



2017 Environmental Report

Environmental Stewardship



Mintha Roach
KUB President and CEO

It's an exciting time for environmental stewardship at KUB. KUB has a long history of championing environmental responsibility. And we are also making excellent progress on projects and initiatives that continue to promote environmental stewardship, both for our organization and for our community.

KUB operates in accordance with green business practices, engaging our employees to identify new opportunities for efficiency and environmental responsibility. An environmental stewardship team comprised of employees from various departments works together to find opportunities to promote recycling, paper use reduction, and other initiatives. Our employees also dedicate time in the community volunteering at environmentally focused agencies and participating in programs like River Rescue, EarthFest, and WaterFest.

In some areas, like transportation and fleet management, KUB has been finding more environmentally efficient options for decades. The fleet programs have long been a critical support function for all areas of KUB, and in the 1970s, KUB first began using alternative fuels by converting some fleet vehicles to compressed natural gas (CNG). We continue to build on that legacy by expanding our use of alternative fuels with additional CNG and hybrid electric vehicles. And the construction of the new public CNG fueling station now provides clean fuel for the Knoxville community in addition to our fleet.

Our mission is to act as good stewards of our communities' resources, safeguarding those resources for the communities we serve today and the generations to come.

Mintha Roach



Environmental Report 2017

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Corporate Environmental Policy



Knoxville Utilities Board's (KUB's) mission is to act as good stewards of our communities' resources, including the environment. KUB demonstrates environmental responsibility by making financially sound investments in our utility systems and facilities in ways that protect and sustain the environment. We serve as a resource for our customers who would like to do the same.

We are committed to achieving this by:

- Meeting or exceeding environmental laws and regulations.
- Utilizing resources efficiently.
- Educating our employees on environmental best practices.
- Assisting our customers with sustainable use of utility services.
- Engaging in sustainability partnerships.
- Continually improving and communicating our environmental performance.

Fleet Programs



KUB's fleet program has long been an industry leader in making environmental responsibility a priority. KUB has used compressed natural gas (CNG) for some of its fleet since the 1970s. In 2005, KUB began increasing use of alternative fuels. Since then, KUB has added E85 (blend of 85 percent ethanol) for flex fuel vehicles, electric, and hybrid vehicles. And we continue to expand our alternative fuel fleet.

In January 2017, we opened our new compressed natural gas (CNG) fueling station to the public. The station is the first in Knoxville to provide this clean burning and affordable fuel to the public. The station replaced the aging facility used only by KUB's fleet, and it supports our goal to increase our CNG fleet to about 100 vehicles by 2020. KUB also received a \$67,500 grant from TDEC to help fund conversion of three new KUB dump trucks for dedicated CNG use. The public station also promotes broader adoption of alternative fuel vehicles and provides a new source of revenue, which makes good business sense.

Station Features

- First of its kind to offer this clean burning fuel to the public in the Knoxville area
- Public access to clean fuel
- Self-service, 24/7 operation
- Fast fill dispensing for a wide range of vehicles from tractor-trailers to passenger vehicles
- Station capacity: 300 gas gallon equivalents (GGE) per hour
- 3 dispensing islands with 6 nozzles total



The West Coast-to-East Coast Natural Gas Vehicle (NGV) Rally made a stop at KUB's CNG station in June 2017. KUB and other natural gas utilities were among the sponsors of this second annual rally to highlight the benefits of using CNG and the variety of vehicles available that use this clean burning fuel. At this event, KUB also presented a "First Fleet" award to Knoxville Mayor Madeline Rogero. The City of Knoxville's fleet was the first to begin using KUB's CNG station when it opened to the public.

KUB was also recognized by Tennessee Clean Fuels (TCF) as one of six new fleets in its Tennessee Green Fleets Certification Program in 2017. Through using alternative fuels and advanced vehicle technologies in 2016, the combined efforts of the six new inductees are equal to saving 140,000 gallons of petroleum and preventing over 300 tons of carbon dioxide emissions. KUB achieved reductions by using vehicles powered by environmentally friendly alternative fuels and through other efficiency efforts, such as idle reduction.

KUB has a long-standing relationship with Tennessee Clean Fuels, having been a Gold partner since 2004. Through this partnership, we learn about the latest technologies and grant opportunities while we help support the alternative fuels industry. In 2016, KUB joined the coalition's Tennessee Workplace Charging Partnership. As a partner, KUB is committed to providing educational information about electric vehicles (EVs) to our employees. KUB currently has charging stations available to employees at no cost while they're working at the Miller's Building, and we are adding stations to the Hoskins Operations Center.



KUB's CNG station, located at 1820 Third Creek Road, is the first of its kind to offer this clean burning fuel to the public in the Knoxville area.



Dozens of local officials and community leaders joined KUB April 19 for the CNG Station grand opening.



KUB participated in several events throughout the year to promote the use of alternative fuels, including the grand opening of KUB's CNG station and the West Coast-to-East Coast NGV Rally.

Customer Initiatives and Partnerships

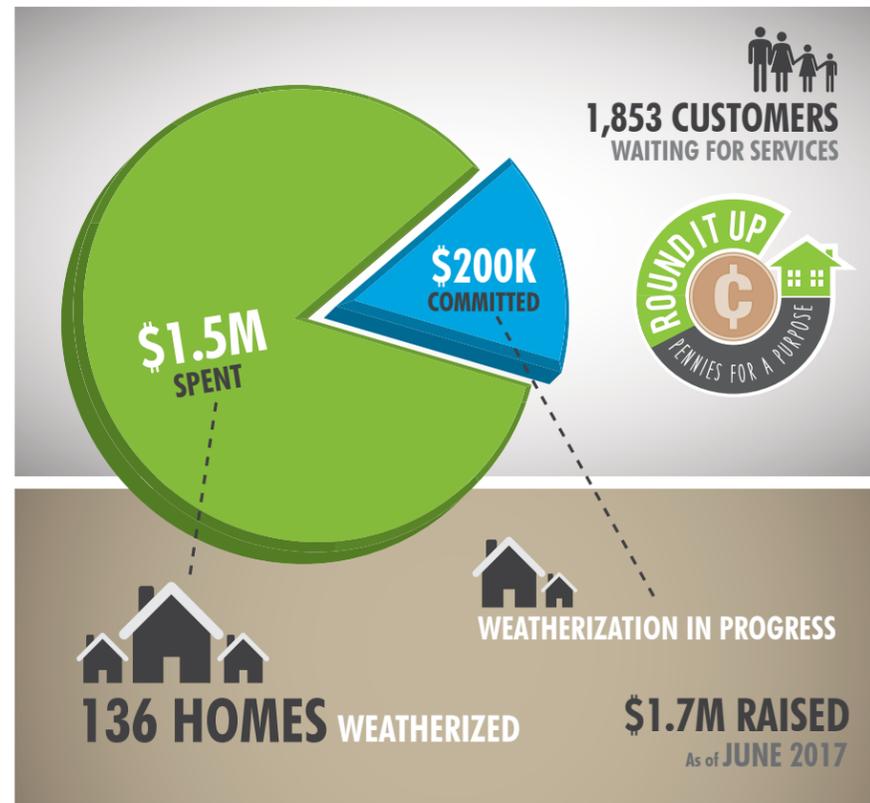


KUB's commitment to environmental stewardship includes partnerships with TVA and others on programs that help create positive change in our community. Since May 2015, KUB customers have donated over \$1.7 million to the Round It Up (RIU) weatherization program by rounding their bills up to the next dollar. KUB forwards 100 percent of RIU funds to the Knoxville-Knox County Community Action Committee (CAC) weatherization program. With these funds, CAC has weatherized more than 130 energy inefficient homes for low-income families in our area, and many more homes are on the waiting list.

KUB also partnered with CAC, the City of Knoxville, and Alliance to Save Energy to apply for the \$15 million TVA grant that funded the Knoxville Extreme Energy Makeover (KEEM) program to weatherize about 1,300 homes from August 2015 to September 2017. The weatherization upgrades are expected to save nearly 6,000,000 kilowatt hours each year, with average utility cost savings to families approaching \$500 annually. This amounts to an average energy savings of 31 percent per home.

These weatherization programs provide a root-cause solution to an ongoing problem in our community—low-income residents in energy-inefficient homes that are costly to heat and cool.

Through other EnergyRight® Solutions programs, our customers helped reduce energy use by over 12 million kWh in TVA's 2016 fiscal year. With that, KUB ranked fourth among TVA distributors for total program savings. KUB's business, industrial, and residential customers received over \$1 million in financial incentives for installing energy efficiency measures last year from those programs.



KUB achieved status as a top performer

for efforts to promote renewable energy and efficiency in the following programs in TVA's FY 2016:

- **Green Power Switch:** Over 9,000 blocks of renewable energy sold
- **Volume Heat Pump for Manufactured Homes:** Energy savings: 379,455 kWh
- **eScore Self Audit:** Energy savings: 687,960 kWh
- **EnergyRight® Solutions for Business:** Energy savings: 8.3 million kWh



KUB's partnerships with agencies like TVA, CAC, the City of Knoxville, and Alliance to Save Energy help provide energy efficient solutions for our community.

Facility Upgrades

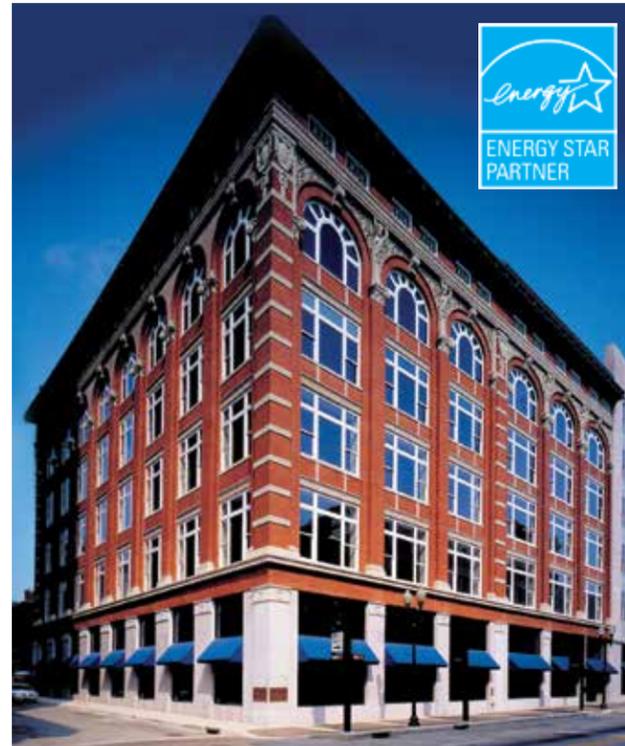


KUB's environmental efforts include upgrading our facilities to conserve energy and promote sustainability. The upgrades include retrofits, construction, and new initiatives to keep our daily operations aligned with KUB's environmental mission.

KUB completed construction in August 2017 on a 50-kilowatt rooftop solar array for KUB's Corporate Services Building at our Middlebrook Pike campus. The system will offset 15 percent of the building's electric load and 45 metric tons of carbon dioxide equivalent annually, which is equal to preventing emissions from 110,000 miles driven or 5,100 gallons of fuel consumed. Additionally, the project will help KUB better understand solar impacts on the electric system and how to support customers who are interested in installing their own systems.

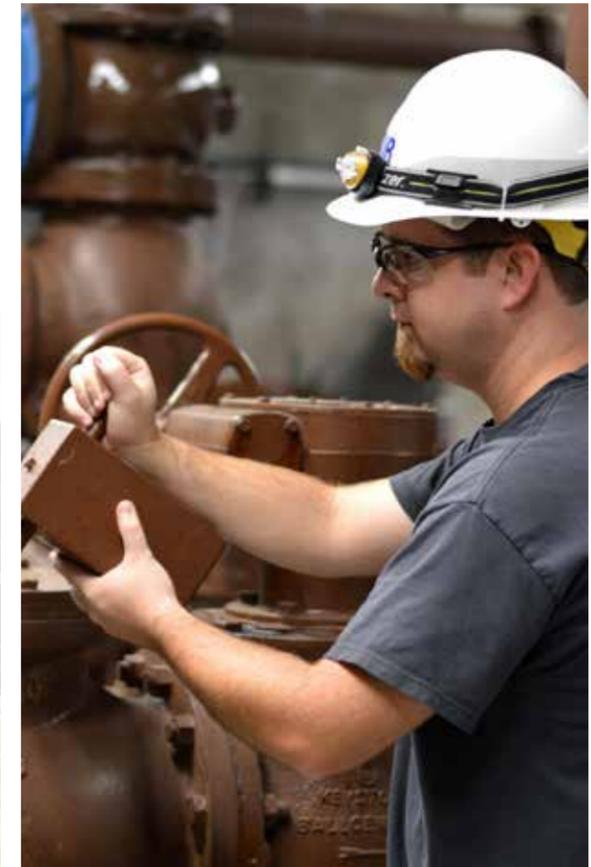
We are also looking at renewable energy options for our operational facilities. For the Kuwahee Wastewater Treatment Plant, we plan to complete a combined heat and power (CHP) system by 2020. The system will provide clean, renewable energy by using biogas from the wastewater treatment process to fuel generators that can supply approximately 85 percent of the plant's electrical demand (up to 11,250 megawatt-hours annually). We estimate the project will reduce net carbon dioxide equivalent emissions by 20 million pounds each year, which is equal to removing 2,000 cars from the roads. TVA selected KUB to receive funds for a portion of the project as one of TVA's Waste Heat Recovery EPA mitigation projects. In addition to the environmental benefits, the CHP system will improve operational efficiency by lowering the plant's energy costs.

Our employees demonstrate environmental responsibility by looking for ways to improve efficiency. In 2016, a team of employees developed a new system to reduce chemical requirements at KUB's wastewater pump stations. At each of the 28 pump stations, KUB installed an air pump/blower system that eliminates grease and solids buildup and improves chemical mixing in the pumping process. This system greatly improves the operation of the pump stations, reduces sewer odors, and reduces the need for reactive maintenance, saving KUB nearly \$200,000 in chemical purchases annually.



Award Winning Environmental Results and Accomplishments

- EPA ENERGY STAR certification for KUB's Miller's Building headquarters
- Zero permit violations at KUB's four wastewater treatment plants in 2016; numerous gold and platinum peak performance awards for wastewater plant operations
- National Biosolids Partnership Platinum certification
- Kentucky-Tennessee Water Environment Association Beneficial Use of Biosolids award
- Department of Energy's Sustainable Wastewater of the Future Program member
- American Water Works Association Partnership for Clean Water member
- Utility of the Future Today recognition
- TVA EnergyRight® Solutions Program Top Performer awards
- Founding Partner of the EPA Natural Gas STAR Methane Challenge Program
- Annual Tree Line USA designation since 2001
- American City & County Magazine's "100 Best Fleets in North America" recognition
- Tennessee Green Fleets Certification Program recognition by Tennessee Clean Fuels



With zero violations in 2016, all four KUB wastewater plants won recognition from the Kentucky-Tennessee Water Environment Association and the National Association of Clean Water Agencies.

Operational Improvements



KUB's commitment to environmental stewardship includes reviewing our business practices to identify new opportunities for efficiency and conservation. Internal initiatives can be seen in everyday efforts to reduce, reuse, and recycle, and on a larger scale with programs and practices that create operational improvements that are not only good for the environment but also good for business.

KUB's Grid Modernization program—one of the largest programs in our history—includes multiple opportunities to align with our Blueprint value of being environmentally responsible. The newly installed advanced meters will relay usage information to KUB remotely, removing vehicles from the road and reducing driving by more than 500,000 miles per year. In addition, KUB will upgrade more than 80,000 water meters over the course of the program. The water meter lids must have a hole to accommodate the advanced meter communication devices. Rather than purchasing new lids, the team implemented a solution to retrofit the existing lids. KUB's vendor cuts the holes in the lids and returns them to be placed back in the field with the new meters instead of going into the waste stream. This retrofit has environmental benefits and cost-savings for KUB, with the retrofit costing just \$4–\$5 per lid, as opposed to new lids that cost around \$17.

In 2016, KUB implemented a new bulb-crusher machine to improve the light bulb recycling process. Employees evaluated the previous process used to recycle bulbs from KUB facilities and street lights, which involved storing and packaging the bulbs before sending them for recycling. The new machine crushes bulbs for secure storage in 55-gallon drums, which minimizes storage space by up to 80 percent. The bulb crusher can crush a bulb in less than a second, saving time and labor over boxing the bulbs for shipping, and use of less packing materials is good for the environment. Storing the crushed bulbs in sealed drums also results in a safer work environment. KUB expects machine to result in an annual return on investment of \$12,000.

KUB continues environmental stewardship efforts by working to reduce paper use. Part of that effort included a paperless billing campaign with a gift card incentive for customers who switched to paperless within a promotional period. By the end of FY 2017, more than 13,000 additional customers enrolled in paperless billing, which translates to nearly \$80,000 in annual cost savings for paper and postage and about three tons less paper used.



The new bulb-crusher machine ensures environmental protection, improves safety for KUB employees, and reduces cost for our customers.



KUB supports employees' volunteer efforts, providing the opportunity for employees to find service projects with an environmental focus.



RIVER RESCUE: KUB EMPLOYEES GATHERED ABOUT 25 BAGS OF TRASH FROM WILLIAMS CREEK & ABOUT 35 BAGS FROM FOURTH CREEK.

ADOPT-A-HIGHWAY: KUB EMPLOYEES COLLECTED 15 BAGS OF LITTER ALONG KUB'S ADOPTED SECTION OF MIDDLEBROOK PIKE NEAR THE HOSKINS CENTER



Customers Value KUB's Environmental Commitment

KUB exists to serve its customers, and we are grateful that they recognize the environmental achievements we have made on their behalf. In a recent customer satisfaction survey, 91% of residential customers and 94% of business customers rated KUB's environmental stewardship "good" or "excellent." KUB was also named a "Favorite" Green Business in the 2017 News Sentinel Best of Knoxville Reader's Poll. Our commitment is to continue our focus on environmental excellence so that we can meet our customers' needs now and into the future.





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