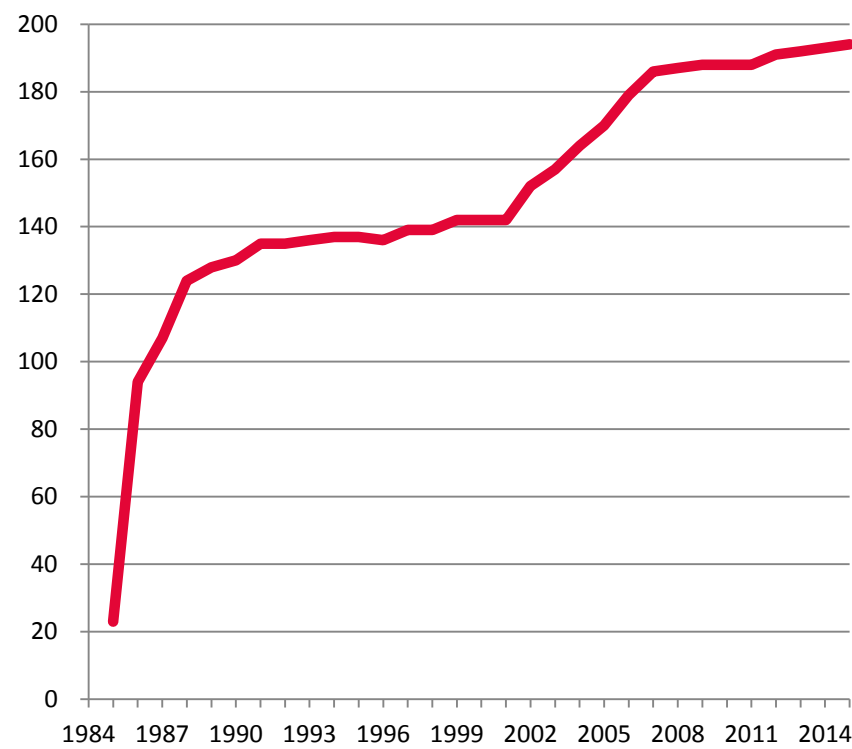


# Heating and Cooling the City

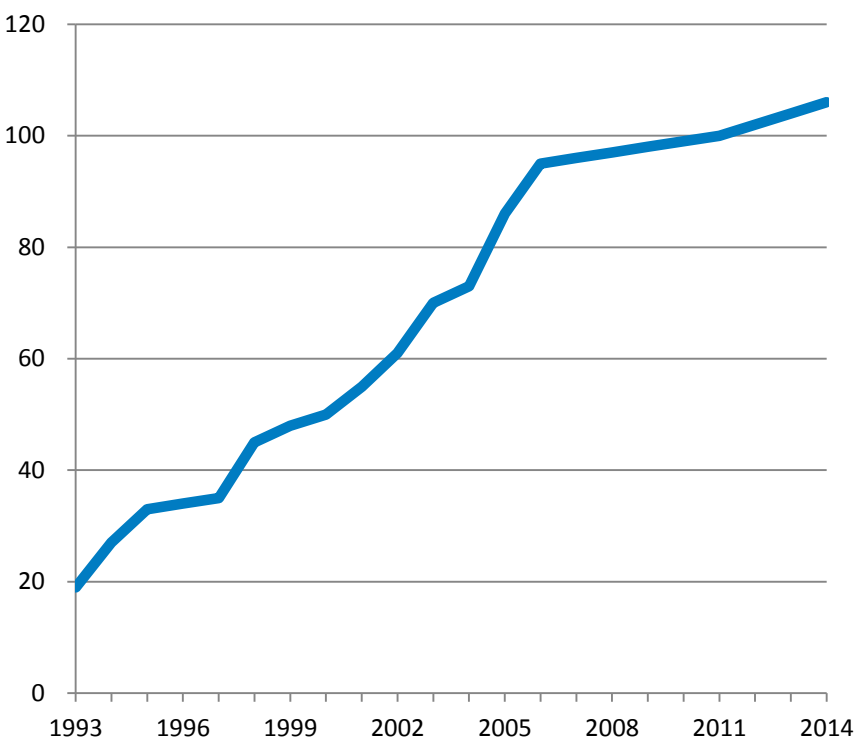


# Customer Growth

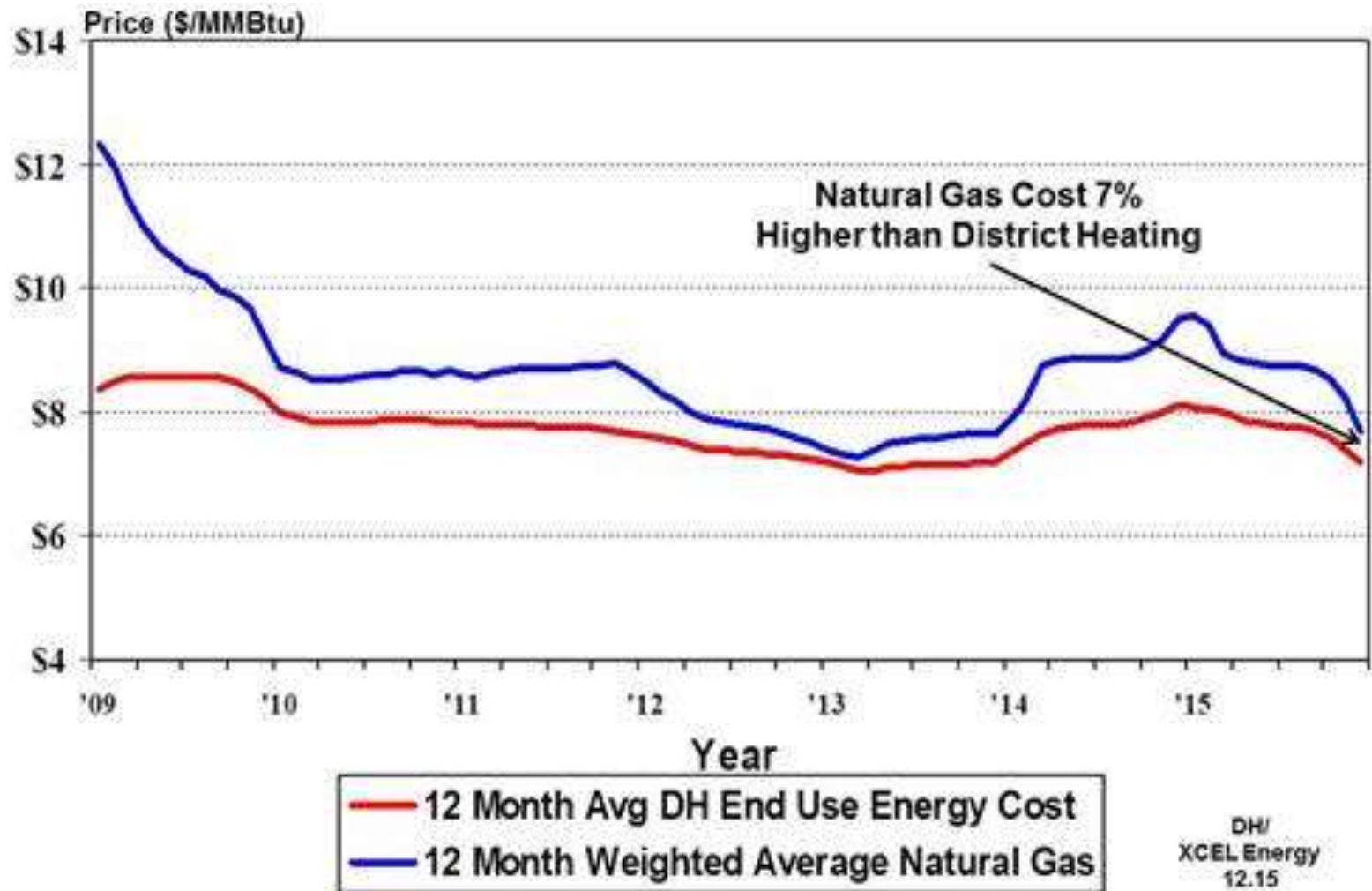
Customer Growth: Heating



Customer Growth: Cooling



# Energy Charges – District Energy vs Onsite

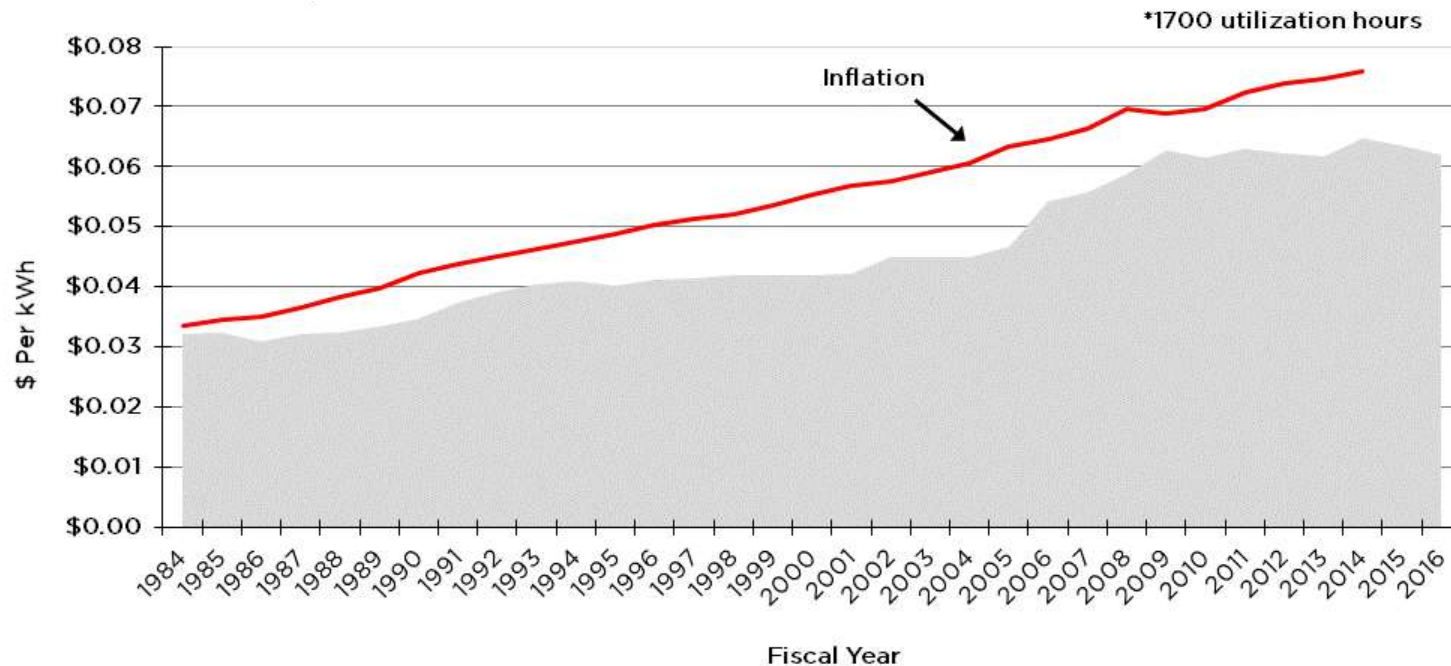




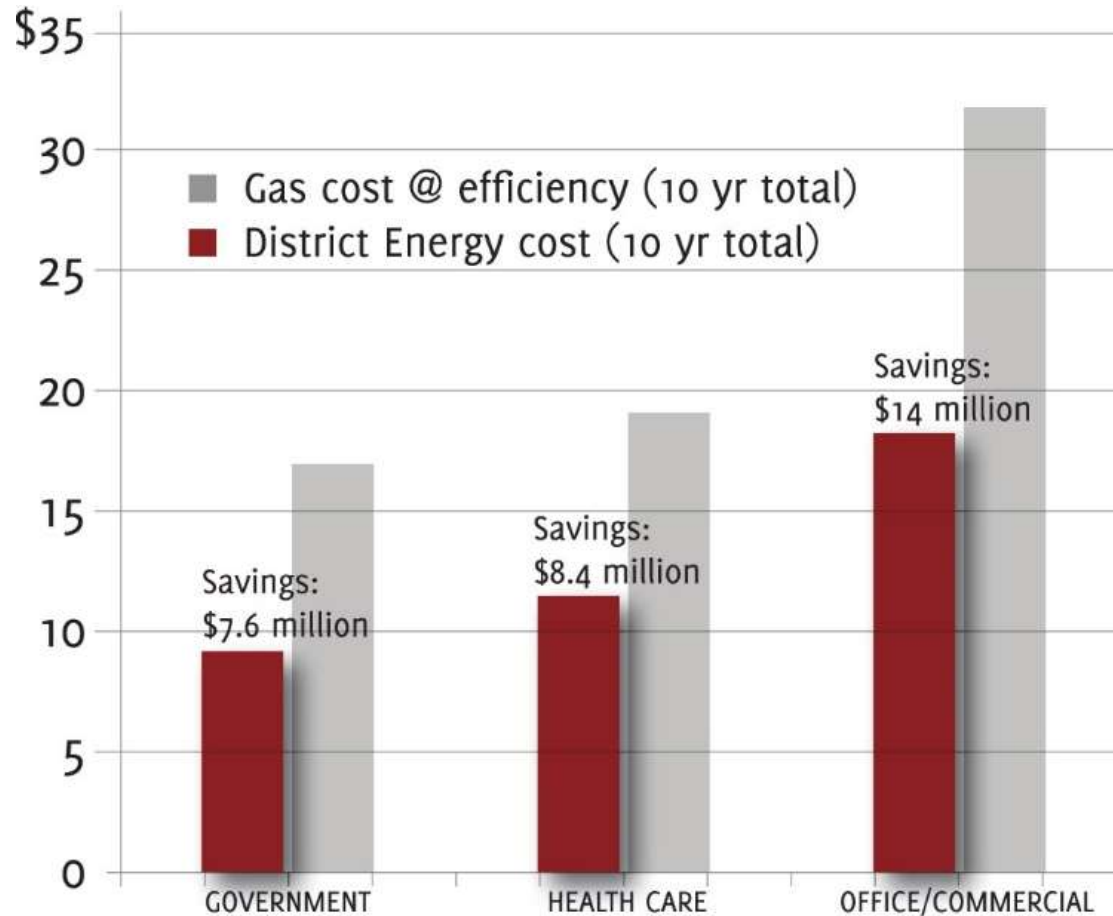
# Combined Rate Summary 1984-2016

District Energy customers are paying less for our services today than 33 years ago (adjusted for inflation)

Combined Rate Summary 1984-2016



# Customer Savings Between 2000-2010



Not all District Energy customers are represented in the chart, such as residential customers and entertainment venues.



# Our Changing Market



# Challenges

## Stick-Built Construction

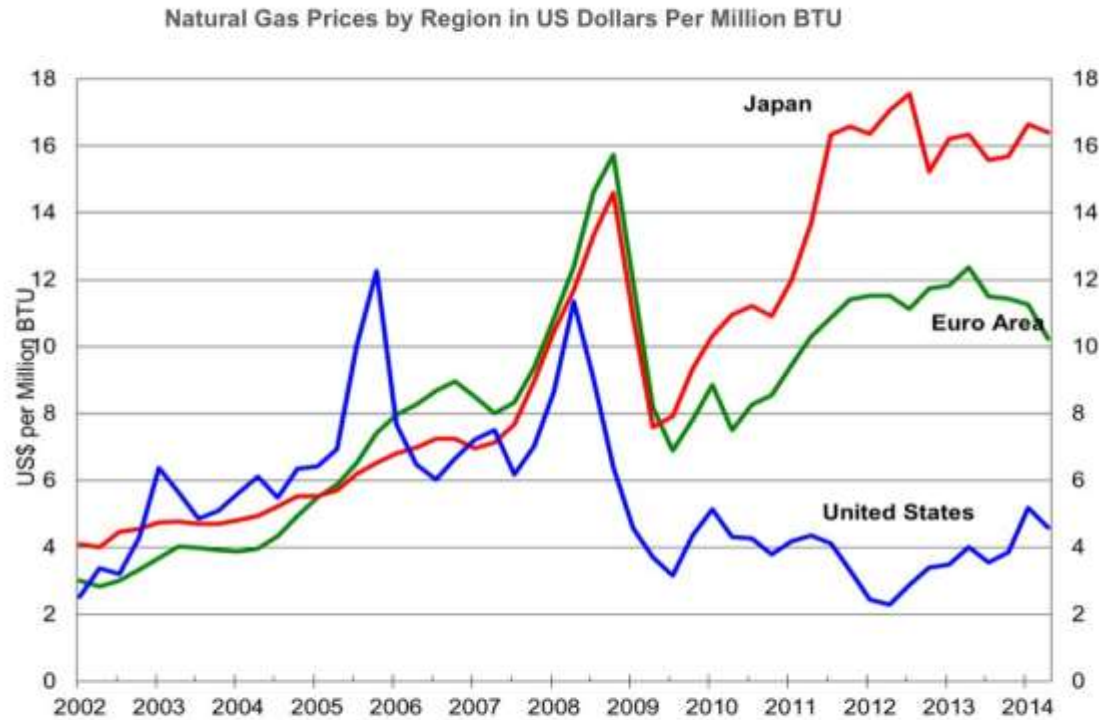


## Magic-Paks



# Challenges

## Natural Gas Discoveries Lower US Energy Costs



Sources: World Bank and Citi Research



# Challenges

## Condensing Boilers



## Magnetic-Driven Chillers



# Opportunities – Collaborative Planning

## Higher Ground





# Opportunities – Smarter Buildings





# Opportunities for System Growth

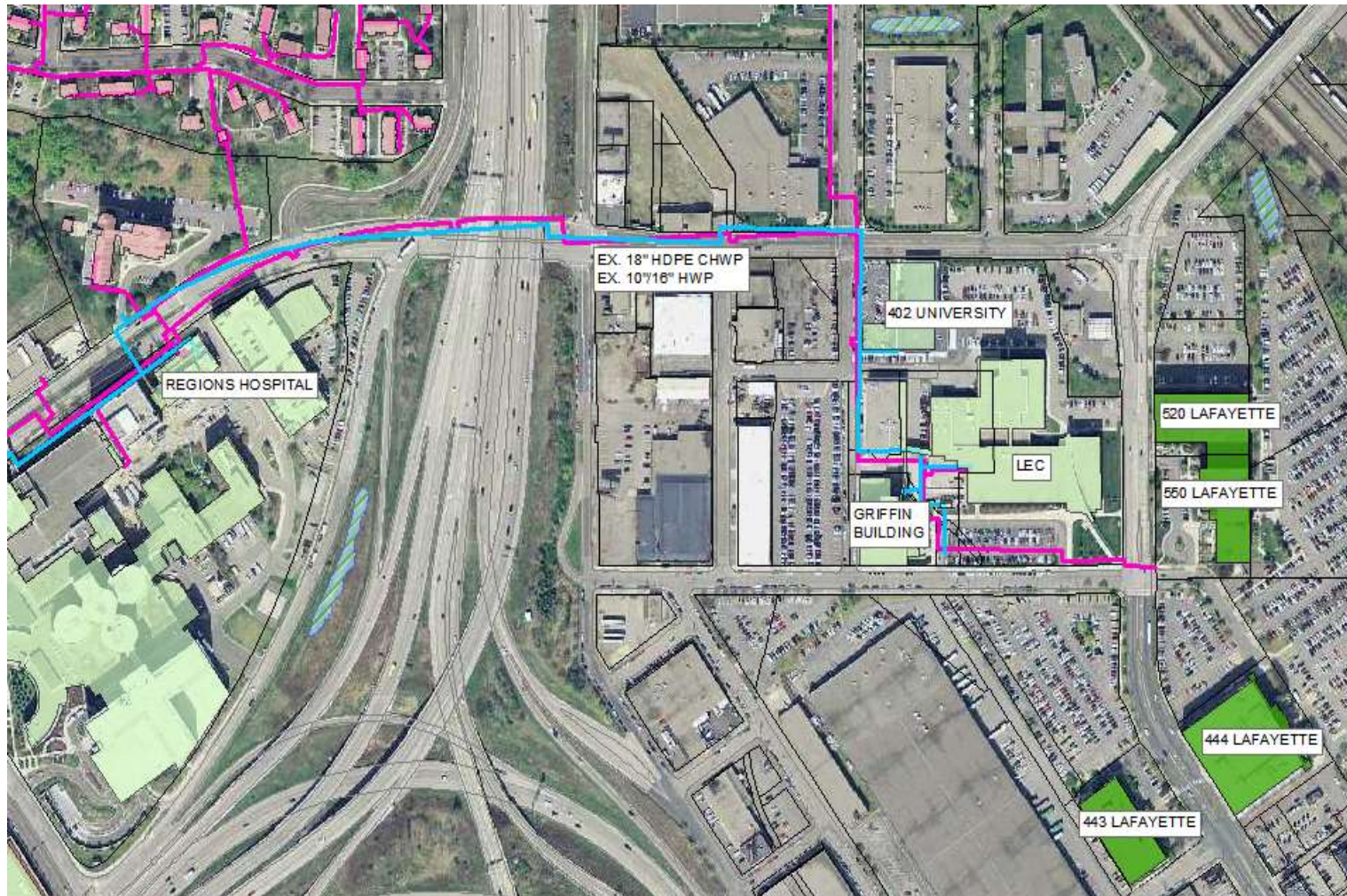


# Secondary Core Water Loop - Geothermal Integration





# Secondary Core Water Loop – Wastewater Energy Recovery





# Ford Site Redevelopment Planning



# Energy Island – Waste Heat Recovery



# Eliminating Coal





# For district heating utility in St. Paul, time's up for coal

## WRITTEN BY

Frank Jossi  
10/28/2015

## PHOTO BY

NatureNerd / Creative  
Commons



Coal will no longer be used as power source by the 2020-2021 heating season by St. Paul-based [District Energy LLC](#), a district heating and cooling provider for the city's downtown and surrounding neighborhoods.

The district energy heating system provider used coal primarily during the winter months when natural gas supplies decline, according to Ken Smith, chief executive officer and president. The company's plan calls replacing coal with a mix of natural gas, biomass, fuel oil, solar and efficiency measures.

"For me as the leader of this organization putting out that marker as to when we're going to be done (with coal) was important," Smith said. "We're leaders in our industry both here in the United States and in North America. We feel we can do it."

Removing coal from the district energy system will reduce carbon emissions by 21,000 tons – the equivalent of taking 4,400 cars off the road.

"It's pretty significant that District Energy is voluntarily transitioning off coal," said Anne Hunt, St. Paul's environmental policy director. The company's decision to take "a proactive step to reduce carbon emissions" without having to do so by statute "is a really big deal," she said.



# Combined Heat & Power



- 33 MW of electricity
- Renewable, clean, urban wood residue
- Greenhouse gas CO<sub>2</sub> reduced up to 280,000 tons per year

# Solar Thermal Integration



# Enhanced Thermal Storage





# Waste Heat Recovery

- Local recycler
- Potential customer
- Waste heat
- Backup heating supply assets



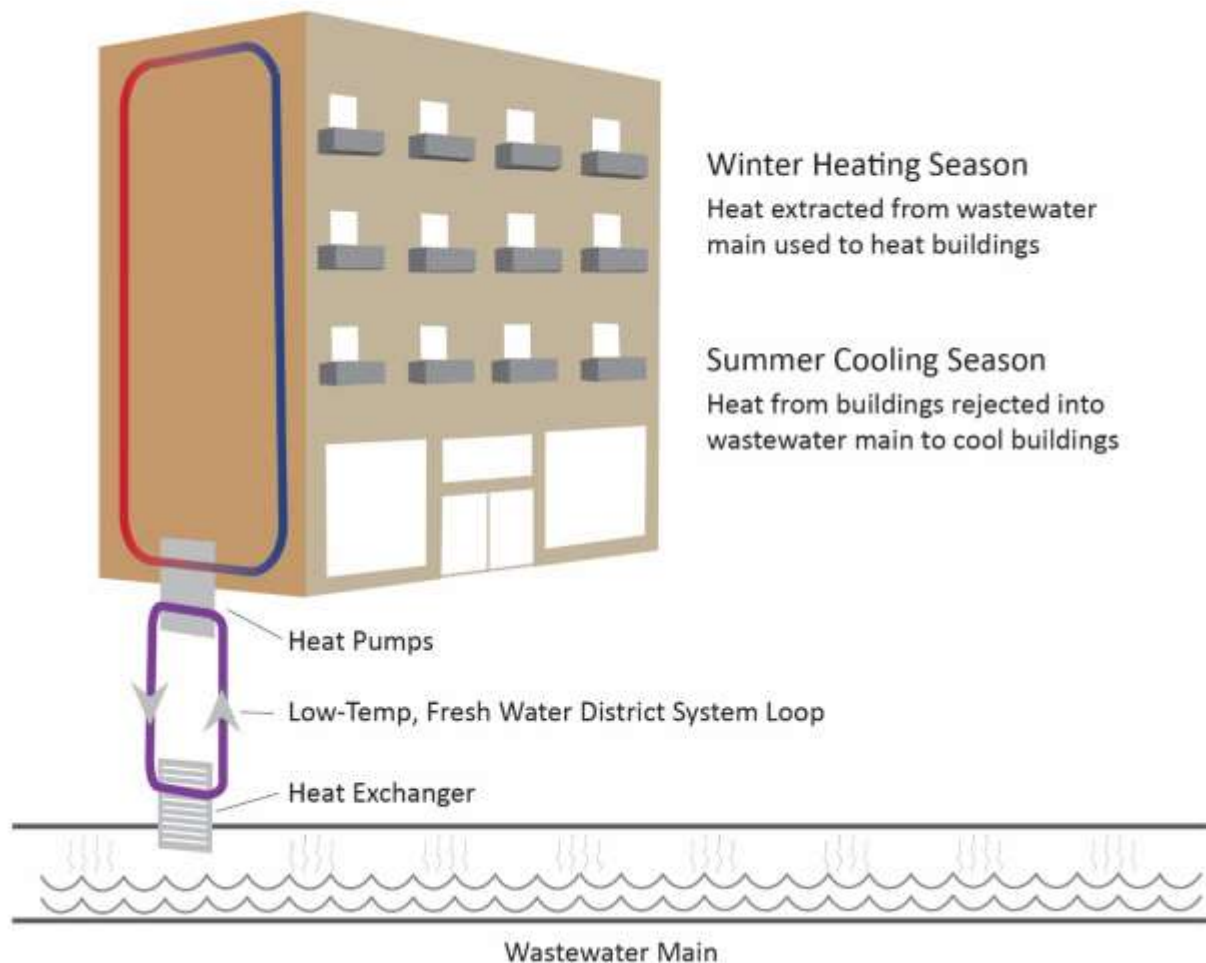
# Distributed Gas Generation





# Wastewater Energy Recovery

## Wastewater Main Energy Capture



# **Educating Customers and the Community**



# Sustainability, Technology, and Education



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## Welcome to the Saint Paul EcoDistrict

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[WHERE TO START](#)



[ECODISTRICT MAP](#)



[www.saintpaulecodistrict.com](http://www.saintpaulecodistrict.com)



# Saint Paul EcoDistrict Placemaking



# Saint Paul EcoDistrict Future Phases

- Classroom curriculum: K-12
- Demonstration projects of varying scale
- Interactive projects and on-site education
- Science festival
- Large-scale daylighting
- Developer engagement – Align future development with EcoDistrict Principles
- Prototyping Festival
- Plume Project





# Plume Project (districtenergyplume.com)





# Thank you

