Gas Foodservice Equipment Network

# Reducing Electric Demand With Energy Efficient Gas Equipment

## *"the GREENER and more ECONOMICAL choice"*

***by Tom Stroozas - CFE, RCGC, CFSP***

We all recognize the importance of incorporating whatever we can into our foodservice operations to make them greener and more environmentally friendly. Why just recently it was reported that a well-known national steakhouse chain said their restaurants are now using some low-voltage fluorescent light bulbs and paper straws and cups made of cornstarch that quickly degrades in landfills. The chain even incorporates waterless urinals in states where they are legal. And one location in Florida has 66 solar panels on its roof!

Charting a return on an environmental investment like this can be difficult; for example the fluorescent bulbs are four times more expensive than traditional ones, however they require significantly less energy and can last up to five times longer. The solar panels have reduced that restaurant's electric bills by only about 5 percent. And the straws…well, they cost twice as much as plastic ones.

While, there are many good ways to reduce your restaurant's environmental impact, reducing your electric demand by incorporating as many pieces of energy efficient gas equipment appropriate for your applications, will go far towards "the greening of your restaurant," and with perhaps much quicker results and bottom line profit contributions.

## Electric Demand & Global Warming

Electricity forecasters tell us that our demand for power will increase by some 18% over the next ten years, but confirmed generation capacity – the sources of electricity that we will need – will grow by only 8.5%. Plus, expansion and strengthening of the power grid and the hardware that's needed to transmit and deliver that power to your restaurant continues to lag — expected to grow by a bit less than 9% in the United States. And with nearly fifty percent of all electricity generated in North America derived from coal burning generating plants, this increased electric demand is certain to increase the carbon emissions and hasten global warming.

All this means that a sudden surge in weather-related disruptions, i.e. hurricanes, tornadoes, etc. or construction delays could leave you facing periodic disruptions in electrical power for your foodservice facility. So increasing your on-site use of gas appliances can become a real asset to reducing your dependency on future electric generation.

## Uncovering Electric Demand Charges

The demand component of your electric bill is the key to many competitive situations when comparing electric to gas cooking technologies since commercial electric rate schedules usually include "demand" charges. Simply put, the user must pay a minimum charge each month that is based upon this maximum demand over a 15 or 30 minute interval each month, depending on your local utility's rate design. This maximum peak interval use of power serves to determine the "demand" charge part of the electric bill for the billing cycle.

Since there is generally only one electric meter on a restaurant, it is not easy to determine which piece or pieces of electric equipment are the principal factors in producing the maximum demand. In essence, you are paying for the privilege of having enough electricity available for your maximum use, whether you use the maximum all day or not.

Furthermore, some equipment must be operated and cannot simply be turned off: lights, fans, refrigeration, HVAC, etc. All of these uses contribute to that initial pattern of the demand curve and help establish the demand charge. If electric cooking equipment is installed too, then the demand for electricity increases, thus increasing the demand component of the bill as well.

When comparing electric cooking equipment to gas technologies, the cost of any such increase in electric demand must be added to the estimated energy charges to determine the total operating costs of the electric appliances.

## A Closer Look at Typical Comparisons

When comparing appliance performances head-to-head, one should consider the use factors (the equipment that is used the most in your facility on a daily basis) to see how to save the greatest amount of energy in the shortest period of time. In other words, switching from an electric fryer to a high-efficiency

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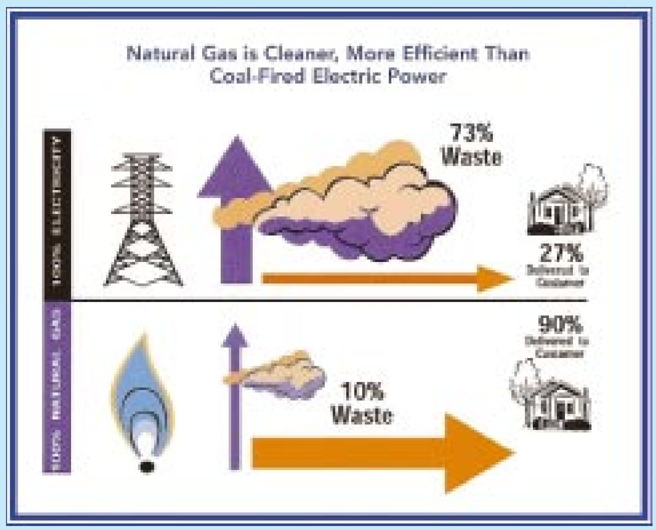
## TEE: The Key to Sound Energy Decisions

Measuring the efficiency of the entire energy cycle from production through the actual point of use is called "total energy efficiency" or TEE. The reason that natural gas is less expensive and a "greener" energy source than electricity is that it has a higher TEE (cumulative amount of BTUs delivered from the point of extraction to the point of use). Although electric appliances have higher efficiency at the point of use (site) the energy lost in its generation and transmission to the point of use is the reason for generally higher costs on a BTU to BTU comparison.

As an example, let's assume that we start with 100,000 BTUs of natural gas at the wellhead and convert it into electricity at a power plant, transfer it via wires to your restaurant, where it then "goes to work" in your kitchen. During this process, we have lost 73% of our original energy, thereby delivering only 27,000 BTUs to your facility, but yet billing you for the entire 100,000.

On the other hand, we start with that same 100,000 BTUs of natural gas at the wellhead and send it directly to your restaurant through a series of underground pipelines, and voila, we've delivered




Courtesy of American Gas Foundation

90,000 BTUs of useable energy — only losing 10,000 BTUs during the process. This is the cumulative delivered energy factor that makes the cost of natural gas significantly less expensive than electricity; up to 75% less in many cases!

Although gas may not be as efficient at the point of use, it has a higher TEE and therefore is a more economical and environmentally "greener" energy source because less product is lost during the delivery process! And, natural gas does not have a demand factor built in like electricity does!

gas fryer can show a quicker return on investment and significant electric demand reductions because the fryer is probably used many hours over the course of a day versus a piece of equipment that is used only sparingly.

Let's look at the savings that can be achieved by eliminating two 22 kW electric fryers from your kitchen lineup and replacing them with two gas units. In the Clearfield County, Pennsylvania market, (which is centrally located in the state), you can expect to save over $200/month in demand charges alone (44 kW x current PEC demand rate of $4.38/ kW = $192.72). Factor that with additional electric savings of around $3,500 annually (44 kW x current PEC electric rate of $0.11/kWh = $4.84/hour x a conservative usage estimate of 2 hours/day = $9.68/day x 360 days = $3,484.80) and the savings quickly becomes enough to pay for a couple of new gas fryers.

Since the gas isn't free, we can factor in that cost at roughly $2,071 annually (two fryers at 110,000 BTUs/hour each = 2.2 therms/hour x 2 hours/day = 4.4 therms/day x 360 days = 1,584 therms/year x current PPL Gas rate of $1.308/therm = $2,071.87).

So, bottom line savings here:

**Annual Electric Fryer Cost (2 fryers)**

$2,312 kWd + $3,484 kW = $5,796 electricity/year

**Annual Gas Fryer Cost (2 fryers)**

1,584 therms/year x $1.308/therm = $2,071 gas/year

**Savings from switching to gas = $3,725/year**

By switching to "clean — green — economical" natural gas, not only would you save $3,725/year, you would also eliminate over 25 tons of carbon dioxide emissions from the atmosphere! (See GFEN article in April 15 Cooking For Profit, "The Restaurant Footprint" for a discussion on calculating carbon dioxide emmisions.)

*To learn more about natural gas appliances for your foodservice operation and how they can help reduce your electric demand charge, and your carbon footprint, log onto the Gas Foodservice Equipment Network at www.gfen.info*