Codes, Mortgages, and Equity

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ABSTRACT

While building energy codes generally are cost-effective over the lifetime of buildings (and greatly reduce their greenhouse gas emissions), the impact of the initial costs on low-income and disadvantaged communities has been a key issue in state and local adoption of codes as well as in the federal adoption of code requirements for new homes with federally-supported mortgages. We used an existing analysis of the 2021 International Energy Conservation Code along with housing, demographic, and income data from the 2021 American Housing Survey to estimate how initial costs—and subsequent lifetime net savings—may vary for these groups. Because so many low-income, Black, and Hispanic households are renters, the average upfront costs are lower for these groups, while they benefit from the same energy savings. Similarly, these households are more likely to reside in multifamily buildings, for which the upfront costs of meeting the code are minimal. Population distributions weighted toward milder climates and smaller homes also contribute to lower costs and savings. We also looked at historic volatility of home energy costs and how energy codes reduce energy bill volatility and consequent financial risk. Finally, we suggest ways that lenders and others can help affordable housing owners pay the cost of codes and ensure low-income and minority households are not harmed by the upfront costs.

Introduction

Housing affordability and the availability of affordable housing have become major policy and political concerns in the United States. The median sales price of a new home more than doubled in eleven years through October 2022, rising $280,000 (in nominal dollars). While prices have since dropped, rising interest rates have kept real costs high (Census 2024). Rents have also risen, but only a little faster than general inflation (BLS 2024). The Biden administration has struggled to address the housing supply gap (White House 2023), even as the number of homeless has been rising (HUD 2023). This issue is especially acute for low-income households and for communities that historically have been prevented from buying homes by redlining, racial covenants, other discrimination, or simply lack of savings.

Building energy codes, which set minimum efficiency requirements for the features of new homes that affect energy use, reduce the overall cost of housing, and thus improve the overall affordability, by reducing energy bills. They also generally improve the health and comfort of residents as well as the durability and climate resilience of the homes, and reduce the need for much more costly efficiency retrofits later. Thus, improved building efficiency can reduce the delinquency and default rate of mortgages and the climate risk to mortgage portfolios (Kaza, Quercia and Tian 2014, Argento, Bak and Brown 2019). However, energy codes can also modestly increase the initial cost of building homes, and thus there has been concern that they could make it harder to purchase new homes and could decrease the supply of new affordable housing.

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Despite the benefits, state and local adoption of building energy codes has been highly variable and often very slow (EERE 2024). States weaken the model codes or adopt no codes at all. For almost half of new homes built, state energy codes are aligned with model codes of at least a decade ago, in some cases allowing energy use more than a third higher than with up-to-date codes.

In light of the benefits of energy codes for homeowners, the Energy Policy Act of 1992 and later the Energy Independence and Security Act of 2007 directed the US Department of Housing and Urban Development and the US Department of Agriculture to require new homes with mortgages that they subsidize to meet model energy codes. The agencies have not always been timelier than the states. It took them until April 2024 to update the federal requirement from the 2009 International Energy Conservation Code (IECC) to the 2021 IECC (ASHRAE Standard 90.1-2007 to 2019 for high-rise multifamily buildings). The Department of Veterans Affairs is supposed to follow their lead. As of this writing the Federal Housing Finance Agency was also considering directing Fannie Mae and Freddie Mac to adopt similar requirements. But the same concerns regarding the impact on affordable housing supply have been raised in these proceedings.

This paper takes a closer look at the affordability and equity impacts of building energy codes. The next section examines the differences in distributions of low-income and minority households by building type, ownership, climate zone, and the differences in their average energy codes costs and savings. The following section examines the mutual impacts between energy bill savings and energy bill volatility.

Impact of Codes on Overall Housing Affordability

Building new homes to minimum energy codes reduces the energy use and utility bills for decades with an added initial cost that typically also is financed over many years. These cost and savings will vary by home type, heating and cooling system, and location (climate), among other characteristics. The Department of Energy (DOE) and Pacific Northwest National Laboratory (PNNL) do extensive analysis of energy codes costs and savings for hundreds of combinations, which they average by state, climate region, and nationwide (EERE n.d.). In recent code cycles, apartment units have lower savings and much lower (or even negative) costs than single-family homes, and both the savings and costs are highest in cold climates in the North.

The impacts on residents also vary by ownership type (tenure) and loan type. While DOE generally assumes an upfront cost in an added down payment of 12% of the additional home cost (plus taxes and fees), with the rest amortized in the mortgage, for an FHA or USDA loan the down payment is often less than 5%, and renters will only pay upfront any added security deposit and first month's rent—perhaps 1% of the cost to the extent it is passed on in the rent. About three fourths of renters still pay their heating and cooling bills directly, and others pay indirectly as part of rents. Depending on how energy efficiency is considered in the valuation of the home, a second owner may pay less or nothing at all for the efficiency features. Since very few low-income households own a new home, as discussed below, many will not even pay the modest cost of codes.

The financial impacts are especially important for low-income and minority residents. Energy burdens, the portion of household income taken up to pay energy bills, are much worse for Black, Hispanic, and low-income households (Drehobl, Ross and Ayala 2020, Bell-Pasht 2024). Although DOE's analysis is by climate zone and home characteristics, this can be used to estimate some differences by group, as Black, Hispanic, and low-income households are not evenly distributed. The impacts of codes on them depends on where they are and what type of homes they have.

Housing Distributions of Low-Income and Minority Households

Table 1 below profiles the distribution by building type and homeownership status for all residents, low-income residents, white households, Hispanic households, and Black households across the United States. Low-income households are defined here as those with income less than 200% of the federal poverty line. While more than two thirds (69%) of white households own a single-family home, less than half of the other populations do: only 45% of Hispanic households, 41% of Black households, and 36% of low-income households *(Census 2022)*. Only 1% of low-income households own a single-family home less than ten years old (roughly the time a typical owner keeps a home). Conversely, Hispanic, and Black households are renters at a much higher share—52% and 57%, respectively—than their white counterparts (only 28%). This trend holds for low-income households, of which 61% are renters.

Table 1. Distribution of households across housing type and tenure, by group

	All households	Low-income households	White non-Hispanic households	Hispanic households	Black households
Owners					
Older single family (>10 years old)	56%	35%	64%	42%	37%
New single Family (<10 years old)	5%	1%	5%	3%	4%
Multifamily low-rise	1%	1%	1%	1%	1%
Multifamily high rise	2%	2%	2%	1%	1%
All owners	64%	39%	72%	48%	43%
Renters					
Older single family	13%	20%	11%	18%	18%
New single family	0.4%	0.4%	0.4%	0.4%	0.5%
Multifamily	23%	41%	17%	35%	39%
All renters	36%	61%	28%	52%	57%
Total (owners + renters)	100%	100%	100%	100%	100%

Notes: Data tabulated from the 2021 American Housing Survey (Census 2022). Includes all occupied, site-built homes in the United States. New single-family homes are built in 2012 or later.

Impacts on low-income and minority households will also vary based on regional distributions. Table 2 shows that 57% of Hispanic households are concentrated in the West South Central, Mountain, and Pacific census divisions (Southwest and West), predominantly in warmer climate zones where they will face lower costs and lower energy savings over time (compared to 34% of all households) (HUD and USDA 2024). Similarly, 56% of Black households live in the South Atlantic and East and West South Central divisions (Southeast and South), where they also will face lower costs and savings than the colder regions in the North. Conversely, white households are comparatively more evenly spread across the census divisions but are somewhat overrepresented in East and West North Central (the Midwest)—where costs and savings are high.

Table 2. Distribution of households across U.S. census divisions, by group

	All households	Low-income households	White non-Hispanic households	Hispanic households	Black households
New England	5%	4%	6%	3%	3%
Mid Atlantic	13%	13%	13%	13%	14%
East North Central	15%	15%	18%	7%	14%
West North Central	7%	7%	9%	2%	4%
South Atlantic	19%	20%	18%	16%	33%
East South Central	6%	8%	7%	1%	9%
West South Central	12%	14%	9%	21%	14%
Mountain	7%	6%	8%	10%	2%
Pacific	15%	13%	12%	26%	7%
Total	100%	100%	100%	100%	100%

Notes: Includes all occupied, site-built homes in the United States. Low-income is defined as below 200% of the federal poverty line (Census 2022).

Impact of Housing Tenure, Type, and Location on Energy Code Costs and Savings

As mentioned above, renters typically pay much lower upfront costs associated with code improvements than buyers of a new home. However, the monthly rents may increase because of the landlord's added costs. Unlike mortgage payments, which generally are fixed in nominal dollars, the added rent may rise over time (or decrease as the building ages, especially if maintenance is poor).

Table 3 illustrates these differences using PNNL estimates of national average construction costs and energy savings for the 2021 IECC vs 2009 IECC (90.1-2019 and 90.1-2007 for high-rise multifamily). The upfront costs are only down payment and fees for owners and security deposit and first month's rent for renters. The annual costs for owners are increased mortgage payments and property taxes minus the interest tax deduction; and renters face added rent costs. All the residents receive the annual energy savings.

While the impact of code improvements on home prices and on rents may depend on local market competition and on valuation of the comfort, health, and energy benefits, for the purposes of this analysis we assume that builders and landlords simply pass on the added costs. This means landlords increase the rent such that the discounted present value of the rent increases over the analysis period of 30 years is equal to their added cost including financing. The landlord's added cost is net of their tax savings from added property depreciation and from expensing mortgage interest.

The lifetime savings are lower for multifamily because energy bills are lower, but the upfront cash needed is very small for all renters. Payback is quick for owners and almost instantaneous for renters—obviously for multifamily units with low added construction costs, but even for single-family homes.

Table 3. Variation in 2021 IECC cost and savings by home type and ownership

	Owners	Renters		
	Single family	Single family	Low-rise multifamily	High-rise multifamily
Upfront cost	($931)	($58)	($24)	($0)
1st year added housing cost	($465)	($317)	($131)	($1)
1st year energy savings	$963	$963	$403	$224
1st year net savings (excluding upfront costs)	$498	$646	$272	$223
10th year net savings	$665	$732	$308	$268
Years to positive cash flow	1.7	0.1	0.1	0.0
30-year NPV savings	$9,984	$11,661	$4,902	$4,302

Notes: Positive cash flow occurs when the monthly net savings pay back the upfront cost. NPV is discounted net present value. Construction costs and annual energy savings are from PNNL as reported in (HUD and USDA 2024). The down payment, fees, and tax rates also are from PNNL (Salcido, et al. 2021). The inflation, interest, and discount rates are updated based on 2022-2050 projections (EIA 2023) and are intended to be long-term averages: 2.35% inflation in added home value and rent, 2.07% energy cost inflation, and 5.1% mortgage interest and discount rates. For renters, assumes the increase in the present value of the rent will equal the present value of the added mortgage and tax costs, incorporating 30-year depreciation and a higher marginal tax rate (27%) more reflective of investors (Ungar, Barrett and Perry 2020).

Table 4 estimates the upfront costs and lifetime net savings for single-family homes by ownership and by socioeconomic group, based solely on their respective distributions, weighted by region.[2] Energy code costs and savings vary dramatically by climate zone (Salcido, et al. 2021). However, after averaging over the region/climate distributions by income and race, we see only modestly lower upfront costs and net savings for low-income, Black, and Hispanic owners and renters separately, based on more of them living in milder climates. There are significantly greater overall differences when including both owners and renters (Black households have 23% lower upfront costs and 8% lower net savings than white non-Hispanic households). In multifamily buildings the costs are even lower but the differences between groups are small.

[2] AHS provides census division-level data. However, PNNL costs and savings estimates are provided by IECC climate zones. We used DOE data on new single-family and multifamily housing permits by state and climate zone to give construction weightings by census division and climate zone and thus translate the PNNL weighted average estimates from climate zone to census division (EERE 2022). Our results by socioeconomic group are weighted over the census divisions. As a result, our national savings and costs estimates in Tables 4-5 differ slightly from those estimated by PNNL.

Table 4. Weighted added upfront costs and lifetime savings for single-family homes going from 2009 IECC to 2021 IECC, by household group

		All	Low-income	White non-Hispanic	Hispanic	Black
Owners	Upfront costs	$958	$942	$965	$934	$922
	Lifetime net savings	$10,852	$10,340	$11,144	$9,892	$9,784
Renters	Upfront costs	$59	$59	$60	$59	$58
	Lifetime net savings	$12,290	$12,259	$12,643	$11,791	$11,743
All	Upfront costs	$799	$632	$842	$687	$651
	Lifetime net savings	$11,106	$11,014	$11,347	$10,426	$10,399

Notes: See note to Table 3 for assumptions. Costs and savings are first weighted by climate zone separately for renters and owners, based on census data *(Census 2022)*. The "All" rows report a weighted average based on the blend of renters and owners in single-family housing (see Table 1).

The differences are more dramatic after averaging over single-family and multifamily homes, as shown in Figure 1 and Table 5. For example, Black households have discounted net lifetime savings of $8,052, 20% below the $10,063 savings for white non-Hispanic households. However, they only have average upfront costs of $389, 43% below the average $681 initial cost for white households. In all cases the savings are significant and quickly pay back the upfront expense.

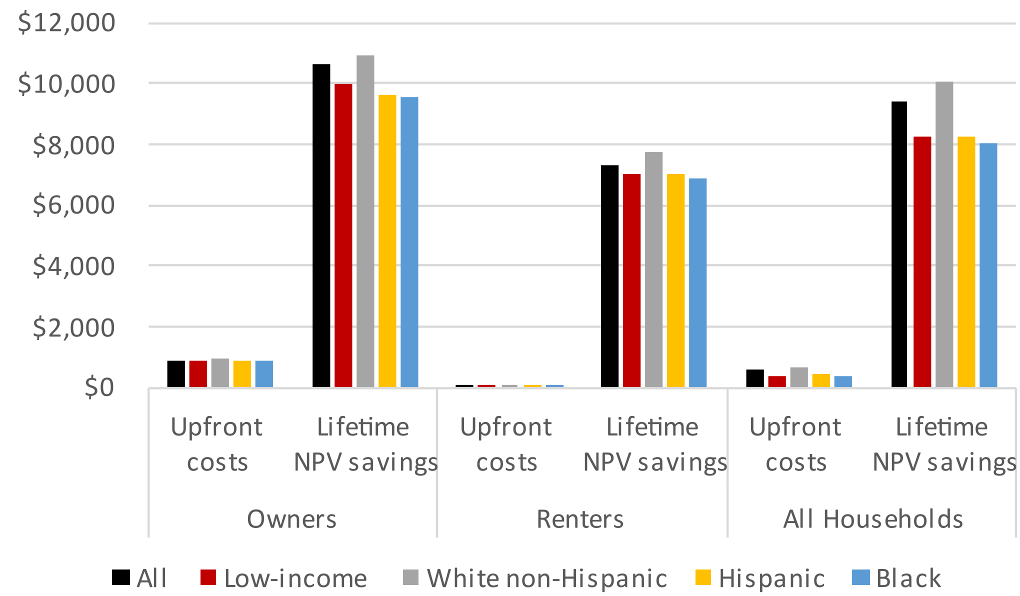

Figure 1. Upfront costs and lifetime savings for 2021 IECC vs 2009 IECC by household group and tenure

Table 5. Weighted added upfront costs and lifetime savings for all home types going from 2009 IECC to 2021 IECC, by household group

		All	Low-income	White non-Hispanic	Hispanic	Black
Owners	Upfront costs	$921	$887	$931	$893	$883
	Years to positive cash flow	1.7	1.7	1.6	1.7	1.7
	Lifetime net savings	$10,602	$10,020	$10,906	$9,635	$9,539
Renters	Upfront costs	$25	$24	$28	$25	$23
	Years to positive cash flow	0.05	0.05	0.05	0.05	0.05
	Lifetime net savings	$7,305	$7,053	$7,759	$7,005	$6,893
All	Upfront costs	$596	$364	$681	$438	$389
	Years to positive cash flow	1.1	0.7	1.2	0.9	0.8
	Lifetime net savings	$9,405	$8,221	$10,063	$8,285	$8,052

Notes: See notes to Tables 3 and 4 for assumptions.

Influence of Size, Quality, and Financing on Costs and Savings

Size: Of course, other factors also can influence costs and energy bills. As shown in Figure 2, even within a housing type, low-income households tend to have smaller homes (they also tend to have fewer people). The median size of a single-family house for low-income households appears to be about 20% smaller than for higher-income households. The median multifamily unit is about 10% smaller. The median house and unit sizes for Black and Hispanic households are in between those for low- and higher-income households; the median for Asian households appears to be larger (average number of people per household is slightly smaller for Black households but larger for Hispanic and Asian households). Smaller homes typically have lower upfront costs and lower energy bill savings.

HUD took a closer look at size impacts as part of its analysis of energy code impacts on new homes with FHA loans. The analysis estimated that a 10% reduction in square footage is associated with only a 3.3% reduction in energy bills and that a 20% reduction in square footage yields a 2% to 12% (10% weighted average) reduction in the incremental cost of building to the 2021 IECC rather than 2018 IECC in single-family homes (HUD 2024).

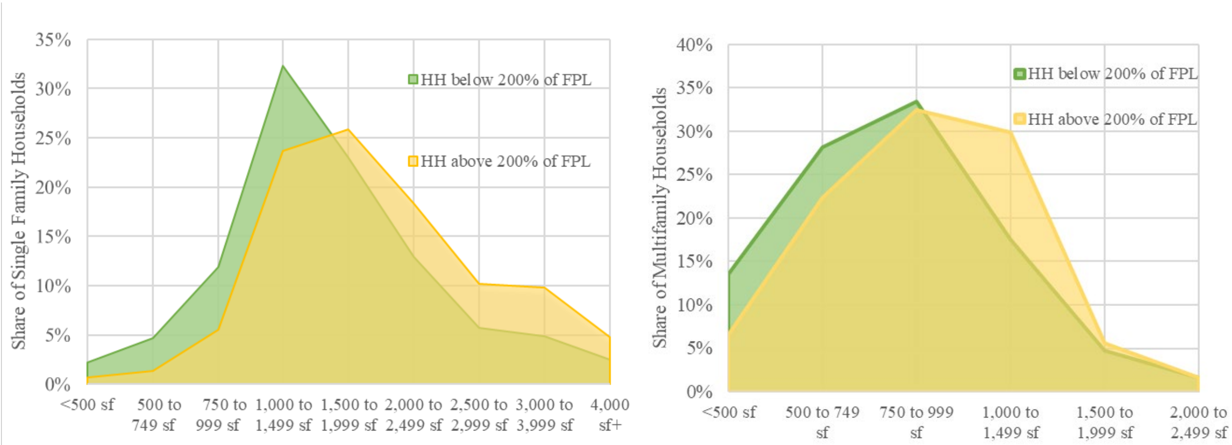

Figure 2. Distribution of U.S. single-family (left) and multifamily (right) households by unit size, in square feet, for low-income (under 200% of the Federal Poverty Level or FPL) and other households (Census 2022).

Quality: There also is evidence of racial gaps in energy use apart from ownership, income, household size, location, and home type. In particular, Black households have higher energy expenditures than white households even after controlling for those factors, likely due to differences in housing quality and energy efficiency investments. These differences may be in part the result of racist U.S. policies that have led to wealth inequality and highly segregated residential zoning, which in turn led to unequal private and public investment in home upgrades, appliances, and building quality that would improve home energy efficiency (Lyubich 2020). We are not aware of data to explore whether there would also be similar group differences in energy codes costs and savings.

Financing: Home Mortgage Disclosure Act (HMDA) data confirm that Black and Hispanic households on average take out loans for houses with lower property values than white non-Hispanic households (see Table 6). This may be due in part to factors such as location, size, and quality of the home that we have already discussed and that may suggest slightly lower costs for code improvements. The slightly higher interest rates for Black and Hispanic households, however, would slightly increase the financing costs. More concerning, the high loan-to-value ratios (i.e., low down payments), could indicate that more Black and Hispanic households would have trouble folding the added cost from codes into their mortgages. While more detailed home financing is out of scope of this analysis, such issues should be considered in future analysis.

Table 6. Median mortgage characteristics by household group

	Property value ($)	Interest rate (%)	Debt to income ratio (%)	Combined loan to value ratio (%)
White non-Hispanic	365,000	4.99	38.00	89.00
Black	315,000	5.00	43.00	96.50
Hispanic	335,000	5.13	43.00	95.00
All borrowers	**355,000**	**4.99**	**39.00**	**90.00**

Notes: Data from all originated or purchased loans for single-family homes purchased as a primary residence *(CFPB 2022)*. Includes first liens only.

Sensitivity to Bill Volatility and Savings Uncertainty

Energy Bill Volatility and Impact of Codes

The previous section addressed average energy costs and savings, but residents need to pay energy bills each month. Most mortgage payments are flat for the duration of the mortgage (in nominal dollars—they typically slowly decline in real terms), and taxes and insurance typically rise slowly with home values (notwithstanding recent climate-related turmoil in insurance markets in a few states). But energy bills can vary widely because of weather, volatile energy prices, utility rate hikes, and changes in occupancy or behavior. Improving building efficiency can reduce not only the average energy bills but also the uncertainty and risk of bill spikes. Reducing volatility is especially important for low-income and disadvantaged households that lack the savings to pay high energy bills even for a month or a season.

Modeled energy bill savings also are uncertain because of modeling errors, a range of occupant activities and behavior, and unforeseen changes. So, there may also be risk in basing estimates of an income-constrained consumer's ability to pay the added cost on projections of future energy bill savings.

To look at the impact of energy bill volatility, we examined average and modeled home energy bills. Estimated nationwide mean monthly home energy bills in real dollars are shown in Figure 3. While the monthly volatility has decreased since the 1980s—in part due to greater efficiency—there remains significant variation. Over the last thirty years (1994-2023) the highest monthly total ($380) is 69% above the mean ($225), and the lowest monthly total ($157) is 30% below the mean. However, the volatility of annual energy bills (12-month sum of the monthly bills) is much lower: the highest annual bill over the past 30 years is 18% above the mean, and the lowest is 10% below the mean.

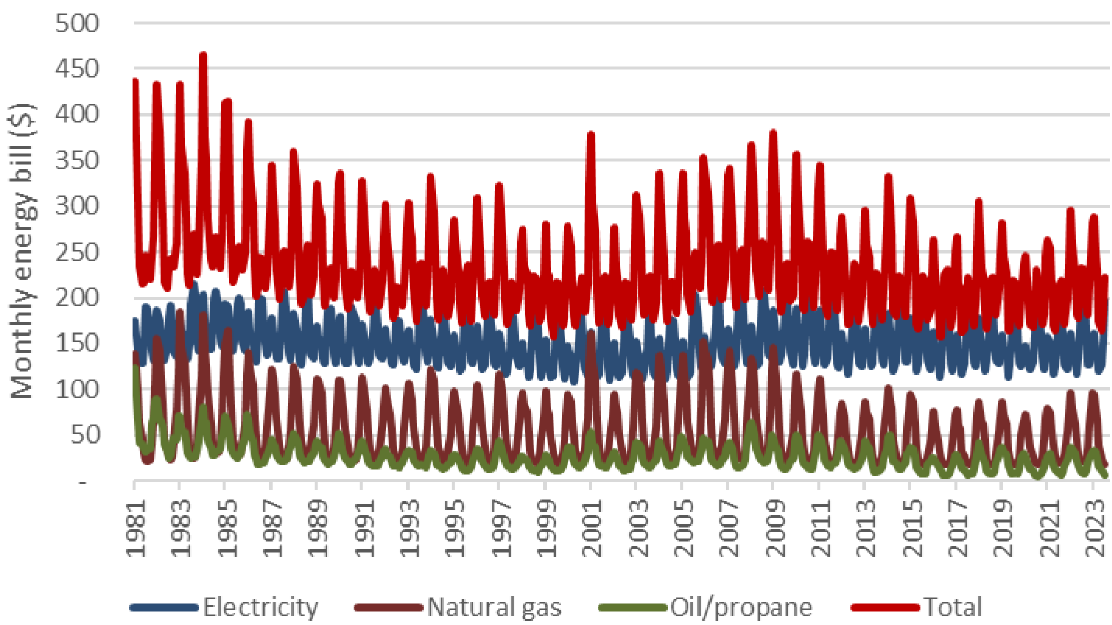

Figure 3. Mean monthly home energy bills in real 2024 dollars. We multiplied residential monthly energy use by source (EIA 2024a) by monthly real energy prices by source (EIA 2024c, EIA 2024d) and divided by the number of households (Census 2023). We assumed oil use was half heating oil and half propane, used heating oil prices per gallon for propane prior to 1990, and averaged or interpolated some monthly data.

The energy bill volatility for individual households may be much different from the national average. In Figure 4 we estimate the range of real annual home heating bills for a typical New Hampshire home with a gas furnace based solely on price volatility (in contrast to Figure 3, this is a model heating bill based on a fixed energy usage and does not reflect variation in behavior or weather). New Hampshire was chosen as an illustrative case with high winter heating bills and hence vulnerable to natural gas price volatility. Over the past 30 years the highest annual bill is 30% above the mean, and the lowest is 29% below the mean. For a home at roughly the 2009 IECC, the heating bill would have spiked by $623 from 1999 to 2006 and again by $286 just from 2021 to 2022 (a 17% jump in real prices in one year).[3] However, for a home that uses 35% less gas—the PNNL estimated difference in gas use between a gas home built to 2009 IECC and 2021 IECC—the volatility is reduced along with the average bill. The bill spikes are reduced to $405 and $120 respectively.

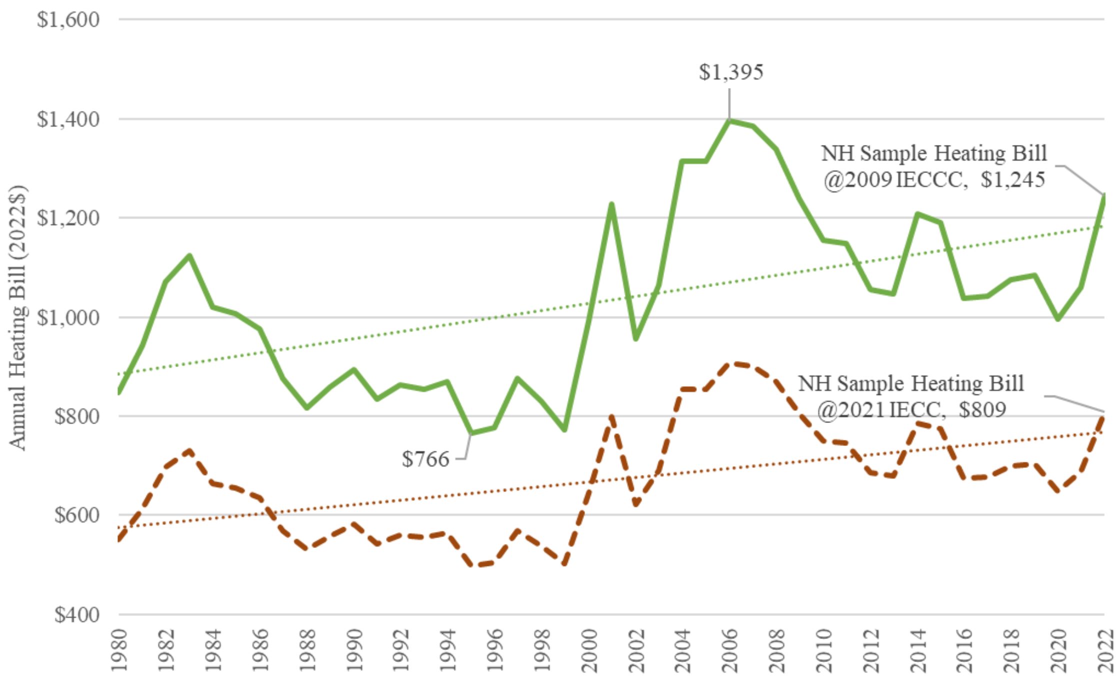

Figure 4. Modeled annual natural gas heating bill for hypothetical gas-heated household built to 2009 IECC and 2021 IECC, using real historical average gas prices in New Hampshire and assuming fixed usage of 105 therms per winter month (EIA 2024b, Unitil 2011, EERE 2022).

Impact of Volatility on Code Net Savings Uncertainty

The volatility also applies to the energy savings from codes. In the example in Figure 4 the monthly code savings range from $268 to $488. But the Northern heating bill in Figure 4 shows only the most volatile part of whole-home energy costs. On the other hand, the national average in Figure 3 likely underestimates volatility for a typical single home. These examples suggest that in a given year the energy code savings may be 20% or more off of the long-term

[3] For 2009 IECC, assumes an average 105 therms per winter month for a total of 630 therms per heating season. Heating bills are calculated based on the actual annual average price per therm of natural gas delivered to residential consumers in New Hampshire.

average—and even more than that in a single month. Of course, there will be additional uncertainty because the modeled homes will not perfectly project the average energy use, and the savings in a single home will also be different from the average.

We can compare the level of volatility to the sensitivity of the estimated net energy code savings to look at the likelihood that a household will not realize any net savings in a year. Here we consider owners of single-family homes (the worst case because of the higher costs) under our updated financial assumptions. The average owner in any climate zone would have to pay a net added expense in any single year (i.e. mortgage and other payments exceed the energy bill savings) only if the total energy savings were 43% lower than projected. Savings would need to be 52% lower than projected overall for the national net lifetime savings to turn negative. While we know the projections cannot accurately predict the savings in a given month and year, households will still benefit even with much lower energy bill savings.

Conversely, if energy savings were 20% higher than projected, national net lifetime savings would increase by more than a third, and if bill savings were 55% higher than projected—e.g., due to a price spike due to other customers leaving the natural gas system—national net savings would double.

Approaches to Address Equity Concerns

Building energy codes improve the overall affordability of homes for low-income and disadvantaged households, and thus financial agencies by adopting code requirements will generally help these households financially and reduce mortgage defaults. But codes may make qualifying for a mortgage and buying a new home slightly harder. If the added cost of meeting the code is added to the home price, interested buyers who are already near a cap on the size of a qualified mortgage (such as an FHA mortgage) may not be able to add the increase into that mortgage and may not be able to come up with a higher down payment either. Here are a few measures that could help ensure all can benefit from the more efficient new homes required by state and local codes or by financing requirements such as the HUD-USDA one.

Federal Beyond-Code Incentives

Under the Inflation Reduction Act builders can earn a tax credit of $2,500 for an ENERGY STAR home (version 3.2 starting in 2025) or $5,000 for a Zero Energy Ready Home (ZERH). The added cost of meeting ENERGY STAR requirements compared to the 2021 IECC is estimated to be less than $2,500, except for homes in the far North with gas heating (EPA 2023), so most builders may be able to reduce costs by going above code. The bill also expanded the 179D tax deduction for efficient multifamily buildings (above three stories), funded state-run rebates for efficient electric equipment for homes with low- and moderate-income residents, and provided broad funding that can be used for zero-emissions homes primarily in low-income and disadvantaged communities (Ungar and Nadel 2023).

Appraisal Reform

While there is substantial evidence that buyers value energy efficiency in homes, home appraisals rarely consider energy features, which can prevent financing the added cost in mortgages that are near the loan-to-value cap (Doyle and Bhargava 2012). Appraisals are supposed to recognize efficiency features (Fannie Mae 2024, Freddie Mac 2022), and there is a

Residential Green and Energy Efficient Addendum for appraisals (Appraisal Institute 2019) along with multiple training courses and certifications for green appraisers. However, the appraisal process is designed to maximize independence and minimize costs, not for precision. Most buyers and real estate agents are not reading the detailed guidance available on how to work the system. The procedures for advertising energy features, making information on comparable properties available on multiple listing services, selecting qualified appraisers, and incorporating the information into the valuation need to be normalized. The proposed GREEN Appraisals Act (H.R. 8402 / S. 4340) from Rep. Sean Casten (D-IL) and Sen. Michael Bennet (D-CO) would require and train appraisers to take into consideration energy reports such as a Home Energy Rating System (HERS) report or Home Energy Score.

Green Mortgages

Fannie Mae, Freddie Mac, and FHA all offer green mortgages for multifamily buildings that provide slightly reduced interest rates or insurance rates for buildings that meet green requirements (HP Sustainability, Housing Sustainability Advisors, and University of New Hampshire 2023). This might be a 0.1% interest rate reduction or 0.2%-0.5% insurance premium reduction for meeting any of several green building certifications, such as ENERGY STAR or LEED Zero Energy, or for energy and water use reductions. These programs have been widely used, especially when the loans were exempted from the caps on Fannie and Freddie multifamily financing, though the green requirements have often been loose. Since then, some of the benefits have been reduced, and owners and developers can often get the same incentives for building affordable housing—thus providing no additional incentive to make affordable housing green. Larger incentives for greener buildings, in addition to affordable housing incentives, would help normalize better construction.

Targeted Assistance

As the upfront cost of the energy code will generally be small, it is most likely to be an issue for low-income homebuyers and nonprofit affordable housing developers. Targeted assistance to pay the added cost increment could address this issue with modest government funds. New federal programs provide possible sources of funding, including $1.225 billion in codes funding for states and localities and $20 billion in the Greenhouse Gas Reduction Fund that can be used to finance new zero-emissions homes.

LIHTC Preferences

Most new subsidized affordable housing in this country is built using the Low Income Housing Tax Credit (LIHTC). The tax law does not include any federal efficiency requirements for the tax credit, but it does direct states to consider incentivizing efficiency in their allocation of the credit. State Qualified Allocation Plans (QAPs) adopt a variety of ways, including requiring, or giving points for, green building certifications or energy features (Bartolomei 2017). Because the allocation is very competitive, awarding points can be an effective strategy for spurring green construction. More states should set high bars for efficiency and should ensure the allocations cover the added cost.

Adjusting Mortgage Size Caps

Some home buyers require the largest loan they can get based on their income and the home value. In this case they may not be able to add the additional cost of meeting the code into the mortgage. Incorporating the home efficiency value into the appraisal or paying the added cost with new funding sources, as discussed above, may help these buyers. In addition, Energy Efficient Mortgages (EEMs) attempt to address this limitation by financing energy improvements outside of mortgage caps (U.S. Department of Energy n.d.). However, in the decades they have been available through government-backed loan programs, EEMS have never been widely used, likely because they are more difficult to underwrite and add limited value. A legislative proposal, the SAVE Act, would have increased the income and value-based mortgage caps based on projected energy savings. But in response to consumer advocate concerns that increasing mortgage payments based on uncertain energy savings could cause lower-income borrowers to default, the sponsors switched to the GREEN Appraisals Act mentioned above. The Veterans Administration under recently enacted legislation is developing a process to include home efficiency in its residual income calculation, which is designed to be a more accurate approach to determining ability to pay.

Conclusion

As for all policies, it is critical to consider the disparate impacts of building energy codes on low-income and disadvantaged communities. Because the codes yield significant energy bill savings across building types and climate zones at relatively modest cost, they are beneficial across communities. But there are differences. Low-income and minority households appear to have both lower upfront costs and lower energy cost savings on average because they are more often in multifamily buildings as well as in milder climates (and in smaller homes, but that was not included in the estimates here). Because they are more often renters, their average upfront expenses appear to be especially low. These estimates are of course uncertain, but by reducing energy bills, energy codes will also reduce their volatility, helping reduce bill shocks that low-income and minority households can ill-afford. The benefits of codes are clear. It is important to ensure that affordable housing can meet the requirements of the energy code without undue burden on the residents or the developers. The best approach is to incentivize to build well beyond current energy codes for homes with lower—or zero—energy bills as well as appropriate disclosure and valuation of the home efficiency.

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