



# Multifamily Building Energy Efficiency

## South-Central Regional Multifamily Market Assessment

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## I. Introduction

As part of a multi-regional study to address the multifamily buildings market, SPEER has completed this assessment to identify barriers and opportunities for increasing efficiency in these buildings, both nationally and more specifically within our region. This report is a summary of multifamily construction data and multifamily efficiency programs currently operating in the region, along with some key findings and noted opportunities. This paper is intended as a starting point to further develop the body of regional knowledge and expertise in this area, one of the most significant segments of the built environment.

The multifamily building market has unique opportunities and challenges for energy efficiency investments that include the adaptation of building codes, unique construction methods, varying occupant and owner characteristics and tenant metering. All of these factors may play an integral role in the feasibility of energy efficiency investments in the multifamily market. Despite the market's challenges, supporting energy efficiency investments in multifamily buildings has the potential to impact the health, comfort, and affordability of occupants and improve profitability for the building owners.

As part of this project's overall evaluation of the national market, we find significant differences in the various regions and use this opportunity to highlight and define some of the specific characteristics in the South-central region. Several economic tailwinds have favored the Southern and Western regions during the past decade. This effect was most pronounced over the last five years, when the employment grew nearly 2.5 times that of the Northeast and Midwest. Robust job growth has specifically accelerated apartment development. The supply of new apartments grew by roughly 715,000 units in the South and West over the last five years, nearly three times the volume delivered to the Northeast and Midwest regions (see table 1).<sup>1</sup> This steady market growth is also reflected in the increase in rental pricing and high occupancy rates.

**Table 1**

<b>Market Rental Property Growth by Region of US (by number of units)</b>		
<b>Metro Region</b>	<b>2015 Growth</b>	<b>2014 Growth</b>
West	8.4%	5.4%
South	4.7%	2.9%
Northeast	4.5%	2.3%
Midwest	3.6%	2.4%

Unless otherwise noted, multifamily housing is defined as structures containing five or more units. This threshold is used to align with the differences in building codes for multifamily buildings that impact construction methods and the required energy metering systems.

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<sup>1</sup> <http://www.realpage.com/mpf-research/apartments-follow-households-but-numbers-vary-by-region/>

## II. Regional Characteristics

Oklahoma and Texas make up the South-central region of the US. While both of these states benefit from relatively low cost of living when compared to the national average, there are some clear differences that impact the multifamily markets in each state.<sup>2</sup> Most notable is the current population growth of Texas (9.24%) as compared to the national average (4.10%) over the past 5 years<sup>3</sup>. This higher than average growth is indicative of a transitioning population that in turn increases demand for multifamily rental housing and results in high occupancy rates, increased rental prices, less available affordable housing, and greater construction activity for market-rate multifamily properties. This growth also impacts the demand on the local electrical grid, thereby generating interest in energy efficiency investments to offset or delay utility investments in additional electrical generation and infrastructure.

In contrast, Oklahoma's population growth (4.26%) is closer to the national average (4.10%) in the past five years. However, the recent decline in the oil and natural gas industry is reflected in slightly lower occupancy rates for multifamily properties in Oklahoma. While these differences do play a role in each state's particular multifamily housing markets, similarities are strong with regard to the barriers to energy efficiency investments in multifamily properties.

The American Council for Energy Efficient Economy & CNT Energy reported that the potential for utility savings in Texas' multifamily market was greater than 445 GWh of electric power and 30 million therms of natural gas. The national potential for energy efficiency savings from enrolling the entire multifamily sector in a quality program is over \$3.4 billion. Even if we adjust these figures by removing the 25.52% of U.S. buildings built after 1990, the potential for energy efficiency savings is immense<sup>4</sup>.

## III. The Overall Multifamily Market

The majority of residential housing units in the region (74%) are made up of single family residences or small multifamily properties with up to four units (See table 2). The multifamily market constitutes approximately 18% of the region's housing units. Of those, buildings are fairly evenly distributed among 5-9 unit properties, 10-19 unit properties, and 20+ unit properties (see Table 3). There is also a significant portion (8%) of residential units that are categorized as "other" with the vast majority of this housing category made up of mobile or modular structures (161,885 mobile home and 2,350 boat or RV).

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<sup>2</sup> Sperling's Best Places compares range of living expenses – with 100 being average Texas scored 90.3 and OK scored 84. <http://www.bestplaces.net>

<sup>3</sup> US Census estimates from April 1, 2010 through July 1, 2015.

<sup>4</sup> <http://aceee.org/sites/default/files/publications/researchreports/a122.pdf>

Table 2

South-central Regional Housing Unit Building Types						
Category	Regional Total		Oklahoma		Texas	
	Estimate	Percent	Estimate	Percent	Estimate	Percent
<b>Total</b>	11,826,839		1,675,586	14.17%	10,151,253	85.83%
<b>1 Unit</b>	8,146,127	68.88%	1,253,875	74.83%	6,892,252	67.90%
<b>2 - 4 Units</b>	598,383	5.06%	75,981	4.53%	522,402	5.15%
<b>5+ Units (MF)</b>	2,139,849	18.09%	181,495	10.83%	1,958,354	19.29%
<b>Other (Mobile)</b>	942,480	7.97%	164,235	9.80%	778,245	7.67%

American Community Survey 3 Year Average 2013 (DP04)

Table 3

South-central Regional Multifamily Units Per Building						
Multifamily Units	Regional Total		Oklahoma		Texas	
	Estimate	Percent	Estimate	Percent	Estimate	Percent
<b>Total</b>	2,139,849		181,495	8.48%	1,958,354	91.52%
<b>5 - 9 units</b>	556,827	26.02%	59,949	33.03%	496,878	25.37%
<b>10 - 19 units</b>	694,580	32.46%	59,510	32.79%	635,070	32.43%
<b>20+ units</b>	888,442	41.52%	62,036	34.18%	826,406	42.20%

American Community Survey 3 Year Average 2013 (DP04)

#### IV. Occupants - Owners or Tenants

The American Community Survey data shows that renter-occupied housing in the South-central region is on average 36.76 %. Of those that are renter-occupied, they are fairly well divided between the under 5 units and 5+ units. **However, in the larger multifamily (5+units) facilities, renters or tenants occupy almost 97% (see Table 4).**

Table 4

Occupied Multifamily (5+ units) Housing Unit Ownership						
Geography	Total Occupied housing units estimate		Owner-occupied housing units estimate		Renter-occupied housing units estimate	
	Estimate	Percent	Estimate	Percent	Estimate	Percent
<b>Regional</b>	1,788,384		19,851	1.11%	1,732,074	96.85%
<b>Oklahoma</b>	147,912		2,894	1.96%	145,663	98.48%
<b>Texas</b>	1,640,472		16,958	1.03%	1,586,411	96.70%

American Community Survey 5 year estimate 2010-2014 (S2504)

Another difference between owned and rented properties is the consumption of energy and approximate utility spending (see Table 5). In the southern states, owned properties average

significantly less energy consumption than rented properties<sup>5</sup>. Of the southern states, Texas consumes more energy per unit and more per household occupant than other states.

Table 5

Southern States - Energy Consumption Cost				
	Owned Single Family	Rented Single Family	Owned Multifamily	Rented Multifamily
Cost /sq ft	\$1.00	\$1.08	\$1.27	\$1.34

National Residential Energy Consumption Survey<sup>6</sup> data show that although multifamily units have a somewhat higher energy use per area (kBtu/square feet), they have significantly lower energy use per household or per capita – about 40% as much as single-family housing.

### V. Age of Structure

The age of multifamily buildings impacts the age of energy consuming equipment, end of life cycle upgrades as well as major renovation activities. Targeted outreach and education to facilities that are likely due for major renovation can help lead owners to invest in comprehensive retrofits that can provide holistic energy savings in conjunction with other renovation activities. If they are aware of the cost savings and financial performance of integrating efficiency improvements across the entire property, as well as energy efficiency financing options available, then they are more inclined to include those items in their scope. In addition to reduced energy use and resident’s comfort, which decreases turn-over; these holistic project considerations could have a significant impact on the maintenance costs and operating income, and the resale value of the property.

During the 1960’s and 1970’s, multifamily construction took off in part to accommodate the first wave of baby boomers as they began to live on their own. Multifamily construction was strong again in the early 1980s, spurred by generous tax provisions intended to stimulate the economy after the 1981 recession. Building activity then slowed to a moderate pace for much of the next two decades. **Only a quarter of the region’s multifamily units were built before 1980, but approximately two-thirds of the existing market was built before 2000. All of these buildings are now prime candidates for comprehensive retrofits as they were all built prior to any energy code adoption in the region (see Table 6).**

<sup>5</sup> <https://www.eia.gov/consumption/residential/data/2009/index.cfm?view=consumption#summary>

<sup>6</sup> The Residential Energy Consumption Survey (RECS) is conducted by the Energy Information Administration (EIA) with the help of Oak Ridge National Lab.

Table 6

Multifamily Units –Building Construction <sup>7</sup>						
	South-central Region		Oklahoma		Texas	
Year Built	Total	Pre-2000	Total	Pre-2000	Total	Pre-2000
Total existing today	2,139,849	1,450,770	181,495	151,321	1,958,354	1,299,449
Built 2010 to 2015	300,491		12,094		288,397	
Built 2000 to 2004	388,588		18,080		370,508	
Built 1990 to 1999	280,248		14,412		265,836	
Built 1980 to 1989	643,840		56,839		587,001	
Pre 1980	526,682		80,070		446,612	

Number of New Residential Housing Units by State (Five or More Unit Buildings) - Item 105

### VI. Multifamily Real Estate Market Trends and Growth Trajectories

The multifamily real estate markets are currently benefitting from the strong population growth and high numbers of relocations to this region. This is due in large part to the relatively low cost of living coupled with strong economic prospects which has resulted in significant growth in the major cities. Based on the US Census estimates from 2010-2014, four of the ten fastest growing cities in the nation are located in the South-central region (Austin, Fort Worth, Oklahoma City, and San Antonio – see Table 7). That population influx coupled with increased lending restrictions for home ownership as a result of the economic recession of 2008 led to increased demand for rental housing. In an effort to keep up with this growing demand, construction of multifamily properties has continued to increase.

Table 7

MPF Research Market Statistics 2015 (Q3 Data) <sup>8</sup>						
City	Effective Rent	Occupancy Percent	Annual Job Change	Annual Permits	Annual Demand	Annual Completions
San Antonio	893	94.5%	29400	1465	6048	4902
Houston	1007	94.8%	38400	24297	15053	14412
El Paso	727	93.0%	2500	738	1086	880
Dallas / Fort Worth	975	95.5%	103500	20927	18675	15994
Corpus Christi	896	95.4%	2200	667	221	404
Austin	1152	96.1%	31100	9491	9108	9219
Tulsa	683	94.6%	-100	696	913	833
Oklahoma City	731	93.3%	9600	1206	1655	2104

<sup>7</sup> <https://www.census.gov/construction/bps/>

<sup>8</sup> <https://www.realpage.com/mpf-research/>

MPF Research reports that demand for U.S. rental apartments surged during the 2nd quarter of 2016. They found that apartment occupancy across the nation's 100 largest cities has increased by 127,402 units in the 2nd quarter. This is one of the biggest quarterly market demand totals posted throughout recent years, topping the 2015 2nd quarter market demand volume by 23%. Furthermore, apartment market demand from April to June well surpassed completions totaling 67,550 units.

## VII. Retrofit Challenges

### A. Structural Challenges

The prevalence of particular structure types is a function of land costs, zoning regulations, and historical development patterns. In central cities, where land costs are predominately high, there are more large multifamily buildings; while single-family homes and smaller multifamily buildings are most common in rural areas. Rental units in buildings with 10 or more units constitute 37 percent of the rental stock in central cities, compared with only 27 percent in suburban areas.

**Buildings built prior to 2000 are likely to have un-insulated walls, single-pane windows, and air infiltration issues, all of which contribute to lower efficiency. Making these structural investments is more difficult and more costly for building owners.** Due in part to energy code adoption and improved building practices, the EIA reports that in 2009 heating and cooling is no longer responsible for the majority of energy use in homes and that appliances now account for 35% of all household energy use<sup>9</sup>.

This means that less of the savings will come from retrofitting building envelope and HVAC measures, and more will come from water heating efficiency gains, appliances or electronics. Many of the appliances in rental units (refrigerators, washers, dryers) are the property of the building owner, not the household who pays the energy bills. Since the owner has no economic motivation for upgrading them, they tend to be older and less efficient appliances than in single-family homes. Renters pay for utilities, and yet they are less able to affect the efficiency of their homes. However, according to a recent study, when building owners paid for all energy costs, median annual energy use was 26% higher than when tenants paid for the energy costs directly<sup>10</sup>.

Cooling still consumes significant energy and affects the peak demand in summers in the South-central region. Both duct sealing and air conditioning system upgrades are impacted by the building's design limitations for access and space available to retrofit or upgrade. Access to forced air duct systems for sealing can be limited, and while aerosolized sealing products<sup>11</sup> can be used to seal ducts to improve air flow, the energy savings is not as high as in single family. Many older multifamily buildings utilized fur-down air handling units, also known as "pancake units" as they did not take up valuable square footage, and they are a challenge when upgrading systems.

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<sup>9</sup> <https://www.eia.gov/consumption/residential/data/2009/>

<sup>10</sup> "Energy Efficiency Programs in Multifamily Affordable Housing", Energy Efficiency for All, January 2015.

<sup>11</sup> <https://aeroseal.com/>



## B. Policy Challenges

Most multifamily tenants pay their utility directly and are individually metered for electric use in this region, but few have individual meters for gas and water use. This individual electric metering allows for tenants to be responsible for their own use, but becomes a barrier for the building owner. **Building owners need access to whole-building energy use data, to enable benchmarking and audit tools which help to identify potential savings or develop plans for comprehensive retrofits.** Obtaining whole-building data is a challenge in unit metered buildings, due to customer privacy laws in Texas. There is a need for policy that allows utilities to provide whole-building consumption data to building owners or to their designated third parties so that energy management professionals can translate this data into useful information for the building owner.

Texas recently adopted the 2015 Energy Codes for all new buildings and substantial retrofits, which will have significant impact on the new residential and commercial building stock in Texas. **We believe that a stand-alone multifamily building energy code should be developed to adequately address the unique characteristics of these structures, including adaptations for the construction and the enforcement of the code.** The current codes for residential and commercial buildings leave builders and code officials adjusting requirements, or inadequately enforcing the code in these properties and may be losing some efficiency that could otherwise be achieved for this market segment.

Finally, new federal regulations are phasing out the current R-22 refrigerant and replacing it with R-410A refrigerant to decrease environmental impacts, with full transition to be completed by 2020. This new regulation may encourage building owners to delay replacement, because the new units that operate on R-410A require replacement of both the indoor evaporator coil and the outdoor condensing unit (for split systems, the majority in multifamily) and may require structural modifications as the new units have somewhat larger space requirements. This may be addressed with targeted utility programs during this transition period.

## VIII. Affordable Housing Summary

According to *“Low-Income Working Families: The Growing Economic Gap”*, by the Working Poor Families Project, supported by the Annie E. Casey, Ford, Joyce, and C. S. Mott Foundations<sup>12</sup>, low-income families are defined as those earning less than twice the federal poverty limit. They reported that in 2011, the low-income threshold for a family of four with two children was \$45,622. In 2011, the majority of low-income working families (61 percent) spent more than one-third of their income on housing, exceeding an accepted guideline for what constitutes affordable housing. HUD reports over 330,000 subsidized housing units in the region, and that they average over 90% occupancy. Below is a breakdown of the various subsidy programs and their reported units for each state (see Table 8).

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<sup>12</sup> [http://www.workingpoorfamilies.org/wp-content/uploads/2013/01/Winter-2012\\_2013-WPFP-Data-Brief.pdf](http://www.workingpoorfamilies.org/wp-content/uploads/2013/01/Winter-2012_2013-WPFP-Data-Brief.pdf) (page 8)

Table 8

Subsidized Housing Available Under HUD Programs			
	South-central Region	Oklahoma	Texas
Program Type	Units	Units	Units
Summary of All HUD Programs	330,945	53,291	277,654
Public Housing	67,479	13,015	54,464
Housing Choice Vouchers	189,100	24,945	164,155
Mod Rehab	1,016	156	860
Project Based Section 8	63,463	13,066	50,397
S236/BMIR	305	305	0
202/PRAC	1,433	1,101	332
811/PRAC	1,988	702	1,286

<https://www.huduser.gov/portal/datasets/picture/yearlydata.html#download-tab> (state)

All of the states with the highest proportions of low-income working-poor families were located in the southern or western United States. Texas and Oklahoma have some of the highest numbers when ranked against the other states. Texas ranks 44<sup>th</sup> and Oklahoma ranks 45<sup>th</sup> in the reported percent of population who are working poor. ACEEE recently published a full report to address “Lifting the High Energy Burden in America’s Largest Cities”<sup>13</sup>.

The Low Income Housing Tax Credit (LIHTC) program has been the primary source of funding for both development of new low-income housing and preservation of existing subsidized properties since 1986<sup>14</sup>. An important factor in the success of this program is that private investors, rather than the federal government, provide the equity up front and bear the financial risk for the projects. Rather than providing direct subsidies that reduce tenants’ monthly contributions to rent, the LIHTC program reduces the effective cost of developing rental housing by generating capital through the sale of tax credits. In exchange for the credits, developers must set aside a minimum of either 20 percent of the units for renters with incomes that do not exceed 50 percent of area median income, or 40 percent of units for those with incomes up to 60 percent of area median income. In practice, nearly nine out of 10 rental units in developments supported by the tax credits have been set aside for low-income renters. LIHTC is one of the most successful efforts on record in terms of sound financial performance and delivery of good-quality rentals for low-income families.

## IX. Multifamily Energy Efficiency Utility Incentives

Incentive programs are directly related to the energy market structures and vary between municipally owned utilities and cooperatives, vertically-integrated and regulated investor owned utilities, and deregulated investor owned utilities. While incentive programs generally offer owners and contractors

<sup>13</sup> <http://aceee.org/sites/default/files/publications/researchreports/u1602.pdf>

<sup>14</sup> [http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/jchs\\_americas\\_rental\\_housing\\_2013\\_1\\_0.pdf](http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/jchs_americas_rental_housing_2013_1_0.pdf)

a way to reduce project costs; programs specifically designed for multifamily buildings are not widely available in the South-central region.

### A. Texas Multifamily Incentives

Utilities in the deregulated electric market<sup>15</sup> which account for nearly 70% of Texas' electricity consumption, are mandated to provide energy efficiency incentives. The Public Utility Commission of Texas (PUC) Substantive Rule 25.181 (Energy Efficiency Rule) establishes procedures for meeting this legislative mandate. Effective January 1, 2013, the latest Energy Efficiency Rule switches the goal metric from a percentage of load growth to a percentage of peak demand. In this market, electricity efficiency incentive programs are developed by the Transmission/Distribution Service Providers (TDSPs) which have no direct relationship with the energy consuming customers. The incentives go through the third-party service providers, Retail Electric Providers, or low income assistance organizations. In addition to cost recovery TDSPs receive bonuses for exceeding their reduction goals within their cost limits. As a result programs are developed to be as cost-effective as possible and encourage the highest participation in standard offer programs to meet their reduction goals. They offer programs including residential, commercial, low income, and load management. The large industrial customers have opted out of these programs through a legislative opt-out provision, as is common in several other states.

CenterPoint Energy has three programs that target the multifamily sector within their electric service territory. New multifamily building developers are incentivized to install non-electric water heating. CenterPoint Energy also has an incentive program for developing new Energy Star High-Efficiency Low-rise properties. All multifamily incentives for retrofitting existing buildings must be applied for under two separate programs, the residential standard offer program for the individual residential units, and the commercial program for common use areas or services. The exception is CenterPoint's direct install program for existing affordable housing complexes by providing the installation of energy efficient measures at no cost to the developer, property owner, or tenants. Based on the existing equipment they install compact fluorescent lamps (CFLs), kitchen and bathroom faucet aerators, low-flow showerheads, water heater tank wrap, and a water heater pipe wrap.

Municipally owned utilities claim success with their multifamily incentive programs in Texas, as these tend to have direct oversight by community leaders and thus address the various customer needs in the community. Municipal utilities with concentrated multifamily buildings and programs include Austin, San Antonio, and Denton. Other municipal and cooperative utilities located in small to mid-size cities have lower proportions of multifamily properties and often have limited or no incentive programs.

- Austin Energy's long standing multifamily PowerSaver Program was initiated in the late 1980's and benefits from continued development with input and support from local community stakeholders. The program promotes duct sealing, window film, and high efficiency lighting. Further, the program provides a list of the properties that have participated in the program for the public.

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<sup>15</sup> <http://www.puc.texas.gov/>

- City Public Service (CPS) which serves San Antonio offers a [Smart-Thermostat](#) program for multifamily properties, and new development design assistance.

The Texas Department of Housing and Community Affairs (TDHCA) administer the Weatherization Assistance Program, funded by the US Department of Energy with the program goal to reduce the household cost burden of low income tenants through energy efficiency. These services are provided through various sub-recipients throughout the state<sup>16</sup>. The TDHCA Low Income Home Energy Assistance Program ([LIHEAP](#)) provides up to \$5,000 per household in energy saving upgrades.

Customer Assistance Programs (CAP) are also offered to reduce the cost of low-income customers bills, applying reduced fixed charges, or discounts on utility bills. These programs do not consider or reward efficiency and are designed simply to offset the housing cost for these customers.

## B. Oklahoma Multifamily Incentives

Both Public Service of Oklahoma ([PSO](#)) and Oklahoma Gas and Electric ([OG&E](#)) offer a variety of programs, including an off-peak rate option called “Smart Hours,” however there are no tailored or market specific programs for multifamily buildings in Oklahoma. Instead, any multifamily incentives are administered through commercial or residential standard offer programs. Interestingly, OG&E’s Arkansas division does have a specific multifamily incentive program that is easily accessible via their website and offers tailored information and incentives for multifamily properties.

Oklahoma’s low income Weatherization Assistance Program is administered by the Oklahoma Department of Commerce and services are provided through the Community Action Partnership ([CAP](#)). These programs offer both single family and multi-family upgrades to increase efficiency. Customer Assistance Programs are also seen as a way to reduce low income customers housing cost.

## X. Opportunities

### A. PACE Financing



Property Assessed Clean Energy (PACE) financing was authorized by the Texas Legislature in 2013. Since that time, 6 counties and one city have developed and begun to implement these loan programs. Several more are expected to follow. **A residential property with five or more dwelling units is eligible to participate in PACE financing in Texas, because it is considered a commercial building, and this has been [approved by HUD](#).**

PACE enables property owners to obtain low-cost, long-term financing for up to 100% of all costs associated with the design and installation of water conservation, energy efficiency, renewable and distributed generation retrofits. If the owner pays the utility costs for tenants, these improvements can be structured to generate positive cash flow to the property owner because the cost savings derived from them exceeds the amount of the PACE assessment payment. In addition, PACE enables the property owner to amortize the cost of the

<sup>16</sup> <https://www.tdhca.state.tx.us/community-affairs/wap/docs/16-WAP-CountyMap.pdf>

improvements over their useful life. Because PACE loans are secured by assessments on the property, they are automatically transferred to successive owners when the property is sold. Consequently, each owner of the property pays only that portion of the assessment that accrues during its period of ownership.

PACE assessments may be passed to tenants as a condition of the lease. PACE loans enable property owners to overcome traditional barriers to making capital investments in property. Without PACE, property owners will continue to practice “delayed maintenance” shifting the responsibility to a new owner. Utilities have the opportunity to “buy down” the financing to encourage this investment, as these programs are established in their service territories.

## **B. Low Income Utility Allowances**

In federally subsidized affordable housing, a tenant’s monthly total rental payment includes both the costs of shelter and a reasonable amount for utilities, known as the utility allowance. Utility costs for this calculation include electric, gas, water, and trash collection. The determination of utility allowances affects the rent paid to owners of affordable housing as part of the renter qualification. A lower utility allowance results in owners keeping a larger portion of the total rent (relative to utility payments) allowable under low income qualification (based on maximum percentage of income). The current, widely-adopted utility allowance calculations do not account for the efficiency of a property, creating a barrier to energy and water efficiency investment. These Utility Allowances are usually determined from a schedule or estimated utility cost, based on regional data.

**Two new methods have been introduced that consider the efficiency of the building, and benefit both the owner and tenant in low income properties.** The Energy Efficiency-Based Utility Allowance (EEBUA) provides an adjusted schedule for new buildings that exceed the energy code. In 2008, the Internal Revenue Service (IRS) amended the utility allowance regulations for Low Income Housing Tax Credit (LIHTC) properties to authorize the Energy-Based Consumption Model. The ECM, which is governed by the state housing finance agencies, uses engineered simulation to more accurately estimate the energy use of a building. The ECM encourages projects to achieve greater energy-efficiency than the EEBUA because the utility allowance is based on characteristics of the specific project.

These new policies are beginning to address the split benefit in low-income properties between owners and tenants. Cash flow of new construction projects adopting EEBUA or ECM can increase due to higher expected rental income, allowing for additional pre-construction financing dollars. Retrofit projects using ECM will allow for the owner to recoup their investment over time. Under both scenarios, the projects are reducing energy consumption which reduces energy demand, and increases tenant satisfaction. Rent is adjusted to recognize the savings in utility costs, while maintaining the net housing cost at below 30% of income.

Our case study (see Appendix) demonstrates the process by which Foundation Communities, a LIHTC property, used the ECM for one major retrofit property that also included solar, was able to access federal and utility incentives, and will recoup their investment within 10 years.

### C. Innovative Offerings by ESCOs

**There may be an opportunity for an innovative Energy Service Company (ESCO) to pilot a modified performance type contract which specifically addresses the needs of multifamily properties.** Larger ESCOs tend to focus on larger properties with significant capital opportunities, such as public housing authorities. However, a contract tailored by an ESCO to address upgrades for a company owning a relatively large portfolio of apartment buildings that included both tenant and common spaces would likely increase the savings and owner benefits (rather than just a single site, although savings and margins might be lower and simple paybacks longer than traditional performance contracts). Such a solution would ideally use a holistic, full-service approach that manages the entire process for the client, including any incentives.

Further, such a proposal is likely more suitable for apartment owners/operators who hold and manage properties for longer periods of time and are invested in the longer-term performance of their assets. A modified performance contract might also encourage apartment market leaders who build to a higher efficiency standard in new construction, to bring older buildings within their portfolio up to a higher standard, consistent with their overall branding and strategy. From a market transformation perspective, working out a winning offering might also incentivize private sector ESCOs to target this segment of the market more aggressively.

### D. Regional / National Multi-Family Energy Challenge

**Given the success of the DOE [Better Buildings Challenge](#) throughout the U.S., we would like to see a tailored challenge that encourages, supports and recognizes energy efficiency commitments by industry leaders that own and operate larger portfolios of multifamily properties.** Voluntary challenges are particularly well suited to this region's political landscape. In 2016, EPA will also be supporting and hosting their [Battle of the Buildings 2016 Boot Camp](#) which requires goal setting, benchmarking and reporting through Portfolio Manager. A similar framework that supports a multifamily specific approach and targets existing apartment buildings may be successful and could be coordinated through regional REEOs.

Large corporations are increasingly making sustainability commitments, and some report their efficiency to the industry-recognized platforms, such as the [GRESB](#) rating system for sustainability and energy performance in real estate. This challenge could also serve as a means to increase public recognition and encourage these multifamily companies to meet their ongoing commitments while also encouraging other companies to participate.



## XI. Conclusion



The multifamily market in the South-central region makes up approximately 18% of all housing units. Of these, a majority (42%) are located in developments of over 20 units followed by (33%) located in 10-19 unit properties and 26% in 5-9 unit properties. Additionally, the increased population growth in the region, coupled with stringent home loan qualifications following the mortgage crisis of 2008, has resulted in extremely high occupancy rates which in turn increase rental prices.

Approximately 2/3 of the existing multifamily buildings in this region were built prior to the adoption of energy codes leaving a large number of buildings that could significantly benefit from energy efficiency improvements.

Despite the potential energy savings, and the benefits of energy efficiency for multifamily occupants, there are significant barriers to energy efficiency investments in our region. These include the prevalence of split incentives that result from single unit utility

meters, high occupancy rates, and few targeted energy efficiency programs that mitigate these challenges and align the benefits of energy efficiency for both multifamily property owners and occupants. These challenges are compounded by structural challenges to retrofits of the multifamily building design.

To alleviate the split benefits issue and encourage building owners to invest in upgrades, alternative financing models such as PACE or WHEEL are being implemented, or considered for adoption. Providing permission to access consumption data are an immediate option that may help building owners in the shorter term; however building owners need access to whole-building energy use data to enable benchmarking and audit tools and to identify potential savings or develop plans for comprehensive retrofits. New methods for establishing a utility allowance in low-income properties, which rewards investments in energy efficiency, are now available to allow the property owner to see a return on investment.

The potential may exist for an innovative ESCO performance type contract to specifically target large apartment portfolio owners considering retrofits of multiple existing properties to both tenant and common areas. Finally, given the success of past EPA & DOE style energy challenges, a well tailored statewide multifamily energy challenge may attract some owners/operators with multiple properties in the region willing to publicly commit to certain improvements in some portion of their existing stock.



## **Energy Consumption Model for Utility Allowances – Appendix Case Study**

Founded in 1990, Foundation Communities is a non-profit organization that uses Low-Income Housing Tax Credits to develop high-quality affordable apartments. In Texas, they own and operate 19 properties, providing homes to 5,000 residents. As a low income housing provider, they are required to use Utility Allowances (UA) to set the maximum allowable rent, ensuring that total housing cost (rent + utilities) is limited to 30% of a tenant's income as legally required. UA only applies in low-income housing where the tenant pays all or some of the utility costs.

The UA is most often established by the Federal Housing and Urban Development ([HUD](#)) or the Public Housing Authority (PHA) estimations based on average use information. However, there are two other methods that are available that offer some advantages to the building owner, while still limiting total housing cost to 30% of income. These allowances are approved annually by the state housing authority.

### **Actual Use Method**

In properties that are master-metered, rather than unit-metered, the Actual Use methodology is used to calculate UAs for water and wastewater, and for energy. IRS rules require they submit 12 months of utility data for 20% of the units in each floor plan, as long as the residents have been living there for at least one year. To the limited extent that building owners use this method, it is most often used for energy. However, it is administratively burdensome to access energy data for tenant units due to privacy concerns.

Foundation Communities is avoiding the administrative burden of accessing tenant energy data, but is taking advantage of using the Actual Use Method for water and wastewater UAs. Two of Foundation Communities' properties have water-efficient upgrades and use a third-party water consumption sub-metering and billing service with monthly, unit-level data available to building owners. This data is easily accessible and exceeds the minimum requirements for the Actual Use Method.

### **Program Impacts and Results:**

By using this method, Foundation Communities has generated an additional \$225,000 in potential recouped revenue annually between these two properties. Given the how conservative the Public Housing Authority UAs are for water and wastewater, other property owners may find that the additional potential revenue may justify the cost of a contract with a third party water sub-metering service at water efficient properties.



## **Energy Consumption Model:**

Foundation Communities is using the Energy Consumption Model (ECM) methodology at one property, which uses building characteristics, systems installed, and weather. This does not include any behavioral components. At this property, which had a major energy efficiency retrofit in 2011, they expected that tenant consumption was well below the standard PHA UA. The project included metal roofs, R38 insulation, solar screens, Energy Star appliances and SEER 15 HVAC for 200 all-electric units. They hired a third-party consultant to develop an energy model and produce a report to submit to the Texas Department of Housing and Community Affairs (TDHCA). This agency requested actual use data to back up the model, as they had never accepted this methodology to establish a UA.

Foundation Communities obtained aggregated whole-building use data from Austin Energy, and used that data to establish an Energy Use Intensity (EUI). This EUI allowed them to calculate the actual average energy use for each floor plan. The review required several months to complete, but TDHCA determined this was suitable backup for their model – the first to be approved ECM in Texas. Foundation Communities has since submitted for renewal of the approval and the submission was accepted without issue.

## **Program Impacts and Results:**

The cost of using the ECM method was approximately \$5,500 for the third-party modeling, but the savings is expected to produce \$113,000 in annual increased revenue. This will effectively pay back the cost of these efficiency investments in less than 10 years (calculated without interest on financing). This method allows the building owner to recoup energy and water efficiency investments while still maintaining total housing costs at 30% of tenant income. This effectively eliminates the “split incentive” barrier to multifamily building efficiency upgrades.

## **Where to Begin?**

Benchmarking and data review is the first step in evaluating which buildings or units to invest in, as well as the building owner considering the different UA methodologies which are available as they develop a project. Any business model or program that eliminates the “split-benefit” of investing in efficiency will support healthier, more comfortable and more affordable housing for our communities.

## **Solar Enabled on Tenant Accounts**

While the ECM method does not specifically address adding photovoltaic (PV) solar arrays, PV may be included in the modeling as a building characteristic. This allows owners of LIHTC properties to install PV and recoup their investments and overcome the split incentive issue, particularly when combined with utility rebates and the federal tax credit.