# Energy Utilities: Partners with the HVAC Industry

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Electric and natural gas utility companies (energy utilities) are finding themselves an increasingly competitive business environment. Competition exits within the electric power industry, among electric and natural gas utilities, and with technological advancements such as natural gas cooling and geothermal heat pumps. Competition is a major reason for efforts to increase consumer satisfaction. No longer can energy utilities succeed by providing energy as a product. To stay competitive, they must provide value-added services to product offerings.

In response to competition, a difficult economy, environmental action and government policies, marketing of cost-effective gas and electric cooling equipment is an important energy utility corporate strategy. Energy and cost-effective cooling systems (e.g., air conditioning) in new, retrofit and replacement construction are a means to be competitive and reduce capital expenditures on power plants, and electric or natural gas transmission.

This article will propose formation of a partnership between energy utilities and the heating, ventilating and air conditioning (HVAC) industry. The industrial partnership is a way to solve energy and environmental problems, provide benefits to both industries, and reduce consumer operating costs.

## ENERGY AND COST-EFFECTIVE HVAC

Neither the HVAC industry or its consumers understand the complexity in providing electricity or natural gas. For this reason, many do not accept an energy utility's marketing initiative. Consumers must understand how the technology and/or service they purchase will provide benefits.

Similarly, energy utilities must understand how an electric or gas cooling technology will affect its consumers. Proper market support (or marketing) of HVAC products can have a positive affect on the energy utility industry and its consumers.

When factors that contribute to a building's kilowatt and CCF load, namely heat gain and loss, lighting, miscellaneous, and consumer use are considered, it is evident that communication is a key factor to an energy utility's marketing success.

## HVAC AND UTILITY INDUSTRY PARTNERSHIP

Heating and air conditioning energy use is a significant portion of residential and commercial building expense. Therefore, such costs have a significant impact on personal savings or profits. Because of energy-effective natural gas and electric cooling technology, opportunities now exist to provide consumers with typical paybacks of zero to two years.

To implement effective cooling and HVAC technology programs, a commitment to consumer's needs, desires and actions must be made. To fulfill this commitment, the energy utility and HVAC industry must work together. There must be improved information exchange for the energy utility industry to aggressively serve the consumer.

## A MEANS TO PROVIDE UTILITY AND CONSUMER BENEFITS

Most utility consumers will not consider purchasing new (or different) cooling technologies without product and/or systems performance information. To reduce operating costs, energy utility consumers must know what, when, where and why energy is being used. This is most important when new (or different) cooling technology is considered, as it may alter business operation, change employee work habits or require capital investment decisions.

Cooling technology performance information is a service the energy utility industry should consider in competitive market environments. If this service is an integral part of a market support program and tailored to each consumers' needs, it will reinforce an ability to retain and acquire consumers. Performance information also benefits consumers and energy utilities by providing a means to reduce peak load cost.

## UTILITY AND CONSUMER BENEFITS— THE PARTNER'S RESPONSIBILITY

Cooling and HVAC systems are major investments by energy utility consumers; therefore, accurate near- and long-term demand, energy use and cost forecasts are critical. Market support programs must provide quantitative information that applies to the technology's annual operating cost for a time period that is satisfactory to the consumer.

To correctly forecast operating costs, the partnership must ensure market support which anticipates a variety of subjects:

- Installation Procedure
- Efficiency of Home/Office
- Consumer Use
- Correctly Selected HVAC Components to Avoid Mismatching
- Operational and Maintenance Procedure
- Operational Characteristics by Times of Day and Year
- Hours of Operation/Year
- Expected Life and Performance Degradation
- Other

To provide aggressive energy utility marketing, cooling systems must be compared on such items as:

- Comfort Provided
- Space of Plant/Equipment Room
- Capability to Heat/Cool at Any Time
- Zone or Individual Control
- Acoustic Quality
- Supply/Return Air Space Requirements
- HVAC System Operation and Maintenance (O&M) Costs
- Cooling Technology O&M Costs
- Environmental Benefits—On and Off the Building Site
- Architectural Quality
- Plant/System O&M Technical Training and Professional Knowledge
- Acceptance by Building Owners, Tenants and O&M Professionals

## GAS AND ELECTRIC HVAC TECHNOLOGY CHALLENGES

The development of specific natural gas and electric cooling equipment to reduce electrical demand and conserve energy has been accomplished by major research organizations and manufacturers. Challenges to the energy utility and HVAC industry partnership are:

- Determine what combination(s) of equipment, delivery systems, control strategies and maintenance procedures will optimize fuel selection, life-cycle cost, and consumer satisfaction for heating and cooling new and existing buildings in cold, warm and hot climatic areas.

- Evaluate natural gas or electric cooling technology in combination with the delivery system, control and maintenance for new and existing buildings. Provide this in a manner which is optimal for an energy utility and its consumer.

- Transfer proven combinations of electric or natural gas cooling technology, delivery system, control and maintenance to the A/E, mechanical contractor and building owner/manager/operator. Provide this in a manner that encourages acceptance and minimizes development effort/costs.

- Continue to evaluate, revise and update electric or natural gas cooling and HVAC system combinations when technology is developed that applies to the cooling plant, HVAC delivery systems, control methods or operational/maintenance strategies.

## THE CUSTOMER'S NEEDS

Customers with high operating costs need all the technical and financial assistance an energy utility can provide. Too often they are limited by time and/or money to fully explore and execute improvements in energy use. The growth of energy service companies and performance contracting exemplifies how customer needs are being serviced in the market place.

However, major commercial, institutional and industrial customers

are not energy novices. Often they have an in-house operation's and/or engineering staff with excellent technical skills. They can place many challenges upon an "outsider" who recommends change. Many times proof is required for such items as: effect on company product or service quality, cost savings, maintenance cost useful life, inconvenience, change in business practices, impact on the "boss," etc. Customers must know how a technical change will affect their business.

Customers must be technically, financially and professionally persuaded that the technology and operating cost savings are a win/win for themselves and an energy utility. Simplified energy audits or paper studies which are generalized do not serve customer's needs—too often they simply become paperweights. Ultimately, the bottom line is justification of cost.

## APPROPRIATE COOLING TECHNOLOGY AND HVAC SYSTEMS

The natural gas and electric utility industry both have products and systems which are beneficial to the consumer. The major question by a qualified consumer, design firm or contractor is, "Which product applies to this specific application?" The answer to that question can only be given on a case-by-case basis. One cannot say—with professional merit—"this system is appropriate to most customers."

Application of the cooling technology and HVAC system to the customers' current and forecast rates, O&M costs, business/building functions, etc., all enter into a recommended product answer.

Natural gas cooling technologies being accepted in the market today include: absorption cooling, engine-driven chillers and desiccant cooling. Absorption cooling provides advantages of CFC elimination and reduction of peak electric demand. Depending on customer and location there can be operating cost savings. Engine-driven chillers can be energy efficient, include waste heat recovery, have good part-load performance and reduce peak electric demand. Similar to the absorption chiller, a reduction in operating cost can be realized. Desiccant cooling is best utilized when small changes in outside temperature and high humidity conditions are present. Desiccants remove humidity (latent heat) by absorbing water. Moisture is removed by heating. It has been estimated that a typical air conditioning system uses approximately one-half of its en-

ergy to dehumidify.

To provide competitive operational costs, the electric utility industry offers cooling technologies that include: variable speed chillers, water-to-air heat pump systems and geothermal heat pump systems. Variable speed water chillers provide the advantage of efficient part-load/full-load performance and CFC reductions. Dependent on customer and location there can be operating cost savings. Water-to-air heat pump systems provide an advantage of zone control, heating/cooling at any time, transfer of heat within a structure, part-load performance (e.g., on/off) and CFC reduction. Similar to the variable speed chiller, a reduction in operating cost can be realized. Geothermal heat pump systems provide the advantages of water-to-air heat pump systems, but allow our earth or water to be an energy resource and thermal storage device. The operational cost advantages (as in the case of the previous cooling technology and HVAC systems discussed above) are building, customer, location and energy utility price dependent.

## CONCLUSION

The electric and natural gas utility industry (energy utilities), together with the heating, ventilating and air conditioning (HVAC) industry, are conscious of energy's relationship to the environment and worldwide vulnerability to oil imports.

The energy utility and HVAC industry have developed electric and natural gas cooling technologies that make each kilowatt or CCF work harder. However, the industries and their consumers must be aggressive if we are to ensure cost-effective operation and maintenance (O&M) benefits to all. The energy utility and HVAC industry must ensure that energy efficient electric or natural gas cooling technologies realize a market demand that is based on economic value.

In a spirit of common interest, the energy utility and HVAC industry must provide cooperative services and technologies which benefit themselves and the consumers. Together, the industries can provide energy-efficient HVAC systems. The result will be consumer investment, free-market competition, consumer satisfaction, stockholder benefits and environmental quality.

## ABOUT THE AUTHOR

*William S. Fleming* has more than 25 years' experience with heating, ventilating and air conditioning (HVAC) technology, energy efficiency, renewable resources and demand-side management engineering services to utilities, industry, government, and commerce. Mr. Fleming's education and experience provide a broad knowledge of issues on the subject of energy efficiency for utilities, utility consumers, the HVAC and construction industry, and building owners/management. Mr. Fleming has worked closely with major utilities and commercial/industrial firms involved in cost-effective utilization of energy.

For his professional services to the HVAC, construction, building owner/management, and electric/gas utility industry, Mr. Fleming has received national recognition such as:

**Fellowship** - American Society Heating, Refrigeration and Air Conditioning Industry (ASHRAE).

**Energy Managers Hall of Fame** - The Association of Energy Engineer's highest award, November 1995.

**Charter Member**, Association of Energy Engineers (AEE)

**ASHRAE Certification of Appreciation** - Chairman, Technical Committee 9.6 (Systems Energy Utilization); Technical Committee 6.8 (Solar Energy Utilization)

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