



Metro Nashville DISTRICT ENERGY SYSTEM

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Employee Spotlight: Meet Harry Ragsdale, Metro Contract Administrator



Harry Ragsdale joined the Metro District Energy System administration team in February 2007 when his firm, Thermal Engineering Group, Inc., was awarded the contract to provide Metro DES project contract administration consulting services. Since then, DES has continued to be a success for the city of Nashville, both in supporting commercial

General Manager's Corner

By Tim Hestle

Have you ever received one of those fun fact books for your birthday? They describe important historical things that happened during the year you were born. Since the Energy Generation Facility ("EGF") recently celebrated its five-year anniversary, I thought it would be interesting to look at some things that have occurred during the past five years.



2003

- **Constellation Energy Projects & Services Group ("Constellation Energy") begins commercial operation of the new Energy Generation Facility for the Metro Nashville District Energy System ("DES") on December 16.**
- Dow goes above 10,000.
- Mad cow disease is confirmed.

2004

- NASA rover lands on Mars.
- **Metro DES celebrates "Grand Opening" January 26.**
- Scientists clone human embryos in South Korea.
- **VIPs from Nashville's "European Sister City," Magdeburg, Germany, tour the EGF with a representative from the mayor's office.**
- Former President Ronald Reagan dies.
- Olympics are held in Greece.
- Oil prices top \$50 per barrel.
- Boston Red Sox win first World Series since 1918.
- George W. Bush is re-elected president.
- **The first meeting of the Metro DES Advisory Board is held.**
- Earthquake in Indian Ocean creates tsunami which devastates Indonesia.

2005

- New England Patriots win back-to-back Super Bowls.
- Pope John Paul II dies.

development and in reducing the city's carbon footprint. We recently caught up with Harry to find out a little more about the role of project administrator, and to see if there are any upcoming projects.

Q: For those who don't know what a project administrator does, please tell us what your role is at Metro DES.

A: The function of the project contract administrator is to perform ongoing coordination and administration oversight of the District Energy System operations to ensure services to DES customers continue at a high level of performance. I oversee operations and system maintenance, system and new customer development, rate development, invoice approval, coordination of customer-related activities, contract compliance, budget preparation, and other administrative duties.

Q: Share some career highlights with us. What path led you to where you are?

A: I have been involved in district energy nationally for more than 25 years. Over the past 20 years, TEG has provided technical support on a number of occasions for Nashville District Energy System. During the city's transition from the Nashville Thermal Transfer Corporation system to the new District Energy System, I represented the then-existing private customers in developing a mutually acceptable long-term energy contract with the city. Our firm's experience and local presence matched well with the city's requirements to provide oversight in the operation of this valuable asset.

Q: When you took over the position, the facility was almost brand-new. Any DES employee will tell you that there's a sense of obligation to keep the facility and equipment like new. What's been the biggest challenge in accomplishing this goal, and how is the plant holding up in its fifth year?

- **Two new customers added to Nashville District Energy System - Viridian Tower and Schermerhorn Symphony Center.**
- **Metro Public Library connects to Nashville District Energy System.**
- Hurricane Katrina devastates the Gulf Coast near New Orleans.
- Hurricanes Katrina and Rita have major negative impact on fuel prices.
- **Constellation Energy promotes John Schaffer to VP of operations.**
- **Tim Hestle takes over as general manager responsible for the Nashville District Energy System.**

2006

- **Constellation Energy's partnership with the city of Nashville to design, build and operate the new district energy facility wins top honors from the National Council for Public-Private Partnerships.**
- Pittsburgh Steelers win Super Bowl.
- **A.A. Birch Courthouse connection to Nashville District Energy System is completed.**
- International District Energy Association Conference is held in Nashville.
- **Constellation Energy and Nashville District Energy System are awarded District Energy System of the Year.**
- Oil reaches \$78.40/barrel.
- Fidel Castro hands over control of Cuba to his brother.
- **Members of the Japanese Heat Services Utilities Association tour the EGF.**
- Former President Gerald Ford dies.

2007

- **Constellation Energy and Metro develop a Business Continuity and Disaster Recovery Plan for the DES.**
- Indianapolis Colts win the Super Bowl, led by former UT quarterback Peyton Manning.
- **Mayor Purcell dedicates an informational kiosk describing the history of district energy in Nashville and a commemorative plaque at Nashville District Energy System's Generation Facility.**
- Gordon Brown replaces Tony Blair as United Kingdom's new prime minister.
- **Metro selects Harry Ragsdale of Thermal Engineering Group as new contract administrator for the Nashville DES.**
- Nashville experiences the hottest and driest August since record-keeping began 137 years ago.
- Dow peaks above 14,000.
- Mortgage crisis hits U.S. market.
- World markets fall after U.S. losses.
- Al Gore wins Nobel Prize for stance against global warming.
- Karl Dean is sworn in as sixth mayor of Metro Nashville and Davidson County.

A: Actually, we assumed the role of project contract administrator at the end of the first five-year term held by the previous project contract administrator, GBB. The new system was near the end of its third fiscal year and beginning to move into the fourth. Under its operating contract with the city, CEPS is to maintain the new facility in a "like-new" condition. The qualifications that made CEPS an appropriate candidate as the system operator and the credentials and competence of its staff make maintaining the new facility at this period in its life less than a daunting task.

Maintaining the 30-plus-year-old underground energy distribution system (EDS) is a challenge. Constant attention to the EDS is required to ensure reliable service to the customers. Over the last four years, Metro has invested substantial time and money in making improvements to the EDS.

Q: Where is the system now, in terms of capacity? Are there other potential downtown customers who aren't using Metro DES' services that could benefit from changing to the system?

A: The system, as it currently operates, has adequate capacity to serve future opportunities like the proposed Nashville Convention Center and the adjacent proposed hotel. The facility was designed to accommodate a 12 percent to 15 percent capacity expansion within the footprint of the existing building. Other than servicing new development, any building with aging in-house heating or cooling systems would most likely see serious economic benefits from utilizing Nashville District Energy System.

Q: Are there any capital projects in the works for the near future?

A: There are ongoing EDS upgrades on the books which are paid for by funds allocated through FY08. The tunnel system, which houses a portion of the steam distribution system, is in need of renewal; however, capital funding for FY09

- Red Sox sweep the World Series.

2008

- Eli Manning leads N.Y. Giants in Super Bowl victory over Patriots.
- **EGF upgrades operating hardware and software.**
- More than 100,000 people attend the Country Music Association Music Festival in Nashville.
- Oil prices hit a record high of \$147.02/barrel.
- Olympic Games are held in China.
- Michael Phelps wins a record eight gold medals swimming for U.S.A.
- Dow hits five-year low, now below 10,000.
- U.S. House approves bailout package for insurance and banking industries.
- Barack Obama is elected president.
- **New OSHA-mandated ARC Flash Program is implemented at EGF.**

2009

- **Mayor Dean attends five-year anniversary celebration for Metro Nashville District Energy System.**
- Pittsburgh Steelers win a record sixth Super Bowl.
- Dow drops below 7,000.

During the past five years, Constellation Energy has provided safe, reliable and efficient steam and chilled water service to the DES customers. Plant personnel take safety very seriously and strive for an accident-free workplace. Taking into account the type and amount of work handled by our team, I consider it a major accomplishment to have achieved zero lost-time accidents.

Normally, one would think that as equipment ages, efficiency would diminish. Over the past five years, however, the efficiency of the EGF has increased due to operators finding new and better ways to operate and maintenance personnel keeping the equipment in "like-new" condition. Constellation Energy continues to meet all of its contractual guarantees, and the savings achieved by these efficiencies are passed through to the customers.

Something else we are very proud of is the Energy Generation Facility's reliability. Since startup, it has been online 99.8 percent of the time, including scheduled outages. As far as the DES customers are concerned, this is probably the most important accomplishment we have achieved.

As we continue into the future, Constellation Energy Projects & Services Group is looking forward to many more years of successful operation of the District Energy System for the city of Nashville.

was placed on hold, and the FY10 capital budget remains under review.

Q: The proposed downtown convention center continues to move forward. Is this a project in which DES could play a role? If so, how would this affect the existing DES customers?

A: At this time, the proposed convention center is developing as a district energy customer. The addition of the convention center should improve the overall system efficiency, and higher efficiency correlates to lower costs for the customers.

Q: What advice would you give to DES customers to keep costs down and efficiency high as we transition from spring to summer?

A: For either steam or chilled water, making sure major air-handling systems are staged when turned on will reduce demand and keep costs down. As we enter the cooling season, maintaining high differential temperatures between the chilled water supply and return improves overall system efficiency and helps to reduce customer costs. Poor steam-trap maintenance contributes to unnecessary use of steam and increases operating costs.

The [DES Web site](#) contains a section called Tips for Customer Energy Savings. We recommend that all of our customers review the site to get more information on how to save money and keep efficiency high.

Q: What do you like to do when you're not on the job?

A: Spend time with my four grandchildren and squeeze in a little golf.

Metro DES Marks Five-year Anniversary With Celebration

Metro Nashville District Energy System kicked off the year by celebrating its fifth anniversary with a customer appreciation reception. Among the company's achievements over the first five years is reducing the region's carbon footprint by about 46,600 tons annually.



Mayor Karl Dean presents John Schaffer, CEPS vice president of operations, with a plaque of appreciation.

That was one of the several accomplishments cited at the reception, which featured remarks from Mayor Karl Dean, Metro DES Project Administrator Harry Ragsdale and Constellation Energy Projects & Services' (CEPS) vice president of operations, John Schaffer. CEPS is the contractor that oversees the day-to-day operations at the DES facility.

"Today we celebrate five successful years of operation that have helped support the redevelopment of downtown Nashville," Ragsdale said. "But our success would not be possible without the support of our valued customers. We're very pleased with how far we've come in the past five years. The new District Energy System is much more efficient and reliable than its predecessor, which is very important in the environmentally conscious world we live in today."



Harry Ragsdale, Metro DES project administrator, thanks Metro DES customers, Metro officials and CEPS for five years of support.

Several DES customers and Metro officials attended the reception, which was held in a large, heated tent outside the DES plant. Afterward, the plant was opened for tours.



Metro DES customers, Metro officials, CEPS employees and other invited guests mingle before taking a tour of the facility.



Eddie Wisdom, Metro DES operations manager, gives a tour of the facility to several guests after the reception.

Customer Spotlight: Sommet Center

Home to the Nashville Predators, the Sommet Center has become an iconic anchor of our downtown skyline. The venue seats more than 17,000 for hockey games, but has the capability to expand to 20,000 for other events. It's also a regular site for large concerts. In the next few months alone, acts such as Billy Joel and Elton John, Coldplay, Keith Urban and Metallica will make a stop at the multifaceted venue. The Sommet Center has been a DES customer since 1996, when the building was opened. We recently sat down with Terry McConnell to discuss his role as director of operations at the Sommet Center.



Q: What is your role as director of operations at the Sommet Center? How long have you been in your current position?

A: I direct and supervise personnel involved in operating, monitoring, repairing and maintaining the facility's lighting and electrical distribution, HVAC, fire system, emergency power system, and other systems as required for the safe and efficient operation of the facility. I will begin my seventh hockey season this fall.



Q: What did you do prior to working at the Sommet Center?

A: I worked for Dalcour Management based out of Huntsville, Ala. My job position was maintenance manager for Dalcour Properties in north Alabama.

Q: What's the most challenging part of your job?

A: Our event schedule is very demanding. Converting the space for hockey games, concerts, basketball games and other events can be challenging on a tight schedule. Fortunately, we have a very talented staff, and with the support of outside vendors and contractors we're able to facilitate the seamless transition from one event to the next. Coordinating and maintaining the logistics for the completion of each task is the most challenging aspect. Our patrons are our business, and when the doors open we must be on our "A" game.

Q: Does DES provide steam and chilled water, or just chilled water, to the Sommet Center?

A: The arena has been online with DES since opening, and we have used both steam and chilled water from day one.

Q: Does the ice used for Predators games affect the amount of chilled water DES provides?

A: Yes, it does. In order to maintain the 60 degree ambient temperature and 40 percent relative humidity for hockey games, our consumption of chilled water is tremendous.

Q: DES has been able to provide some of the lowest chilled water prices in the nation over the past year. Have you noticed any benefits?

A: The DES customer service meetings are very informative. The presentation concerning utility expense and how the market affects the cost of steam and chilled water production really opened up our eyes as to how well DES has managed utility costs delivered to the Sommet Center, and we've certainly noticed the benefits.

Q: The proposed downtown convention center is moving forward. How will that affect the Sommet Center, if at all?

A: I believe the proposed convention center will have a positive impact on the Sommet Center as well as the downtown business community. It should be an economic engine for the whole SoBro area, and could give us an opportunity to book more events. We could also see an increase in attendance at hockey games and other events as a result of more convention visitors.

Q: Has the weakening economy had an effect on the number and size of events held at the Sommet Center?

A: Fortunately, the Sommet Center has maintained a very busy schedule. Our management team has done an excellent job of continuing to book events. Whether it's family shows, concerts or sporting events, Middle Tennessee has a wide selection of entertainment choices to choose from at the Sommet Center.

Q: What do you do when you're not on the clock?

A: I have two teenage boys. We enjoy outdoor activities such as riding ATVs, camping, hunting and fishing.

DES Customer Energy Savings

By Kevin L. Jacobs, P.E.

Summer is quickly approaching! Before we find ourselves in the middle of another hot, sweltering Southern summer, you may want to take the time to prepare your cooling system for peak loading. We would like to present to you, once again, a few suggestions on saving energy this summer. Energy conservation is beneficial for everyone. Saving energy not only makes economic sense, but also is helpful for the environment. Most people think that electricity is a “clean” form of energy and has no environmental impact, but approximately 64 percent of the electricity produced by TVA is from coal or hydrocarbon-based fuels. Reducing your electrical energy consumption is as important to the environment as reducing your natural gas or gasoline use. We hope the following suggestions are helpful to you as you prepare for the warm days ahead.

Pumps

All DES customers have pumps. There are chilled water pumps, hot water pumps, domestic water booster pumps and other miscellaneous pumps scattered throughout the system. Almost all of these pumps have seals, bearings and wear rings of some sort. Poor maintenance of these items can lead to premature failure of the pump, which means potential downtime for repairs, or a decrease in efficiency. Excessive vibrations, noise and overheating of the pump can be signs of misalignment, bearings on the brink of failure or wear rings that are worn too much. The most common sign of poor or failed seals is leaking water from around the pump shaft, and may be an indication of bearing or alignment problems.

Also, don't forget the motors, which likewise have bearings and need regular inspections and maintenance. Motor bearings should be inspected for damage if you ever have any problems with your pump bearings, seals or wear rings. You should regularly inspect your pumps for these types of problems.

Most likely, your pumps run constantly and are major consumers of electricity at your building. Any decrease in pump efficiency can be costly. For example, a pump operating at 2,000 GPM, at 70 feet of head, with a 77 percent efficiency rating and a 93 percent motor efficiency rating, draws approximately 48 hp (36 kW). A change in pump efficiency to 72 percent due to bad bearings or wear rings can lead to an increase in approximately 3.4 hp (2.5 kW). This change in energy may not seem significant at first, but if the pump runs constantly (8,760 hours per year) and electricity costs \$0.10 per kWhr, this change in energy equates to approximately \$2,200 per year. How many pumps do you have that run constantly? As you can see, small changes in pump efficiency can lead to significant savings in energy and cost.

Fan belts

Most fan coil units and air handlers have belt-driven fans. Fan belts become frayed or stretched over time, causing slippage between the motor and fan pulleys. This slippage can result in reduced fan speed, which will reduce the volume of air flowing through the fan. When this begins to occur, you may begin to notice that your air-side temperatures are becoming too hot or too cold, and you may begin to lose control over the air temperature completely. With damaged or broken fan belts, the motor drives continue to use electricity but will result in less air flow; thus the efficiency of your operation begins to decline. Check your fan belts regularly and replace broken or damaged belts to keep your system working properly. You may also want to inspect for excessive vibrations with the fans and motors or an uneven wearing of the belts, which may be a sign of misalignment. While you're at it, don't forget to inspect the fan and motor bearings. Bad bearings in fans decrease efficiency just as they do in pumps. Also, inspect the fan itself. Excessive build-up of debris or corrosion of the fan can cause the fan to become out-of-balance, creating excessive vibration that will lead to premature bearing or belt failure.

Controls and control valves

Properly functioning control valves and dampers are vital to maintaining a healthy and reliable cooling system. You should regularly inspect your control valves at your coils or heat exchangers to make sure they are stroking properly. You may also want to inspect your dampers, especially if you have an economizer cycle on any of your air handlers, to make certain that they are opening and closing when they are supposed to—and only then. Stuck valves and dampers can be a hindrance to your operation, but may also be a source of energy loss. Outside air dampers that are stuck open will greatly increase the chilled water required at a coil on a hot day. Similarly, control valves that are stuck open allow chilled water to pass through your coils uncontrollably. These energy losses are difficult to quantify and vary between units, but they can be costly! Your control system (EMS) can also be a source of energy loss if your thermostat settings are not correct or are not responding properly.

Humidity control and chilled water

It is common for buildings to have humidity control on their coils to maintain a steady level of humidity year-round. You may want to review the operation of your humidity controls to make certain they are not causing an unnecessary increase in chilled-water usage by using too much steam for reheat. We have seen some buildings with both high steam and chilled water usage during the summer months due to faulty humidity control. You may also want to check to see whether any changes were made during the heating season to your reheat settings. Some customers may make changes to the humidity controls in the winter, but forget to change them back in the spring.

Air filters

Air filters, as we all know, should be checked and replaced regularly. As they become

clogged, they introduce restrictions in the air-side flows across your coils. These restrictions may cause an increase in the electrical energy required by your fan. You may also begin to experience a loss of control of the air-side temperatures. In addition, with dirty or missing filters, dirt and debris may find their way to the face of your coils. With dirty coils, the air-side flow rate will become restricted; but you may also experience a decrease in heat transfer, thus causing a loss of air-side temperature control and a decrease in Delta T. In addition, cleaning your coils can be expensive. Check your air filters regularly, and replace them as necessary!

Coils and strainers

You may never have thought too much about it; but your coils get dirty on the inside, too. Occasionally, debris or sediment may find its way into your coils. This debris can decrease the amount of heat transfer at your coils, causing the air-side temperature to be warmer than it used to be. As the leaving air temperature rises, the leaving chilled water temperature falls, reducing your building's overall Delta T. Flushing out the inside of your coils can be costly, but it could greatly improve the space conditioning potential of the coil and help reduce pumping energy by reducing the pressure drop through the coil. While you're at it, you may want to blow down all of the strainers to ensure that they are clean and not overflowing with debris. If you do clean your coils (inside and out), you may want to make sure that the air-side condensate drain is clean, too. The clean coils may improve your heat transfer so much that you will be able to remove more moisture from the air, thus improving the overall humidity and comfort levels in your building.

Staging equipment

The importance of staging your equipment cannot be overemphasized. Although not necessarily a source of energy loss, opening valves quickly or starting many pieces of equipment at once can cause a momentary jump in your chilled water (or steam) demand. These spikes in demand can cause your monthly demand to exceed your contract demand. When this occurs, your demand could be adjusted to a higher value (based on the magnitude of the demand) for the next 12 months! Turning pumps on simultaneously or opening valves quickly has a tendency to cause a sudden jump in chilled water flow through your building. You can potentially avoid a demand adjustment by staging your air handlers, fan coils and pumps over the course of 30 minutes to one hour. In addition, never, ever open your main steam valve, or any valve, quickly. Slowly open your valves, either manually or your control valves, to result in a slow cooling of your system over the course of at least one hour, if not longer.

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