

Assessing CPS Energy's Affordability

PRESENTED BY

Ahmad Faruqui

Travis Carless

Rohan Janakiraman

PRESENTED FOR

CPS Energy

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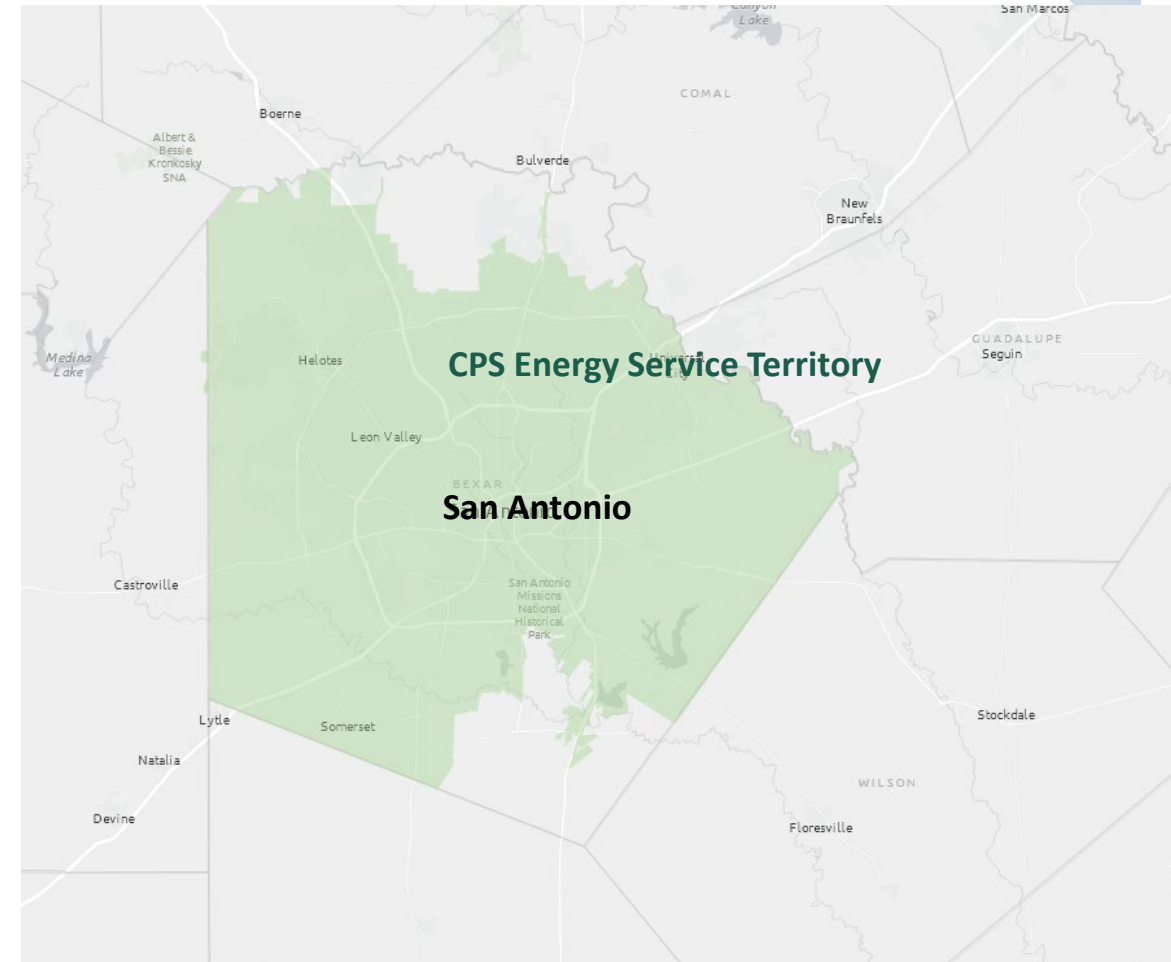
Overview of Energy Insecurity

Energy insecurity is broadly defined as the inability to meet basic heating, cooling, cooking, and lighting needs

Common metrics used to assess a customer's access to affordable and reliable energy for basic energy bills are:

- Total Energy Bill: Assessing the amount and the customer's ability to pay the energy bill
- Energy Burden: The ratio between the customer's total energy bill and their household income
- Disconnection Notices: The frequency a customer receives disconnection notices from an energy utility
- Foregoing Necessities: The frequency a customer reduces or foregoes paying for other necessities (e.g. groceries, medications) due to high energy costs
- Unsafe or Unhealthy Temperatures: The frequency a customer keeps their home at a unsafe or unhealthy temperature to mitigate energy costs

The Energy Burden is one of the most common metrics used for assessing energy insecurity



Source: S&P Global Market Intelligence; Accessed October 2021

What is a high energy burden?

The American Council for an Energy-Efficient Economy (ACEEE) considers households with a high energy burden are those that spends 6% (10% for severe energy burden) or more of total household income on electricity and gas costs (3% for single service)

Benefits and Drawbacks of the Energy Burden Metric

Pros	<ul style="list-style-type: none">• Simple and generally accepted as a metric. For example, In 2016, the New York State Public Service Commission adopted an Energy Affordability Policy (EAP) that set an energy burden at 6% of household income for low-income residents
Cons	<ul style="list-style-type: none">• Tends to underestimate customers experiencing a high energy burden that keeps temperatures at an unsafe temperature

Energy Burden Causes and Correlations

- **Location and Geography**
 - Rural, urban, remote community, Native American, island territory
 - Climate
 - Population density
 - Urban morphology (affecting access to jobs and efficient appliances)
- **Housing Characteristics**
 - Characteristics of the building (manufactured, age, multifamily or single-family)
 - Rental and public housing
 - Types of appliances used
 - Type of thermostat (WiFi, smart, programmable, touch screen)
- **Socio-economic Situation**
 - Income
 - Ethnicity and race
 - Immigrant vs native-born
 - Number of occupants, children, elderly, and disabled
- **Energy Prices and Policies**
 - Energy prices and rate designs
 - Energy mix and access to natural gas
 - Availability and effectiveness of low-income energy programs and appliances
- **Behavioral Factors**
 - Lack of knowledge
 - Misplaced incentives/ principal-agent problems (especially in multifamily homes)
 - Lifestyle cultural factors
 - Lack of control over energy bills
 - High non-monetary costs

Energy Burden Approach and Assumptions

The annual energy burden is calculated by dividing the total energy bill by the total household income for the average bundled customer as shown below:

$$\text{Annual Energy Burden} = \frac{\text{Annual Electricity Costs} + \text{Annual Gas Costs}}{\text{Annual Household Income}}$$

$$\text{Annual Electricity Costs} = (\text{Price of Electricity}) \times (\text{Quantity of Electricity Consumed})$$

$$\text{Annual Gas Costs} = (\text{Price of Gas}) \times (\text{Quantity of Gas Consumed})$$

- We captured household incomes for representative counties using American Community Survey Census data
- Electric and gas utilities that serve a majority of the representative county were used as representative utilities to capture average consumption and prices
- The Energy Burden varies across the cities based on
 - The prices of electricity and gas
 - The quantities of electricity and gas consumed
 - The annual household income
- The Energy Burden can be mitigated by implementing low-income discount and energy efficiency programs



Defining an appropriate scope

- To be able to calculate the energy burden by city, we need to establish 3 parameters
 - (1) - The Representative County for Income: The US Census Bureau has income data at a county level; thus it necessary for us to pick 1 county in a city and assume it is broadly representative of the city as a whole. As a general rule, we attempted to select the **most populous county** that was within the city's geographic area.
 - (2) - The Representative Electric Utility: Calculating the annual electricity bills requires to select 1 electric utility that serves the geographic area in question. As a general rule, we decided to select the electric utility that has the **largest market share** in the given geographic area.
 - (3) - The Representative Gas Utility: Calculating the annual gas bills requires to select 1 gas utility that serves the geographic area in question. As a general rule, we decided to select the gas utility that has the **largest market share** in the given geographic area.

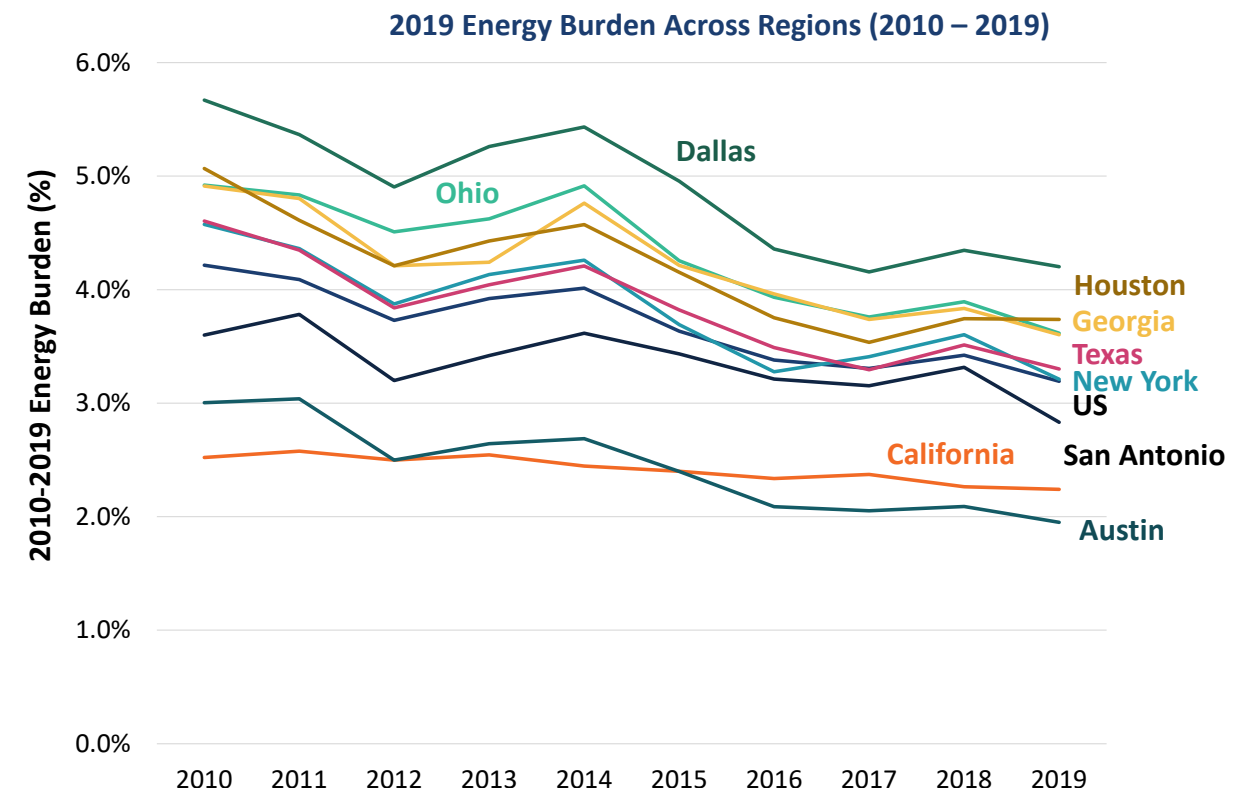
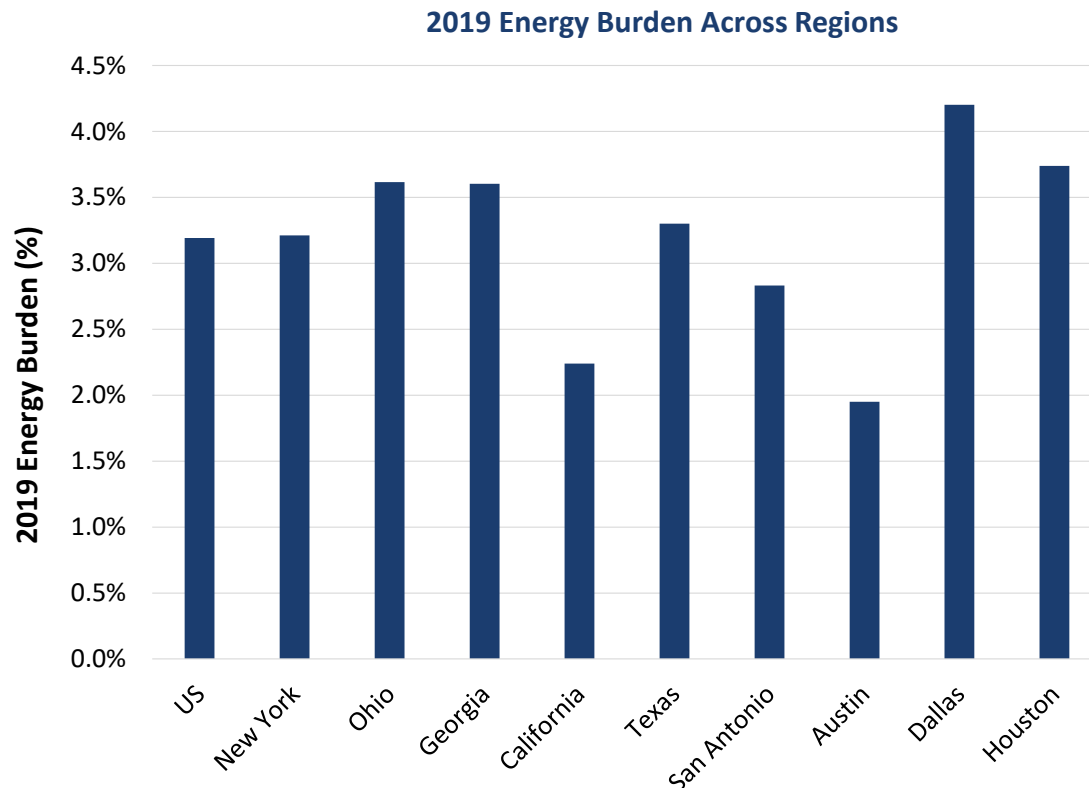
City	Representative County for Income	Representative Electric Utility/Retail Provider	Representative Gas Utility
San Antonio	Bexar County	CPS Energy	CPS Energy
Austin	Travis County	Austin Energy	Texas Gas Service
Dallas	Dallas County	TXU Energy	Atmos Energy Corporation
Houston	Harris County	Reliant Energy Retail Services	CenterPoint Energy Entex
Atlanta	Fulton County	Georgia Power	State of Georgia*
Baltimore	Baltimore County	Baltimore Gas & Electric	Baltimore Gas & Electric
Jacksonville	Duval County	JEA	Peoples Gas
Los Angeles	Los Angeles County	Los Angeles Department of Water and Power	Southern California Gas Company
Orlando	Orange County	Orlando Utilities Commission	Peoples Gas
Phoenix	Maricopa County	Arizona Public Service	Southwest Gas
Stockton	San Joaquin County	Pacific Gas and Electric	Pacific Gas and Electric

Notes: Aggregated residential gas data for Georgia was used to estimate gas consumption and prices due to the unavailability of gas consumption and price data for Atlanta Gas & Light

Energy Burden (2010-2019)

Residential CPS customers experience a lower energy burden than the average customer in Texas and the US

- Customers that live in Austin and California experience the lowest energy burden
- Energy burdens have trended downwards from 4.2% in 2010 to 3.2% in 2019 in the US and 3.6% to 2.8%, respectively, in San Antonio

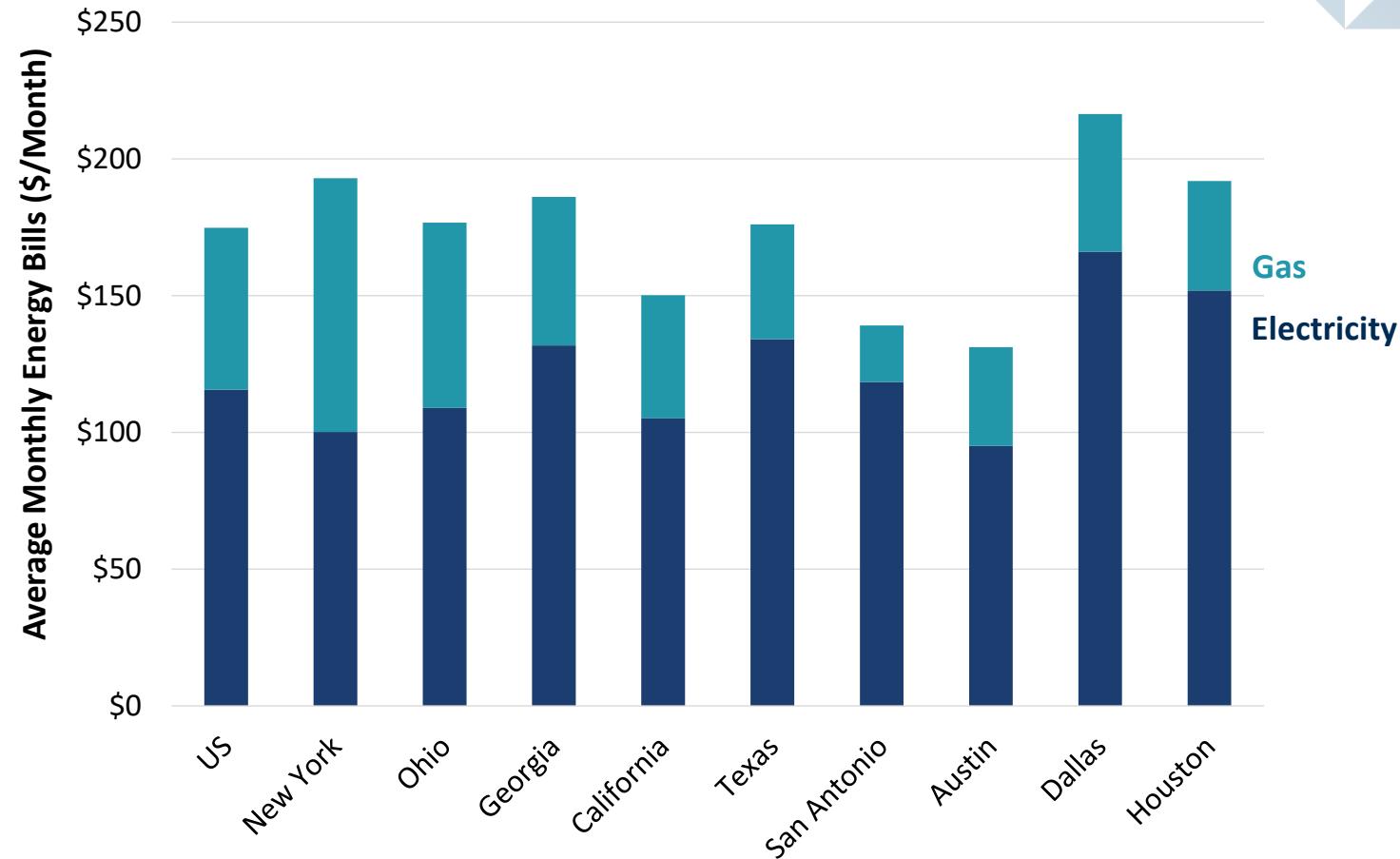


Source and Notes: Annual Electric Power Industry Report, Form EIA-861, U.S. Energy Information Administration, 2019; Annual Report of Volumes, Revenues, and Customers by Company (2002 – 2019), American Gas Association; and Table S1901: Income In the Past 12 Months, 2019: ACS 1-Year Estimates, US Census Bureau. Estimates are not weather-normalized. Gas estimates are based on Municipally and Investor Owned Distributors.

Average Residential Customer Monthly Energy Bills (2019)

On average, CPS residential customers have the highest share of electricity costs (85%)

- CPS customer bills are 10% and 21% lower than the national and Texas state averages, respectively
- Energy customers in Dallas (\$216/month), New York (\$193/month), and Houston (\$192/month) incur the highest energy bills relative to other benchmarks

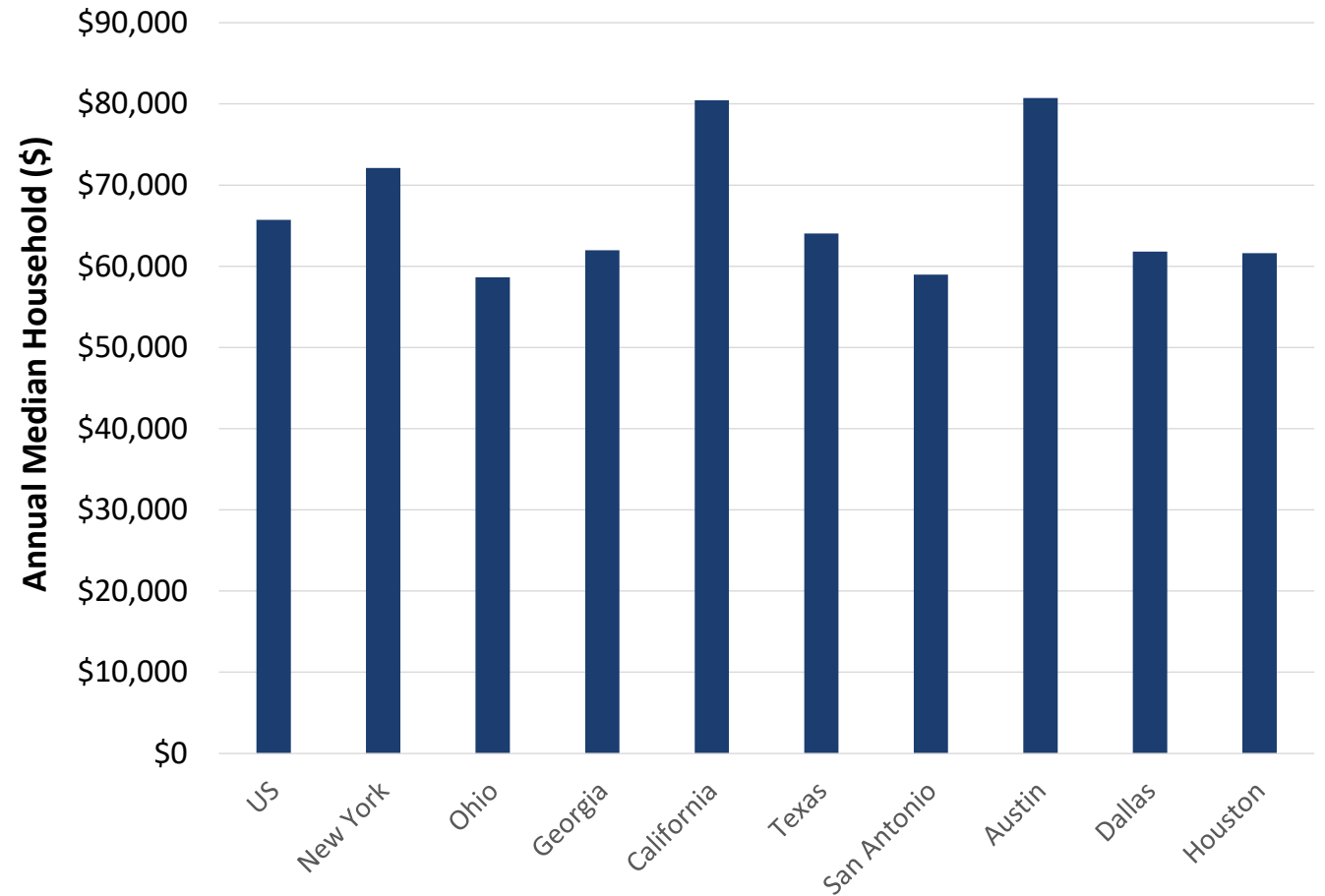


Source: Annual Electric Power Industry Report, Form EIA-861, U.S. Energy Information Administration, 2019 and Annual Report of Volumes, Revenues, and Customers by Company (2002 – 2019), American Gas Association. Estimates are not weather-normalized. Gas estimates are based on Municipally and Investor Owned Distributors.

Annual Median Household Income (2019) by County

Residents in San Antonio (Bexar County) and Ohio have the lowest median income

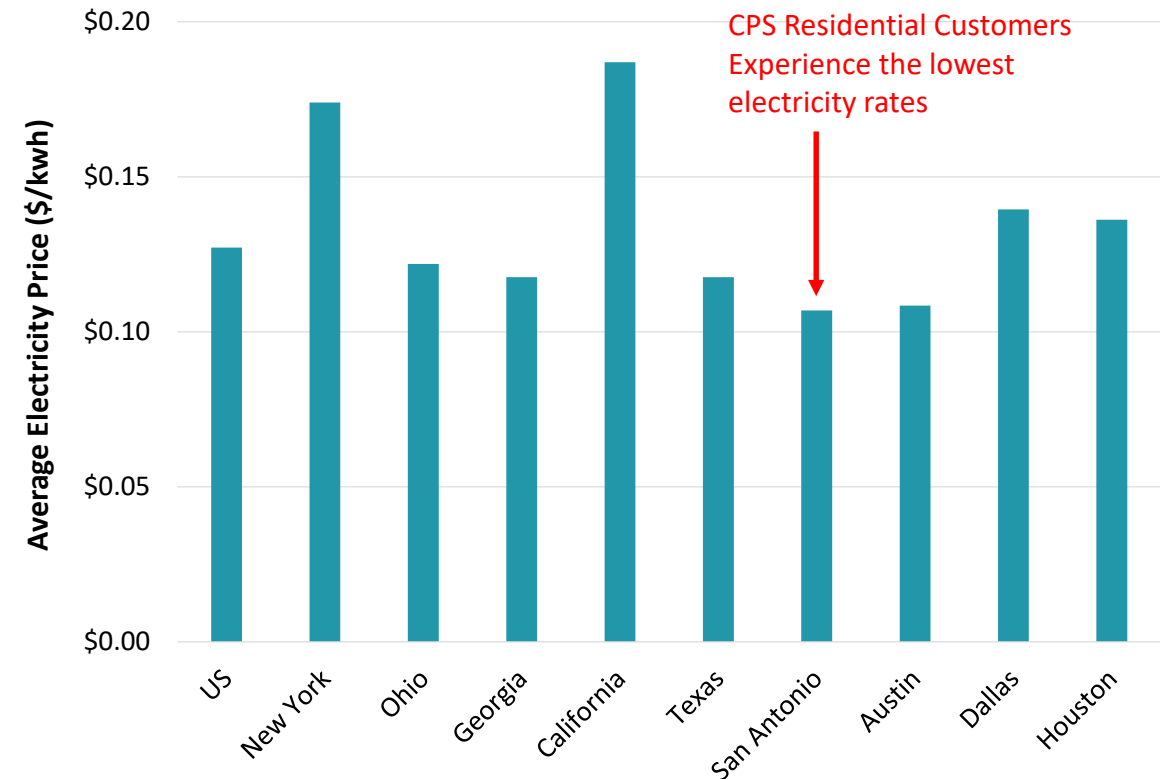
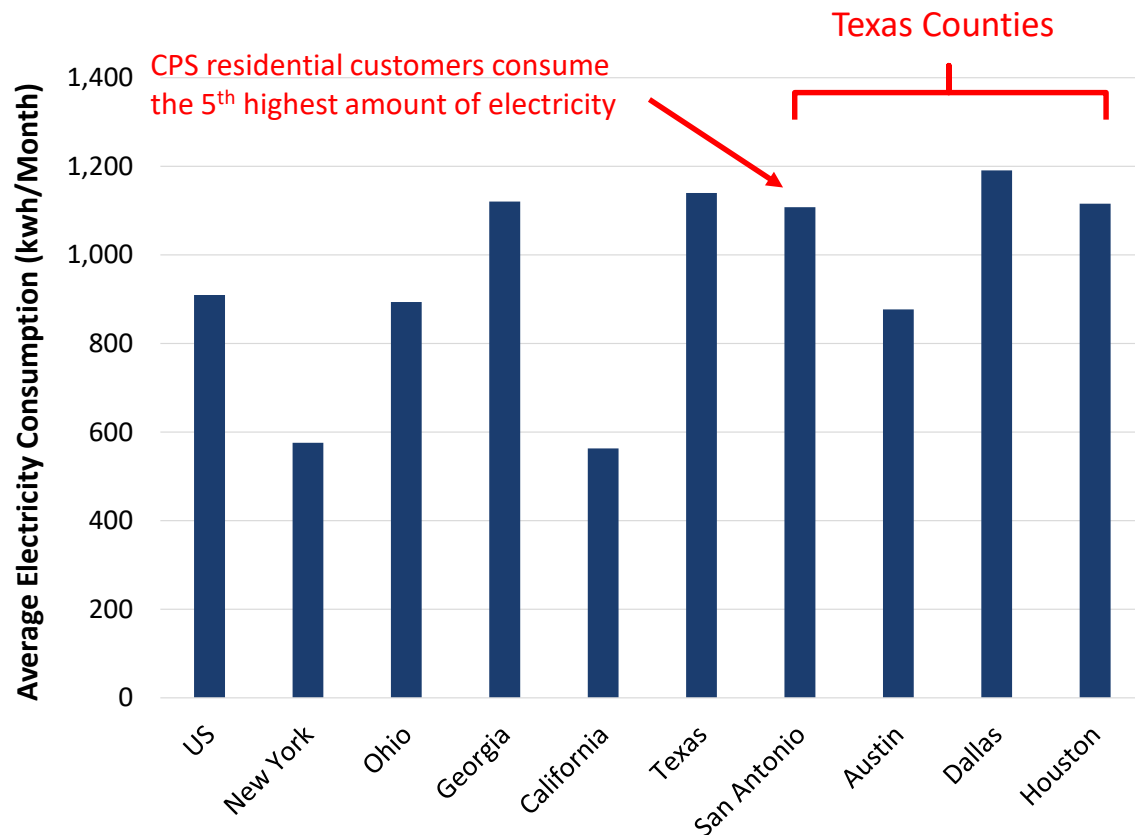
City	Representative County for Income
San Antonio	Bexar County
Austin	Travis County
Dallas	Dallas County
Houston	Harris County
Atlanta	Fulton County
Baltimore	Baltimore County
Jacksonville	Duval County
Los Angeles	Los Angeles County
Orlando	Orange County
Phoenix	Maricopa County
Stockton	San Joaquin County



Source: Table S1901: Income In the Past 12 Months, 2019: ACS 1-Year Estimates, US Census Bureau

Residential Electricity Consumption and Prices (2019)

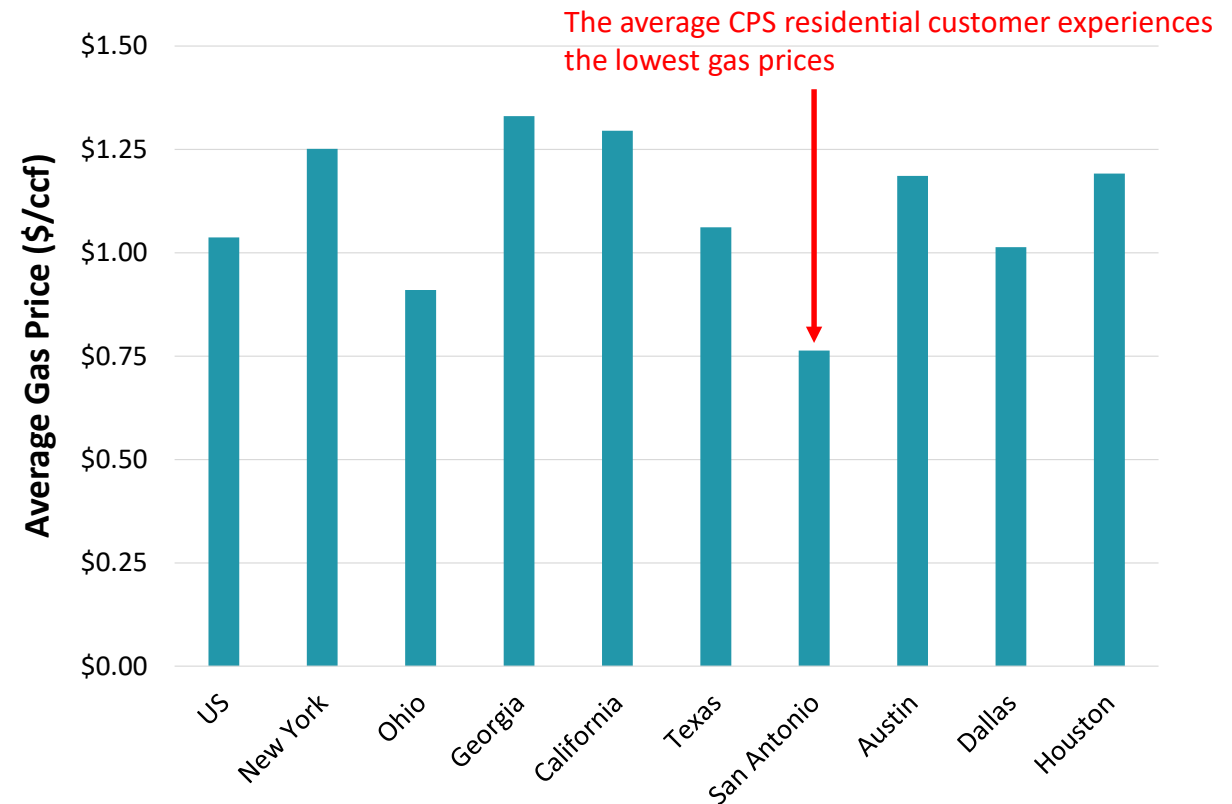
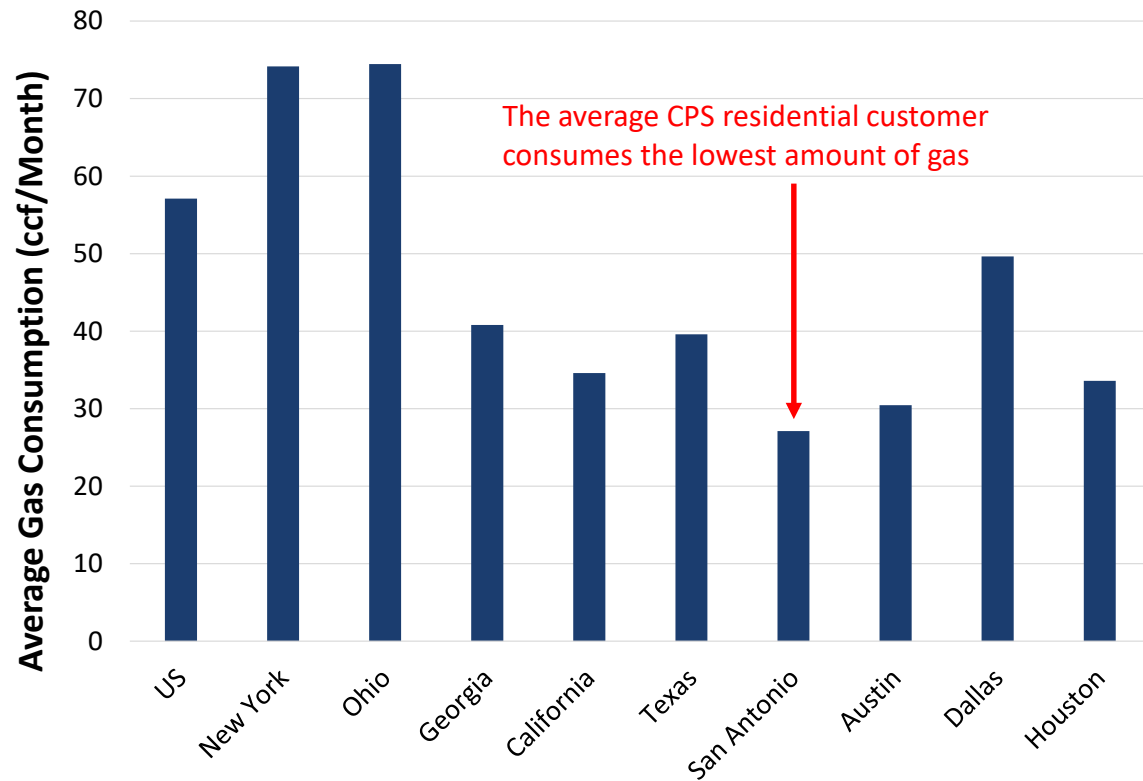
The average residential CPS customer consumes 22% more electricity than the national average, while experiencing the lowest electricity prices relative to the other benchmarks (16% less than the national average)



Source: Annual Electric Power Industry Report, Form EIA-861, U.S. Energy Information Administration, 2019. Estimates are not weather-normalized.

Residential Gas Consumption and Prices (2019)

- Due to a warmer climate, the average CPS residential customer consumes about 50% less gas than the national average in 2019
- The average CPS residential customer pays the lowest gas prices



Sources and Notes: Annual Report of Volumes, Revenues, and Customers by Company (2002 – 2019), American Gas Association. Estimates are not weather-normalized. Estimates are based on Municipally and Investor Owned Distributors.

How Does Energy Affordability Differ by Income Level?

- When examining questions of energy affordability for households in various geographic areas, looking purely at the energy burden faced by the **median** household in that geographic area provides very little insight about the energy burdens faced by low-income households or high-income households in that area
- To address this question, it is necessary to segment the set of households into multiple income groups
- In our study, we segment the populations of San Antonio, Austin, Dallas and Houston into income quintiles
 - An income quintile is a measure of geographic socioeconomic status that divides the population into 5 income groups (from lowest income to highest income) so that roughly 20% of the population is in each group. The table in the lower left-hand corner shows which income percentiles are in which income quintile.
- Since each income quintile contains a range of incomes, it is necessary to condense these set of incomes into a one number ‘summary statistic’ for the purposes of calculating energy burdens by income quintile
 - The statistic that we use is the ‘Household Income Interval Mean’. The household income interval mean is the average household income for households in a given income quintile. The table in the lower right-hand corner shows the household income ranges and income interval means for 3rd income quintile households in San Antonio, Austin, Dallas and Houston.

Income Quintile	Income Percentile
1	<20 th
2	20 th – 40 th
3	40 th – 60 th
4	60 th – 80 th
5	>80 th

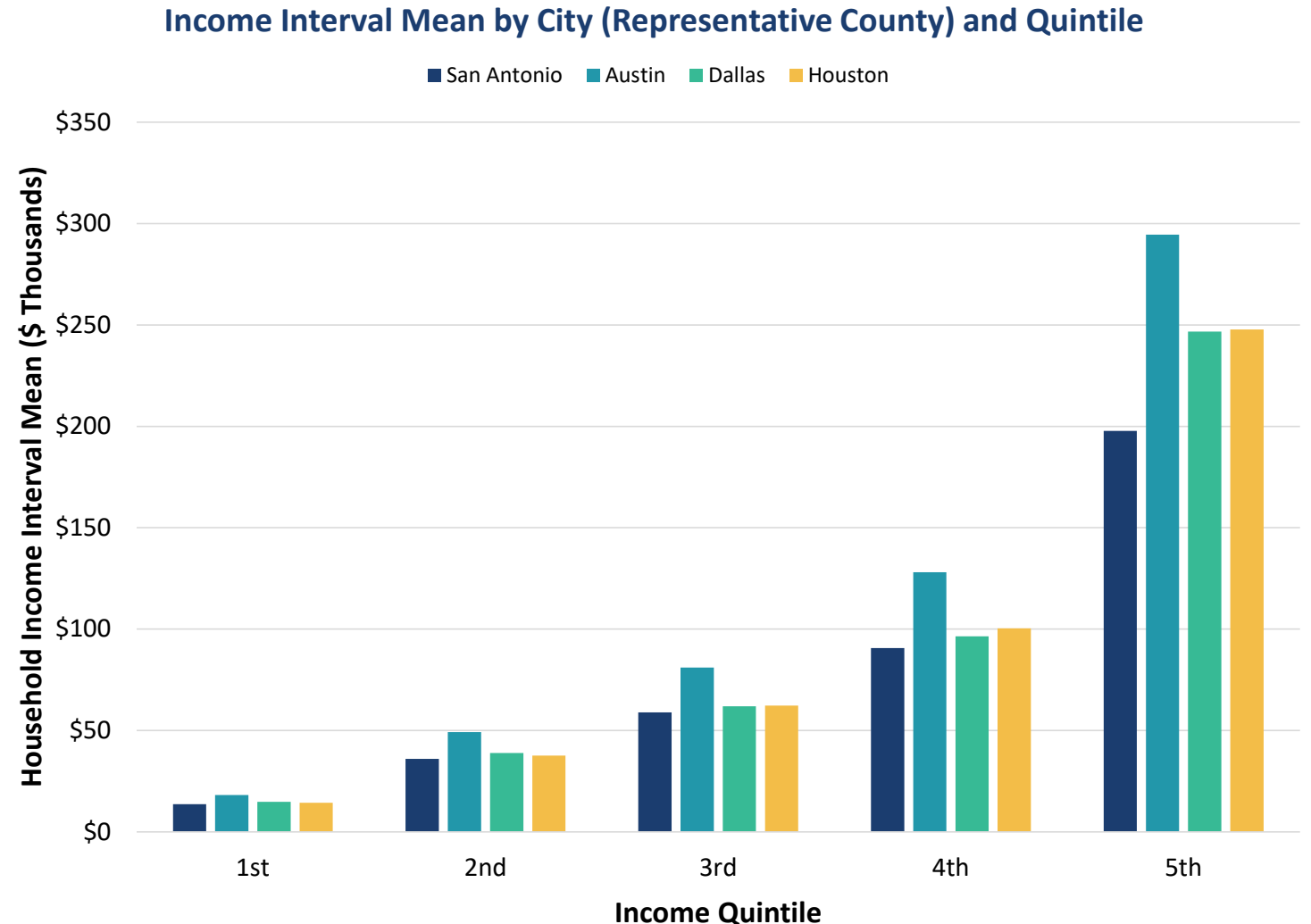
City	County	Min Income	Max Income	Interval Mean
San Antonio	Bexar County	\$47,179	\$71,820	\$58,974
Austin	Travis County	\$63,881	\$100,736	\$81,071
Dallas	Dallas County	\$49,976	\$75,988	\$61,978
Houston	Harris County	\$49,782	\$77,760	\$62,290

Source: [Mean Household Income of Quintiles, US Census Bureau](#). [Income Quintiles – Concept Definition](#).

Income Distributions of Various Texas Cities (2019)

- At every income quintile, households in San Antonio are poorer, on average, than households in Austin, Dallas and Houston
- The average 3rd income quintile household in San Antonio earns **73%** as much as the average 3rd income quintile household in Austin
- The average 5th income quintile household in San Antonio earns **67%** as much as the average 5th income quintile household in Austin and **80%** as much as the average 5th income quintile household in Dallas or Houston

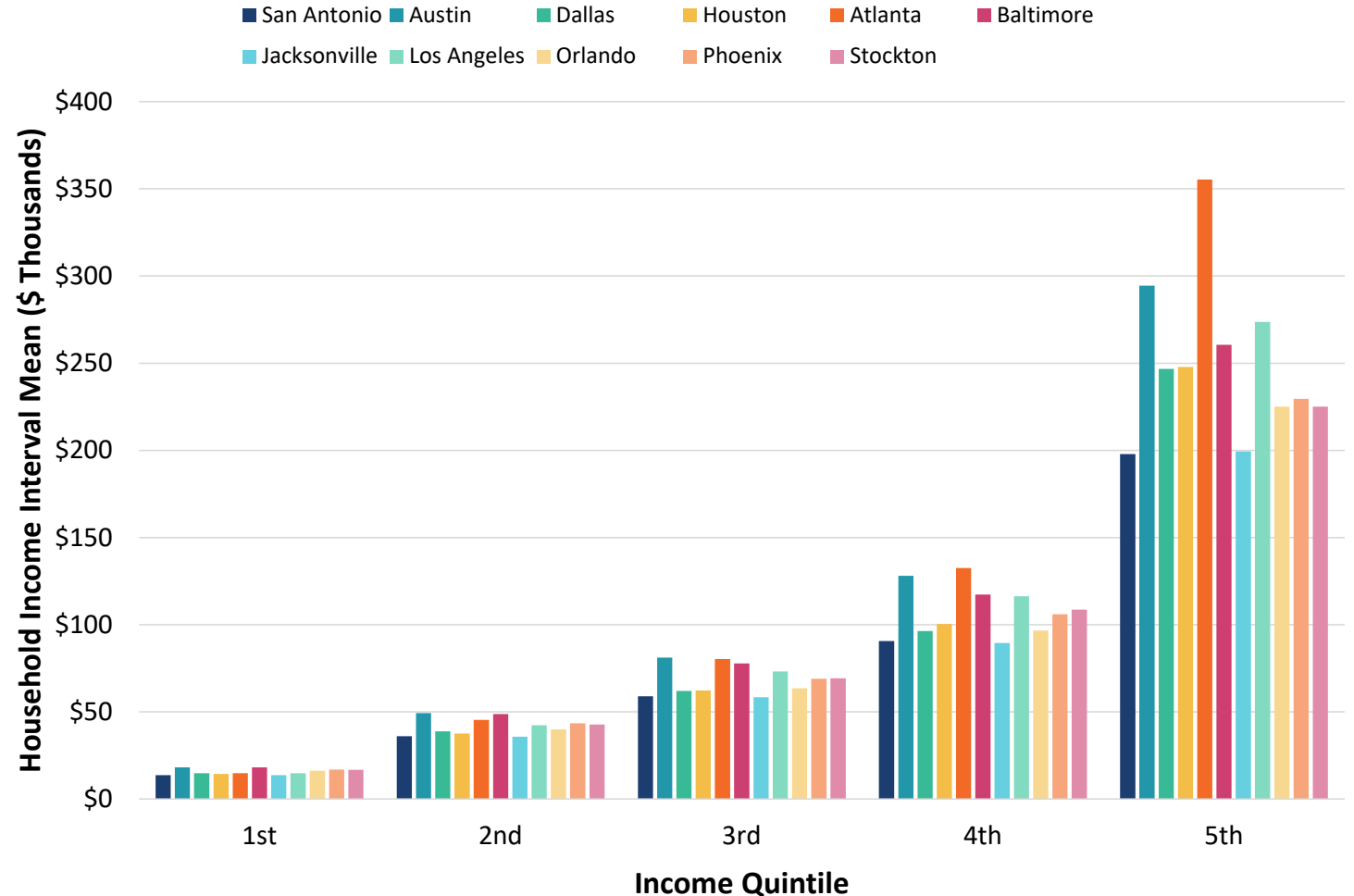
Source: [Table B19081 - Mean Household Income of Quintiles, 2019: American Community Survey 1-Year Estimates Detailed Tables, United States Census Bureau.](#)



San Antonio Households are generally poorer than their Counterparts (2019)

- Out of the 11 cities surveyed, Jacksonville's income distribution **most closely parallels** San Antonio's income distribution
- 4th and 5th income quintile households in Atlanta and Austin were **wealthier**, on average, than similar households in the other surveyed cities
 - On average, 5th income quintile households in Atlanta made **75%** more than 5th income quintile households in San Antonio
- Across all 11 surveyed cities, the income interval means of households in 1st and 2nd income quintiles were less than **\$50,000**

Income Interval Mean by City (Representative County) and Quintile



Source: [Table B19081 - Mean Household Income of Quintiles, 2019: American Community Survey 1-Year Estimates Detailed Tables, United States Census Bureau.](#)

Estimating Energy Costs by Income Quintile

- Two components to estimating annual energy costs by income quintile:
 - Annual Energy Bill for an ‘average’ full-service customer of a given utility
 - Relative energy consumption for households in a given income quintile and served by a specific utility
- Average Annual Energy Bill = (Residential Sales Revenues for the given utility) / (Number of Residential Customers)
- Relative energy consumption is computed from the 2015 Residential Energy Consumption Survey (RECS)
 - RECS possesses data on electricity and gas consumption by income level and region
 - Annual Electricity and gas consumption by income quintile is computed based on this data and then divided by the average annual electricity/gas consumption for the given region to obtain a relative energy consumption figure
 - On an annual basis, 1st income quintile households in San Antonio, Austin, Dallas and Houston generally use **80%** of the electricity that average households in these cities use and **75%** of the gas that average households in these cities use
- For a given income quintile,
 - (Annual Electricity Costs) = (Relative Electricity Consumption) × (Average Annual Electricity Bill)
 - (Annual Gas Costs) = (Relative Gas Consumption) × (Average Annual Gas Bill)
 - (Annual Energy Costs) = (Annual Electricity Costs) + (Annual Gas Costs)
- Assumptions
 - The fixed component of the bill is comparatively small
 - The volumetric charge (i.e. the sum of the charges assessed on a \$/kWh basis for electricity service or the sum of the charges assessed on a \$/CCF or \$/Therm basis for gas service) is generally flat

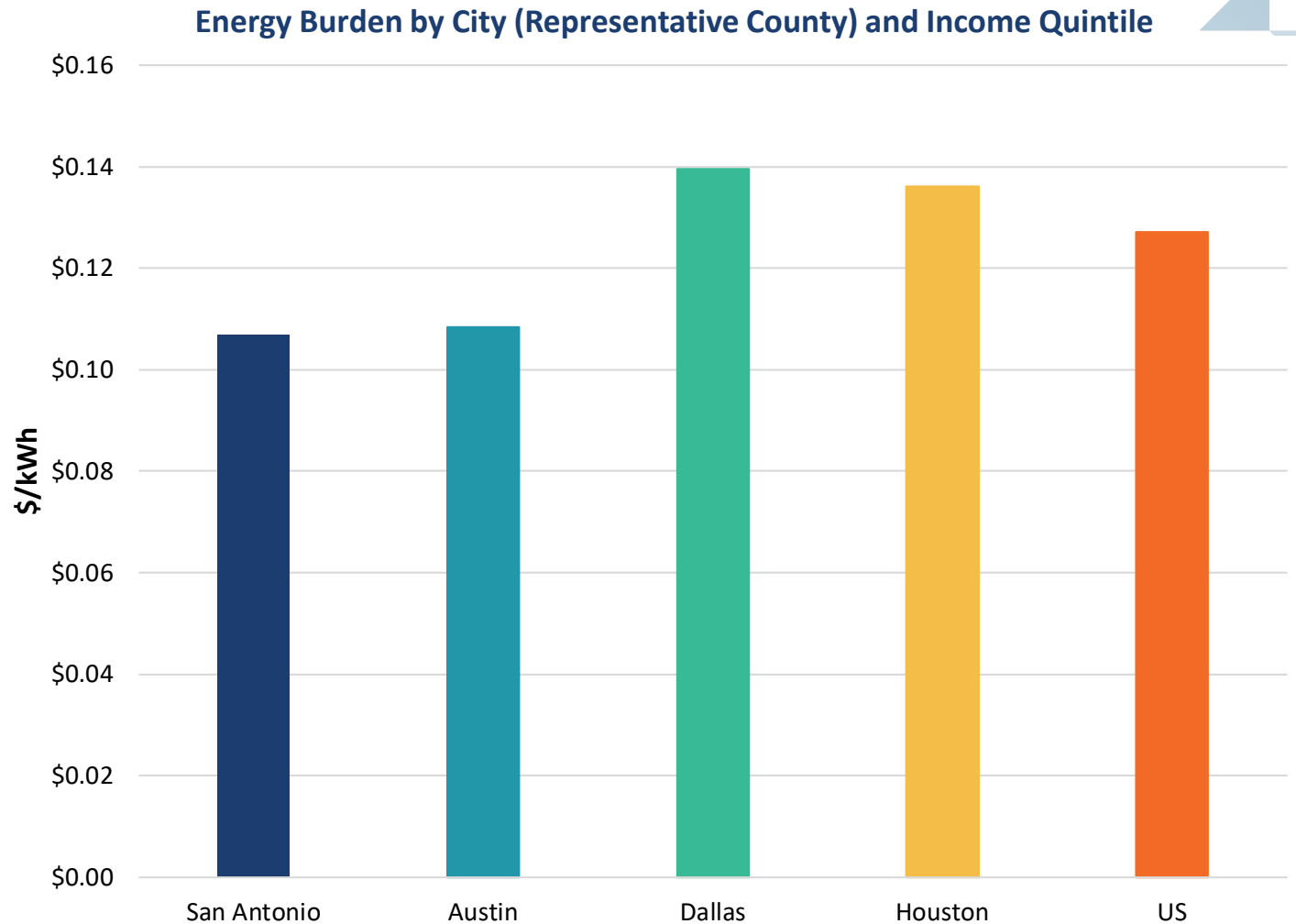
Sources: [Annual Electric Power Industry Report](#), Form EIA-861, U.S. Energy Information Administration; [Annual Report of Volumes, Revenues, and Customers by Company \(2002 – 2019\)](#), American Gas Association; [2015 Residential Energy Consumption Survey](#), Energy Information Administration

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Average Electricity Price across Various Texas Cities (2019)

- In 2019, households in San Antonio and Austin faced considerably lower prices than households in Dallas or Houston
 - **\$0.11/kWh** for households in San Antonio and Austin vs. **\$0.14/kWh** for households in Dallas and Houston
- When compared with ‘full-service’ residential electricity customers across the US, we find that households in San Antonio pay **16%** less for their electricity on a per kWh basis
 - US Households who were ‘full-service’ customers paid approximately **\$0.13/kWh** for electricity in 2019

Sources: [Annual Electric Power Industry Report, Form EIA-861](#).

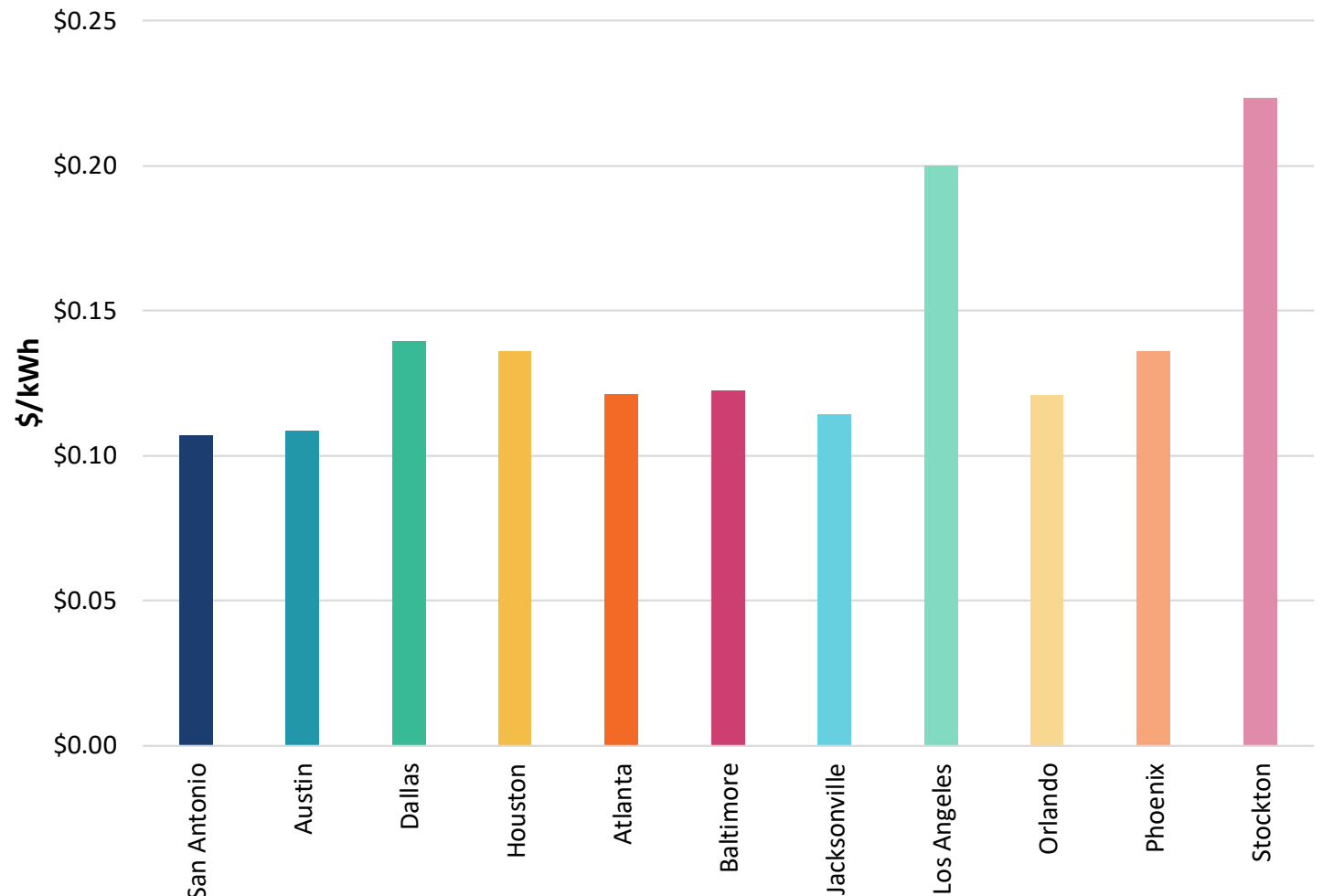


San Antonio Households Face the Lowest Electricity Prices

- Out of the 11 cities surveyed, residential households in San Antonio faced the **lowest average electricity prices** (\$0.11/kWh)
 - On average, residential households in these 11 cities faced per kWh electricity prices of **\$0.14**; **30% higher** than the electricity prices households in San Antonio face
- Households in Los Angeles and Stockton faced **far higher** electricity prices than those in the other surveyed cities
 - Residential households in Los Angeles and Stockton both faced electricity prices of **\$0.20/kWh or higher**; **43% higher** than residential households in Dallas (whose households face the third highest electricity prices on a per kWh basis)
- Households in Texas generally faced **lower** electricity prices than households in other parts of the United States

Sources: [Annual Electric Power Industry Report, Form EIA-861](#).

Energy Burden by City (Representative County) and Income Quintile

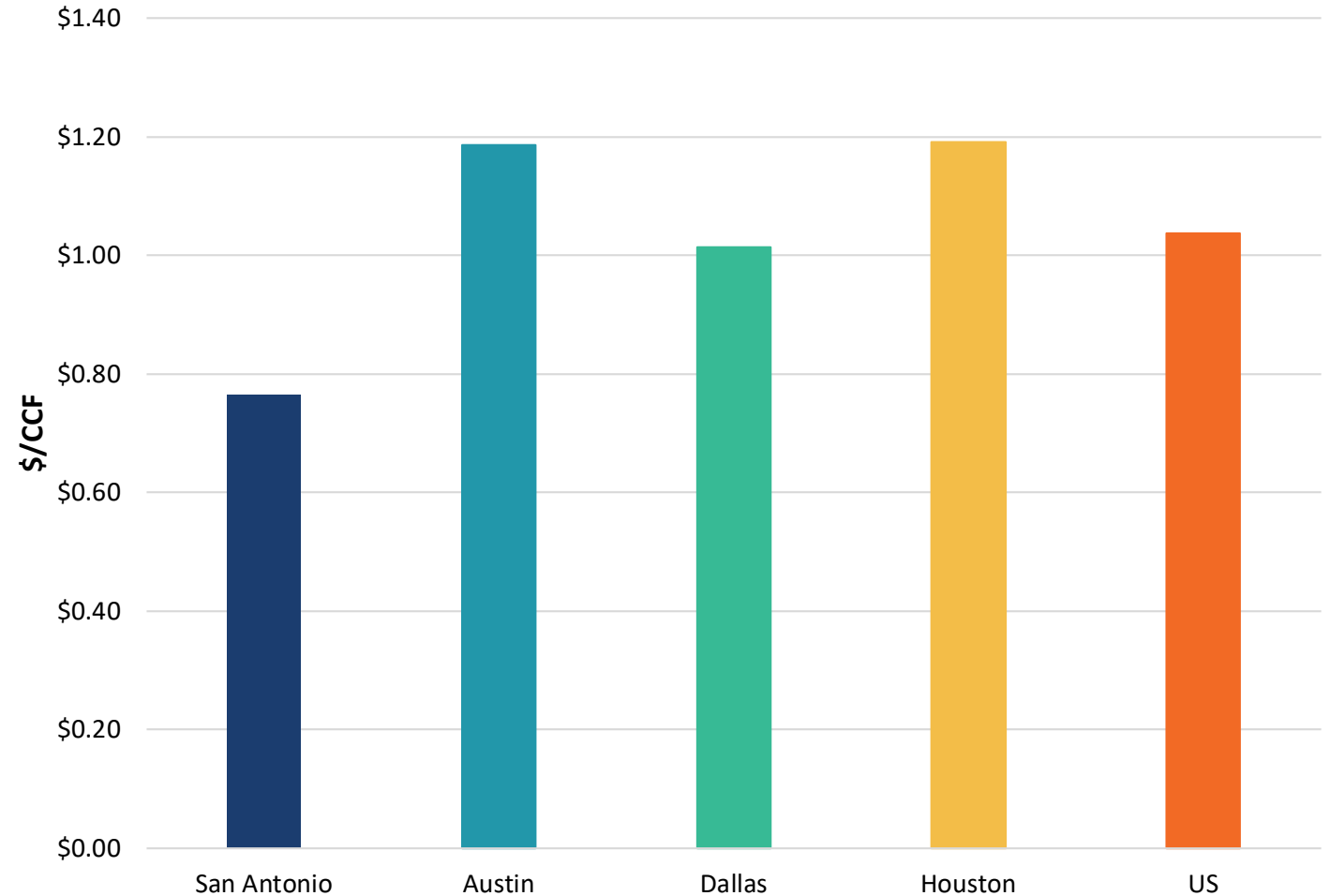


Average Gas Price across Various Texas Cities (2019)

- In 2019 households in San Antonio faced considerably lower gas prices than households in Austin, Dallas or Houston
 - Gas prices for residential customers in San Antonio were **36%** cheaper than in Austin or Houston and **25%** cheaper than in Dallas on a per CCF basis
- When compared with all residential gas customers across the US, we find that households in San Antonio pay **26%** less for their gas on a per CCF basis
 - On a per CCF basis, households in San Antonio paid **\$0.76/CCF** whereas households across the US paid an average of **\$1.04/CCF**

Sources: [Annual Report of Volumes, Revenues, and Customers by Company \(2002 – 2019\)](#).

Energy Burden by City (Representative County) and Income Quintile

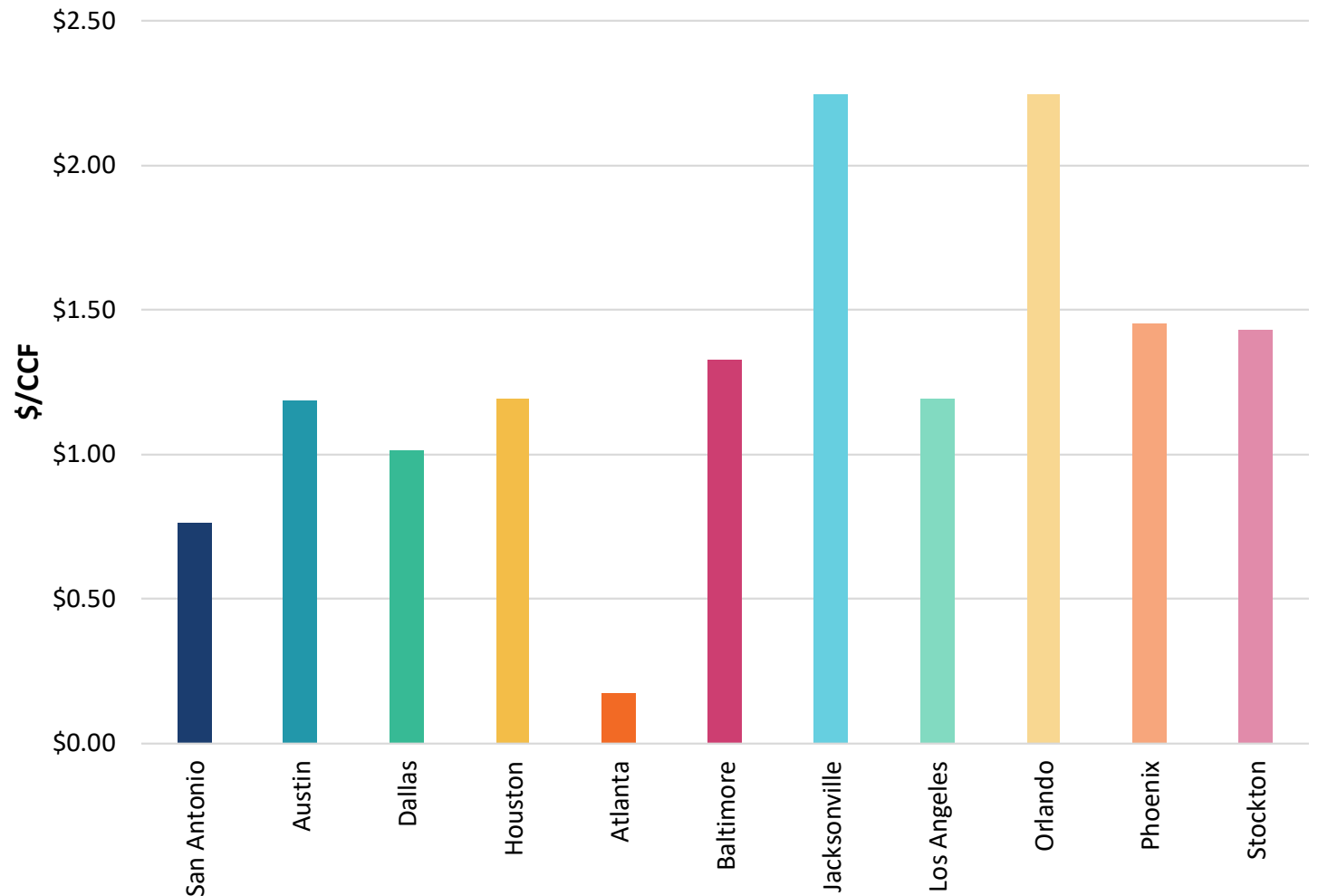


San Antonio Households Face Low Gas Prices

- Residential households in San Antonio faced gas prices **43% lower** than households in the other 10 surveyed cities
 - **\$0.76/CCF** in San Antonio vs. **\$1.35/CCF** in the other 10 surveyed cities
- Households in Jacksonville and Orlando, both customers of Peoples Gas, faced **significantly higher** gas prices than households in the other surveyed cities
 - **\$2.25/CCF** for households in Jacksonville and Orlando vs. **\$1.45/CCF** in Phoenix (the city with the third highest residential gas prices in this sample)
- Atlanta's very low natural gas prices are the result of an **incomplete dataset**
 - Some utilities had residential sales volumes but not sales revenues thus pushing the estimated price **downwards**

Sources: [Annual Report of Volumes, Revenues, and Customers by Company \(2002 – 2019\)](#).

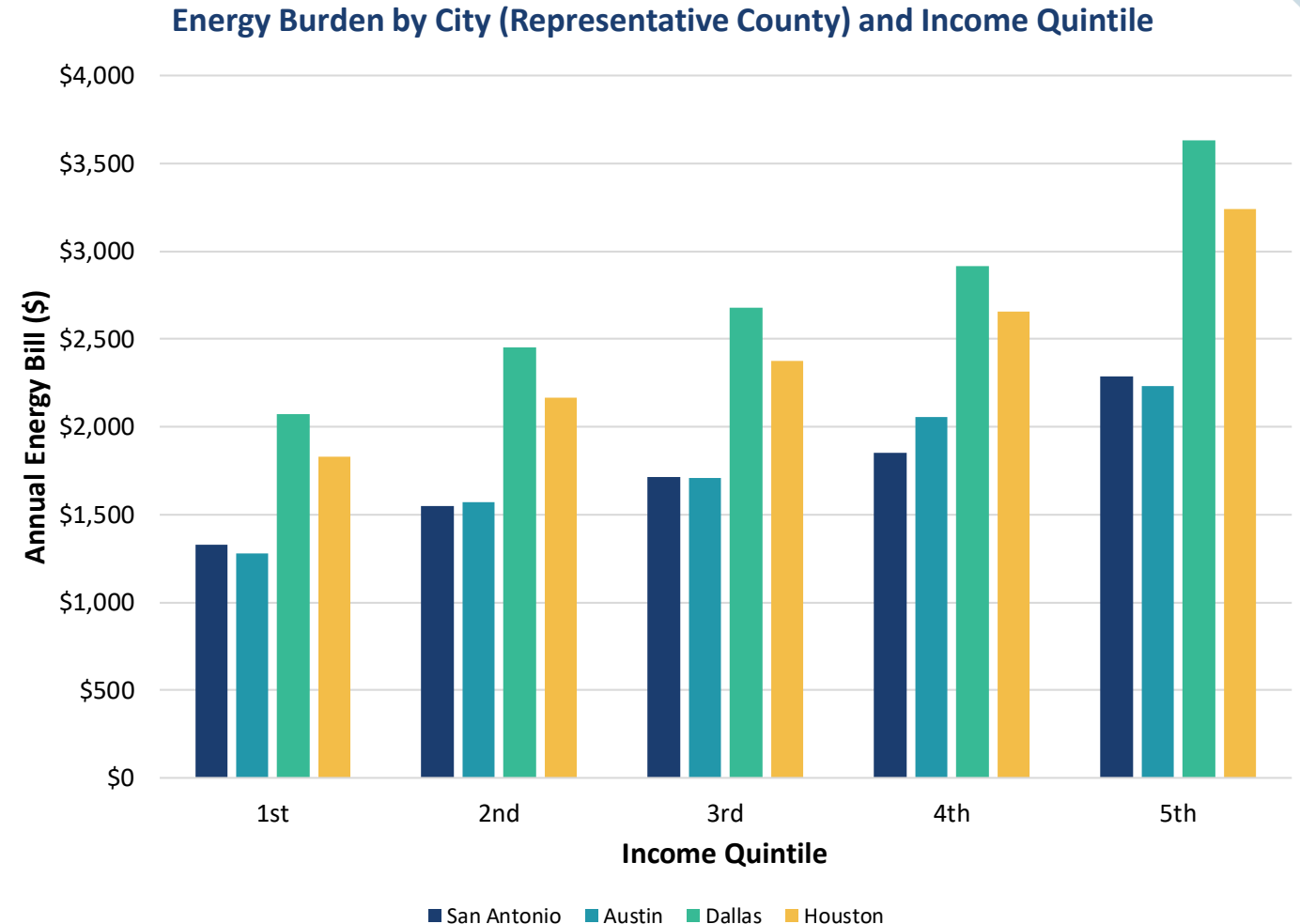
Energy Burden by City (Representative County) and Income Quintile



Energy Bills by City and Income Quintile (2019)

- On average, households in Dallas and Houston face **higher** estimated energy bills than households in Austin and San Antonio, regardless of income quintile
- This difference in energy bills is primarily driven by the fact that households in Dallas and Houston face **significantly higher** estimated electricity bills
 - 1st income quintile households in Dallas face **42% larger** electricity bills on average, than 1st income quintile households in San Antonio
 - On average, 1st income quintile households in Houston face annual electricity bills that are **29% larger** than those that 1st income quintile households in San Antonio face

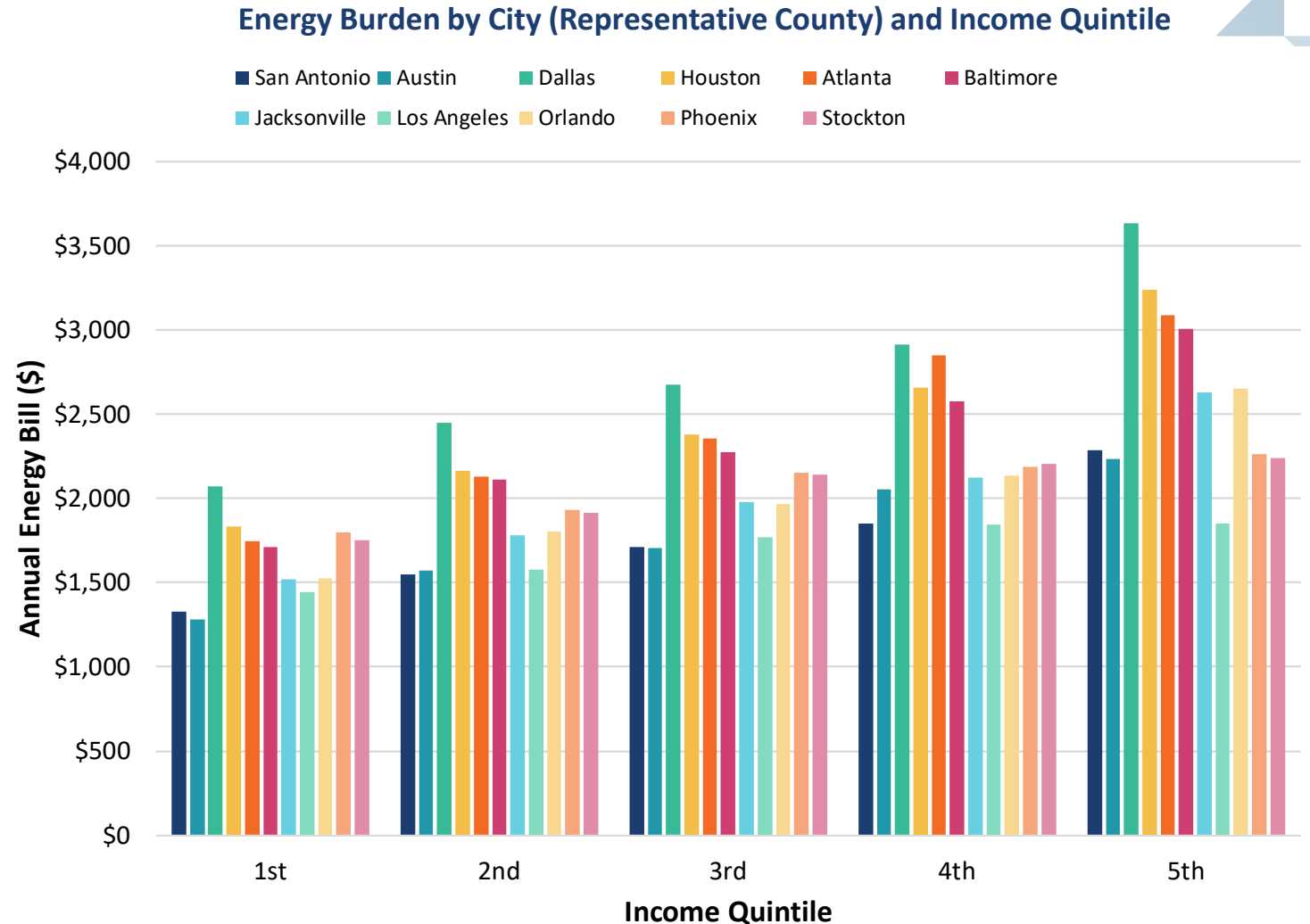
Sources: [Annual Electric Power Industry Report, Form EIA-861. Annual Report of Volumes, Revenues, and Customers by Company \(2002 – 2019\)](#). [2015 Residential Energy Consumption Survey](#).



San Antonio Households Face Comparatively Low Energy Bills

- Across the 1st, 2nd and 3rd income quintiles, households in San Antonio, Austin and Los Angeles faced the **lowest** estimated energy bills
- Across all income quintiles, households in Dallas, Houston and Atlanta faced the **highest** estimated energy bills
- Regardless of income quintile, residential households in Atlanta faced average annual energy bills **30 – 50%** higher than the energy bills faced by households in San Antonio
 - 4th income quintile households in Atlanta faced **53% higher** estimated energy bills than comparable households in San Antonio did

Sources: [Annual Electric Power Industry Report, Form EIA-861](#). [Annual Report of Volumes, Revenues, and Customers by Company \(2002 – 2019\)](#). [2015 Residential Energy Consumption Survey](#).

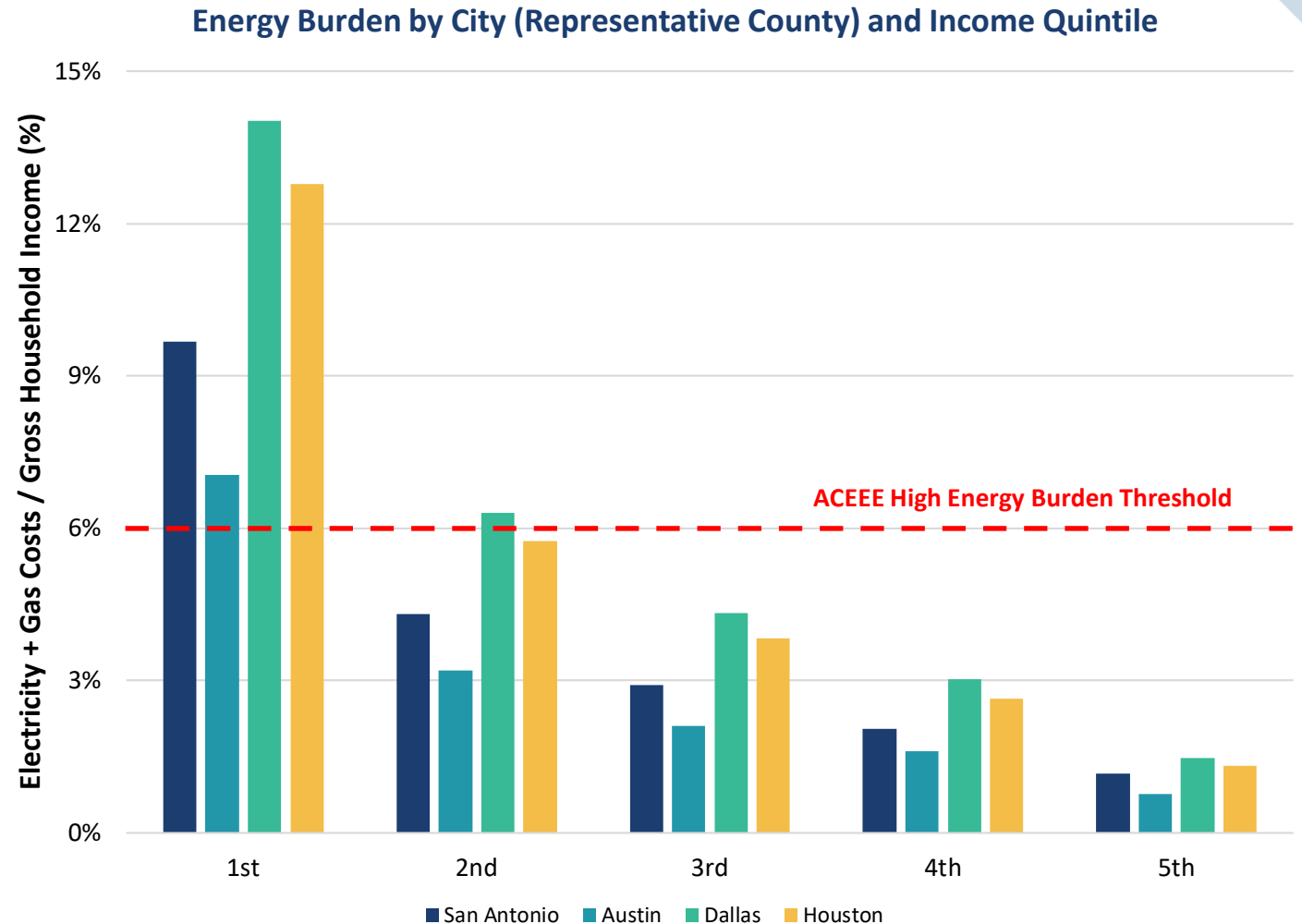


Energy Burdens by City and Income Quintile (2019)

- On average, 1st income quintile households across each of the examined Texas cities experience a **high energy burden**
- Despite the fact that households in San Antonio have lower incomes on average, households in Dallas and Houston face higher energy burdens
 - Largely driven by higher electricity bills
- 2nd income quintile households in Austin face lower energy burdens than 3rd income quintile households in Dallas and Houston
 - The same is true of 3rd income quintile households in Austin and 4th income quintile households in Dallas and Houston

Sources: [Annual Electric Power Industry Report, Form EIA-861](#). [Annual Report of Volumes, Revenues, and Customers by Company \(2002 – 2019\)](#). [2015 Residential Energy Consumption Survey. Table B19081 - Mean Household Income of Quintiles, 2019](#): [American Community Survey 1-Year Estimates Detailed Tables, United States Census Bureau](#).

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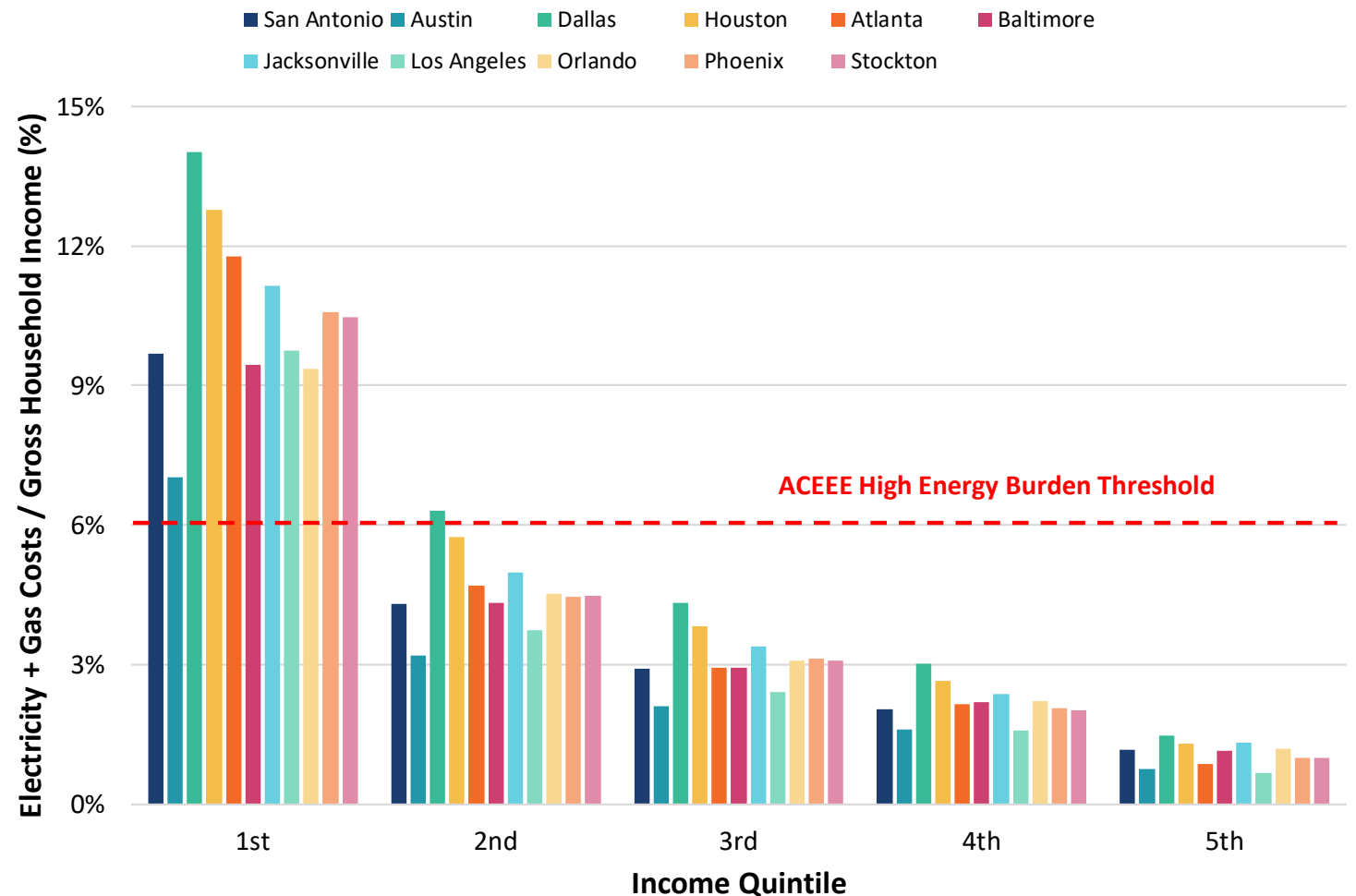


ENERGY BURDEN BY INCOME QUINTILE

Low Income San Antonio Customers Face Lower Energy Burdens (9.7%) than Other Low Income Customers (10.6%)

- Despite the fact that San Antonio households are poorer, on average, than households in the other surveyed cities they faced **lower energy burdens** on average than households in these cities
 - Across of each the first 4 income quintiles, San Antonio households faced energy burdens between **7% and 9% less** than the average energy burden faced by households in each of the other 10 surveyed cities
- 1st income quintile households in San Antonio face an average energy burden of **9.7%**; whereas the average 1st income quintile household in the other 10 surveyed cities faced an average energy burden of **10.6%**

Energy Burden by City (Representative County) and Income Quintile



Sources: [Annual Electric Power Industry Report, Form EIA-861. Annual Report of Volumes, Revenues, and Customers by Company \(2002 – 2019\).](#) [2015 Residential Energy Consumption Survey. Table B19081 - Mean Household Income of Quintiles, 2019: American Community Survey 1-Year Estimates Detailed Tables, United States Census Bureau.](#)

Approach to Calculating Energy Burdens by Census Tracts

- In 2019, San Antonio had **366** census tracts, **358** of which had available income distribution data
- We segmented the **358** census tracts with income data into 5 groups (3 groups of 72, 2 groups of 71) based on the average energy burden in each census tract
 - Groups: Most Burdened Tracts, 2nd Most Burdened Tracts, Middle, 2nd Least Burdened Tracts, Least Burdened Tracts
- For each census tract in San Antonio, we assume that energy bills for each income quintile constant
- For a given income quintile in a census tract, we compute the energy burden by dividing the city-wide energy bill for that income quintile by the household income interval mean for that census tract and income quintile

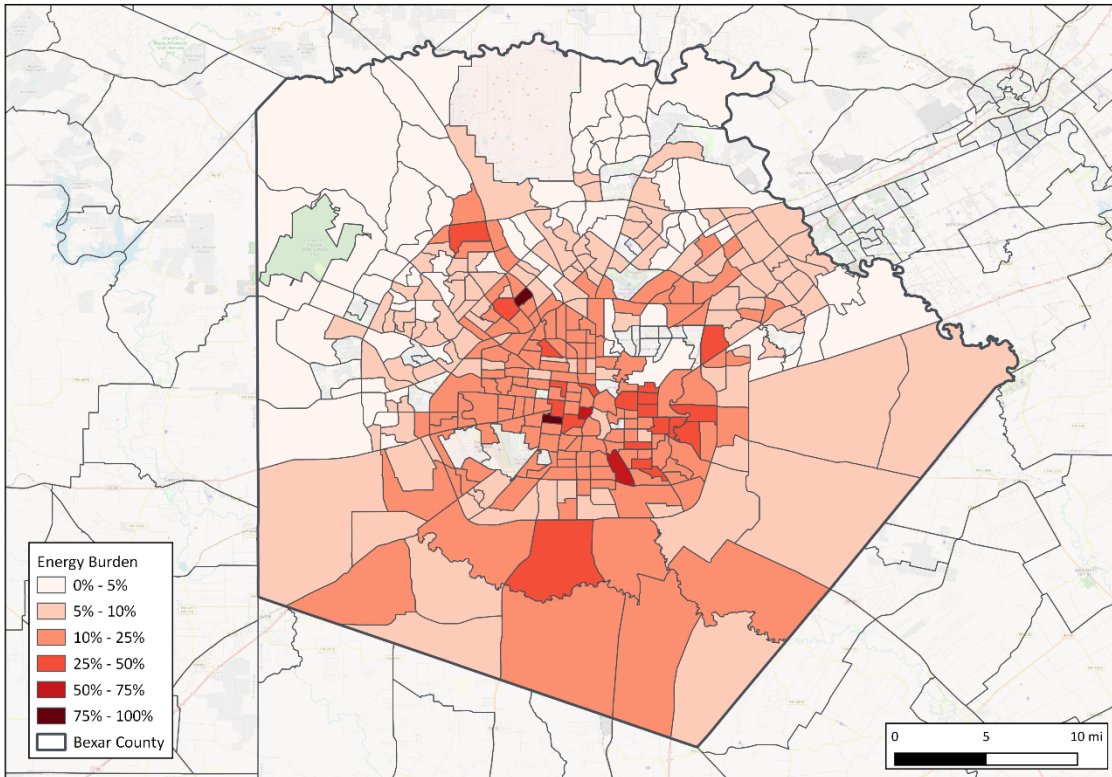
Income Quintile	Annual Energy Bill (\$)
1 st	\$1,326
2 nd	\$1,550
3 rd	\$1,713
4 th	\$1,851
5 th	\$2,289

Bexar County Energy Burdens

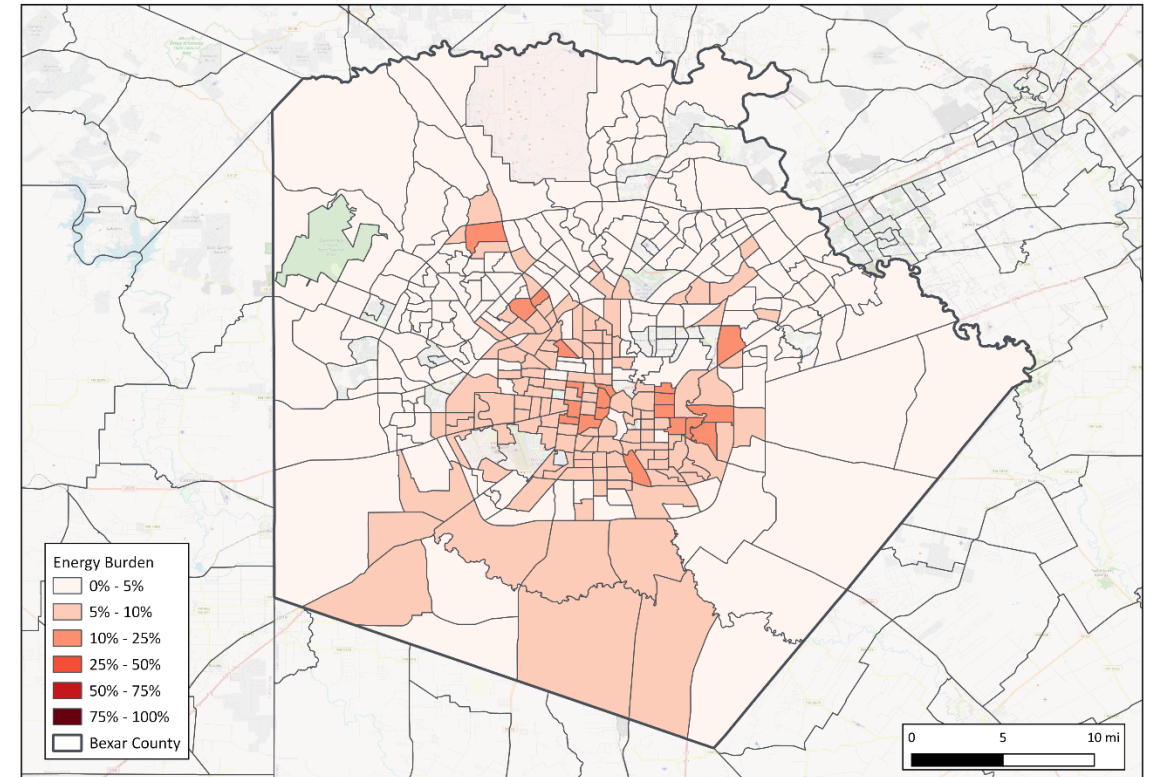
High energy burden tracts are clustered in the center and southern region of the county

- There are more than 20 tracts within the 1st income quintile that are experiencing energy burdens of more than 25%

1st Income Quintile Energy Burden



Average Energy Burden



Sources: [Annual Electric Power Industry Report, Form EIA-861](#). [Annual Report of Volumes, Revenues, and Customers by Company \(2002 – 2019\)](#). [2015 Residential Energy Consumption Survey](#). [Table B19081 - Mean Household Income of Quintiles, 2019: American Community Survey 1-Year Estimates Detailed Tables, United States Census Bureau](#).

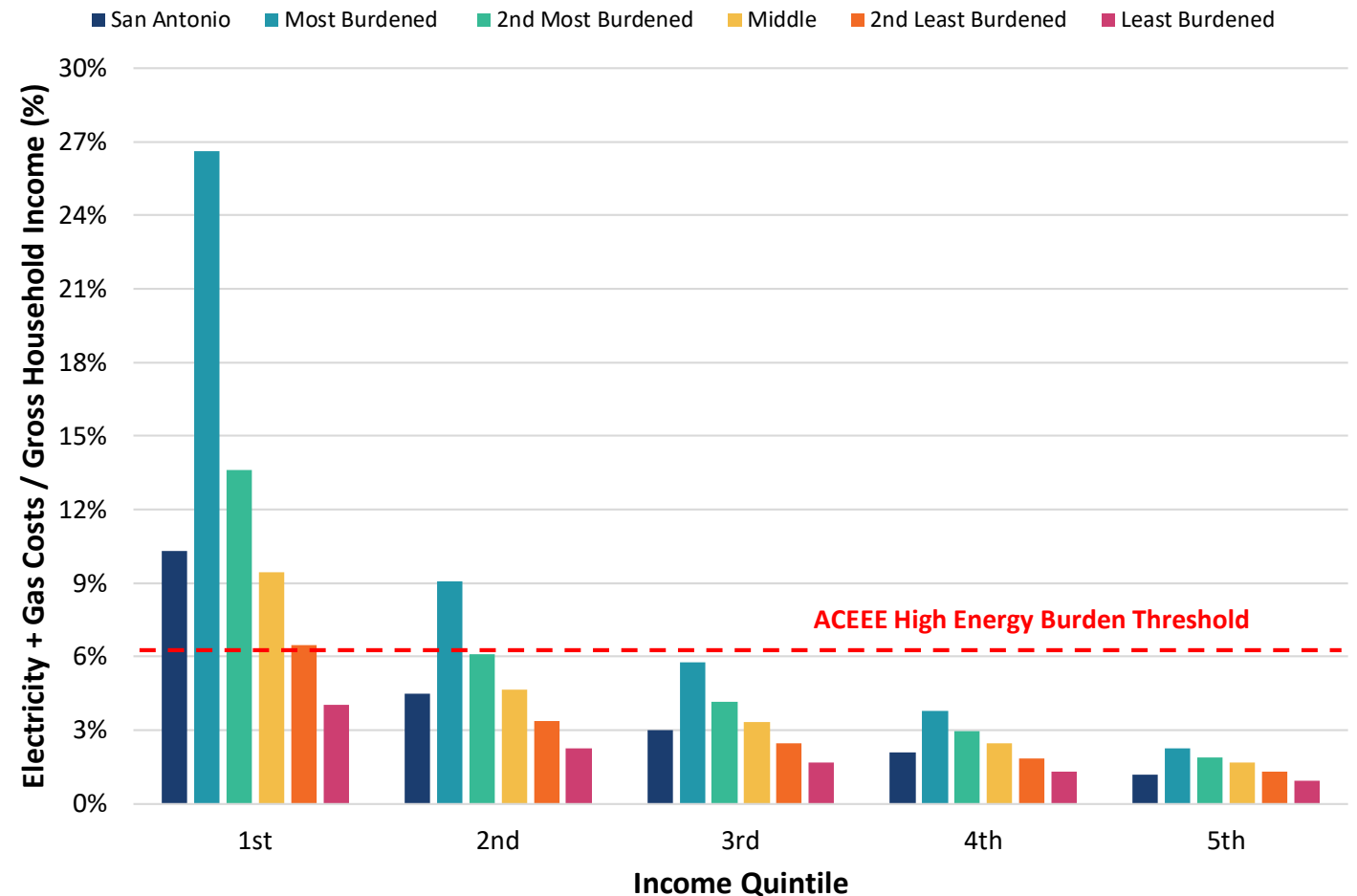
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Average Energy Burdens by Census Tract and Quintile

- On average, households in San Antonio's most burdened census tracts faced energy burdens **four times higher** than households in San Antonio's least burdened census tracts
 - 9.5% for households in San Antonio's most burdened tracts vs. 2.1% for households in San Antonio's least burdened census tracts
- The disparity in energy burdens is much more apparent for 1st income quintile households than it is for 5th income quintile households
 - For first income quintile households, the average energy burden faced by the most burdened census tracts is **6.6 times greater** than the burden faced by the least burdened tracts
 - For fifth income quintile households, the disparity between the most and least burdened census tracts is **2.4**

Sources: [Annual Electric Power Industry Report, Form EIA-861. Annual Report of Volumes, Revenues, and Customers by Company \(2002 – 2019\).](#)
[2015 Residential Energy Consumption Survey. Table B19081 - Mean Household Income of Quintiles, 2019: American Community Survey 1-Year Estimates Detailed Tables, United States Census Bureau.](#)

Energy Burdens by Census Tract vs. Energy Burdens for San Antonio



Response to Addressing Energy Burden

Financial incentives, retrofit subsidies, tax credits, weatherization programs, and clean energy programs are used to mitigate energy burdens given the potential electricity savings for low-income households (in addition to bill assistance)

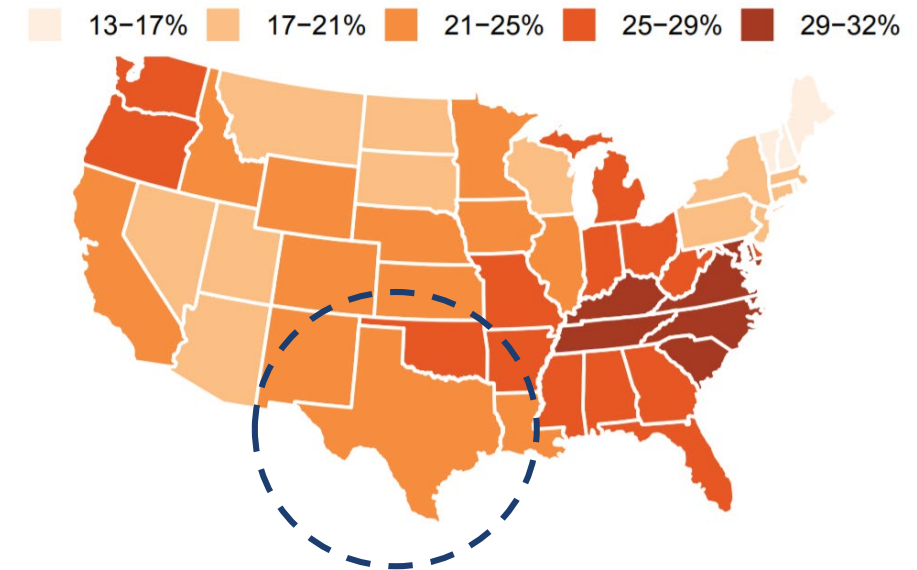
- **Federal, State, and Local**

- US Department of Energy (DOE)’s Weatherization Assistance Program partners with states and community agencies to achieve energy and cost savings for low-income customers
- The US DOE’s Clean Energy for Low Income Communities Accelerator (CELICA) partners with states and local organizations to improve access to renewable energy (rooftop solar PV systems) and energy efficiency programs to low-income households
- Bill assistance through LIHEAP programs
- Financing and tax credits for retrofits and new appliances through the Energy Efficiency and Conservation Loan Program (EECLP) and the Low-Income Housing Tax Credit (LIHTC) program

- **Utility**

- Bill assistance/flexibility (low-income discount programs, budget billing, prepaid electricity services, and payment plans)
- Retrofit/Energy efficiency programs
- \$0-repayment/loan programs for energy efficiency programs
- “Pay as you save” option to repay loan as a component on utility bills
- Installation of home energy management systems

Potential Electricity Savings in Low-Income Households



The Department of Energy estimates that Texas has the potential for 21-25% in electricity savings for low-income households

Sources: “[Low-Income Household Energy Burden Varies Among States — Efficiency Can Help In All of Them](#),” The Office of Energy Efficiency & Renewable Energy, US Department of Energy; Brown et al., (2020), “[The persistence of high energy burdens: A bibliometric analysis of vulnerability, poverty, and exclusion in the United States](#),” Energy Research & Social Science

Other Low-Income Energy Discount Programs

Federal

- LIHEAP
 - The federal government provides funding to states, tribes, and territories to help low income households pay for heating or cooling their homes
 - Annual income limit of \$39,750 for a family of 4 and family members that receive benefits such as SNAP, SSI, and TANF may also be eligible

New Jersey

- Universal Service Fund
 - Annual income eligibility of less than or equal to 185% of the Federal Poverty Level and more than 3% of household income for electric service and more than 3% of household income for natural gas service (6% if households use electricity for heating)
 - Discounts between \$5 and \$150 per month are available based on household size, energy burden, and income

California

- California Alternate Rates for Energy (CARE)
 - Monthly discount of 35% for electricity and 20% for natural gas
 - Eligibility based on total household income (e.g., \$52,400 for a household size of 4)
 - Eligibility can be granted based on enrollment in public assistance programs (e.g., Medicaid, WIC, National School Lunch's Free Lunch Program (NSL), SNAP, Tribal TANF)
- Family Electric Rate Assistance Program (FERA)
 - Monthly discount of 18% on electricity for households with incomes that slightly exceed those in the CARE program
 - Eligibility for households of three or more and total household income (e.g. \$52,401-\$65,500 for a household size of 4)

Sources: CARE/FERA Programs, <https://www.cpuc.ca.gov/lowincomerates/>, Energy Burden Report, ACEEE (2020), <https://www.aceee.org/energy-burden>, Universal Service Fund (USF), New Jersey Department of Community Affairs, <https://www.nj.gov/dca/divisions/dhcr/fag/usf.html#q4>, Accessed April 15, 2021, Low Income Home Energy Assistance Program (LIHEAP), <https://www.benefits.gov/benefit/623>, accessed April 15, 2021

Challenges with Addressing Energy Burdens

- Tax credits and subsidies are not viewed as inclusive due to the affordability barriers and the limited amount of tax credits that can be received from a household with low tax liabilities
- Low-income homeowners may need additional financial incentives such as low or 0% interest loans to overcome the high upfront cost of new appliances, smart thermostats, rooftop PV systems, retrofits needed to improve energy efficiency and invest in renewable energy
- Landlords may not be motivated to pay for energy improvements

Sources: "[Low-Income Household Energy Burden Varies Among States — Efficiency Can Help In All of Them](#)," The Office of Energy Efficiency & Renewable Energy, US Department of Energy; Brown et al., (2020), "[The persistence of high energy burdens: A bibliometric analysis of vulnerability, poverty, and exclusion in the United States](#)," Energy Research & Social Science

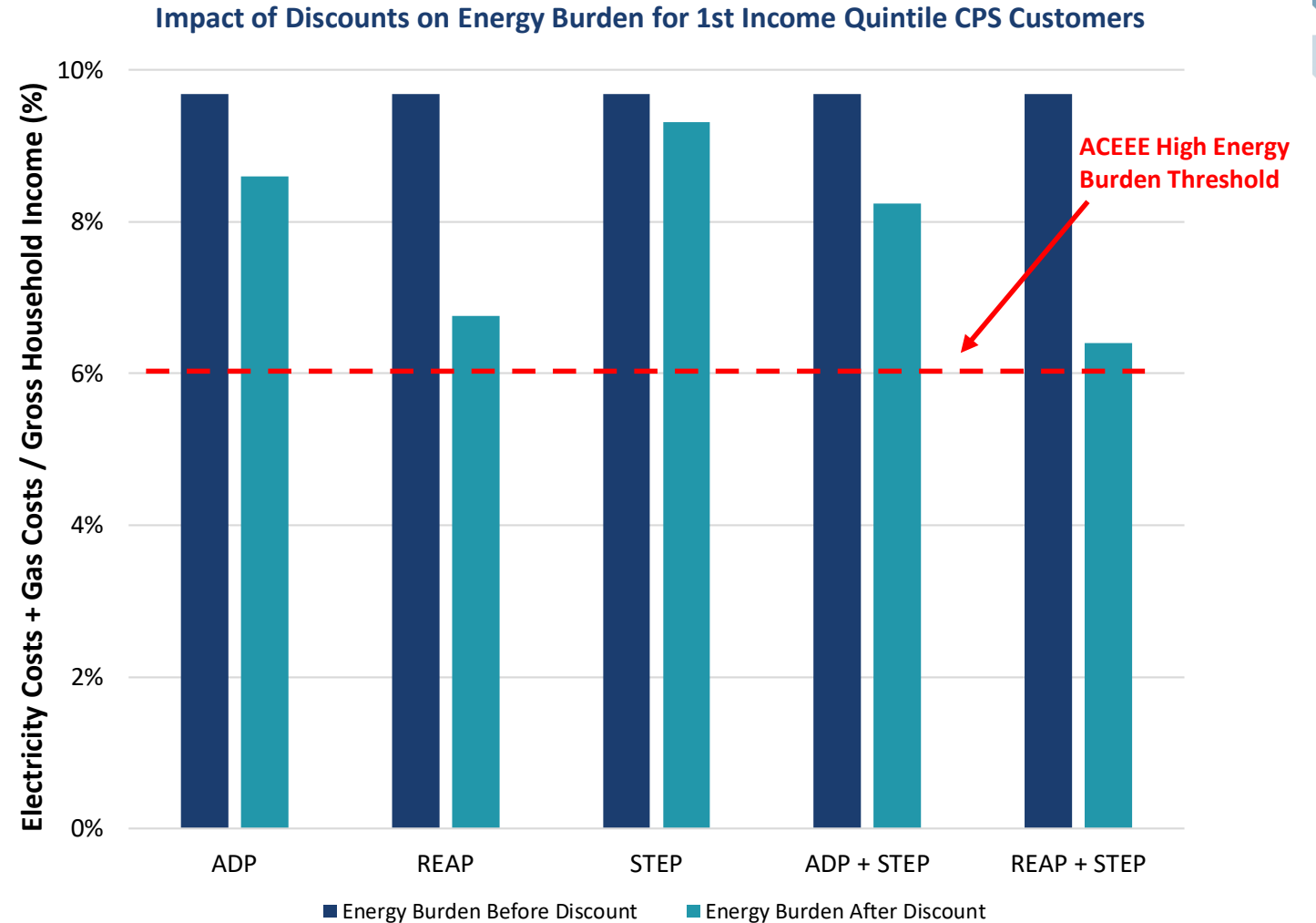
Discounts Offered by CPS Energy to Low Income Customers

- CPS Energy offers three discount programs for low-income customers: The Affordability Discount Program (ADP), Residential Energy Assistance Partnership (REAP), Save for Tomorrow Energy Plan (STEP)
- ADP
 - Works by discounting a portion of the service availability charge for electric and natural gas every month for qualifying customers
 - To qualify for the ADP program, a household's pre-tax income must be at or below 125% of the federal poverty line and meet at least one other requirement laid out by CPS
 - Participants in the ADP program can save a maximum of \$12.30/month or **\$147/year**
- REAP
 - Qualifying for the REAP program
 - ▶ Household income must be at or below 125% of the federal poverty line and the household must be experiencing financial hardship
 - ▶ Head of Household must meet one of the following criteria: (1) Elderly, (2) Handicapped, (3) Require Critical-Care Equipment, (4) Have small children in their home
 - Participants in the REAP program can receive a maximum of **\$400/year** to pay for their cooling, air conditioning or heating bills
- STEP
 - Established in 2009 by an ordinance of the City Council of San Antonio requiring CPS Energy to save 771 MW of electricity demand by 2020 at a cost of no more than \$849 million
 - Between FY2020 and FY2048, the net Residential Bill Savings are projected to be **\$1.1 B**
 - ▶ On an annual basis, this comes out net bill savings of **\$37.8 M** per year for residential customers
 - Using the fact that CPS Energy had roughly 760 K residential electricity customers in 2019, we can estimate bill savings of **\$50/year**

Sources: [Affordability Discount Program Saves Customers Nearly \\$5 Million](#), CPS Energy Newsroom. [REAP / Utility Assistance](#), CPS Energy Newsroom. [CPS Energy Assistance Programs](#), Need Help Paying Bills. [Save for Tomorrow Energy Plan \('STEP'\) Program Review](#), CPS Energy.

Impact of Discounts on Energy Burdens for 1st Income Quintile Customers

- While each of these programs markedly reduce the energy burdens for 1st income quintile customers, they still experience high energy burdens
 - 1st income quintile customers who receive benefits from ADP, STEP or both programs still must pay about **8%** of their pre-tax household income to cover annual energy costs
- The combined benefits of the REAP and STEP programs reduce the estimated energy burden for 1st income quintile customers from **9.7%** to **6.4%**
- Of these 3 programs, the STEP program has the smallest impact on the energy burdens for 1st income quintile customers



Appendix

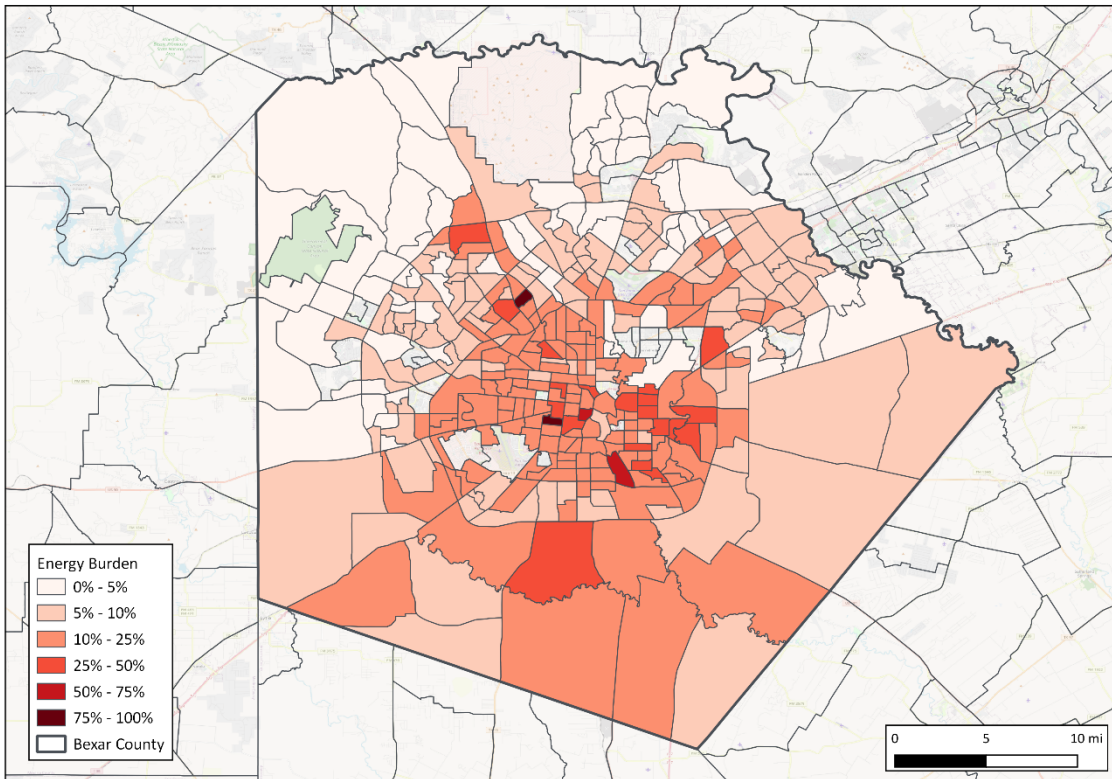


Energy by Census Tracts – Detailed Analysis

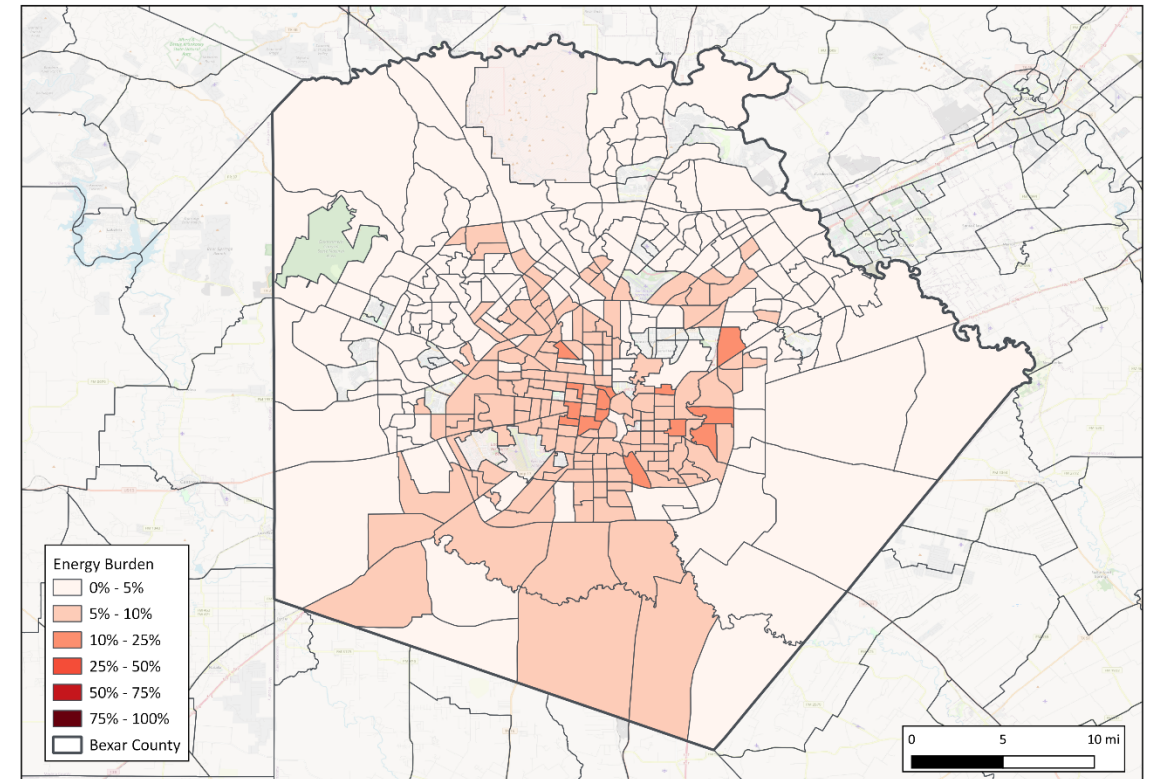
Census Tract Group	Number of Tracts	Range of Energy Burdens, 1 st Income Quintile	Range of Energy Burdens, 2 nd Income Quintile	Range of Energy Burdens, 3 rd Income Quintile	Range of Energy Burdens, 4 th Income Quintile	Range of Energy Burdens, 5 th Income Quintile
Most Burdened	72	14.7% - 92.1%	4.9% - 18.6%	3.6% - 15.0%	2.3% - 8.1%	1.2% - 4.0%
2 nd Most Burdened	72	9.6% - 19.9%	4.1% - 8.3%	2.4% - 5.8%	1.4% - 4.1%	0.6% - 3.0%
Middle	72	6.5% - 13.4%	3.0% - 6.1%	2.0% - 4.3%	1.4% - 3.5%	0.6% - 2.5%
2 nd Least Burdened	71	4.5% - 9.4%	2.7% - 4.6%	1.7% - 3.1%	1.2% - 2.5%	0.5% - 1.9%
Least Burdened	71	2.5% - 5.7%	1.2% - 3.4%	0.8% - 2.3%	0.5% - 1.9%	0.3% - 1.5%

Quintile 1 and 2 Bexar County Energy Burdens

1st Income Quintile Energy Burden



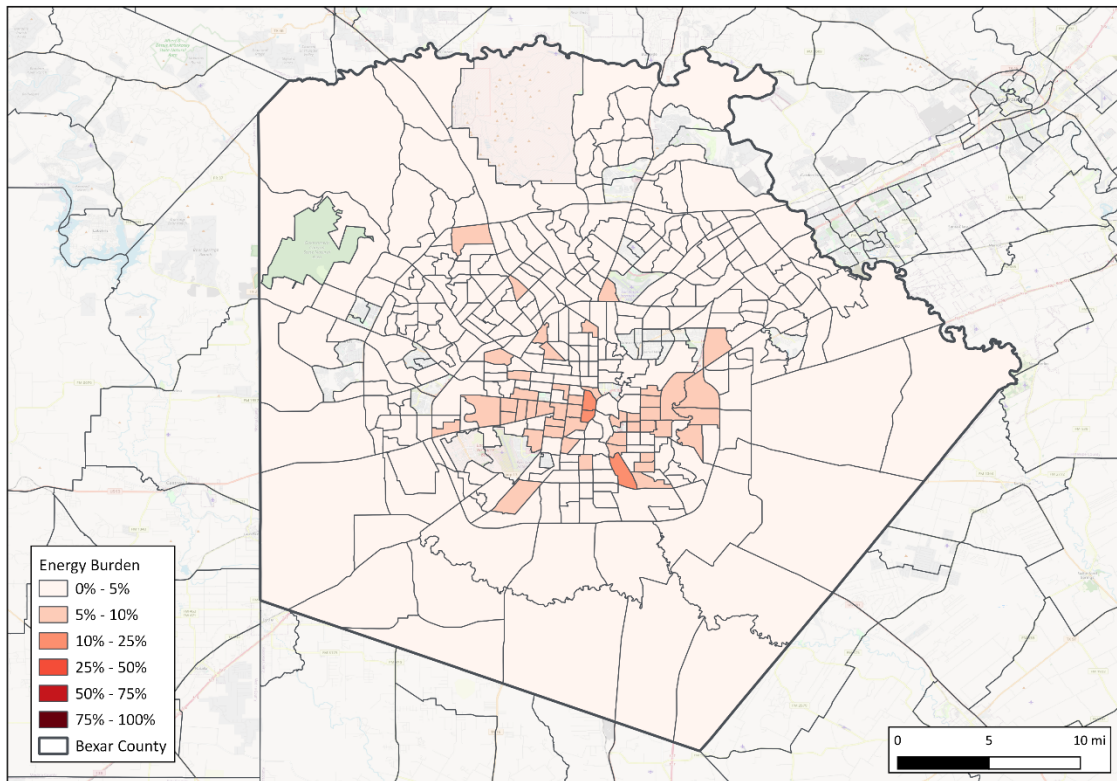
2nd Income Quintile Energy Burden



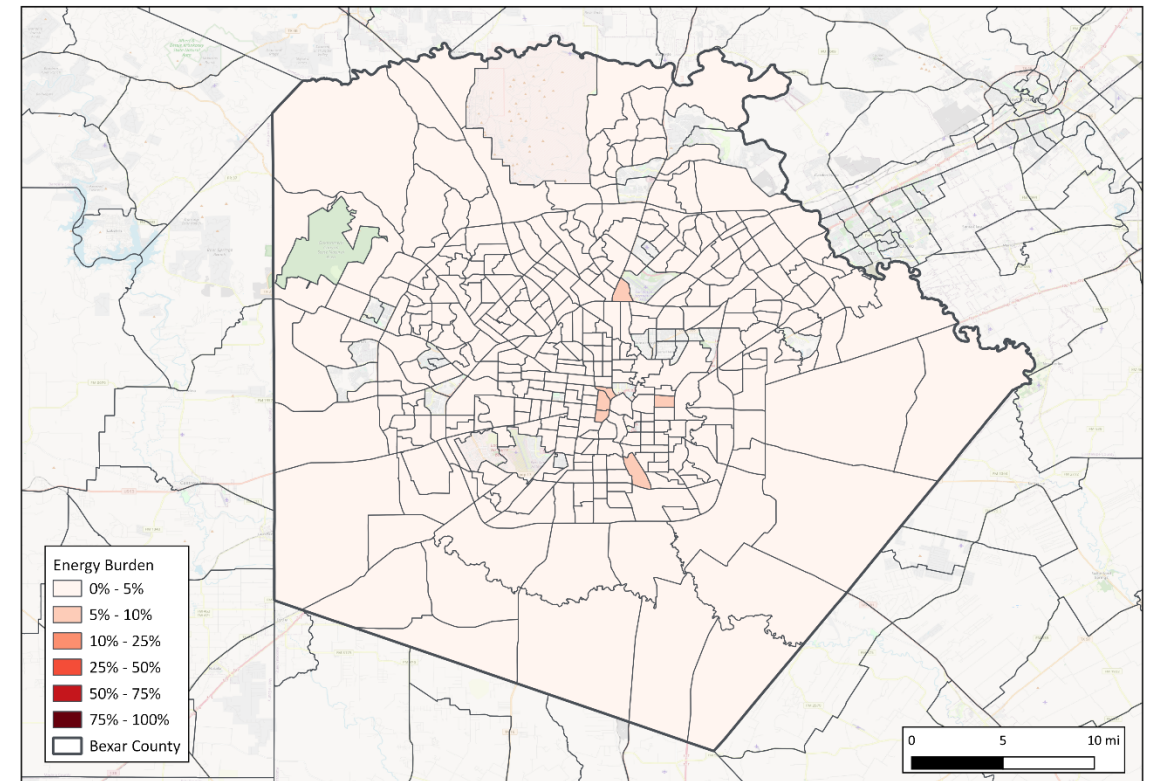
Sources: [Annual Electric Power Industry Report, Form EIA-861](#). [Annual Report of Volumes, Revenues, and Customers by Company \(2002 – 2019\)](#). [2015 Residential Energy Consumption Survey](#). [Table B19081 - Mean Household Income of Quintiles, 2019: American Community Survey 1-Year Estimates Detailed Tables, United States Census Bureau](#).

Quintile 3 and 4 Bexar County Energy Burdens

3rd Income Quintile Energy Burden

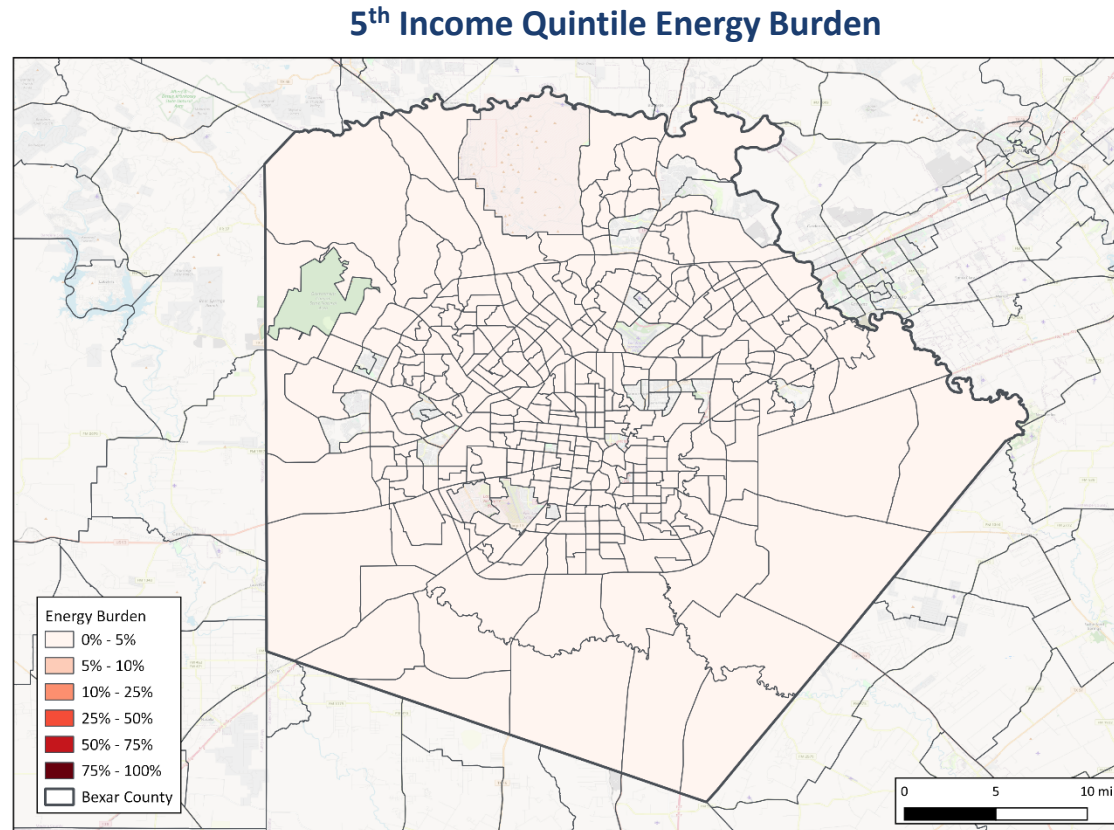


4th Income Quintile Energy Burden



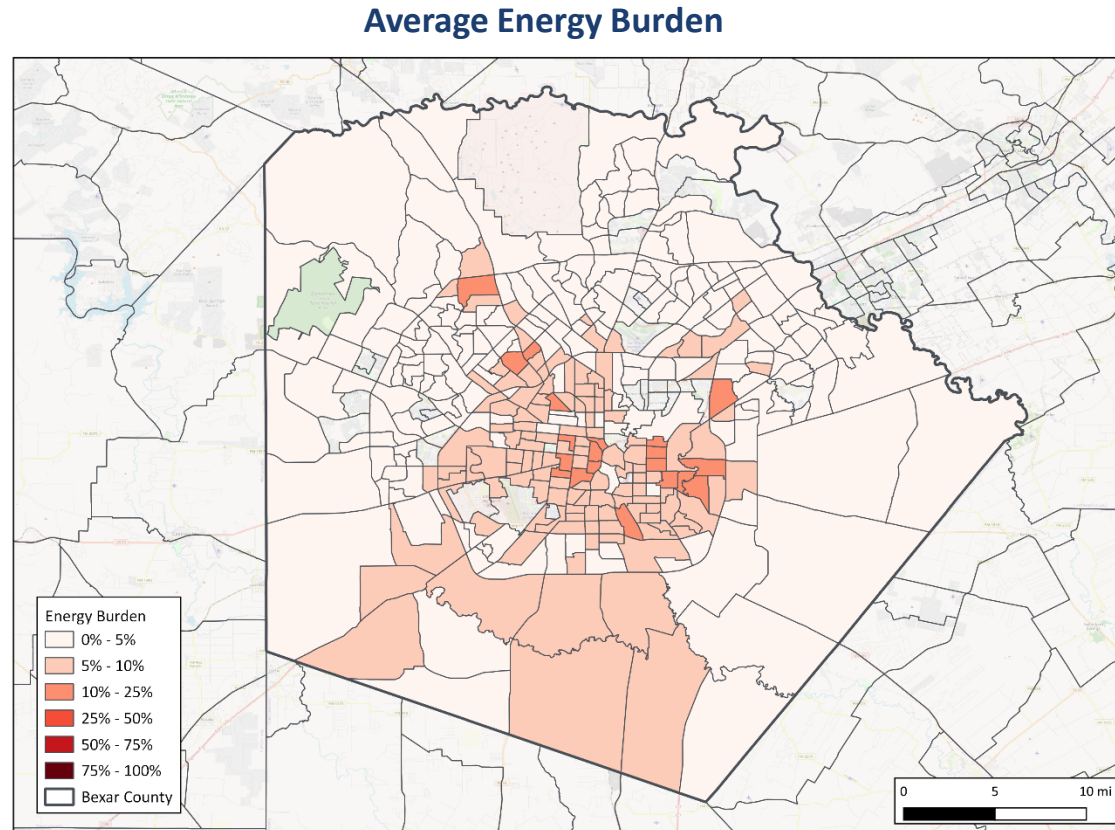
Sources: [Annual Electric Power Industry Report, Form EIA-861](#). [Annual Report of Volumes, Revenues, and Customers by Company \(2002 – 2019\)](#). [2015 Residential Energy Consumption Survey](#). [Table B19081 - Mean Household Income of Quintiles, 2019: American Community Survey 1-Year Estimates Detailed Tables, United States Census Bureau](#).

Quintile 5 Bexar County Energy Burdens



Sources: [Annual Electric Power Industry Report, Form EIA-861](#). [Annual Report of Volumes, Revenues, and Customers by Company \(2002 – 2019\)](#). [2015 Residential Energy Consumption Survey](#). [Table B19081 - Mean Household Income of Quintiles, 2019: American Community Survey 1-Year Estimates Detailed Tables, United States Census Bureau](#).

Average Bexar County Energy Burdens



Sources: [Annual Electric Power Industry Report, Form EIA-861](#). [Annual Report of Volumes, Revenues, and Customers by Company \(2002 – 2019\)](#). [2015 Residential Energy Consumption Survey](#). [Table B19081 - Mean Household Income of Quintiles, 2019: American Community Survey 1-Year Estimates Detailed Tables, United States Census Bureau](#).