

CLIMATE CHANGE, PUBLIC HEALTH, BUSINESS + INNOVATION

Building a better environment: Construction's impact on climate and equity



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7 MIN READ
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Thomas Jefferson Community Land Trust board member Grace Leonard and executive director Christine Jacobs celebrate the construction of four affordable homes on Nassau Street.

Credit: Emily Hays/Charlottesville Tomorrow

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As the temperature begins to rise while people are at home because of the COVID-19 pandemic, they soon will find themselves reaching for the thermostat. While a spike in power bills is common in summer and winter months, how steeply they rise in some cases can be influenced by the construction quality of a home or apartment.

Outside of transportation, buildings are one of the top sources of emissions due to the power they use for

Outside of transportation, buildings are one of the top sources of emissions due to the power they use for heating, cooling, lighting and appliances. Structures that draw energy from renewable sources like solar and wind can be a win for climate resiliency, but that is not the only way for a building to have a positive impact towards net zero.

Along with the city and county declaring emissions goals, the state has done so, as well. Virginia is also in the midst of updating its Uniform Statewide Building Code, modeled after a code that is drafted every three years by the International Code Council. Some states, like Maryland, adopt each code update automatically, but Virginia uses its own amendments. The process to adopt a newer version is underway and would bring the state closer to where others already are.

“It’s nothing groundbreaking. The tech exists and has been adopted for years; we are just not enforcing it as a state,” said Wilson Ratliff, technical director at Local Energy Alliance Program.

As a nonprofit organization, LEAP works to retrofit older, existing structures to bring them to better energy efficiency standards. The work often involves measures like enhancing insulation and installing airtight fixtures and energy-efficient appliances. While LEAP deals in the field of fixing existing structures, at the state-level the Virginia Energy Efficiency Council has been in collaboration with various stakeholders to facilitate adoption of USBC for future construction.

According to Chelsea Harnish, the executive director of VAEEC, Virginia had previously allowed a visual inspection for building tightness and air duct tightness — two areas that could have air leakage if they are not constructed well enough. Virginia had an amendment in place that allowed for visual inspections, although mechanical testing had been in line with the model building code, but VAEEC in late 2019 came to an agreement with the Homebuilders Association of Virginia to update the testing process.

Harnish explained that the new code will require blower door testing — a mechanical test to make sure new construction meets a minimum threshold for the amount of leaking air.

“There are other states that have been doing these mechanical tests for about eight years,” Harnish said. “It was about time Virginia got up to speed.”

While the upcoming summer heat is expected to bring a seasonal spike in energy usage, Wilson said it’s still important to be aware of general everyday energy consumption. This is where he says efficient appliances, LED lighting and water-saving techniques “can make a difference.”

Harnish said it will be important to continue implementing energy efficiency measures in new construction going forward to help the state reach its climate goals.

“It’s important to look at new constructions. Today’s new homes will be tomorrow’s old homes. It’s important to implement energy efficiency measures,” Harnish said. “When it comes to climate conversations, a lot has been around what utilities can do, but our building stock and performance of it is where we need to take a closer look, too.”

Environmental equity

As the state progresses on its adoption of new building code regulations and more developers begin to embrace measures like electric vehicle infrastructure and solar, affordable housing-focused developers and managers have been vanguards in the deployment of quality constructed, energy efficient dwellings.

Piedmont Housing Alliance Executive Director Sunshine Mathon sees a natural alignment between the mission of his organization to provide a “platform of economic stability” with ensuring utility costs are predictable and lower.

“It only strengthens the families that we serve,” he said.

Mathon explained that modifications to make homes more energy efficient are often a matter of choice for middle or higher-income families, while lower-income families may not be able to afford the up-front costs

middle or higher-income families, while lower-income families may not be able to afford the up-front costs but stand the most to benefit from the long-term gains.

“For a lower-income household, the impact of utility bills, particularly the cyclic nature of seasonal surges in energy consumption, makes planning bills really hard,” Mathon said.

PHA, which manages Charlottesville-area properties targeted towards low-income families, has partnered with LEAP to [retrofit older properties](#) it manages. Most recently, LEAP also worked to update [homes in the county’s Southwood Mobile Home Park](#) ahead of a planned neighborhood redevelopment.

A 2014 Virginia Tech [study examined the connection between energy efficiency and affordable housing](#). Its goal was to identify and verify benefits of housing policy through the Virginia Housing Development Authority that encourages energy efficiency in affordable rental stock through the state’s Low Income Housing Tax Credit program. Tax credits administered through VHDA help turn developer’s plans for affordable units into a reality.

According to the study, which examined multifamily construction built to EarthCraft standards, “energy usage for developments in the study is 16.6% less than estimated and approximately 30% less than new standard construction” and averaged about \$54 in savings per month.

EarthCraft is a [green-building program](#) for homes and multifamily units, that addresses environmental performance, indoor air quality and building durability. The Virginia Tech study used EarthCraft certified units in its examinations, as they are one of the few relative datasets available for such a study.

Due to privacy regulations with utility companies, Mathon explained it can be tricky and time-consuming to track individualized energy usage to measure energy consumption. As such, PHA is taking a special approach as it redevelops Friendship Court in order to track its improvements like efficient HVAC, insulation, and airtight sealing.

Rather than building individual meters for electricity, residents’ utility bills will be master metered.

“We will pay Dominion and internally sub-meter resident accounts so that we know what is owed and consumed,” Mathon said. “It’s not to sidestep a privacy law, but what it does is give us a toolset and framework for verifying improvements we do on a building scale and the impact for our residents in the long-run.”

As Charlottesville government reconciles its budget amidst the financial impact of COVID-19, staff is currently recommending a one-year delay on funding for a portion of the redevelopment. Mathon said that if the city holds the delay to only one year, it should not slow down Friendship Court’s redevelopment, as each construction phase spans multiple years. Mathon said that the funds would arrive towards the end of construction for the first phase, rather than the beginning.

While ongoing efforts to update existing dwellings and update codes for future construction can help localities and the state meet climate goals and contribute to a greener globe, the impact of efficient structures can immediately impact individuals.

“Not only is climate change a big picture concern, but it really does make a tremendous difference for those families over the long term,” Mathon explained.



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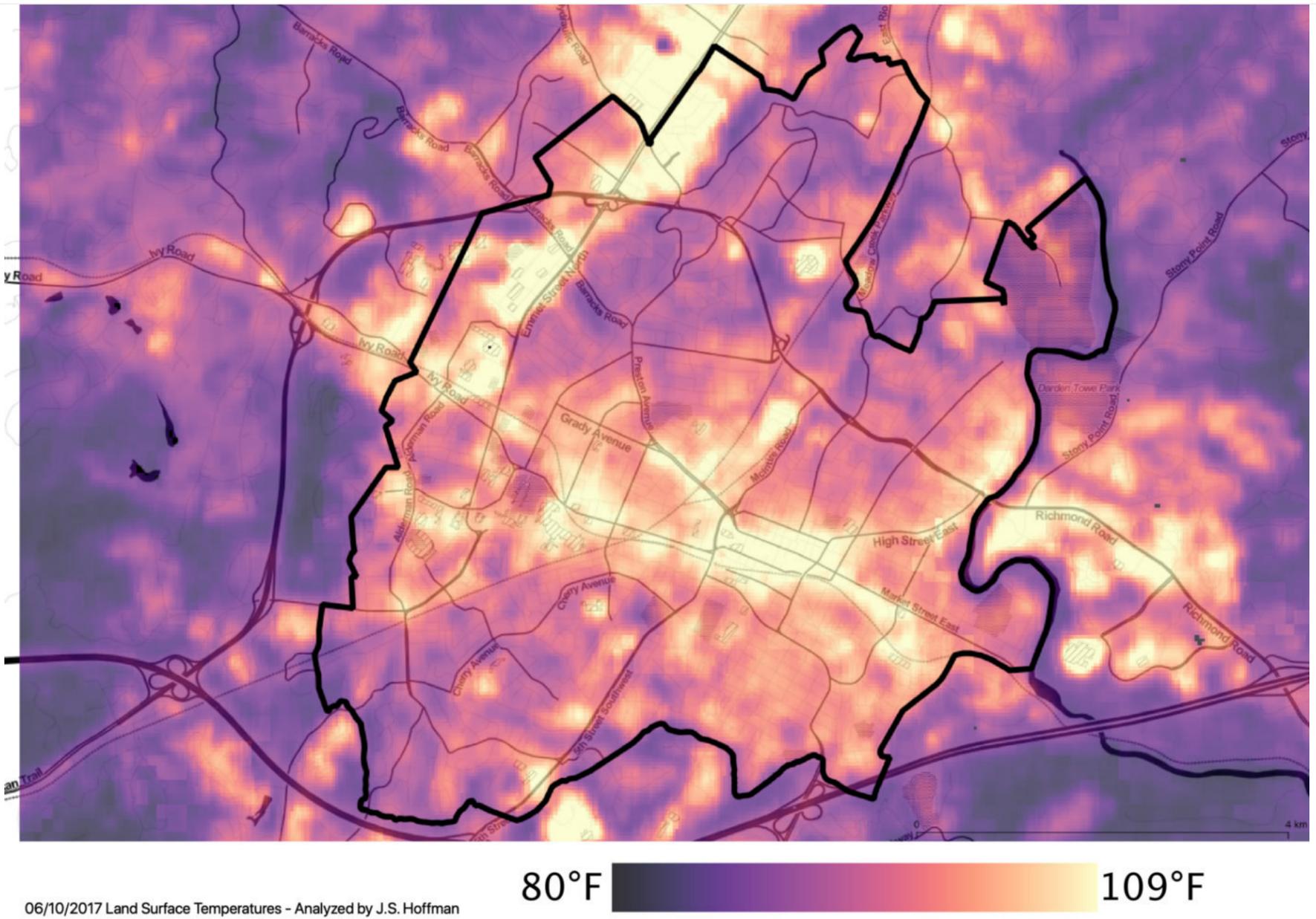
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Heat islands to factor into planning process revision



CHARLOTTE RENE WOODS
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5 MIN READ
Thursday, July 23, 2020, at 7:09 PM



A land surface analysis shows the hottest areas of Charlottesville.

Credit: Graphic by Jeremy Hoffman

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Charlottesville experienced a heat wave recently, with a record-breaking stretch of temperatures above 90 degrees and some days surpassing 100 degrees. In the midst of a pandemic that has disproportionately affected communities of color, as well as those with underlying health conditions and low-income individuals, extreme temperatures can exacerbate acute health conditions — and urban planning

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over time has played a role in what areas are the hottest in a community.

A recent [Harvard study](#) outlined strategies for how local communities and states can reduce the risk of COVID-19 transmission during climate-related events like heat waves, hurricanes and wildfires. And a [study published earlier this year](#) and co-authored by Jeremy Hoffman, a scientist at the Science Museum of Virginia, examined the role that housing policies have played over time.

The study focused on the heat island effect, where urban areas with fewer permeable surfaces and greenspace retain hotter ground temperatures than suburban and rural areas. In examining cities across the U.S., it found that areas which were formerly redlined show higher temperatures. Redlining is the historical practice of denying mortgages or loans for racially biased reasons and has contributed to less homeownership and generational wealth building of racial minorities.

“The consistency of greater temperature in formerly redlined areas across the vast majority (94%) of the cities included in this study indicates that current maps of intra-urban heat echo the legacy of past planning policies,” the study reads.

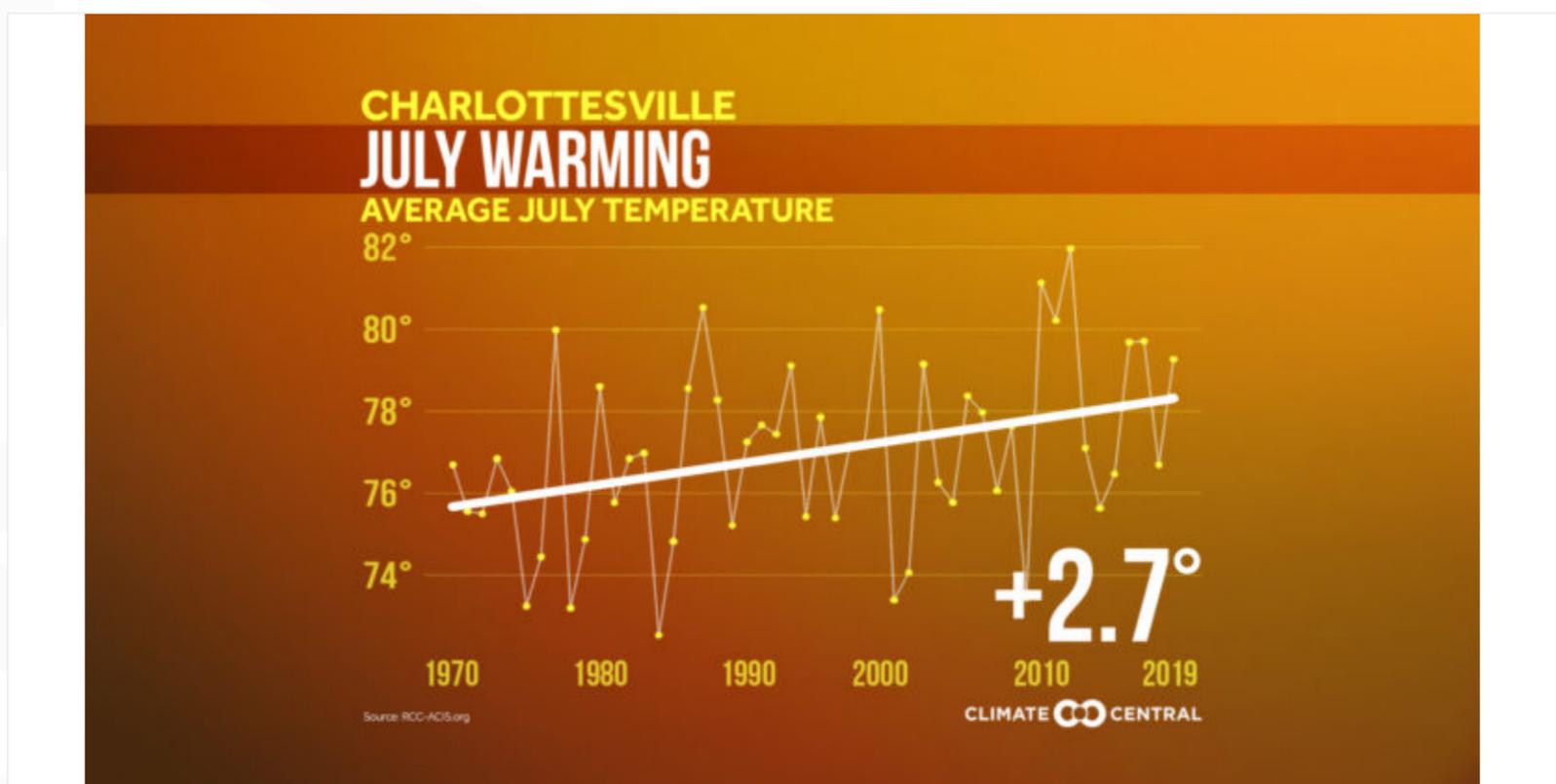
Hoffman says that enhancing climate resilience in communities intersects with public health and equity.

“By addressing the urban heat island effect, we address other aspects of climate related topics with housing, health, and economic issues as well,” Hoffman explained.

The intersection is an area of focus for Sacoby Wilson, a University of Maryland professor, who specializes in environmental health. He says that historically in the U.S., there’s been a lack of equity in zoning, planning and development.

“There’s disproportionate access to built environment amenities and natural amenities, so when you think of access to green space, tree canopies, parks,” Wilson said. “Also, when you think of access to food infrastructure, looking at access to healthy housing — whether it be housing in regard to energy efficient housing, or housing in regard to exposure to chemical or biological agents of concern.”

Charlottesville Tomorrow has [previously reported the role quality-constructed, energy-efficient housing plays](#) in reducing power bills — especially for low-income families — and reducing emissions in line with regional climate goals. It also plays a role in the health of residents.



Credit: Graphic by Climate Central

While a spike in heat is common in summer months, data from Climate Central — a scientific nonprofit organization — shows that the number of extremely hot days has increased in recent years.

“When you get back to the issue around housing and heat issues, you know that communities of color and

low-wealth communities disproportionately have more impervious surfaces. We know that they are prone to be in urban heat islands,” Wilson said.

In analyzing the land surface temperatures of Charlottesville, Hoffman’s data shows the hottest areas to be in the densest areas of commercial and residential. Though density, especially in housing, has been argued to encourage more walkability and create nodes for public transportation to curb emissions, factors like the inclusion of greenspace and tree canopies can help.

City planning commissioner Rory Stolzenberg says that the commission requires that any tree canopies being removed for development or redevelopment be replaced, but notes that the replaced canopy will take time to come to fruition.

“If you tear down a mature tree, you can put a tree back that once mature will provide shade, but for the next couple decades, it will be in its youth and not provide as much cover.” he explained.

Meanwhile, the city of Charlottesville is in the [midst of redoing its Comprehensive Plan that will include a zoning rewrite and affordable housing strategy](#). Having hired the Rhodside and Harwell and Brick & Story consulting firms to steer the process, the strategies are in the process of being added into the overall Comprehensive Plan. The process, which began in January, is expected to transpire over two years and has been conducting virtual outreach amidst the pandemic.

“I think a place to look in climate resiliency is zoning rewrites. I think we can embed this into our comprehensive plans and also connect cities’ comprehensive plans to their climate action plans,” Wilson said.

As Charlottesville set goals to reduce greenhouse gas emissions by 45% by 2030 and to reach net zero by 2050, the city is also drafting its climate action plan.

“We have heard from residents who are thinking about how Charlottesville can both prepare for and work to mitigate climate change,” said Jennifer Koch, an urban planner with Rhodside and Harwell. “ In addition to ensuring the general consideration of this in the plan, it’s an important equity consideration ... not every neighborhood has an abundant tree canopy or a lot of green or permeable space.”

According to Koch, while her team’s focus is the Comprehensive Plan, affordability and zoning, her team is in connection with the city staff that are working on the climate action plan.

“It is a cross-cutting concern that will also touch on many other aspects of the plan, including housing and transportation,” she said.



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New report reveals where Charlottesville's 'energy burdens' are



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A new [report by Community Climate Collaborative](#) indicates which neighborhoods in Charlottesville face “energy burdens,” and officials say that solutions can interconnect between the city’s ongoing development of its Climate Action Plan and its Comprehensive Plan.

An energy burden is the percentage of a household’s income that goes towards energy costs. Myriad factors contribute to energy burdens to include insufficient insulation, appliances that are not energy efficient, construction quality and the income of a household spent on energy.

The neighborhoods where residents spend more of their income on power are 10th & Page/Venable, Jefferson Park Avenue and Ridge Street — neighborhoods between downtown and the University of Virginia composed of a mix of renters and homeowners, many of whom have lower incomes.

Energy burdens disproportionately affect low-income residents. Laura Goldbatt, of the Charlottesville Low-Income Housing Coalition, said that higher percentages of such a resident’s income going towards utility bills could mean the difference between taking on a second job or having available funds for other

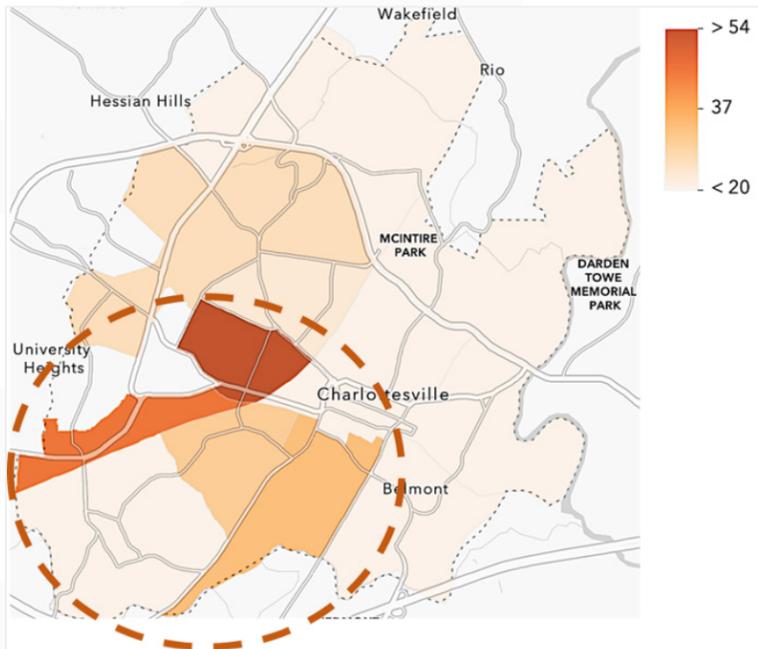
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utility bills could mean the difference between taking on a second job or having available funds for other personal expenses.



10th & Page / Venable, Ridge Street, and Jefferson Park Avenue carry Charlottesville's biggest energy burdens.

Credit: Community Climate Collaborative

She noted that by mapping energy burdens in the area, targeted policy can be created to reduce emissions and enhance affordability — two prominent goals in ongoing local planning processes.

“This report represents only the beginning of our understanding of how energy equity impacts our community and how climate and affordable housing policies help address it,” said Caetano de Campos Lopes, C3’s director of climate policy.

De Campos Lopes spearheaded the report, which analyzed census tract data.

“I think that this report has the goal of trying to demystify this perception that climate conversations are only for climate advocates,” de

Campos Lopes said. “We look forward with this report and other organizations to bring this perception that the city should be more holistic in its approach to solutions.”

The report confirms suspicions or hypotheses some officials have had regarding which areas could benefit most from ongoing efforts related to energy efficiency and how those solutions connect to other area goals and strategies.

“We knew that pockets of wealth could hide energy burdens,” C3 Executive Director Susan Kruse said. “In order to see disparities and inequities, you need to look beyond the averages.”

As a collective average, most Charlottesville residents pay less than 3% of their income on power. But while examining deeper into each neighborhood, C3 determined which areas residents are paying more of their income to heat or cool their residences.

Among key findings, the report says that nearly 5,000 homes are paying more than 6% of their annual income on energy costs while more than 4,000 are paying more than 10% and more than 800 homes pay more than 20% of their annual income on energy costs — particularly a burden for residents with lower area median incomes.

As the city works towards the development of its Climate Action Plan and revises its Comprehensive Plan, the processes are a chance to bring the conversations together.

Planning a more equitable environment

“Our area is expected to see an increase in the number of our higher heat days,” said Susan Elliott, climate protection program manager for Charlottesville.

Data from Climate Central — a scientific nonprofit organization — also shows that the number of extremely hot days has increased in recent years, with the average July temperatures up by nearly 3%. As of Thursday, there had been [35 straight days of high temperatures in Charlottesville at or above 90 degrees](#). The previous record, set in 2016, was 21.

Last summer, Elliott led the charge in the city establishing its goals to reduce greenhouse gas emissions over time and to reach carbon neutrality by 2050. She is also involved in the city’s development of a Climate Action Plan.

Previous Charlottesville Tomorrow reporting explored the connections between urban planning, [construction quality and appliance types on energy efficiency](#). As [temperatures rise](#), so will the efforts to cool residential and commercial buildings.

About ⅔ of the city’s greenhouse gas emissions are from buildings — both commercial and residential. Elliott said reducing emissions in buildings can stem from reducing the amount of energy a building would need to draw upon through things like adding insulation, more efficient HVAC and the installation of solar panels. In lower-income households, the upfront costs associated with retrofitting measures or maintenance could be prohibitive.

Elliott said strategies to reduce energy consumption include retrofitting buildings with more energy efficient appliances and enhancing insulation, along with switching to renewable energy sources when able, and thoughtful planting that can pull carbon dioxide out of the air.

“How I view a lot of this is going to feed into the Climate Action Plan conversation is hearing from the community where we should be putting our time and what scenarios meet multiple values from these efforts,” Elliott explained.

With the COVID-19 pandemic, the city’s planned engagement process for the Climate Action Plan has shifted. Elliott said that in August there will be messaging about signing up for email lists to stay up to date along with a survey to refresh community members where previous outreach left off. She noted that previous outreach had yielded desire to bring equity into climate planning conversations.

“We heard about equity and making sure that conversation includes how we frame goals and how we talk about strategies in the [Climate Action Plan],” Elliott said.

Meanwhile, de Campos Lopes says that C3 hopes its report can help inform local planning and policy decisions that bridge affordable housing with climate measures.

“We have these very rich content on previous studies around affordable housing in our community, but there was never a big emphasis in the role of energy costs in the lack of affordability,” de Campos Lopes said. “We are adding to this conversation with this energy perspective we hope will make more feasible and actionable solutions for affordable housing.”



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