

IN THIS ISSUE

**Electric Service Limiters Preset
Unreasonable Health and Safety Risks
Low-Income Customers**

NOTE TO READERS

ON-LINE DELIVERY

This document presents the bi-monthly electronic newsletter of Fisher, Sheehan & Colton: *FSC's Law and Economics Insights*. Previous issues of the newsletter can be obtained at FSC's World Wide Web site:

<http://www.fsconline.com/new/news.htm>

Fisher, Sheehan & Colton
Public Finance and General Economics
34 Warwick Road, Belmont, MA 02478
(voice) 617-484-0597 *** (fax) 617-484-0594
(e-mail) roger@fsconline.com

**THE USE OF SERVICE LIMITERS IN RESPONSE
TO NONPAYMENT IMPOSES UNAVOIDABLE
HEALTH AND SAFETY RISKS ON LOW-INCOME
CUSTOMERS.**

Electricity use is essential to preserve the public's health, even well beyond the use of electricity for heating purposes. Nonetheless, Iowa utilities are promoting the use of new technology that would automatically disconnect service if pre-set usage limitations are exceeded.

Recent comments prepared by Fisher, Sheehan & Colton, Public Finance and General Economics (FSC) for the Iowa Department of Human Rights (DHR), in response to a regulation considered by the Iowa Utilities Board (IUB), explains how and why service limiters pose unacceptable health and safety risks.

**THE USE OF ELECTRICITY FOR
MEDICALLY-ESSENTIAL NEEDS**

The loss of electric service poses an immediate threat to the health of Iowa households, including households with children. A Congressionally-funded survey by the National Energy Assistance Directors Association (NEADA) reports that the home electric service that is being disconnected to low-income households is frequently essential to the operation of medically-necessary equipment in the home.

A full 25% of all energy assistance recipients surveyed, which had children under the age of 18, reported that a member of the household used medical equipment that requires electricity. A full 6% of all energy assistance recipients surveyed by NEADA reported that the equipment using electricity was used to treat

asthma. Nearly as many (4%) said that someone in the household was taking medication that required refrigeration.

FACTORS AFFECTING HOUSEHOLD ENERGY USAGE

The DHR comments were presented in response to a regulation before the IUB to approve the use of service limiters by Iowa's electric utilities. Service limiters involve technology that disconnects electricity to a home if usage at any point in time exceed a preset limit. The IUB would allow the limiter to trip whenever usage exceeded 3,600 watts at any moment in time.

Usage and Appliance Age and Efficiency

Setting electricity limits based on some type of "average" load for refrigeration and other appliances will unreasonably affect low-income customers. The use of electricity for refrigeration, for example, depends largely on factors beyond a household's ability to control. The age and relative energy efficiency of the appliance, itself, is the primary driving factor in the energy consumption of refrigerators.

Consider, for example, the fact that new refrigerators are nearly 100 percent more efficient than a new model purchased only 20 years ago. In 1997, however, EIA/DOE reported that 2.0 million of the 9.4 million households eligible for federal fuel assistance had refrigerators 20 or more years old; an additional 3.4 million of these low-income households had refrigerators that were from 10 to 19 years old. Imposing limits at the average will understate low-income electric usage and adversely affect low-income households.

Usage and Household Demographics

The demographics of a household further drive the level of electricity consumption at any instant in time. To provide an example of the severe restrictions a 3,600 watt limit would impose, consider a scenario for a typical four person household preparing for school or work.

The kids want toast and the parents need coffee, totaling 2,200 watts (1,200 watts for the toaster and 1,000 watts for the coffee maker). Eight lights in the house are in use, between bedrooms, kitchen, and bathroom, half of which are CFLs and the other half are incandescent, totaling 400 watts. Given this scenario, if *any* of the following occurs, the limiter will shut off service:

- The furnace fan kicks on (up to 2,350 watts to start up; up to 875 watts to run);
- The refrigerator kicks on (approximately 1,000 watts to start up; 400 watts to run);
- The well pump kicks on (1,500 to 10,000 watts to start up; 400 watts to run);
- The garage door is opened (1,400 watts to start; 350 – 775 to run);
- A curling iron is plugged in (15,000 watts);
- A blow dryer is turned on (1,500 watts);
- The stove top is turned on to make eggs, bacon, waffle, pancakes (1,200 – 2,600 watts).

Usage and Appliance Types

It is not merely demographics, however, that drive the electric consumption within a home. Even dwellings with non-electric heat, but with electric water heaters, will be unable to heat water. Most house-sized water heaters use heating elements that draw 4,000 watts themselves. A Service Limiter based on a 3,600 watt limit effectively prevents any hot water service in these homes.

Since standard building codes require each dwelling unit to have an approved automatic water heater, use of a Service Limiter with a 3,600 watt limit would place the vast majority of housing units with electric water heaters in code violation.

Finally, dwellings with electric cooking appliances will be seriously disadvantaged compared to those with natural gas appliances. Electric stove elements draw between 1,200 and 2,600 watts each, and ranges draw 2,600 to 3,410 watts (up to 5,700 watts when starting). A home with a Service Limiter would, therefore, not be able to cook food under circumstances where the electric heater is in operation.

It may be easy to create the image of people turning off lights, turning down thermostats, and taking other affirmative steps to control consumption by behavioral changes, DHR said in its comments. Moreover, it may be easy to create the *image* of a vast savings potential that would arise if low-income households only turned off "wasteful" appliances.

However, it is not the number of new appliances, but rather the age, condition and energy efficiency of basic appliances, as well as the age, condition and efficiency of the housing structure itself, and the demographics of the household, that drives consumption levels. Statements that Service Limiters will help payment-troubled consumers better control their energy consumption ignore the fundamental nature of energy usage.

SERVICE LIMITERS AND THERMOSTATICALLY-CONTROLLED APPLIANCES

Service limiters will impose a risk of electric service loss to customers even in instances where the customer is operating no particular appliance.

Consider the impact of a Service Limiter should such technologies be allowed to operate during Iowa's winters for electricity customers. Having a combined load sufficient to trigger the disconnection of service is not dependent upon a person being awake and operating "too many" appliances at the same time. Instead, a Service Limiter can be triggered by the operation of basic appliances with no intervention of a household resident.

The Board's Order proposing regulations states that "for electric heating customers, the limit must be high enough to heat the home." (Order Proposing Regulations, at 4). One problem with that statement is that the regulations make no allowance for the fact that many appliances are thermostatically-controlled, including water heaters, refrigerators, and freezers. Even if no other appliance is in use in the house, whenever one of these thermostatically-controlled appliances switch on at the same time that the electric heater is in use, the limiter will be triggered, shutting off power.

Such a result can occur, in other words, while all members of a household are asleep. The same would occur for well pumps, or sump pumps attempting to run whenever the electric heater is operating. Under such circumstances, a home can become dangerously cold—particularly for vulnerable persons such as the aged or very young—with no action taken by anyone in the home (and no-one awake to undo the dangerous "interruption" of service).

Under the circumstances identified immediately above, it is not simply a matter of a household member waking up and manually re-setting the Service Limiter device to prevent harm from arising. The Service Limiter is triggered by the simultaneous draw of wattage. When the customer manually resets the Service Limiter to restore power, therefore, the power will immediately cut out again, since each of these other appliances will attempt to run as soon as power is restored with the starting wattage of each appliance being substantially in excess of the running wattage.

The only way the customer could break the cycle is to temporarily reduce the temperature setting of the dwelling (thereby curtailing the call for heat) for a period to allow each of the appliances to run. This must, of course, be done in the dark since the tripping of the Service Limiter would prevent any lights from operating.

Even aside from the dangers of these circumstances occurring overnight, when no member of the household is able to respond, the dangers of these circumstances can occur even if no-one is in the home. A housing unit in which no-one is home over a weekend or a week may experience the loss of service due to a thermostatically-controlled appliance drawing power while the electric heater is in operation, thus tripping the Service Limiter. Even if this situation does not present the life-threatening circumstances described above, such a situation presents a distinct and unavoidable threat to property.

The dangers identified above are not uniform either throughout a winter or throughout the state. With regards to heating, for example, there is a direct linear relationship to heating fuel consumption and outdoor temperatures. This relationship is key to all weather-normalization procedures. Known as the heating slope, it is the amount of fuel used for each degree below a base temperature (usually about 62 degrees). The colder it is, the more heat is lost, and consequently, the more frequently the heating system runs.

The usage per heating-degree day also varies significantly from house-to-house, depending on the thermal integrity of the structure and the efficiency of the heating system. The colder it is outside, or the less efficient a home is, the more likely it will be that the heating system will be running, thus making the concurrent start-up or operation of other appliances more likely to trip a Service Limiter.

Should Service Limiters be allowed, the only way to protect life and property given Service Limiter technology is to allow Service Limiters with automatic resets. Regulations governing the use of Service Limiters should provide that the automatic reset is the mandatory default requirement, with any manual reset or remote reset options being in addition to this automatic process.

SERVICE LIMITERS AND THE NEED FOR OFF-SITE RE-SETTING

Service Limiters that cannot be reset at the customer's premises should not be permitted, according to the comments prepared for DHR. In particular, any Service Limiter that requires a telephone call as a precondition to having the Service Limiter reset should be prohibited.

Households in danger of losing their electric service due to nonpayment cannot reasonably be expected to have ready access to a telephone to effect a reconnection of service after a disconnection attributable to a Service Limiter. According to the Federal Communications Commission (FCC), while telephone penetration rates for residential consumers in general exceed 95%, penetration rates for households relying exclusively on public assistance for income fall to only 45%.

Moreover, a household that has lost, or is on the verge of losing, electric utility service due to nonpayment is likely to have previously lost telephone service. Research undertaken at the University of Michigan, based on the Census Bureau's "direct measures of material hardship and poverty," found, for example, that between two and three times as many households are likely to have their telephone disconnected as will have their natural gas or electric service disconnected.

Categorizing households by "work involvement," while 31.8% of households with no work involvement were without telephone service, only 10.0% had experienced a utility disconnection. While 30.9% of households who worked between 1% and 64% of possible months had no telephone service, 15.0% of these households had experienced a utility shutoff. While 17.0% of households working between 65% and 99% of the available months had lost their telephone service, 9.1% had experienced a utility disconnection. The Michigan research was limited to single mothers who were welfare recipients.

The Census Bureau's most recent analysis (2003) of "meeting basic needs" based on its Survey of Income and Program Participation (SIPP) confirms these ratios. While 11.1% of households with income below the Federal Poverty Level had telephone service disconnected in 2001, only 4.3% of such households had utility service disconnected. While 8.9% of households in the lowest quintile of income had telephone service disconnected, only 3.2% of such households had utility service disconnected. While 8.8% of all disabled households had telephone service disconnected, only 3.6% had experienced a utility service disconnection.

It is reasonable for a utility to expect that if a household is facing the disconnection of its natural gas or electric service for nonpayment, it has already lost access to its telephone service. To impose a Service Limiter that requires telephone contact in order to reset the Service Limiter is an unreasonable action.

SERVICE LIMITERS AND WINTER SHUTOFF RESTRICTIONS

The Iowa Code provides that "a public utility furnishing gas or electricity shall not disconnect service from November 1 through April 1 to a residence which has a resident that has been certified under this paragraph." This statutory section does not distinguish between customers who use electricity as their primary space heating and customers who do not. The winter use of Service Limiters would appear to violate this winter shutoff moratorium.

The use of Service Limiters for low-income customers is further contrary to other winter time customer service protections for low-income customers. More specifically, such devices are contrary to the requirement that service disconnections be postponed to allow a customer to apply for winter heating assistance. The loss of service subject to a Service Limiter, when a customer's usage at any one time exceeds a pre-established demand limit, represents the disconnection of service without

notice. IUB regulations provide, however, that "if the utility is informed that the customer's household may qualify for winter energy assistance or weatherization funds, *there shall be no disconnection of service* for 30 days from the date the utility is notified to allow the customer time to obtain assistance." Postponing the disconnection of service is mandatory under the regulation.

The automatic disconnection of service without notice for exceeding a preset wattage limit neither allows the customer notice to seek energy assistance nor provides the customer with a pre-disconnection opportunity to inform a utility that the customer may qualify for winter energy assistance or weatherization funds. The regulatory language ("there shall be no disconnection of service") makes clear that the service disconnection process must allow this opportunity to seek assistance to occur *prior* to the disconnection of service.

SERVICE LIMITERS AND ELECTRIC RATEMAKING

Service Limiters should not be allowed without a corresponding reduction in rates to reflect both the reduced value of the electric service and the inherently reduced contribution which a Service Limited customer will make to the sponsoring utility's capacity needs.

One of the proposed Iowa regulations provides that "there are to be no disconnect, reconnect, or other charges associated with service limiter interruptions or restorations." DHR recommended that this regulation be amended to further require that customers taking service under a Service Limiter be provided with a demand credit.

In requiring a utility to offer a rate credit as part of any Service Limiter program, the IUB should be cognizant both of the precedent of, and the rationale for, the Iowa-Illinois "small user" program adopted 30 years ago. Iowa-Illinois Gas and Electric Company (IIGE) first proposed a "small use" rate in 1978 as part of a general rate

case in which it sought to bring a new power plant into rates.

The Iowa-Illinois rate “was based on the cost of serving small residential customers, and was designed to provide a rate break for small users to encourage conservation during summer months.” The rate was available to residential customers in single-family, individually-metered homes whose daily usage did not exceed an average of 15 kWh per day for the customer’s two highest billing periods from June through September. Any residential customer that did not use air conditioning, Iowa-Illinois found, would, in general, meet the 450 kWh monthly usage (a daily average of 15 kWh).

The Iowa-Illinois rate provided a discount of roughly 16% off of the standard residential rate.¹ Customers taking service under the conservation rate saved roughly four dollars (\$4.00) a month. Iowa-Illinois justified its small use rate on a cost basis. The cost justification, in turn, was based on a customer load survey in which customers were divided into five usage levels.

According to the Iowa-Illinois study: “It was found that customers in the first strata had very even usage patterns: in the summer, they did not incur the same proportion of peak capacity costs as larger users. It was also found that large-use customers have about twice the amount of capacity-related costs per kWh as do small-use customers. The survey further demonstrated that the small-use customers generally use more energy in the winter (for space heating) than other customers, which is also beneficial to system demand since the system is summer-peaking.”

The fact is that customers that impose demands on system capacity that are disproportionately

¹ The discount provided a monthly customer charge of \$2.05 rather than the standard customer charge of \$2.40 per month. Moreover, the conservation kWh charge was set at a flat rate of 4.10¢ per kWh. In contrast, the standard residential rate was 4.92¢ for all summer consumption; winter consumption was priced at 4.92¢ per kWh for the first 500 kWh and 3.80¢ per kWh for all usage over 500 kWh.

less than indicated by their energy consumption will tend to cross subsidize those with disproportionately greater demand for capacity. For example, a customer may represent around 2 percent of total energy but because they have a need for this energy during peak time, might represent around five percent (5%) of system capacity. Under the current system, ignoring the impact of fixed service availability (access) charges, that customer would be facing only two percent (2%) of costs. The remainder would be spread across other customers that utilize capacity disproportionately less.

Conversely, a customer may represent two percent (2%) of total energy, but because they have a Service Limiter, have a need for none (or nearly none) of this on-peak. Without a corresponding bill credit to reflect their lack of contribution to the system peak, the Service Limiter would unreasonably deny customers, on whose accounts such Service Limiters are installed, the benefit of being able to use their service, while still imposing charges for such use.

Utilities often provide rates which reward customers with demand management or which allow demand management by the utilities through demand service tariffs, direct load control tariffs, and interruptible rate tariffs. The “voluntary” use of Service Limiters should be conditioned on the grant of an appropriate monthly demand credit. Not only would such action provide for the equitable treatment of these customers for their loss of demand service, such action should reduce the customers’ rates by 20% to 40%, thereby making it easier for these customers to pay their electric bills.

THE RECOMMENDATIONS OF THE IOWA DHR

The Iowa Department of Human Rights recommended that the Iowa Utilities Board prohibit the use of service limiters. In the absence of such a ban, however, DHR requested the IUB to impose the following restrictions on the use of service limiters:

The IUB should:

- prohibit the use of Service Limiters in any household meeting any one or more of the following criteria: (1) the household in which the customer lives has a child or children age six years old or younger; or (2) the household in which the customer lives has a household member age 65 years old or older; or (3) the household in which the customer lives has a disabled person; or (4) any permanent resident of the household has a medical condition which would be exacerbated or which would pose a danger to health and safety should electric service be discontinued; or (5) any permanent resident of the household has a medical condition the treatment of which, or medicine for which, requires the use of an appliance; requires conditioning (e.g., refrigeration); or otherwise needs electricity; or (6) the household income for the household in which the customer lives is equal to or less than 50% of State Median Income; or (7) the household is a recipient of federal Food Stamp assistance, federal fuel assistance through the Low-Income Home Energy Assistance Program (LIHEAP), or is a recipient of Supplemental Security Income (SSI); or (8) the customer does not have a landline telephone in the home.
- prohibit the use of Service Limiters under each of the following circumstances: (1) Service Limiters may not be used for any customer between November 1 and April 15 of any winter heating season; and (2) Service Limiters must be subject to programming which prevents the disconnection of service for exceeding a preset wattage limitation between the hours of 8:00 p.m. and 7:00 a.m.
- require that the wattage limitations established for the Service Limiter be disclosed to the consumer, along with a comprehensive list of the electric end-uses that could reasonably be expected to operate

within those limits, including an identification of the start-up energy usage as well as the running consumption. Each consumer must be given the opportunity to appeal the specific wattage limitations established for his or her dwelling unit to the Iowa Utilities Board *before* the Service Limiter is installed and made operational; and

- prohibit the installation and/or activation of service Limiters without the express written consent of the customer whose service will be limited.
- prohibit the use of any Service Limiter by a utility that has not, prior to the installation of a Service Limiter, submitted a monthly demand rate credit that reflects, for each month the Service Limiter is in operation: (1) the reduced value of the limited electric service provided to the customer; and (2) the decreased contribution of the service-limited customer to the capacity needs of the electric utility.

A copy of the DHR comments on Service Limiters can be obtained by contacting:

Roger[at]fsconline.com

Fisher, Sheehan and Colton, Public Finance and General Economics (FSC) provides economic, financial and regulatory consulting. The areas in which *FSC* has worked include energy law and economics, fair housing, affordable housing development, local planning and zoning, energy efficiency planning, community economic development, poverty and telecommunications policy, regulatory economics, and public welfare policy.