FSC'S LAW & ECONOMICS INSIGHTS

Issue 05-6 **Fisher, Sheehan & Colton, Public Finance and General Economics** November/December 2005

IN THIS ISSUE

NOTE TO READERS

ON-LINE DELIVERY

This document presents the bi-monthly electronic delivery of *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/news/news.htm

Fisher, Sheehan & Colton
Public Finance and General Economics
34 Warwick Road, Belmont, MA 02478-2841
617-484-0597 *** 617-484-0594 (fax)
editor@fsconline.com (e-mail)
http://www.fsconline.com

Sub-Metering Proposals in Toronto Harm Low-Income Tenants

In 2005, the Government of Ontario proposed to amend the provincial Tenant Protection Act to allow landlords, without the consent of the tenants, to retrofit existing multi-family buildings with electrical sub-meters, thus taking electricity out of the rent and separately charging tenants for that service. The stated purpose for the amendment was to contribute to the creation of a "Conservation Culture" in the residential tenancy sector.

The Toronto-based Low Income Energy Network ("LIEN") was concerned that this amendment would not achieve the Government's energy conservation goals and would harm tenants, many of whom have low incomes and are vulnerable to volatile and increasing electricity prices. FSC worked with LIEN to document a number of issues of concern, and helped LIEN urge the government to proceed cautiously and undertake more research prior to enabling landlords to sub-meter without the consent of tenants.

Savings from Sub-Metering

There is some data that indicates that sub-metering can result in the reduction of energy use. However, this data suffers from several limitations, including non-neutral sources, few buildings studied, and no analysis of the savings. In particular, FSC/LIEN told the government that they had found no studies that provide a detailed analysis of the savings, looking at:

- the nature of the building where savings are being generated, i.e. is electrically heated or not;
- who is achieving the savings;

- whether the savings were being achieved through behavioural changes or through investments in energy efficiency measures; and

- what impact the sub-meters were having on the housing and financial security of the residents.

One of the main reports cited in favor of sub-metering, FSC/LIEN said, is the *Residential Electrical Submetering Manual*, prepared for the New York State Energy Research and Development Authority (NYSERDA) in October 1997 (revised in October 2001).[1] This study cites annual savings of between 12% and 20% of kWh with sub-metering.

The report cites several examples to support its estimates of savings. At least two of the examples (Carlyle Towers and Scott Towers), however, are condominiums, while Goddard Riverside is a non-profit housing development. The nature of the other buildings considered in the NYSERDA report was unclear.

A number of important issues are not clear from the NYSERDA report, including:

- whether these buildings were electrically heated and cooled;

- whether structural changes were undertaken to achieve savings;

- whether the occupants were educated about energy conservation; or

- what impact the sub-meters had on the housing and financial security of the occupants of the housing.

Economic Payback from Sub-Meters

In order for the installation of individual meters to make economic sense, even assuming the meters do generate substantial energy usage reduction, the value of the energy savings should exceed the cost of the meters. An evaluation of the costs and savings generated by individual meters demonstrated that such a finding could not be made in Toronto. Indeed, the cost of installing and administering individual meters would be substantially greater than the value of the expected energy usage reduction.

Using data from the Federation of Rental Housing Providers of Ontario (FRPO), a province-wide organization of apartment owners and managers, an FSC analysis found that there was no economic justification for the installation of individual meters.

For each of three levels of meter cost, the FSC analysis examined six scenarios: a high usage, medium usage, and low usage scenario given heating usage levels, along with a high usage, medium usage and a low usage scenario given non-heating usage levels. The scenarios assumed an annual usage reduction of 18%, the mid-point between the high and low usage reduction levels generally attributable to a move from master meters to individual meters.

FSC found that the move to individual meters would not be economically justified in 17 of the 18 scenarios that were considered. Only in the scenario involving the meter with the lowest possible meter price ($350/meter), and the highest possible heating consumption (1,700 kWh/month) did the individual meter break-even (with a net loss of $0.32 rounded to $0).

Lost Efficiency Opportunities

The incentive structure for energy conservation for the residential rental sector is significantly different from the incentive structure for home and condominium owners or for social (public and subsidized) housing. In the case of condominiums and single family dwellings, the owner and resident are one and the same. In the

[1] "Residential Electrical Submetering Manual", prepared for the New York State Energy Research and Development Authority, Project Manager Mary Ann Bowers, October 1997, revised October 2001.

social housing sector there is often a certain community of interest between social housing landlords and subsidized tenants. In contrast, in the rental-housing sector, the owner/landlord and resident are separate people with markedly different interests: the landlord's purpose is to make a profit, while the tenant seeks a safe, comfortable and affordable home.

This split incentive creates a barrier to energy efficiency in the private rental market. The concern, at its most basic level, is that if the landlord does not pay for the electricity, the landlord will have no incentive to conserve, but conversely, if the tenant does not pay, they have no incentive to conserve.

Sub-metering, on its own, puts the financial incentive to conserve in the wrong place. With bulk metering, the landlord pays for electricity, and the financial incentive for conserving lies with the landlord. In contrast, sub-metering shifts the incentive to conserve to the tenant. This shift shields the landlord from the responsibility to provide an energy-efficient building and appliances for the use of tenants.

If the financial incentive must lie with either the landlord or the tenant, the greatest investment in energy efficiency arises from leaving the incentive with the landlord. It is landlords, not tenants, who have control over most of the high impact and persistent sources of energy conservation:

- Installation of energy efficient furnace – high impact;
- Weatherization – high impact;
- Energy efficient windows – high impact;
- Storm windows or glazing – high impact;
- Insulation upgrades – high impact;
- Energy efficient appliances, including washer and dryer – medium impact;
- Maintenance of appliances – medium impact;
- Installation of programmable thermostat – high impact.[2]

Even in non-electrically heated buildings, investments in strategies such as the quality of the furnace, weatherization and insulation have an impact on the amount of electricity consumed. In poorly heated buildings, tenants routinely use electric space heaters and the oven to heat the unit. Not only do these secondary heat sources pose a health and safety risk, but they increase the usage of electricity.

In contrast, tenants only have control over one high impact energy conservation strategy, *i.e.* reducing the thermostat when asleep or out of the home. Moreover, even many of the other low impact steps within the control of tenants require a financial investment, which is out of reach for most low income tenants, *e.g.*, purchase CFC lights, purchase microwave.

It is also worth noting that the conservation strategies within the control of the landlord are primarily structural strategies, while those within tenant control are behavioral. While both are important, structural changes result in persistent energy conservation, while behavioral strategies generally do not.

For example, if the government adopts a policy of providing energy efficient refrigerators to all low-income households, energy savings will result and will last for the life of the appliance. In contrast, if the government allows energy rates to rise to induce consumers to reduce consumption, there is no guarantee that people will reduce use. Consumers may not because they cannot, because they do not want to, or because they do not know how to.

[2] This list, along with placement of strategies into the categories of high, medium and low impacts, is taken from the "One Tonne Challenge" web site: www.climatechange.gc.ca/onetonne/english

Price Signals

Conversion of master meters to sub-meters does not, unto itself, save energy. Individual meters work no magic on the heating, appliances, lighting, or plumbing systems in a multi-family dwelling. Meter conversion is directed at tenants, not at buildings, and uses a system of economic penalties to discourage tenant energy consumption. It is premised on the assumption that tenants not forced to pay for utility service directly are profligate consumers, and that the transfer to tenants of utility costs will induce greater frugality among tenants.

The entire theory behind the energy conservation potential of individual meters relative to bulk or master meters is based on the efficacy of the "price signals" that would be sent to tenants using energy under an individual meter. Multiple objections can be raised to this "theoretical" notion of sending price signals to low-income households:

- Price signals assume that households pay their entire home energy bills. With low-income households, however, that is often not the case. If, in other words, a household can afford to pay only $60 toward its home utility bill in the first place, rendering a bill of $120 rather than $100 provides no price signal to that customer.

- Winter payment plans tend to render price signals irrelevant. Through a winter payment plan, households are allowed to pay less than their full monthly bill during the winter months so long as the accrued shortfall is retired before the start of the next winter heating season. During neither the winter nor the summer months, therefore, does the electric rate provide a price signal. In the winter months, consumption is "*under*-priced" while during the summer, consumption is "*over*-priced." (A "winter payment plan," by the way, might involve simply someone falling into arrears in the winter months and then entering into a deferred payment plan through which to retire those arrears. There may, but need not, be a formal "winter payment plan" program.)

- Finally, equal billing plans render price signals irrelevant. Through these plans, the customer pays an equal monthly bill throughout the year. At the end of the year, there is a true-up, with the difference rolled into the next year's budget. The plans are *explicitly* designed to take the peak off winter heating bills. In so doing, however, the efficacy of any "price signal" incorporated into monthly rates is destroyed.

Paying More for Less

If sub-metering is introduced, tenants are at risk of paying more for less, and suffering a net loss after sub-metering. This will occur because, under sub-metering, in addition to paying for the commodity, tenants will be required to pay both an administrative fee *and* a fee for the financing costs of installing the meter. In Ontario, these fees are expected to be in the range of $10 - $20 per month, equal to nearly 50% of the electricity bill in a non-electrically heated unit.

Consider the example of an average, non-electrically heated unit in Toronto. The average electricity use in a non-electrically heated rental unit is $37.00 per month. Assume that the monthly administrative fee and capital cost is $16.83. The tenant must, in other words, reduce electricity use by 45.48% or $16.83 to get back to the position that he or she was in prior to installation of the sub-meter.

Given that the refrigerator is non-discretionary and out of the tenant's control, the usage of lights and other appliances must be reduced by more than 57% to break even.

Given that the proponents of sub-metering do not project ***maximum*** potential savings of greater than 30%, these savings seems impossible.

Energy Savings Out of Reach

There are two types of actions that a low-income tenant might take to reduce energy consumption in response to the installation of sub-meters. On the one hand, there are behavioral changes that can be made. Behavioral changes include actions such as turning off lights, reducing heating temperatures at night, ensuring that windows/doors are closed during cold weather, and the like. On the other hand, there are efficiency investments that can be made. These include investments such as replacing old and inefficient refrigerators, replacing inefficient hot water heaters, replacing inefficient heating systems, installing insulation, and the like. By far, the largest savings potential in a low-income household lies with the efficiency investments, not with the behavioral changes.

Unfortunately, multiple market barriers prevent consumer investments in energy efficiency measures. Consumers do not have free access to information on capital/operating tradeoffs. Performing a life-cycle cost analysis on a new appliance, or undertaking an analysis of the payback period for a specific investment in an energy savings strategy, are often not within the ability of a household to do. In addition, the ability to invest in energy savings measures often depends on having access to credit. Consumer credit, however, is frequently limited by financial institutions that disregard the value of conservation investments and refuse to lend based on the potential budget savings generated by reduced energy bills.

In addition to these market barriers common to all residential ratepayers, low-income households have market barriers that are different from, and more extensive than, residential households in general. The result of these market barriers is to more severely restrict the availability of energy-savings measures to low-income households than to residential households in general.

- Low-income households tend to have extremely high implicit discount rates (also sometimes known as "hurdle rates" or "internal rates of return"). In a report for the Electric Power Research Institute (EPRI), Cambridge Systematics found that residential households, overall, demand a hurdle rate for energy efficiency investments of 30 percent. A hurdle rate of 30% translates into a payback period of roughly three years. The implicit discount rate for low-income households, however, is much higher. Cambridge Systematics found low-income hurdle rates ranged up to the 80 - 90 percent level. This means that, for low-income households to make an energy-savings investment, they need to have their money returned to them in savings in roughly one year. This finding makes sense. When a household has little money, it can afford to tie that money up in investments promising a future return only for shorter periods of time.

- Low-income households tend to have extremely low liquidity. The payback period for any particular energy-savings measure becomes irrelevant if the household does not have the investment capital with which to begin. The fact that a new $600 refrigerator will return more than $600 in energy savings over a period of time will not be considered relevant by a household that does not have the $600 to invest.

- Low-income households tend to be renters. Even more significantly than the split incentive discussed above, this tenure status of low-income households translates into the ***frequent mobility*** that accompanies such a rental status. Compared to the roughly twelve percent of the total population that changes residences each year, roughly one-quarter of the low-income population moves. As a result, even in those instances where a tenant may wish to invest in an energy-savings measure,

and assuming a financial ability (*e.g.*, sufficient liquidity) to do so,[3] the payback period required to justify such an investment would need to match the household's tenure. A low-income household, in other words, will not invest in a measure with a two-year payback if that household is likely to move to a different dwelling within the next 12 months.

Summary and Conclusions

While increasing the efficiency of energy usage in residential rental dwellings is a laudable goal, the goal is *not* best reached through the conversion of master meters to sub-metering systems. Such conversions will likely impose higher costs on tenants without generating a cost-effective reduction in energy consumption. Moreover, such a conversion would not place the incentive to invest in energy efficiency measures where that incentive would generate the greatest and most effective investments in efficiency improvements.

The complete analysis released by the Low-Income Energy Network, titled "Zapping Tenants: A Critical Analysis of Sub-Metering in the Residential Rental Sector" (May 2005), can be accessed at:

www.lowincomeenergy.ca

Information can also be obtained by contacting the Advocacy Centre for Tenants Ontario (ACTO) at 416-597-5855 (Toronto).

Fisher, Sheehan and Colton, Public Finance and General Economics (FSC) is a research and consulting firm with offices in Belmont (MA), Scappoose (OR), and Iowa City (IA).

FSC specializes in providing economic, financial and regulatory consulting. The areas in which *FSC* has worked include infrastructure financing, public enterprise planning and development, natural resource economics, community economic development, telecommunications, public sector labor economics, planning and zoning, regulatory economics, energy law and economics, fair housing, and public welfare policy.

[3] This assumes further that a tenant has the authority to invest in energy savings appliances. In most rental instances, it is the landlord that owns major appliances such as refrigerators, hot water heaters and washer/dryers. Certainly, the landlord and not the tenant has dominion over the heating system.