

# *Welcome!*



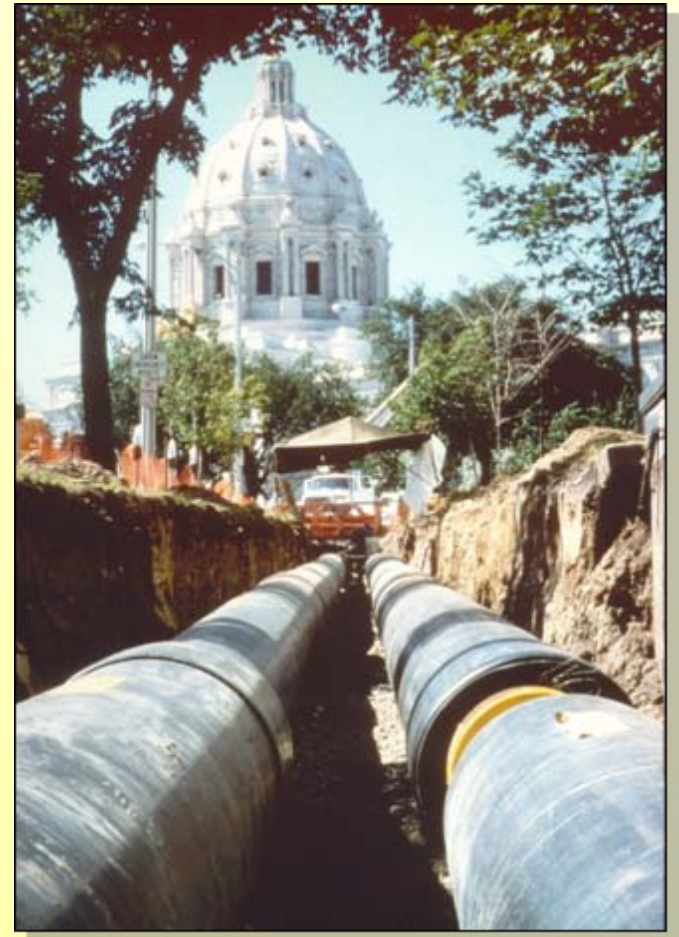
**DISTRICT ENERGY**  
ST. PAUL™

*Greening Saint Paul by using clean,  
urban wood residue and CHP to heat  
and cool downtown buildings...*

# Our mission

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*“Be the preferred provider of community energy services that benefit our customers, the community and the environment.”*



# District Energy organization

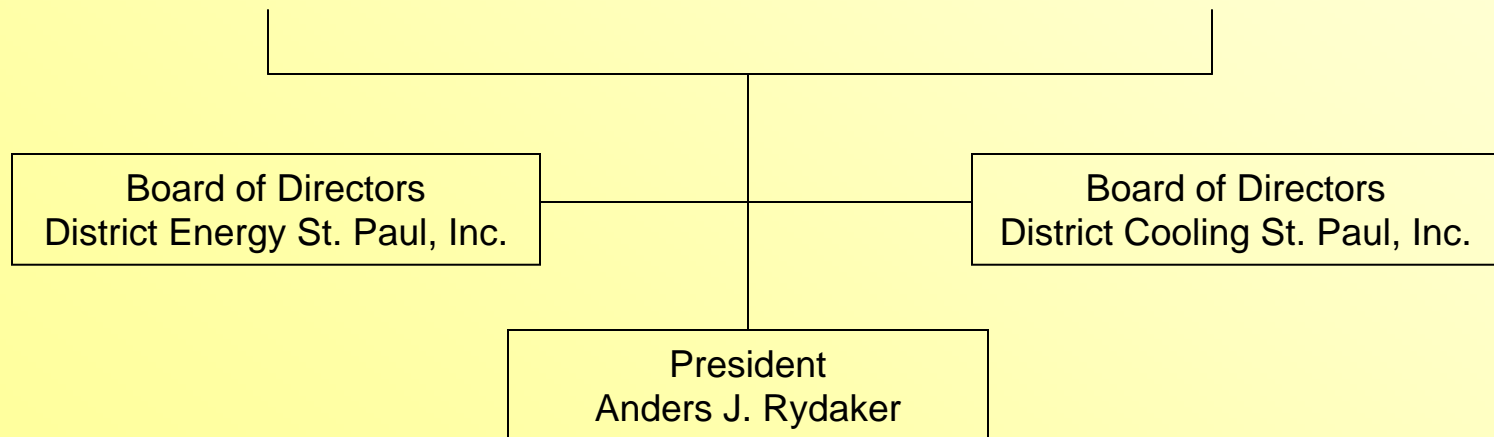
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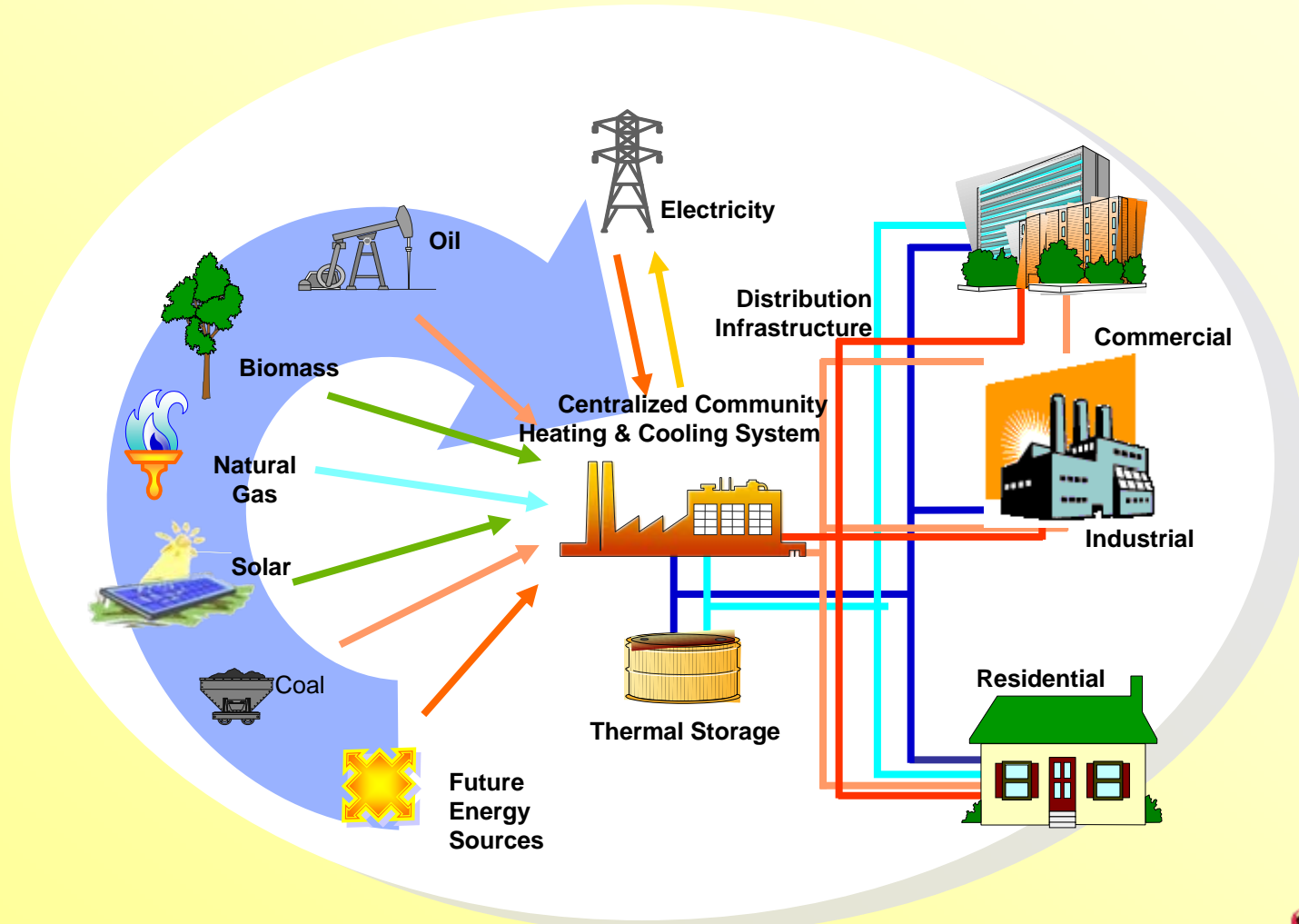
Customers



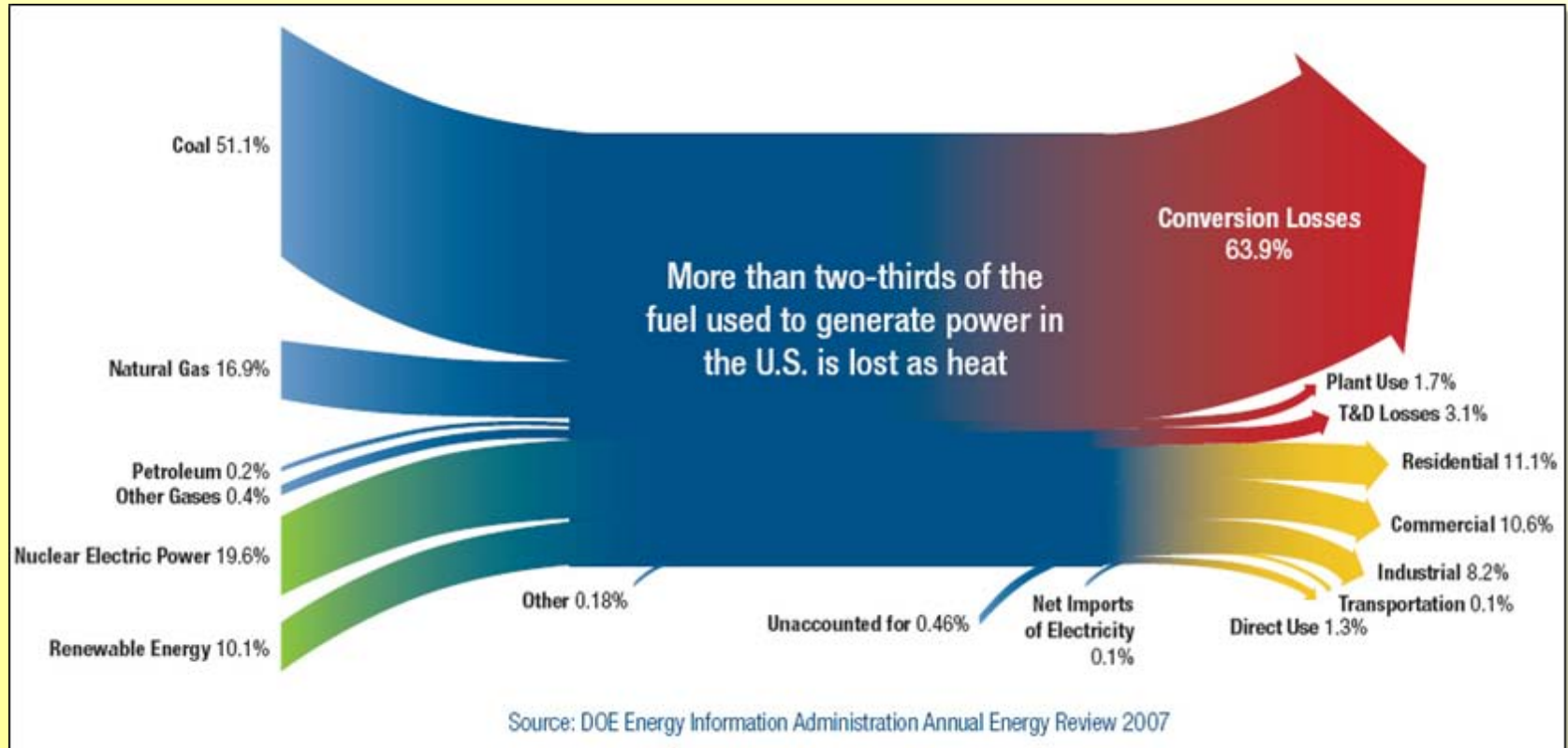
Downtown Saint Paul



# Saint Paul's community energy system



# Energy loss



# Heating and cooling Saint Paul

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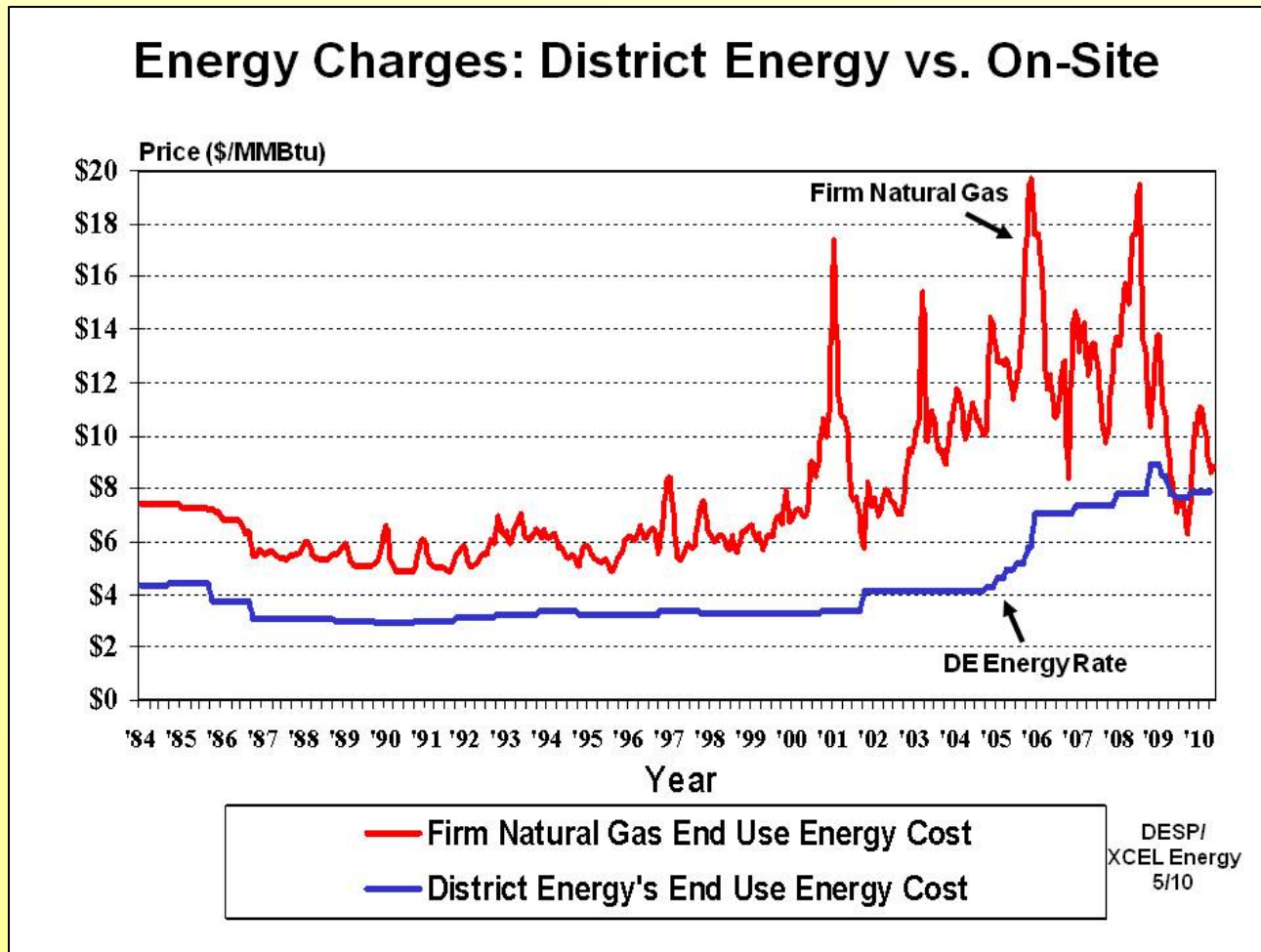
# District Energy today

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- Serves more than 80 percent of the downtown area - over 31 million sq. ft.
- Reduced sulfur dioxide and particulate emissions by more than 50 percent
- Twenty-seven years of outstanding reliability and rate stability
- CHP integration shifted fuel use for system away from fossil fuels to primarily renewable fuels



# Rate stability



# District Cooling St. Paul

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# District Cooling results today

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- Chilled-water demand started at 2,900 tons and has increased to 29,000 tons over 16 years
- Serving more than 60% of the downtown area – approximately 19 million sq. ft.
- Chilled water system includes 6.5 million gallons of storage capacity
- Thermal storage reduced peak-electric demand by as much as 9,000 kilowatts



# Bringing “green energy” to Saint Paul

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# Goal: Enhance Efficiency & Renewable Fuels

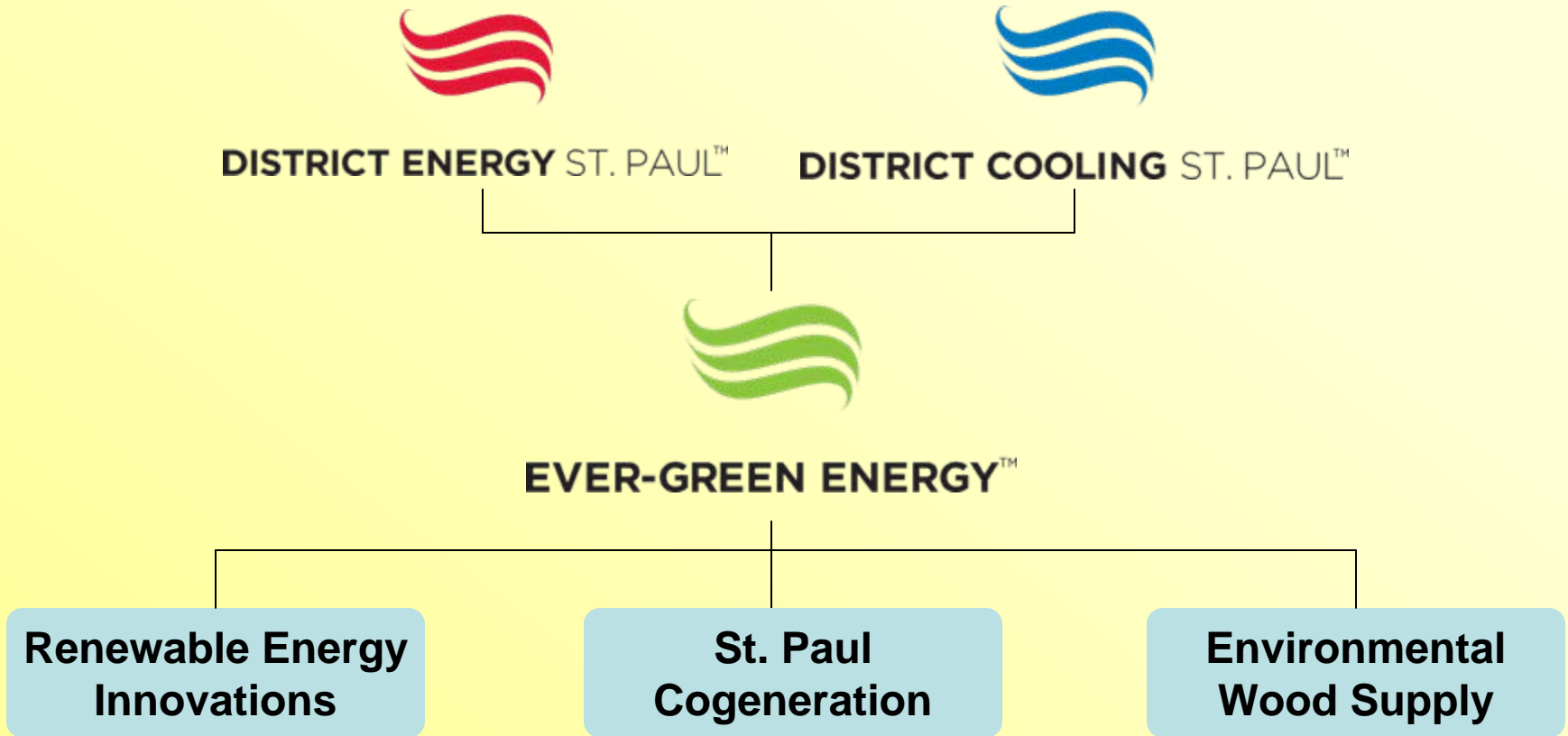
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- Community energy systems/District energy
- Based on:
  - Locally-derived renewable fuels
  - Combined heat and power



# Company structure

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# St. Paul Cogeneration

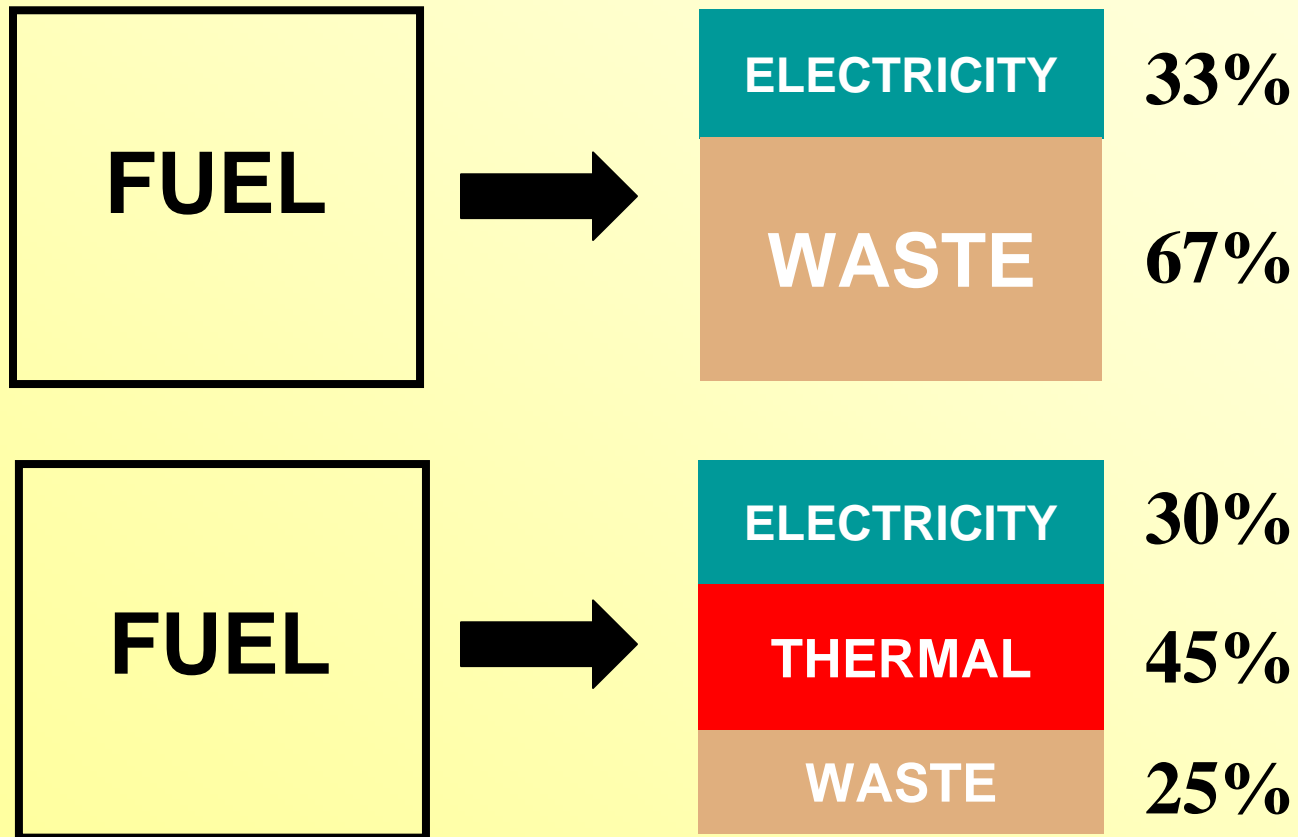
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- 25 MW<sub>e</sub> of electricity to the grid
- 65 MW<sub>th</sub> to the District Energy system
- Fueled by renewable, clean, urban wood residue
- Double the efficiency of conventional electricity-only steam power plants
- Greenhouse gas CO<sub>2</sub> reduced by 280,000 tons per year



# Energy efficiency of CHP

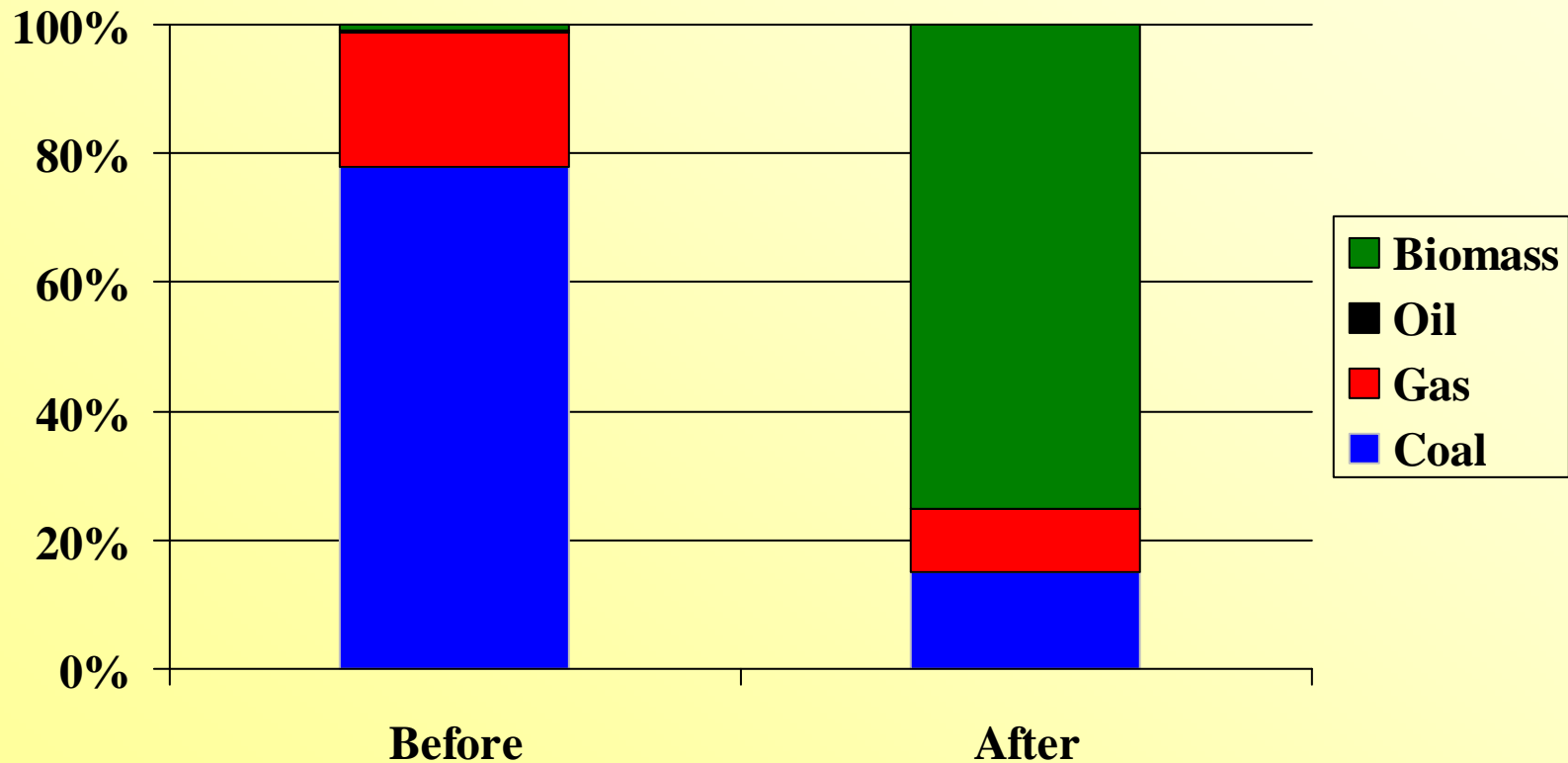
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# Fuel diversification (2008)

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Before and after wood-fired CHP project...



# Why wood waste?

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- Large quantities in metro area
- Disposal problem
- Economically viable
- Community based



# Wood waste processing

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# Keys to a successful energy project

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- Size of the facility
  - Match with energy demand and fuel availability
- Locate near a thermal load
  - Use CHP to maximize the efficiency and generate additional revenue
- Design for high plant reliability/availability/maintainability
- Community support



# Benefits of CHP & biomass

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## ✓ Customers



- Competitive energy prices
- Marketing – served by renewable energy



# Benefits of CHP & biomass

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## ✓ Community



- Community based
- Competitive energy prices
- Marketing opportunities
- Keeps energy dollars local
- Fuels economic growth
- Improves power grid



# Benefits of CHP & biomass

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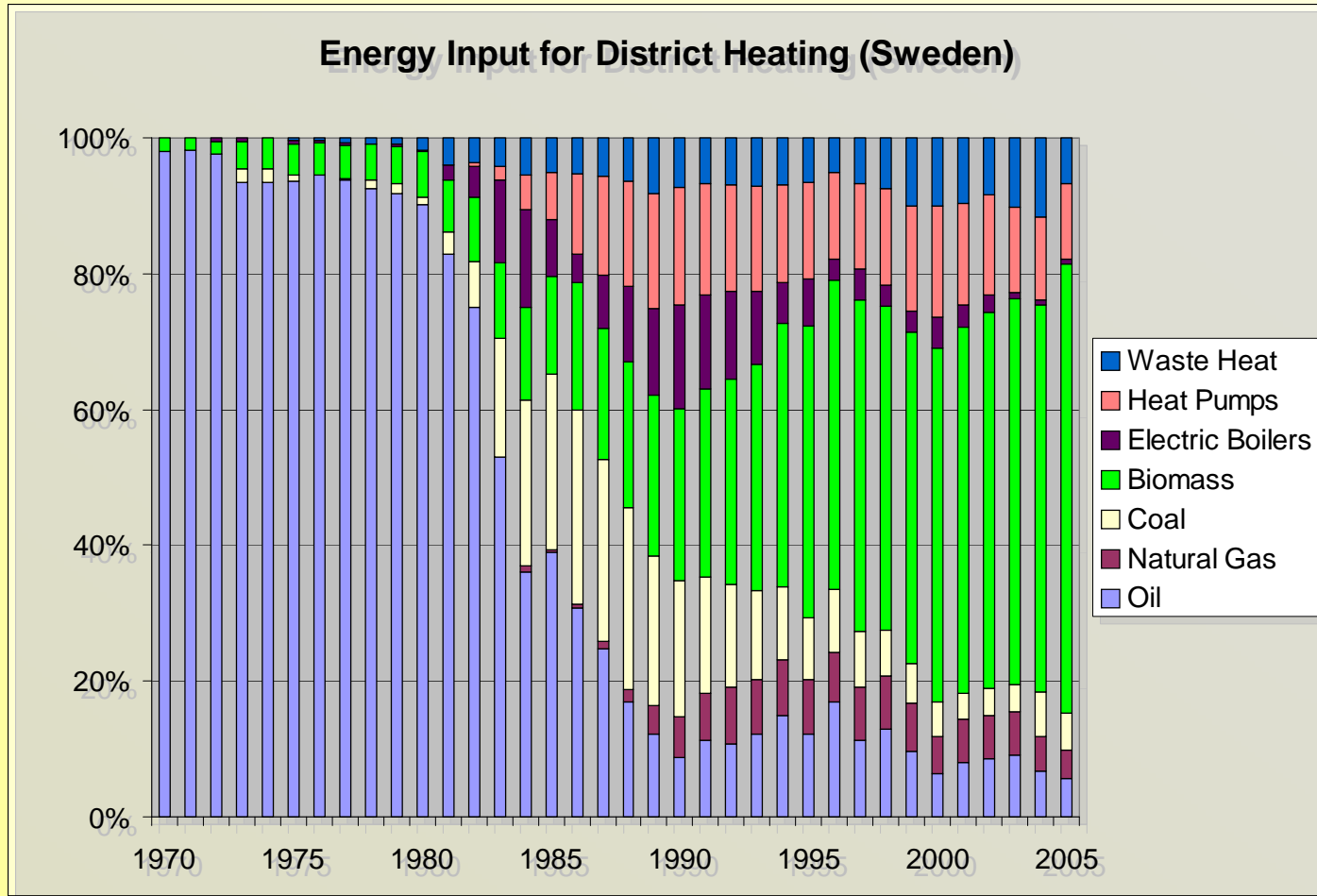
## ✓ Environment



- Decreased emissions
  - Air contaminants
  - Green house gases
- Decreased waste



# What is possible?



# *Thank You!*



**DISTRICT ENERGY**  
ST. PAUL™

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