Global District Energy Climate Awards

Submitted by

DISTRICT ENERGY ST. PAUL™

September 2009

System Location:	Saint Paul, Minnesota, U.S.A.
System Owner:	District Energy St. Paul, Inc.
Type of Ownership:	Non-profit 501(c)(3) Corporation
Submitted by:	Anders J. Rydaker, President and CEO
Address:	Hans O. Nyman Energy Center
	76 Kellogg Boulevard West
	Saint Paul, MN 55102
Phone:	651.297.8955
E-mail:	anders.rydaker@districtenergy.com
Web Site:	www.districtenergy.com

Executive Summary

During the second global energy crises in the late 1970s, the city of Saint Paul, Minnesota, and its building owners faced a major decision about how to secure a reliable energy source and stable energy prices for the future of the central business district. The ensuing collaborative effort by community leaders culminated in the creation of a new community district energy system in 1979 that has since become the largest hot water district energy system in North America. Since 1983 District Energy St. Paul has been delivering on its founders' goals of outstanding customer service and system reliability, and stable rates for its customers. The company has also become an industry leader and the innovative, collaborative, entrepreneurial spirit present at its formation remains imbedded in the culture, values and mission today, and continues to shape its vision for the future.

District Energy St. Paul's accomplishments:

- Provides heating service to more than 80 percent of the central business district, a total of 31.1 million square feet in over 185 buildings and 300 single family homes
- Provides cooling to more than 60 percent of the central business district, a total of 18.8 million square feet in over 95 buildings
- Meets 70 percent of its customers' annual heating needs with renewable thermal energy from a biomass fired combined heat and power (CHP) plant that also generates over 150,000 MWh of renewable electricity each year and puts up to $12 million annually into the local economy for biomass fuel
- Heats twice the square footage of building space with the same amount of input energy as was used in 1983
- Decreased emissions of greenhouse gases by over 200,000 tons per year, and reduced SO_2 and particulate emissions by more than 60 percent
- Uses thermal storage to shift 9 MW of electrical load to off-peak hours
- Has achieved over 99.99 percent reliability in both heating and cooling service to customers since its inception
- Customers have experienced stable rates and pay less today for heating and cooling service than they did when the services first started, after adjusting for inflation. And 93.6 percent of respondents to a customer survey rated the use of renewable energy as important to them when considering the value of the district services
- District Energy St. Paul's board of directors has set a goal of being 100 percent renewable, and the company is actively planning a large solar thermal installation and advanced heat recovery project

In addition to being a widely recognized leader in Minnesota and the nation, District Energy St. Paul has cast a bright vision for the future. In the same spirit and values upon which the company was founded, District Energy St. Paul envisions a future that uses district heating and cooling infrastructure to integrate a variety of renewable energy sources and technologies. These integrated energy systems will play a pivotal role in helping Saint Paul and other communities to realize the full potential of renewable energy and energy conservation technologies, enabling communities to decrease their dependence on fossil fuels and reduce greenhouse gas emissions, while increasing their economic viability.

District Energy St. Paul is committed to leading the way to this bright future.

Company History

During the second global energy crises in the late 1970s, St. Paul and its building owners faced a major decision about how to secure a reliable energy source and stable energy prices for the future of the central business district. Research into alternatives ensued, and a proven technology that had been implemented in Sweden was chosen as the best way for Saint Paul to meet its heating requirements. That technology was hot water district heating.

District Energy St. Paul was formed in 1979 as a result of a collaborative effort by public and private stakeholders including local, state and federal government representatives, community groups, the Saint Paul Building Owners and Managers Association and the University of Minnesota. The results of this innovative, collaborative, public/private partnership remain imbedded in the company's culture, values and mission today.

Final feasibility studies and marketing efforts were completed in 1982, culminating with the signing of 30-year customer service agreements and successful project financing. System construction was completed one year ahead of schedule and $1.3 million under budget. The first downtown customers received hot water service in fall 1983.

Our Vision

To promote energy conservation, provide a high standard of customer service and to give careful attention to environmental concerns, long-term price stability and good corporate citizenship.

Our Mission

To be the preferred provider of community energy services that benefit our customers, the community and the environment.

Our Core Values

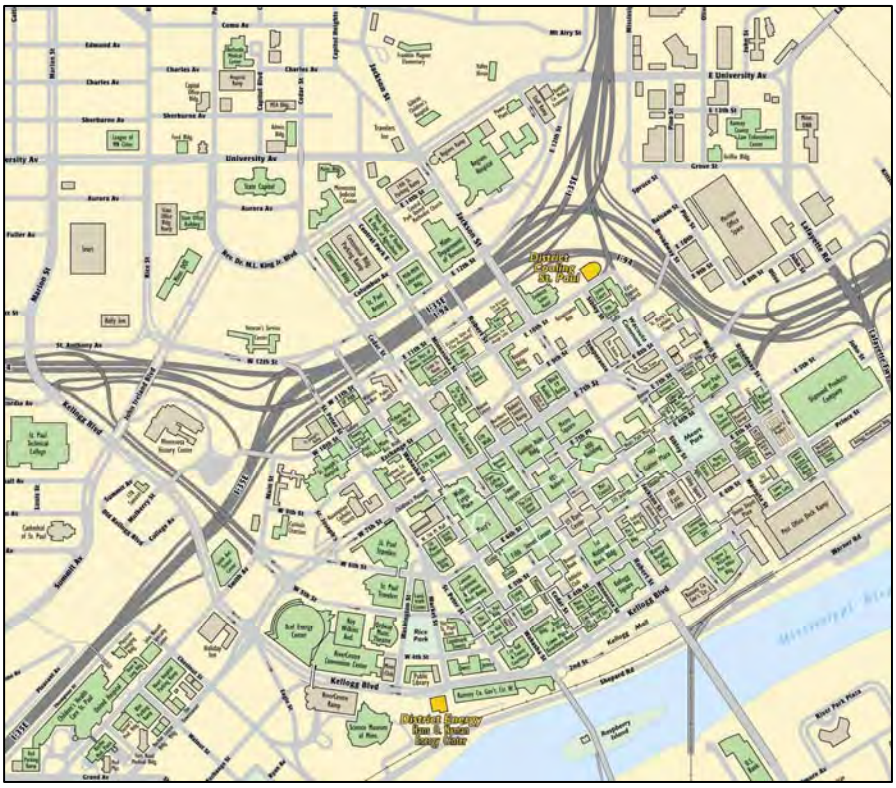
Conduct. We conduct our business with openness, fairness and integrity. We strive for innovation, creativity, learning, excellence and environmental stewardship in all that we do.

Customers. We help our customers succeed. We provide exceptional service to our customers, meeting their requirements and exceeding their expectations.

Work Environment. We provide a safe and healthy working environment that demonstrates dignity and mutual respect to everyone and enables employees to achieve personal and professional balance.

Community. We are involved in the Saint Paul community, doing our part to help it thrive.

Delivering Results, Year After Year



Today, District Energy St. Paul is the largest hot water district heating system in North America and is recognized throughout the United States as a model for other communities and a leader in renewable energy. It currently provides heating service to more than 185 buildings and 300 single-family homes, representing over 31.1 million square feet of building space, or 80 percent of Saint Paul's central business district and adjacent areas. Customers include multi-family, commercial, industrial and large institutional facilities. And the system continues to grow beyond the central business district.

The hot water district energy system has proven to be twice as efficient as the previous steam heating system in downtown Saint Paul. Today the system serves twice the square footage of building space with the same amount of input energy as when the system began in 1983. The distribution system includes 105,900 feet of underground twin supply and return piping (up to 28 inches in diameter) circulating 910,000 gallons of hot water. The system's main distribution pumps circulate up to one million gallons of water per hour. The system's reliability has exceeded 99.99 percent since heating service began.

Customers of District Energy St. Paul, the largest hot water district heating system in North America, pay less for heating service today than they did 26 years ago when service began.

For twenty-six years District Energy St. Paul has delivered against the founding goals to provide reliable energy at stable and affordable prices. When adjusted for inflation, District Energy St. Paul customers pay less for heating service today than they did when service began.

"I take pride in the fact that the State of Minnesota is becoming a leader in combating climate change. District Energy has been ahead of the curve in reducing greenhouse gas emissions, and other companies should look to it as an example."
– The Hon. Betty McCollum, U.S. House of Representatives

District Cooling Service

In the late 1980s, District Energy St. Paul created District Cooling St. Paul to expand its operations and services. The district cooling system was financed in 1991, constructed in 1992 and began serving its eight initial customers in spring 1993. Today the district cooling system has more than 95 customers, representing 18.8 million square feet of building space, or 60 percent of Saint Paul's central business district.

The chilled water distribution system includes 35,500 feet of underground twin supply and return piping (up to 30 inches in diameter) circulating 980,000 gallons of chilled water. Chilled water is supplied by electric centrifugal and low-pressure steam absorption chillers. The district cooling service provides air conditioning with no use of ozone-depleting chlorofluorocarbon (CFC) refrigerants. And the district cooling service has proven to be just as reliable as district heating service, exceeding 99.99 percent since service began. It has also proven to be another way that District Energy St. Paul can be an industry leader.

Thermal Storage

The district cooling system was designed to integrate the use of thermal storage to enable the system to shift a significant portion of the cooling load to off-peak hours. The system includes a 2.5-million-gallon chilled water storage tank built in 1994 adjacent to the District Energy St. Paul facility and a 4-million-gallon storage tank built in 2003 in conjunction with a cooling plant in the northeast corner of Saint Paul's central business district. The use of two thermal storage tanks as well as advanced maintenance and operational techniques enables District Cooling St. Paul to shift up to 9 MW of electric demand to off-peak hours. This has benefited its customers and the electrical grid.

Two thermal storage tanks, advanced maintenance and operational techniques allow District Cooling St. Paul to shift up to 9 MW of electric demand to off-peak hours.

"We are a socially responsible development company and District Energy really fits with this mission, especially with its use of green energy. We chose District Energy and District Cooling for many reasons: the predictability of operating costs, energy efficiency and the lower capital cost compared with new on-site systems."
– Colleen Carey, The Cornerstone Group

Combined Heat and Power

Dating back to 1981, District Energy St. Paul's founders had a dream of using combined heat and power (CHP) and renewable fuels rather than fossil fuels. The system was initially conceptualized and developed keeping these long-term sustainability goals in mind. The use of hot water paved the way for fuel flexibility and future use of combined heat and power (CHP) and other renewables.

Minnesota's State Capitol Complex was the first in the United States to be heated with renewable energy.

In the late 1990s, Ever-Green Energy—a District Energy St. Paul affiliate—partnered with Duke Energy Generation Services to successfully develop a wood-fired CHP plant adjacent to the downtown Saint Paul facility. Through perseverance and careful planning, District Energy St. Paul's founders' dreams were finally realized in 2003 when the largest biomass-fired CHP plant serving a district energy system in the United States came on line.

The Saint Paul CHP plant is the largest biomass-fired plant serving a district energy system in the United States.

Using renewable energy in the form of wood residue, the CHP plant is able to produce up to 33 MW of electricity and up to 65 MW of thermal energy. The renewable electricity, over 150,000 MWh per year, is supplied to the local electric utility and the renewable thermal energy from the CHP plant is used as the primary source of energy for the district heating system. Minnesota's State Capitol Complex was the first in the United States to be heated with renewable energy.

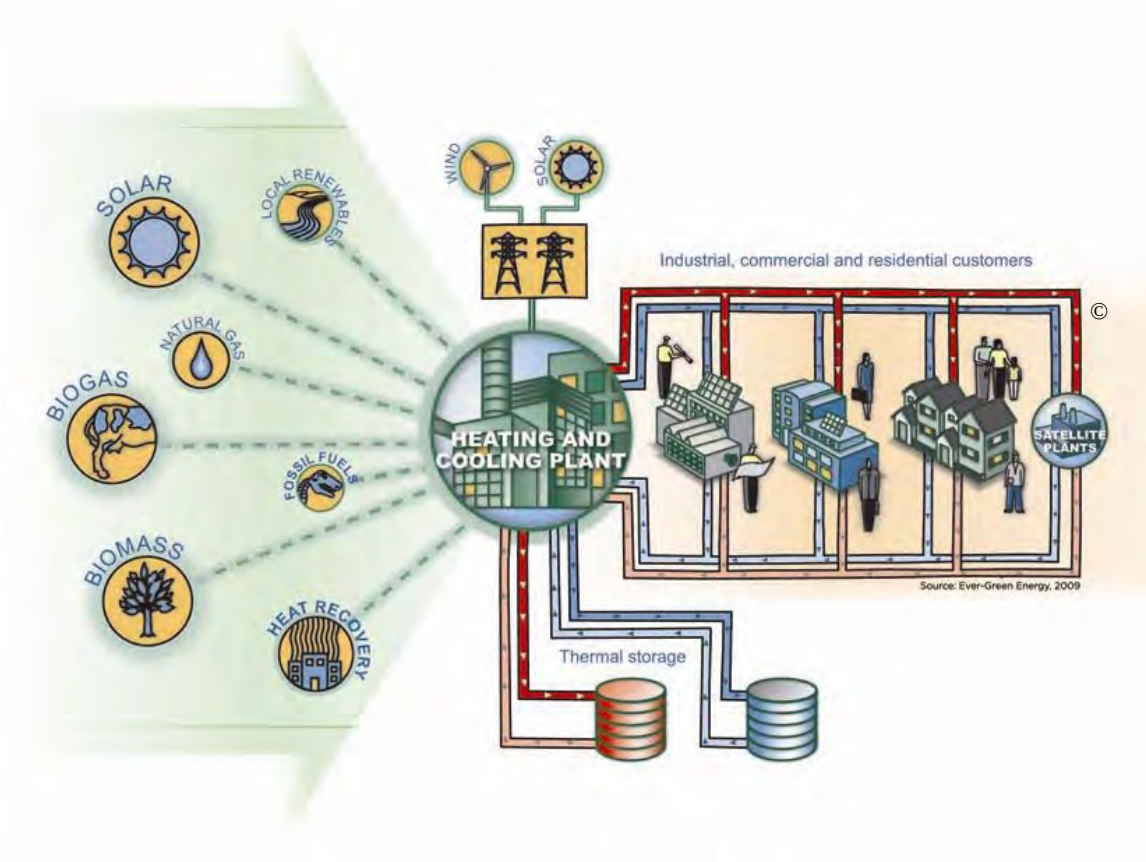
"Use of waste biomass such as the wood products used by District Energy is a win-win-win, for the environment, for our local economy, and for the consumers of this clean and climate-friendly renewable energy source."
– Joe Fargione, Ph.D, Ecologist

The success of this project and its ability to efficiently use renewable energy to meet the heating needs of the central business district and State Capitol Complex has exposed the city, the state and the nation to how renewable energy can be successfully used to meet the electricity, heating and cooling needs of a city. In a recent survey of District Energy St. Paul's customers, 93.6 percent of the respondents rated our use of renewable energy as important to them when considering the value of our services.

District Energy St. Paul's Board of Directors has established a long-term goal to become 100 percent renewable. The company is actively pursuing a vision that integrates a variety of renewable energy sources, including solar, heat recovery, thermal storage and energy efficiency that will eventually lead to the achievement of that goal.

District Energy St. Paul's Integrated Energy Vision

In the entrepreneurial spirit upon which the company was founded, District Energy St. Paul envisions a future that uses district heating and cooling infrastructure in communities to integrate a variety of renewable energy sources and technologies. These integrated energy systems will play a vital role in helping communities realize the full potential of renewable energy and energy conservation technologies. It will also facilitate the broader use of a variety of renewable energy sources and technologies by the buildings in the community, thereby decreasing its fossil fuel usage and greenhouse gas emissions while increasing the flexibility and security of the community's energy system.



District Energy St. Paul is taking several steps towards achieving this vision in Saint Paul.

Solar Thermal. The inherent flexibility of the hot water system enables solar thermal to be integrated into the district heating system. District Energy St. Paul is actively developing the integration of a large solar thermal project into its system at one of its customer's buildings. The planned installation would be the largest solar energy installation in Minnesota, and one of the largest installations in the United States.

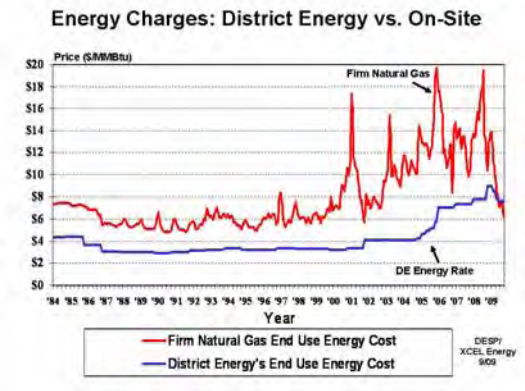
Advanced Heat Recovery. District Energy St. Paul is pursuing an advanced heat recovery project that uses flue gas condensation to extract additional energy from the flue gas of the biomass fired CHP plant. The benefits of this project will be amplified by also integrating the use of thermal storage.

Biogas. District Energy St. Paul continues to pursue the generation and use of biogas as a source of energy in its facilities.

Competitive Pricing

From the beginning, District Energy St. Paul understood the importance of pricing that is able to compete with the cost of on-site natural gas-fired boilers. The Saint Paul Building Owners and Managers Association worked with us to implement a unique rate structure that offers significant benefits to our customers.

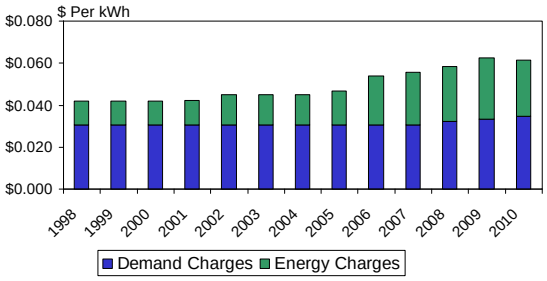
District Energy's charges are made up of two parts: an energy rate and a demand rate. The energy rate is based on the actual cost of fuel. Our large customer base and fuel flexibility allow us to pay lower fuel prices than those paid by individual building owners. Being a non-profit corporation, all savings are passed directly to our customers. The demand rate covers the fixed costs for providing a service that allows customers to save money by eliminating the purchase and installation of major fixed equipment and associated maintenance, administration, operation and repair costs.



District Energy's rate increases over the years have been minimal: rates for district heating service have increased an average of just 2.5 percent per year since 1983, while rates for district cooling service have increased an average of just 2.2 percent per year since 1993. Fuel flexibility and our use of biomass renewable energy have enabled us to maintain stable rates for our customers despite unprecedented volatility in energy prices.

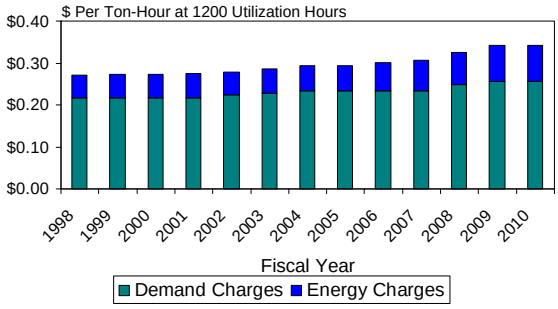
District Energy St. Paul

Combined Rate Summary, FY-1998 to 2010



District Cooling St. Paul

Combined Rate Summary, FY-1998 to 2010



"We like District Energy because we can budget a year ahead and don't need to worry about fluctuating natural gas prices. District Energy is good for the environment and has an unlimited supply of waste wood to use as fuel. We also appreciate the excellent communication and customer service."
– Ken Zahradka, Travelers Cos.

Energy Conservation

A recent article in the International District Energy Association's *District Energy* magazine highlighted ENERGY STAR®-labeled buildings nationwide that are connected to district heating and cooling systems. **We are proud to say that all eight ENERGY STAR buildings in our service area are District Energy St. Paul customers.**

A study released by the New Buildings Institute found that ENERGY STAR-labeled buildings use an average of almost 40 percent less energy than typical buildings and release 35 percent less carbon dioxide into the atmosphere.

One of the ENERGY STAR buildings on our district energy system, the 401 Building, has also earned LEED® EB certification. Only five structures in Minnesota have received this distinction, and the 401 Building is the only one located in downtown Saint Paul. LEED is the U.S. Green Building Council's standard for designing and constructing the world's most energy-efficient buildings.

"Energy conservation and efficiency, as well as the use of renewable energy sources, will all be necessary to meet future energy needs and help protect our environment. District Energy's efforts in these areas can serve as best practices for sustainable energy management that can be more broadly implemented."
– Doug Baker, Chairman, President and CEO, Ecolab

Environmental Benefits

District Energy St. Paul believes that economic growth and environmental stewardship go hand in hand. The following statements summarize our progress over the past 26 years.

District Energy St. Paul: Progress since the early 1980s

- System operates at double the efficiency of the former steam district heating system. The hot water system serves twice the square footage as it did in 1983 using the same amount of fuel
- Sulfur dioxide and particulate emissions reduced by 75% per unit of end-use energy
- Carbon dioxide emissions reduced 50% per end-use Btu
- 116 million gallons of groundwater saved annually

District Cooling St. Paul: Progress since the early 1990s

- Eliminated the use of chlorofluorocarbon (CFC) refrigerants in customer buildings (CFCs are the primary factor in the destruction of the Earth's ozone layer)
- Eliminated one-time use of groundwater to cool customer buildings

- Decreased peak electricity demand by making chilled water at night when power demands are lower
- Decreased electricity consumption in customer buildings

Combined Heat and Power: Progress since the early 2000s

- Reduced sulfur dioxide and particulate emissions, which contribute to acid rain
- Reduced carbon dioxide emissions by more than 200,000 tons per year
- Operates at more than twice the efficiency of conventional electric plants
- Consumes approximately 280,000 tons of wood residue annually, greatly reducing the amount that is burned in open fires or disposed of in other ways
- Reduced use of oil, natural gas and coal by 70%
- Supplies 25 MW of electricity to the local power grid, offsetting production at coal-fired power plants

"District Energy St. Paul is …acting as an environmental steward by reducing greenhouse gas emissions, lowering unhealthy soot emissions, lessening our dependence on fossil fuels and preserving fresh groundwater. All of these efforts help make Saint Paul a healthier, more sustainable place to live and work."
– The Hon. Alice Hausman, State Representative

Customer Relations

Excellent customer service is, and has always been, a top priority for District Energy St. Paul. Key to building strong, mutually satisfying business relationships is good two-way communication. We stay in touch with our customers in numerous ways, including:

- Three directors on District Energy St. Paul's seven-member Board of Directors are elected by our large, medium and small customers. In addition, one director on the District Cooling Board of Directors is elected by district cooling customers.
- Detailed individual budgets are prepared for each customer on our system to assist their internal budgeting process.
- Annual training seminars with a variety of outside speakers are held for the operating engineers in our customer buildings to encourage energy conservation.
- Surveys are sent to our customers to see if we are meeting their needs and to find out how we can improve our services.
- Newsletters featuring our customers, our employees and our community are distributed locally, nationally and internationally.

- Customer buildings and customer testimonials are often woven into the pages of our annual reports, which also receive broad distribution and are used as a marketing/sales tool.
- Customers receive advice on building equipment repairs and purchases, all as part of their demand rate.
- Presentations and tours of our facilities are available for customers and all interested individuals and groups.

"District Energy has made itself a part of the neighborhood. By building an aesthetically appealing plant, improving air quality, reducing its reliance on non-renewable fuels, and keeping energy prices stable, District Energy is helping make Saint Paul the Most Livable City in America."
– The Hon. Chris Coleman, Mayor, City of Saint Paul

Community Involvement

Employees are active in many community events, including:

- **Living Green Expo** – This event features more than 270 exhibitors showcasing environmentally sound products, services and practices and more than 60 workshops on a variety of topics ranging from backyard composting to hybrid vehicle technology. About 25,000 people attend annually.
- **EarthWeek 2009 -** EarthWeek events educate and increase awareness of environmental issues relating to downtown residents, workers, businesses and property owners.
- **Sustainability Stage at Minnesota State Fair** – Employees engage fairgoers in an interactive game focused on renewable energy, sustainability and environmental stewardship. In 2009, the Minnesota State Fair was visited by 1.8 million people.
- District Energy St. Paul's expertise results in numerous presentation requests from local, national and international organizations and conferences. Here are a few:
  - **International Visitor Leadership Program** – Since January 2009 District Energy St. Paul has hosted more than 35 international visitors from 26 countries who were invited to the United States under the auspices of the Department of State's International Visitor Leadership Program. The goals of the program are to discuss various energy issues, including energy security, development of alternative sources, efforts to promote efficiency, energy conservation and industry best practices. In addition the program showcases state and local energy initiatives that currently incorporate the use of alternative energy sources.
  - **Lessons from Sweden, April 2009, District Energy -** District Energy St. Paul and The BioBusiness Alliance of Minnesota hosted a presentation and a tour to discuss how Minnesota can benefit from Sweden's renewable energy policy and industry achievements. The event was well attended by representatives from the

Department of Natural Resources, the Cities of Saint Paul and Minneapolis, legislators and staff, and a variety of industry and non-profit interests.

- **Cleaner Energy Mobile Workshop, April 2009** – Thousands of planning professionals from across the nation gathered in Minnesota to participate in the American Planning Association's annual conference. Many attendees came to the event to learn more about the investments that cities and states are making in sustainability. The City of Saint Paul organized a workshop and tours of several facilities that are focused on energy efficiency and renewable energy, including District Energy St. Paul.
- **Biomass Via 2009, March 2009, Duluth, MN –** District Energy St. Paul presented "Bioenergy: What's Old is New Again" at this conference, which targeted a variety of natural resource professionals whose major objectives were to build awareness and knowledge of biomass harvesting among stakeholders, and to provide the decision-making information needed to determine the economic feasibility of using biomass for energy.

"A sincere thank you for the time and effort you and your associates took to explain and show us your facilities and projects. We were all impressed with both the philosophy and operation of your system; you are doing good things for the right reasons. Our group had many positive comments following the presentation and tour. Thanks so much for sharing your time and expertise."
– Adams-Columbia Electric Cooperative, Friendship, Wisconsin

Community involvement includes educating the general public about our systems and services. An example is the Energy Tree project below:

Energy Tree: A Biomass Education Project –

Energy Tree is a unique collaboration between District Energy St. Paul and its next-door neighbor, the Science Museum of Minnesota. One part of this biomass educational initiative focuses on the wood-fired CHP plant. Three outdoor interpretive panels were installed on a plaza between the two buildings. The first panel explains how biomass crops can be grown for fuel; the second illustrates how the adjacent CHP plant uses a biomass crop to simultaneously produce heat and electricity; and the third panel discusses community energy and the evolution of the original 1906 District Energy St. Paul facility on Saint Paul's downtown riverfront.

District Energy St. Paul is a member of numerous community organizations and employees serve on a number of committees, among them:

- CapitolRiver Council
- Eco Education
- Minnesota Environmental Initiative
- Neighborhood Energy Connection
- Riverview Economic Development Association
- Rotary – Downtown Saint Paul
- Saint Paul Building Owners & Managers Association
- Saint Paul Area Chamber of Commerce

"District Energy St. Paul's staff and board of directors should be commended and recognized for their vision, innovation and determination to bring 'green' renewable energy to the Saint Paul community long before being 'green' was fashionable."
– Anne Hunt, City of Saint Paul Deputy Policy Director for Environment

Awards

District Energy St. Paul's pioneering spirit has earned the company and its people numerous awards and recognition over the years, including the following:

40 Minnesotans On the Move – Presented to President Anders Rydaker – *Finance and Commerce, 2009*

District Energy President Anders Rydaker, Named "Person of the Year" – *International District Energy Association, 2007*

Celebrate Business Success Award – *Saint Paul Area Chamber of Commerce, 2007*

Inspiring Efficiency Innovation Award - *Midwest Energy Efficiency Alliance, 2006*

Contributions to Renewable Energy - *American Council on Renewable Energy, 2006*

Environmental Initiative Award - *Minnesota Environmental Initiative, 2005*

Engineering Excellence Award - *American Council of Engineering Companies of Minnesota, 2004*

Prestigious Energy Prize - *Presented to President Anders Rydaker for pioneering district cooling technology in Sweden and his energy conservation achievements, 2003*

Presidential Citation - *President George W. Bush, 2001*

Top 40 Customer-Focused Companies - *Inc. Magazine, 1995*

Company of the Year Award - *Saint Paul Building Owners & Managers Association, 1995*

System of the Year Award - *International District Energy Association, 1993*

"Environmental Initiative Award winners exemplify the best of many outstanding partnerships taking place to solve a wide range of very complex environmental problems facing our communities. One of our state's greatest assets is the many environmental leaders that understand and leverage the power of partnering to create innovative environmental solutions."
– Mike Harley, Executive Director, Minnesota Environmental Initiative