

District Heating Systems



Creating
Economical Solutions
Through Steam
and Hot Water

We are Burns and Roe, one of the most respected and trusted engineering service providers in the world. Since 1932, we have made sure that our clients maximize their potential and reach their objectives. Our employees are proud of being part of a winning team as our reputation is carried from generation to generation.

Creating Environmental Solutions Through Renewable Energy

Since our inception as a company, Burns and Roe has been acknowledged for its accomplishments in the engineering and construction of power generation stations. Current and completed projects include more than 170 generating stations totaling over 70,000 megawatts of capacity. Burns and Roe has applied its steam generating technology to projects using steam as the source of thermal power. The technology applications are as diverse as municipal district heating, campus heating, chemical processing plants, food processing facilities, pulp and paper plants, and desalination facilities. This experience in power and steam production has provided us with the foundation for our experience in District Heating systems.

... many countries are renewing their commitment to District Heating as they find new ways to use the technology to reduce environmental impacts...

Our most acclaimed domestic District Heating project was performed for the City of Jamestown, New York. This project applied the modern hot water piping technology first established in European systems and coupled it with cogeneration from a local utility's coal-fired electric generating station. After completing a study for the City which concluded that District Heating was both technically and economically viable, Burns and Roe designed the system and supervised its construction and start-up. The system was expanded to 30 megawatts while studies and marketing efforts continued for further growth. Our scope of services included technical assessments, marketing, financing, economic analyses, ownership options, implementation strategies, design, procurement, and construction.

A Responsive Approach to Engineering and Construction

Burns and Roe has been in the forefront of development and modernization of District Heating systems as design engineer, project manager and construction manager. Services that we provide include:

- Feasibility Studies
- Conceptual Design Development
- Project Management
- Detailed Design
- Selection and Contracting for Turnkey Execution
- Design Document Reviews
- Cost Estimating
- Cost and Schedule Control
- Procurement Services
- Life Extension and Modernization
- Condition Assessment
- Construction Monitoring



City of Jamestown - Burns and Roe designed, installed, and later expanded the original District Heating System.

International District Heating System Improvements

Burns and Roe has considerable experience in the rehabilitation and retrofit of international District Heating projects. Some of the largest international projects have been implemented under the framework of the U.S. Agency for International Development (USAID) Energy Efficiency and Market Reform Project. The objectives of this project were to improve energy efficiency and reduce environmental emissions while promoting the importation of U.S. technology to the Russian Federation. For example, District Heating rehabilitation projects in four Russian cities, Tver, Murmansk, Vladimir, and Zelenograd, resulted in over \$3.5 million/year financial savings to system owners and over 15% reduction in greenhouse gas emissions. Burns and Roe provided consulting engineering services for conceptual engineering, management, and procurement oversight services to the local owners.



Murmansk, Russia - Burns and Roe directed the rehabilitation of the Central Heating Plant.

SELECTED CENTRAL HEATING PLANT (CHP) AND DISTRICT HEATING SYSTEMS EXPERIENCE CENTER

Country	Project Name	Clients/Beneficiaries
Russia	Murmansk District Heating System Improvements	United States Agency for International Development (USAID)
	Tver District Heating System Improvements	USAID
	Vladimir District Heating System Improvements	USAID
	Zelenograd District Heating System Improvements	USAID
	Joint Electric Power Alternatives Study (JEPAS)	USAID, The World Bank, The European Bank for Reconstruction and Development
Ukraine	Seven CHP Combustion Efficiency Improvements Project	USAID
Kyrgyz Republic	Improvement of Bishkek CHP and District Heating System	USAID
Kazakhstan	Heat and Power System Efficiency Improvements	USAID
Mongolia	Rehabilitation of Ulaanbaatar CHP No. 3	USAID
Czech Republic	Mitas Cogeneration Project	Gas Energy, Inc.
Poland	Clean Coal Technology Program	U.S. Department of Energy
Latvia	TEC-2 CHP Rehabilitation	U.S. Trade and Development Agency
	Liepaja CHP Project	USTDA
Korea	Master Plan for District Heating/Cogeneration, City of Seoul Mok-dong/Sinjeong-dong Massive Energy Supply Project, City of Seoul	United Nations and the Korea Energy Management Corporation
Canada	Heat Delivery System for a Solar Fueled District Heating System	Central Mortgage and Housing Authority
Various International	Analysis of Cogeneration in the Power Sector of Developing Countries	United Nations
United States	Trenton District Energy Expansion	Banque Nationale de Paris
	District Heating Development	City of Springfield, Massachusetts
	Cogeneration/District Heating and Cooling Project for Jamestown, NY	City of Jamestown, New York
	District Heating and Cooling Feasibility Study for New York City	New York City, New York
	Cogeneration/District Heating Feasibility Study	Brooklyn Navy Yard Development Corporation, New York
	Heat Distribution Systems Life Cycle Cost Analysis	Pan Am World Services
	Comparison of Cogeneration/District Heating and Conventional Power Plant	Minnesota State Planning Agency
	Feasibility of Geothermal District Heating	U.S. Department of Energy
	Evaluation of Cogeneration System Designs and Analysis of District Heating Systems	Electric Power Research Institute
	Design Changes to the District Heating and Cooling System Chicago O'Hare International Airport CHP Relocation Study	Walt Disney World/EPCOT Center City of Chicago, IL

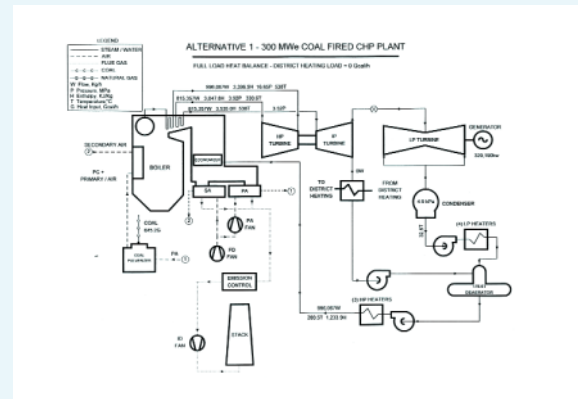
District Heating - from Concept to Operation

Concept - Latvia

Burns and Roe prepared a conceptual design for a coal-fired combined heating and power plant for the City of Liepaja. The plant design is based on an initial electric power output of 300 megawatts with provision for future expansion. The District Heating system is designed to provide a maximum heat load of 330 Gcal/hr. The thermal output of the proposed CHP has been optimized at 180 Gcal/hr, which will be transported from the new plant to the existing facilities in a closed, hot water transmission system.

Operation - Mongolia

The objective of this project was to provide technical, engineering, procurement, installation, and training assistance to Mongolia in the areas of electric power generation and District Heating systems. These services enabled Mongolia to overcome the emergency brought about by outdated and worn out equipment, lack of spare parts, inefficient operations, limited knowledge of energy conservation practices, and shortages of fossil fuels. The scope of work included: Value Engineering/Value Analysis reviews and assessments; detailed reviews of existing facility design and operation; identification of emergency and longer term technical, procedural, and management fixes; installation and start-up services; preparation of technical specifications for equipment and materials; training for Mongolian Energy Sector representatives; and development and implementation of a technical assistance program.



City of Liepaja, Latvia - Burns and Roe provided the conceptual design for a 300 megawatt combined heat and power plant.



Ulaanbaatar, Mongolia - The central heating plant is the only source of heat and hot water in the city.



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