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**The Equities of Energy Efficiency
Investments: Multi-Family Housing (Part
1 of 2 parts)**

NOTE TO READERS

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**In Assessing the Impact of Energy
Efficiency as a Response to Climate
Change, Distributional Factors should be
Considered.**

Utility investment in energy usage reduction programs today is viewed as a wise investment. Years of experience document that utility dollars directed toward helping consumers reduce their consumption serves multiple purposes. Usage reduction reduces the long-term cost of providing utility service. Usage reduction is an effective mechanism by which to control greenhouse gas ("GHG") emissions. Usage reduction can improve affordability to low-income customers and help utilities reduce the costs of nonpayment. It can serve as a driver of economic development, increasing economic activity and creating jobs.

Despite its many benefits, there is an ongoing debate regarding the equities of utility investments in usage reduction programs. The debate questions whether all customer sectors receive their fair share of utility investment dollars. The purpose of this discussion is to take a closer look at those questions involving "fairness," particularly as they relate to the distribution of utility usage reduction investments in affordable multi-family housing. For purposes of this discussion, usage reduction investments will be viewed primarily as an environmental strategy.

Equity vs. Efficiency

The debate over the distribution of utility investments in usage reduction programs mirrors a long-standing discussion in law and economics

regarding the broader environmental agenda. For 100 years, stakeholders, legislators, academicians, regulators and advocates have disputed the propriety of taking distributional impacts into account in environmental policy.

The conversation presents itself as a conflict between “efficiency” and “equity.” It should come as no surprise, therefore, that the “equity vs. efficiency” dialogue has found its way into discussions about energy usage reduction investments as well.

The conflict involves two competing views of the best way to pursue environmental preservation. On the one hand, the “efficiency” school of thought posits that the exclusive objective of public policy should be to maximize the aggregate *magnitude* of environmental protection. Proponents of the efficiency school of thought argue that the distribution of environmental protection is irrelevant. To assert this is not pejorative. It simply indicates the belief that maximizing overall pollution reduction is more important than any consideration of where that pollution reduction might specifically be occurring.

On the other hand, proponents of the “equity” school of thought posit that one must consider not only the magnitude of environmental protection, but must consider, also, the *distribution* of that protection. Proponents of this school argue that it is appropriate to reduce the magnitude of pollution reduction somewhat if that reduction is required to improve the distributional equity.

Within the context of pollution control in particular, efficiency proponents, including the federal Environmental Protection Agency (“EPA”) for years, viewed the public policy charge to include only an identification and pursuit of the maximum technical potential for pollution reduction

(be it water pollution, air pollution, hazardous waste reduction, or any other type of despoliation). Neither the distribution of the benefits arising from this reduction, nor the distribution of the costs needed to be incurred to achieve this reduction, were appropriate factors to be included in the equation.¹

The equity proponents disagreed. The equity advocates argued in response that one fundamental public policy consideration was an identification of who was benefiting from the pollution control efforts and who was bearing the costs. If identifiable groups were being systematically and disproportionately excluded from the benefits, or systematically and disproportionately burdened by the costs, in order to generate the maximum pollution control outcomes overall, remedying those distributional impacts merited a reduction of the overall effectiveness of the environmental strategy.²

A reliance on market mechanisms such as cap-and-trade illustrates the classic tension between those seeking efficiency and those seeking equity in climate change policy. As one commenta-

¹ “To be sure, scholars have engaged in considerable discussion of how the costs of environmental controls affect particular industries, and how these costs place a disproportionate burden on new versus existing, and large versus small, industrial sources of pollution. But there has been at best only an ad hoc accounting of how the benefits of environmental protection are spread among groups of persons. . . There has been virtually no account of how pollution controls redistributed environmental risks among groups of persons, thereby imposing a cost on some for the benefit of others.” (Lazarus, 787).

² This efficiency versus equity debate today is frequently presented in disputes between the developing countries and the developed nations. These international implications are acknowledged and set aside for purposes of this paper.

tor notes: “As environmental policies, environmental justice and market-based theories are diametrically opposed. Market-based systems are designed to achieve aggregate reductions; they are distribution-neutral. The efficiency of pollution reduction is key; spacial distribution is not. In the world of environmental justice, in contrast, distributive justice is key: the issue is who suffers the impact of pollution. Economic efficiency is less important than distributional fairness.” (Kaswan 2008, 10294).

The pursuit of energy usage reduction presents the identical efficiency/equity conflict that has been probed for decades regarding broader environmental protection. The tension poses the following fundamental question: is the objective of a usage reduction program to maximize the total reduction in energy consumption (with its attendant environmental degradation) or is the objective to maximize the total reduction in energy consumption within an equity constraint.

The conclusion advanced below is that, just as the EPA has changed its view from the early days of clean-air / clean-water efforts that “sociological” concerns were outside its purview -- the early EPA asserted its mandate extended only to effective, economic and efficient pollution control—utilities offering usage reduction programs today must change their views as well.

Any discussion of the equity of the distribution of utility investments in multi-family housing has, at its core, certain fundamental assumptions. The discussion below seeks to make those assumptions explicit and to introduce an empirical basis for those assumptions. The purpose of this paper is *not* to empirically establish the validity of these assumptions; other researchers have addressed those topics (and each one might well deserve a paper unto itself). The data below,

however, quite clearly establishes that there is a sound empirical basis for asserting that:

- Multi-family housing makes a substantial contribution to the housing stock of the United States;
- Multi-family housing overwhelmingly tends to be rental housing;
- Multi-family rental housing has a close association to low-income status; and
- Multi-family housing tends to be more energy intensive, and less energy efficient, than single-family housing.

Each of these assertions is briefly considered below.

The Association between Multi-Family Housing, Renter Status and Income.

Treating multi-family housing with energy efficiency is particularly important when one seeks to reach a lower income recipient population. Multi-family housing (defined as buildings with five or more units), one researcher notes, comprises 17% of all housing units in the United States. (Pivo 2014, 1). It makes up at least 20 percent of the total housing stock in nine states (and the District of Columbia). (Wolfe and Brown, 2).

Multi-family housing overwhelmingly is rental housing. Nationwide, 83 percent of multi-family housing units are rental buildings, while only 17 percent are owner-occupied. (Wolfe and Brown, 3) Multi-family housing comprises more than 40% of the entire rental stock in the United States. (Nedwick, 6).³

³ Multi-family housing, however, is highly concen-

In the United States, lower incomes are closely related with residence in multi-family housing. Pivo reports that multi-family housing shelters one quarter (27%) of the nation's very low-income renters. Nearly all (93%) of very low-income households living in multi-family housing are renters. (Pivo 2014, 1).

Recent Census data confirms that renters in multi-family buildings have substantially lower incomes than owners of single-family homes (and even owners of two-family homes). For the nation as a whole, as well as for each Census district,⁴ average renter income is roughly half the income of homeowners.

The same conclusion can be reached when viewing income in relation to household size. The standard measure for accounting for household size is the Federal Poverty Level.⁵ Renter households throughout the country consistently have incomes that are lower as a percentage of Poverty than their homeowner counterparts. Renters in 3 – 4 unit buildings have incomes that are consistently, but not uniformly, at or below 200% of the Federal Poverty Level. For reasons not related to the analysis presented herein, the income of renters in buildings with five or more

trated. According to the Energy Programs Consortium, ten states account for almost 64 percent of all multi-family housing; the top five states accounted for 49 percent. (Brown and Wolfe, 1).

⁴ The nation has been divided into four Census Regions, and nine Census Districts, for purposes of data reporting. A map showing which states comprise each District and Region can be found at: <http://www.eia.gov/consumption/residential/maps.cfm>.

⁵ Federal Poverty Level recognizes that a 3-person household living with an annual income of \$10,000 is “poorer” than a 2-person household living with an annual income of \$10,000.

units are somewhat higher than other renters, but nonetheless still hover around (or below) 200% of Poverty.

It is well-established today that there is a significant potential for energy efficiency savings in the multi-family housing sector. “The potential for energy savings in this sector,” one study found, “is huge and largely untapped.” (Benningfield Group, 6). Energy efficiency in multi-family housing could be improved by about 30 percent.⁶ (Benningfield Group, 4). One reason for this can be attributed to the relatively older age of multi-family housing relative to single-family housing. Most multi-family housing was constructed before 1978, the year the nation's first building energy code was enacted (in California).

Several attributes of multi-family housing often mislead a cursory analysis regarding the potential for achieving energy usage reduction. For example:

- Multi-family housing uses less energy per household (and per person). Multi-family units, however, use more energy per building, as well as more energy per square foot of conditioned floor space.
- Multi-family housing has a much lower ratio of exposed-walls to conditioned floor area (and usually only a floor *or* a ceiling, or neither) exposed to the exterior. As a result, more efficiency poten-

⁶ As Benningfield notes, “this is the ‘achievable’ energy efficiency potential, which means it is both economically reasonable and within normal budget constraints. The economic energy efficiency potential is estimated to be 59% of multifamily energy use. The technical potential is even larger: over 80%.” (Benningfield Group, 4).

tial comes from water heating rather than space heating (or cooling).

- Rather than being concerned about air infiltration to the exterior of the building, multi-family usage reduction often needs to focus on heating and air transfer from dwelling unit to dwelling unit (as well as from dwelling units to common space).
- Many “leaky” systems in multi-family housing units are common systems, such as, for example, ventilation systems used to exhaust kitchens, bathrooms and laundry rooms.
- Multi-family housing is difficult to generalize. The multi-family sector has been found to be “exceedingly diverse in several meaningful ways” (Berkeley, 17), including whether it is high-rise or low-rise, exclusively residential or mixed-use, and whether there is the presence or absence of central systems.

Not only is the achievable energy efficiency savings significant in multi-family housing, but the entry points for introducing energy efficiency are substantial as well. Multi-family housing receives inspections and/or “property needs assessments” at a much higher frequency than do single-family homes. Renovations and repairs resulting from these inspections are more frequent as well.

Multi-family housing is substantially less efficient than other housing types. One study, for example, examined the prevalence of Energy Efficiency Features (“EEFs”), defined to be “physical attributes that reduce the amount or cost of energy required for a given level of energy ser-

vice.” (Pivo, 4). The study concluded that “multifamily rentals were less energy efficient than other housing in 2005 and . . . the gap persisted into 2009.” Some improvement occurred from 2005 to 2009 “but it was modest.” (Pivo, 5). The study reported:

Overall, 87.5 percent of the EEFs (21 of 24) were significantly less common in multifamily rentals than in other housing in 2005 (at the .10 significance level or better). By 2009, this difference had been reduced to 75 percent, though clearly the deficiency in multifamily housing remained.

In the 2005 sample, every HVAC EEF, all but 1 building envelope EEF, and 9 of the 11 appliance EEFs were significantly less common in multifamily rentals. Only 1 feature was more common in multifamily rentals (2000+ vintage clothes dryers), and only 1 was equally common (natural gas cook top). In the 2009 sample, all but one HVAC EEF (2000+ vintage ac), every building envelope EEF, and 6 of 11 appliance EEFs were significantly less common in multifamily rentals, compared to other housing.

(Pivo, 4 – 5).

Not only is multifamily housing less efficient,⁷ but multi-family renters also live about 20%

⁷ Harvard’s Joint Center for Housing Studies reported that “[e]nergy use per square foot is about 10 percent lower in owner-occupied housing than in rentals built since 1980, but among units built before 1940, owner-occupied homes consume 35 percent less energy per square foot. This suggests that there have been more energy-efficiency improvements made to owner-occupied housing than to rental housing since those structures were built. It also underscores the

more densely (per room and per bedroom), thus increasing energy consumption. (Pivo, 2). According to Harvard University's Joint Center for Housing Studies, "while more crowded conditions should not drive-up heating costs (the biggest component of energy use), the larger number of household members relative to area may lead to higher consumption of energy per square foot for other uses, such as water heating, lighting and refrigerators, and other appliances." (Carliner, 2).

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.

Summary

The data and discussion presented above support several conclusions. First, multi-family housing status and rental status are closely aligned. Not simply the majority, but the overwhelming majority, of multi-family units are renter-occupied rather than owner-occupied.

Second, these renters tend to be substantially lower income. Indeed, on average, renters living in multi-family housing live with incomes at or about 200% of the Federal Poverty Level. These incomes are sufficiently low to qualify households for federal energy assistance in many states.

The multi-family units present a significant potential for energy usage reduction. Not only is multi-family housing less energy efficient per square foot of conditioned area, but multi-family housing units have experienced significantly fewer energy efficiency investments.

great potential for efficiency improvements to older rental housing." (Carliner, 2-3).