Alleviating high energy burdens in low-income and disadvantaged communities in rural NC:
NC Clean Energy Fund

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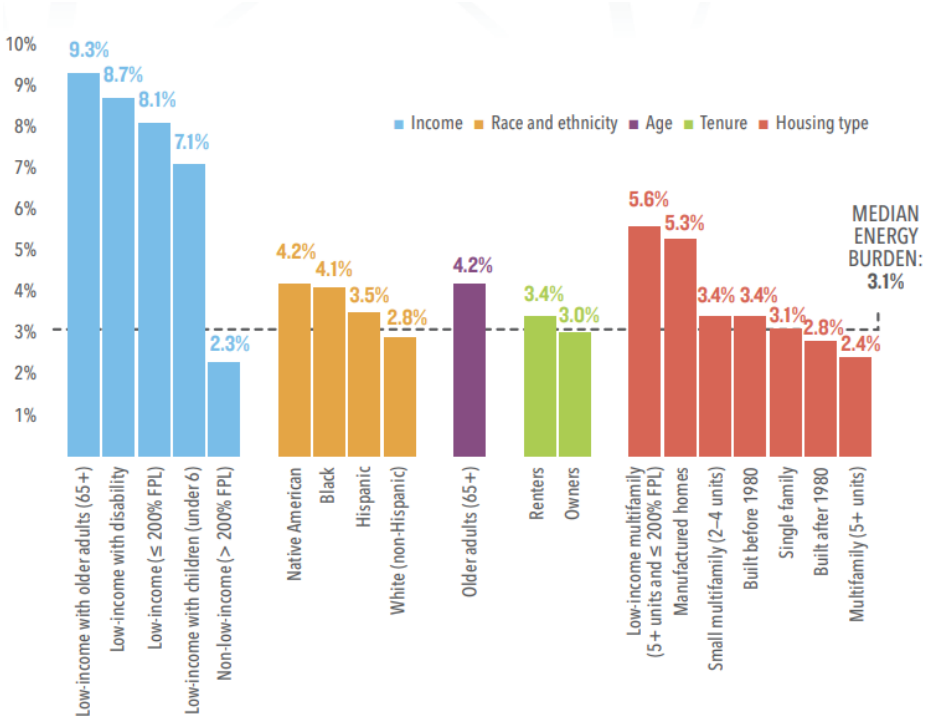
Background

Energy burden is defined as the percentage of gross household income spent on energy costs. It is calculated by dividing the average housing energy cost by the average annual household income. A household with 6% or greater energy burden is considered to be a high energy burden household (U.S. Department of Energy, 2024). Low-income households spend three times more of their income on energy costs compared to the median spending of non-low-income households (8.1% versus 2.3%). Nationally, households spend an average of 3.1% of income on home energy bills (American Council for an Energy-Efficient Economy, 2021). Figure 1, below, depicts national energy burden by subgroup:

Figure 1



Source: American Council for an Energy-Efficient Economy

Problem

Although the Southeastern United States boasts some of the lowest electricity rates in the country, these low rates do not equate to affordability. Paradoxically, households in the region face some of the highest energy bills nationwide.

Root Causes

This disparity arises from several interconnected factors:

1. **Historical inequities**: The legacy of racial and economic segregation continues to shape disparities in energy access and housing quality. Many communities, particularly those with limited resources, have historically lacked investment in energy-efficient infrastructure.
2. **Aging infrastructure:** More than half (53%) of homes in the region were built before energy codes were established. This results in a significant proportion of housing stock that is energy inefficient, leading to higher energy consumption and costs.
3. **Cooling demands:** The Southeast's hot climate drives high demand for cooling. Outdated and inefficient cooling systems further compound energy costs, disproportionately affecting vulnerable households.

(Southeast Energy Efficiency Alliance, 2024)

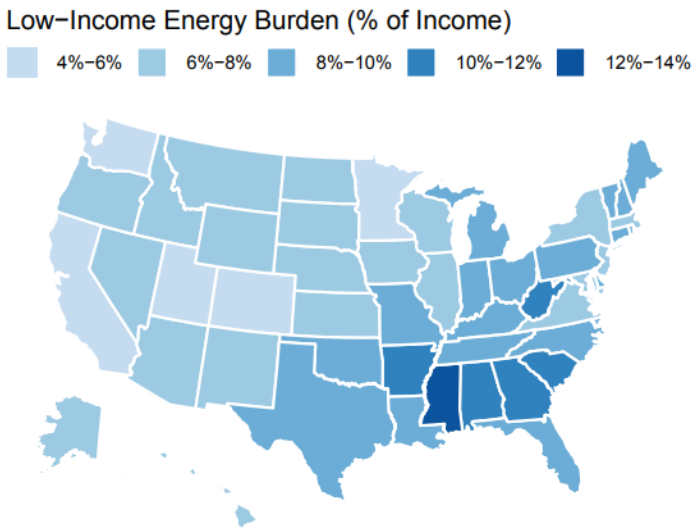
Impacts

Low-income households spend a larger portion of their income on energy bills compared to other income groups due to a variety of reasons (U.S. Department of Energy, 2018, 12). High energy burdens are caused by physical, economic, social, and behavioral factors, including a home's heating source, local weather, and high consumption of electricity. They can impact a household's ability to pay for energy, and force families to choose between paying energy bills and buying food, medicine, or other essentials. This impacts physical and mental health, education, nutrition, job performance, and community development (American Council for an Energy-Efficient Economy, 2021). It's important to note that there are several different scales used to identify low-income households in the United States. For example, low-income households are defined in Figure 1, above, as being ≤ 200% of the federal poverty level (American Council for an Energy-Efficient Economy, 2021). And households earning less than 80 percent of the Area Median Income (AMI) are considered low-income households by the U.S. Department of Housing and Urban Development (HUD) (U.S. Department of Energy, 2024).

Community & Demographics

Although families across the country experience high energy burdens, there is notable regional variation in the challenges faced by low-income households. As illustrated in Figure 2, below, many Southeast states have low-income households (earning less than 80% of the AMI) that encounter energy burdens of 10% or more (U.S. Department of Energy, 2018, 12):

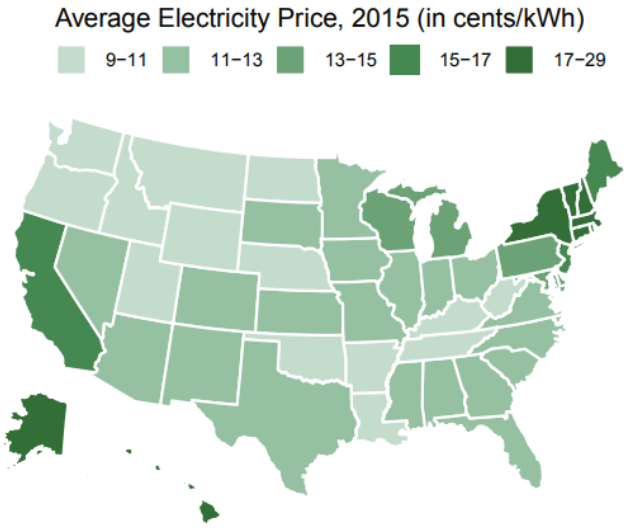
Figure 2



Source: U.S. Department of Energy

In the Southeast, electricity is the primary source of heating, and the high demand for air conditioning further increases overall energy use. This leads to a higher total energy burden, even though electricity prices per kilowatt-hour are relatively lower, as illustrated in Figure 3, below. Even though various factors affect energy consumption, low-income households in this region typically use more energy and electricity overall (U.S. Department of Energy, 2018, 12):

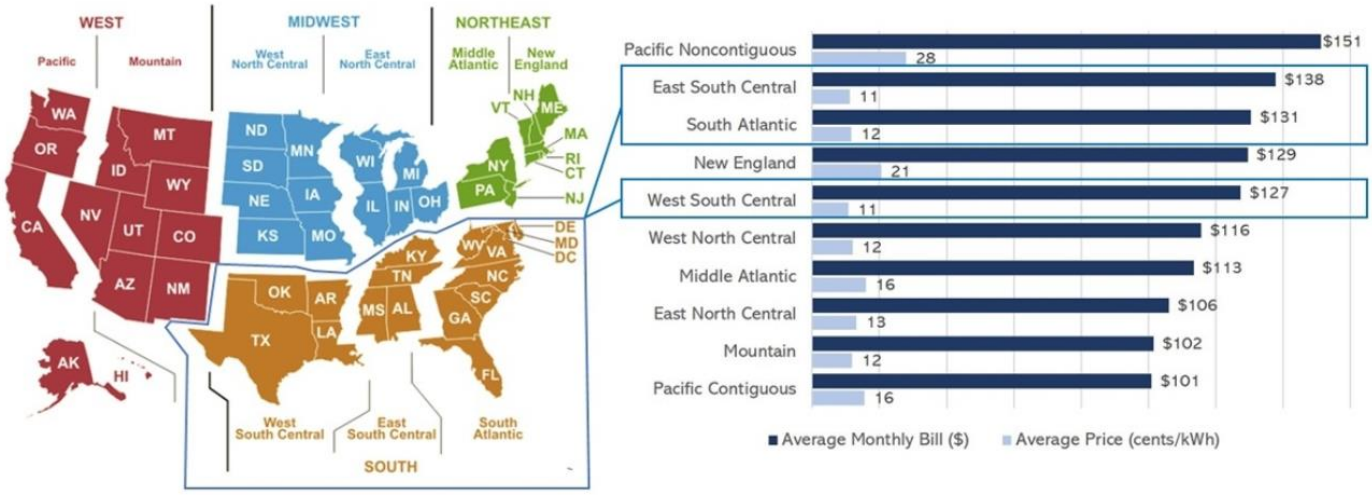
Figure 3



Source: U.S. Department of Energy

The Southeast has some of the lowest residential electric rates in the United States, at 12 cents per kWh. Despite this, the region has one of the highest average monthly electric bills, at $131 (Southeast Energy Efficiency Alliance, 2024), as shown in Figure 4, below:

Figure 4



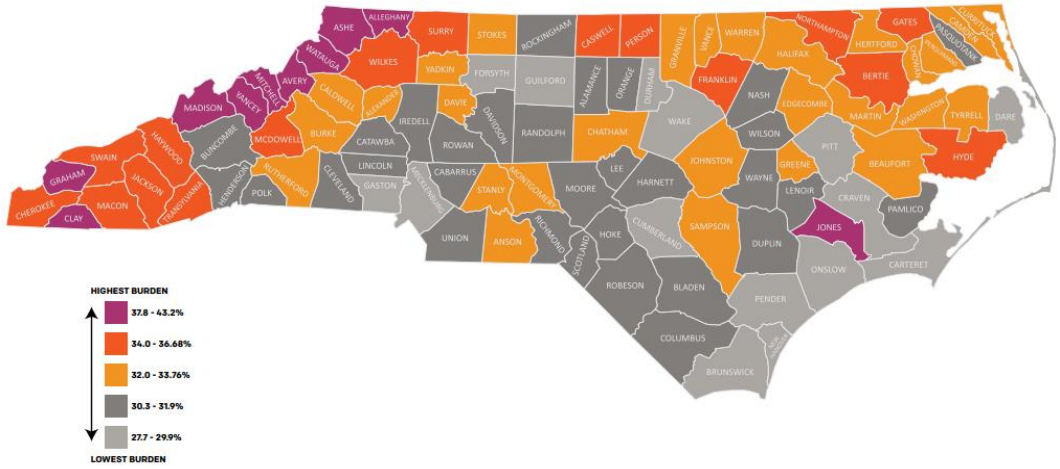
Source: Southeast Energy Efficiency Alliance

This discrepancy underscores the impact of longstanding policies that have prioritized keeping generation and transmission costs low, while offering minimal investment in demand-side efficiencies that could benefit consumers.

The South has a higher rate of cost-burdened customers compared to other regions, with over a third of its population struggling to manage their energy expenses. These households experience energy insecurity, struggling to maintain essential residential services like heating and cooling. The issue is particularly severe in the Southeast, where lower average incomes and high energy consumption contribute to the problem. Rural and elderly residents are especially vulnerable to energy insecurity. This crisis is deeply rooted in historical racial and economic inequities that continue to influence the energy sector and limit access to affordable power (Southeast Energy Efficiency Alliance, 2021).

North Carolina's electricity rates (11.24 cents per kWh) are lower than the national average (14.12 cents per kWh), but the state's average energy burden for low and moderate-income (LMI) households is 19.8%, far exceeding the widely accepted high energy burden threshold of 6%. For households at 50% of the Federal Poverty Level (FPL), the average energy burden is 32.8%, five times higher than that of households earning $55,500 (200% FPL) or more per year, who face an average energy burden of 6.8%, which is still considered a high energy burden. Rural counties across North Carolina experience the highest energy burdens across all income brackets, largely due to energy-inefficient housing and the increasing number of cooling and heating degree days driven by climate change. Households living at 50% of the FPL face energy burdens ranging from 27.71% to 43.2%, regardless of the county. Figure 5, below, shows the most energy burdened counties in NC for households at 50% Federal Poverty Level (Moleka, 2022):

Figure 5

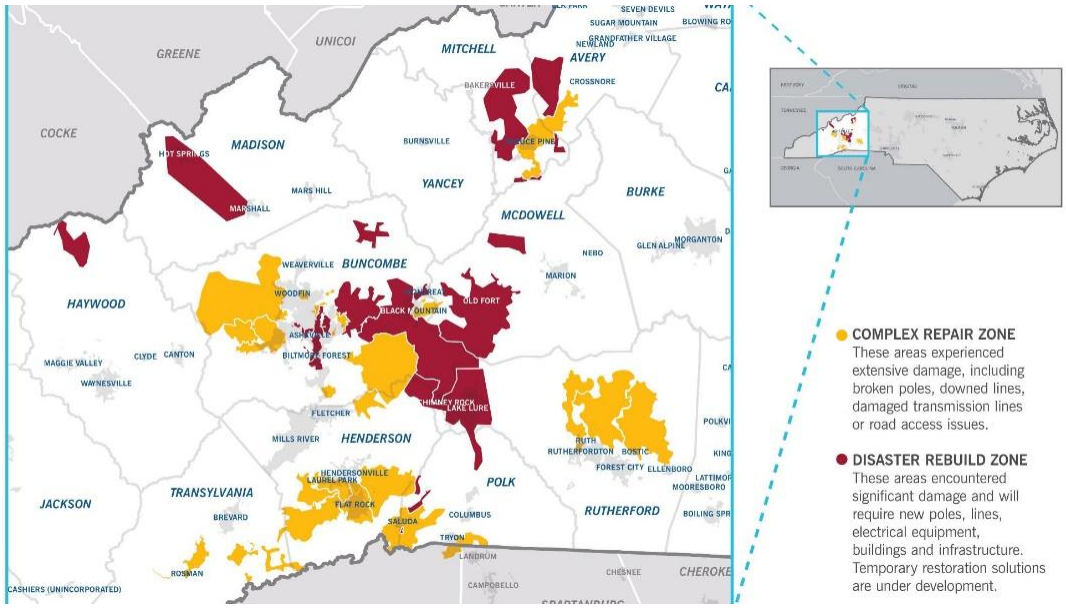


Source: Moleka, E. (Groundswell)

While statewide aid programs like LIHEAP, which is federally funded, can help pay high bills for income-qualified residents, they do not address the root causes and remain insufficient. In 2020, LIHEAP only served 22% of income-qualified North Carolina residents (Moleka, 2022). LIHEAP also works hand in hand with the Weatherization Assistance Program (WAP) which promotes long term energy savings by installing energy conservation and efficiency measures in the low-income housing stock. WAP often must defer projects because of other things wrong with the house, such as Health & Safety issues. There is a need for better coordination with partners, such as community lenders and commercial banks, that can step in and fund needed remediations of health and safety issues first, so WAP can be more efficiently deployed.

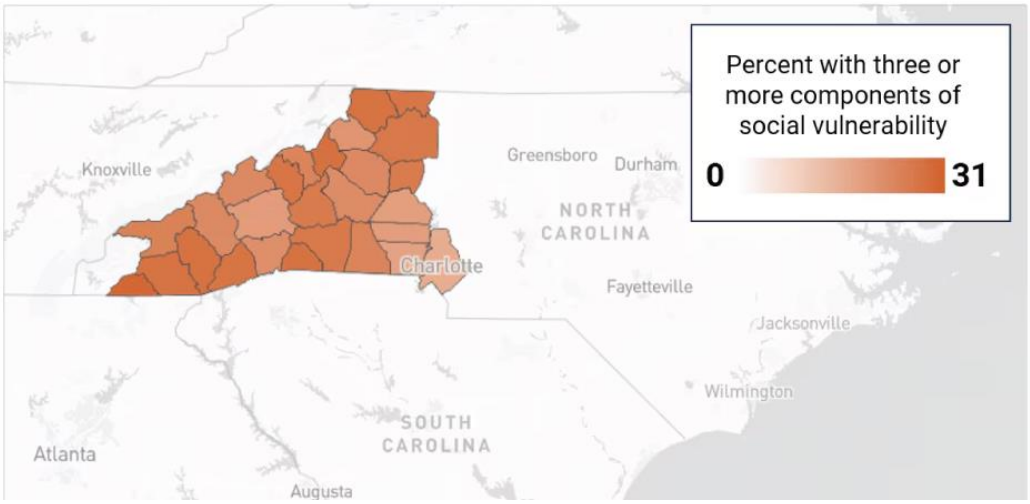
Further exacerbating these issues, Hurricane Helene hit western North Carolina, among other areas, in September 2024, exposing critical gaps in North Carolina's energy resilience, particularly for low-income and disadvantaged communities. The storm highlighted the urgent need to expand clean energy infrastructure that is both resilient to extreme weather and accessible to vulnerable populations. The map of impacts across western North Carolina, in Figure 6 below, shows just how devastating Hurricane Helene was to parts of the state - many of the same areas already struggling with extremely high energy burdens:

Figure 6



Source: Duke Energy

Figure 7, below, illustrates the counties impacted by Hurricane Helene that underwent major disaster declarations. Counties with darker shading represent a higher proportion of residents identified as having high social vulnerability:



Source: U.S. Census Bureau

Rural areas were especially hard-hit, with 10 of the 27 counties being predominantly rural (counties with 80% or more of the population living in a rural area in the 2020 Census). Hurricane Helene struck areas that may have a particularly difficult time recovering from the disaster. Counties within declared disaster zones were more likely to have higher proportions of older adults, individuals with disabilities, and mobile homes compared to counties outside these zones. (Marshall et al., 2024).

The outdated energy infrastructure in rural and mountainous areas of North Carolina was a critical factor during Hurricane Helene, as widespread flooding disrupted power systems. Many rural areas rely on mobile homes and other forms of affordable but energy-inefficient housing, which are particularly vulnerable to power disruptions and extreme weather. Modernizing energy infrastructure can help stabilize housing options by reducing energy costs and improving safety for low-income residents living in affordable housing.

Upgrading systems with renewable energy sources like microgrids and battery storage can enhance reliability during extreme weather. Vulnerable populations, including low-income households and the elderly, faced greater challenges during and after Helene due to energy-inefficient housing and higher energy costs. Expanding access to energy efficiency retrofits and rural electrification projects can lower costs and enhance resilience in these underserved areas. Investments in energy efficiency retrofits for affordable housing not only reduce costs for residents but also extend the lifespan and quality of these housing units, providing a dual benefit of increased resilience and affordability.

Rural electrification is the process of expanding reliable and affordable access to electricity in underserved areas, including rural and mountainous regions. It typically involves upgrading outdated energy infrastructure or deploying renewable energy systems such as microgrids and battery storage. Rural electrification aims to provide households and communities with stable energy services, fostering resilience and supporting economic growth.

How it creates energy access for LMI households

1. **Enhanced reliability**: In areas like rural North Carolina, where Hurricane Helene disrupted power systems, electrification projects can integrate decentralized systems (e.g., microgrids with renewables) to reduce dependence on centralized grids prone to storm damage. This ensures uninterrupted access for LMI households.

2. **Energy cost reductions**: By introducing renewable energy sources, electrification can lower the reliance on expensive and polluting energy alternatives, decreasing energy costs for LMI households. This is especially critical in regions where energy-inefficient housing exacerbates energy burdens.

3. **Equity-focused upgrades**: Electrification projects can be combined with energy efficiency retrofits (e.g., weatherization) to further reduce costs for vulnerable populations, including the elderly and low-income groups, who face disproportionate challenges during extreme weather events like Hurricane Helene.

Subsidies or targeted support are often essential to maximize the benefits of rural electrification for LMI households:

- **Affordability**: Subsidies can offset the initial costs of connecting to renewable-powered microgrids or accessing energy efficiency retrofits, which may be prohibitively expensive for LMI households.

- **Incentivizing equity**: As North Carolina incorporates equity into its climate adaptation plans, subsidies can ensure that electrification projects prioritize underserved areas and align with long-term resilience goals.

- **Scalability**: Policymaker investment can help scale solutions like renewable energy integration and energy-efficient housing, making them broadly accessible across rural areas.

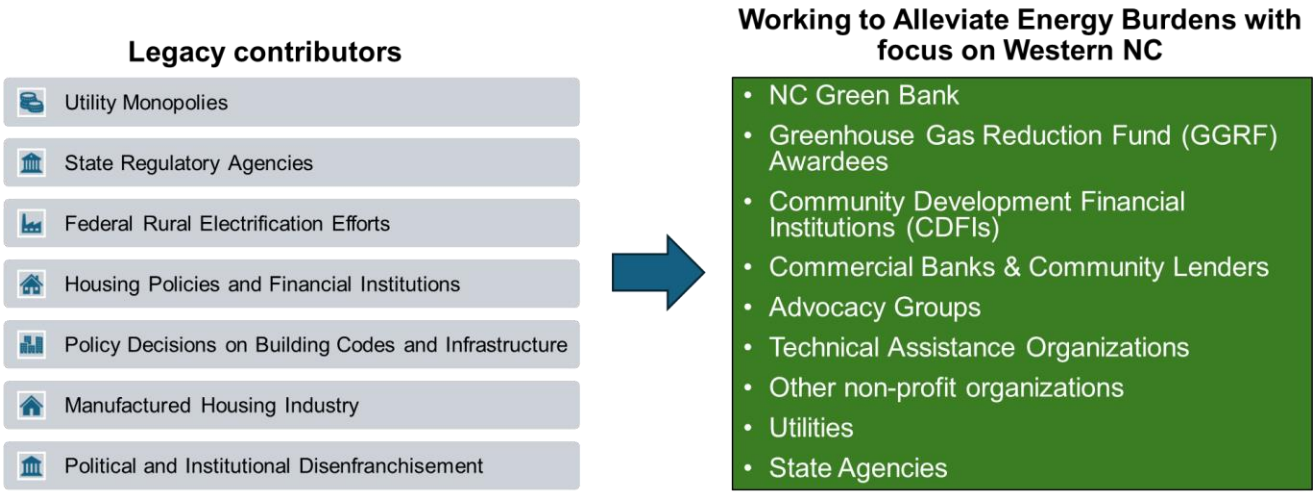
However, rural electrification inherently drives benefits through increased system resilience and efficiency, especially when coupled with renewable energy technologies. Hurricane Helene highlighted the opportunity to modernize Appalachia's power grids, a process that can deliver lasting economic and social benefits if implemented equitably.

North Carolina's efforts to integrate equity into climate adaptation plans emphasize these solutions. Policymakers can drive resilience by investing in renewable energy and energy-efficient housing while ensuring climate adaptation strategies are embedded in energy infrastructure plans. By addressing these infrastructure gaps and focusing on equity, North Carolina can reduce its energy burden and better protect its communities from future climate-driven disasters.

(Mehta, 2024; Marshall et al., 2024; Harvey et al., 2024).

Key Actors

The issue of energy burdens in the Southeast, and North Carolina, specifically, has deep systemic roots shaped by historical and institutional factors. There are several contributors to this challenge, but there are countless organizations working to address the issue:



Source: John Day

Strategies & Solutions

The stakeholders above can work together to address energy burdens. Many are directly responsible for the deployment of grants, tax credits, and financing, referred to as the capital stack or funding stack. Others are more indirectly involved, but are vital given their role from an advocacy, technical assistance, and/or policy perspective. Below is an example of a capital stack for residential energy efficiency and electrification:

Residential energy efficiency and electrification

Sample of available capital sources

COMPETITIVE GRANTS / REBATES	DOE HER (up to $8,000 per unit)
COMPETITIVE GRANTS / REBATES	DOE HEAR (up to $14,000 per unit)
TAX CREDITS	IRS 25C (up to $3,200 per unit)
FORMULA GRANTS	DOE WAP
PUBLIC LOANS	DOE Energy Efficiency Revolving Loan Fund
PUBLIC LOANS	EPA GGRF
PUBLIC LOANS	HUD loan programs
PUBLIC LOANS	LPO Title 17 SEFI program
PRIVATE LOANS	

Source: RMI

Greenhouse Gas Reduction Fund (GGRF) Awardees, Community Development Financial Institutions (CDFIs), and Commercial Banks & Community Lenders

The Greenhouse Gas Reduction Fund (GGRF), a program within the IRA, is a $27 billion Federal investment to combat the climate crisis by financing projects that reduce greenhouse gases and air pollution nationwide. It includes the National Clean Investment Fund (NCIF), Clean Communities Investment Accelerator (CCIA), and Solar for All (SFA) programs. These initiatives will deploy clean technology, especially in low-income and disadvantaged communities, and strengthen community lenders. They support Justice40 Initiative principles and create good-paying jobs in domestic industries (U.S. EPA, 2024).

The NCIF and CCIA funds are intended to support clean energy and climate projects nationwide through national green banks, community development financial institutions (CDFIs), and nonprofit clean energy-focused lending organizations. Commercial banks also play a crucial role, especially alongside NCIF, as NCIF funds must utilize private co-investment for each qualified project. This approach will enable private capital to finance additional projects that otherwise would not be addressed (U.S. EPA, 2024b). Each public dollar is expected to attract nearly $7 in private finance, potentially mobilizing around $150 billion in total (U.S. EPA, 2024c). Private capital providers, such as commercial banks, have a unique opportunity to finance clean energy projects and initiatives. GGRF funds are expected to absorb risk, cover initial losses, and support structures that encourage private lending and investment. This will allow private

capital to achieve risk-adjusted returns while providing end customers with economic benefits from clean energy. Under the $7 billion Solar for All program, the 60 grant recipients will establish or enhance solar initiatives for low-income households, providing over 900,000 families in disadvantaged communities with access to distributed solar energy (Misbrener, 2024).

The $6 billion CCIA, allocated between five hubs - Opportunity Finance Network, Inclusiv, Justice Climate Fund, Appalachian Community Capital, and Native CDFI Network - will offer funding and technical support to community lenders operating in low-income and disadvantaged areas (U.S. EPA, 2024b). CDFIs across the country should be raising their hand to receive funding and technical assistance from CCIA. There is an opportunity here for commercial banks to be educators to CDFIs. CDFIs are being asked to finance projects they are not used to and may see as risky. Commercial banks could be the entities to help them become more comfortable in this space. As these relationships are built, community lenders could bring opportunities to the larger commercial banks for co-lending partnerships.

Under the $14 billion NCIF, three applicants were selected to create national clean financing institutions that provide more accessible, affordable financing for clean technology projects nationwide. Partnering with private sector investors, developers, and community organizations, they will deploy projects, mobilize private capital, and ensure millions of Americans will benefit through energy bill savings, cleaner air, and job creation. Each selectee will dedicate over 40% of their capital to low-income and disadvantaged communities (U.S. EPA, 2024d). These three selectees can be key partners enabling the mass deployment of clean energy initiatives in communities in NC:

- **Climate United Fund (CUF):** CUF is a non-profit partnership formed between Calvert Impact and two CDFIs, Self-Help Ventures Fund and Community Preservation Corporation. With its nearly $7 billion award, CUF and its partners will originate, aggregate, and securitize standardized financial products for energy efficiency retrofits, electrification upgrades, and solar installations. They will invest directly in community lenders and partners to boost private investment in these projects and develop customized financing solutions to support critical decarbonization efforts (U.S. EPA, 2024d).

  CUF has strong partnerships with national clean technology lenders and investors who can adopt standardized products and co-invest with Climate United at scale to reach markets currently underserved by private capital including HASI (formerly Hannon Armstrong Sustainable Infrastructure), Elemental Excelerator, Bank of America, Wells Fargo, JP Morgan Chase, Bank of Montreal, Amalgamated Bank (U.S. EPA, 2024e). Additional commercial banks should inquire about how they can get involved.

- **Coalition for Green Capital (CGC):** With a $5 billion award, their program will focus on public-private investing and leverage the expanding national network of green banks as a key distribution channel, with at least 50% of investments directed to low-income and disadvantaged communities (U.S. Environmental Protection Agency, 2024f).

As part of its application process, CGC confirmed that the financial services and commercial banking sectors have all the necessary capabilities to assist CGC in the timely, efficient, and prudent expenditure and disbursement of funds as proposed in the application, and regularly provide the required services to their supported entities. Transaction Partnership Letters have been received from Amalgamated, Citi, Goldman Sachs, Mizuho Securities, and Wells Fargo (U.S. EPA, 2024g).

Massive engagement from the private sector is needed here. Commercial banks can play various roles in a partnership with CGC. In the short term, commercial banks should flag with CGC the CDFIs and other community lenders they are working with - CGC could then potentially come in and help accelerate these partnerships with creative co-financing offerings and capital injections. In the longer term, commercial banks should engage CGC on how they can partner to develop co-investment opportunities on large scale projects that accelerate the transition to a clean energy economy, such as mass heat pump deployment, on a standardized, national level. Each project would provide a certain percentage of benefits to low-income and disadvantaged communities. Insurance, such as loan loss reserves, could come into play to decrease risk.

- **Power Forward Communities, Inc (PFC):** A coalition made up of Enterprise Community Partners, LISC (Local Initiatives Support Corporation), Rewiring America, Habitat for Humanity, and United Way, PFC has received a $2 billion award to decarbonize and transform American housing. This program will offer customized and affordable solutions for single-family and multi-family housing, with at least 75% of investments focused on low-income and disadvantaged communities (U.S. EPA, 2024f)

  In its application, PFC stated that they anticipate providing approximately half of their award directly through their coalition and half indirectly through community lenders. 158 transaction partners have submitted letters of commitment for their coalition, their project-level product suite, and their entity-level financing structures. These partners include national banks like JPMorgan Chase, Bank of America, and Wells Fargo (U.S. EPA, 2024h). This is another opportunity for more commercial banks to potentially get involved and ultimately be a part of high-impact clean energy projects.

Under the CGC purview, the North Carolina Clean Energy Fund (NCCEF) is a 501(c)(3) nonprofit organization established in 2020 with the mission of addressing clean energy financing gaps across North and South Carolina. As a Green Bank, NCCEF leverages public and private capital to make clean energy projects more accessible and affordable, especially for underserved populations. Their initiatives focus on renewable energy, energy efficiency, clean transportation, and sustainable agriculture, working to deliver environmental, economic, and social benefits throughout the region.

NCCEF is actively developing innovative financial products and partnerships with other lenders, such as commercial banks, to support low-income households and communities affected by

disasters. A key initiative includes a small cash loan program designed to assist individuals in disaster-designated areas of NC with immediate financial needs. This program, offered in collaboration with the Solar and Energy Loan Fund (SELF), is built on a consumer loan platform that ensures accessibility and affordability for vulnerable populations.

In addition, NCCEF is preparing to launch an emergency home repair loan product, aimed at facilitating critical repairs such as roofing, mold remediation, and HVAC systems through a network of vetted contractors. This approach prioritizes consumer protection while addressing post-disaster recovery needs efficiently. NCCEF's role extends beyond financing, as they actively engage with contractors to ensure they are trained and equipped to communicate these financing options effectively to homeowners. The organization also provides hands-on support to borrowers throughout the application process.

Beyond consumer-focused products, NCCEF is working to build a pipeline of community facility and small commercial projects that can integrate solar and battery storage systems. These initiatives aim to enhance energy resilience, with some facilities potentially serving as resilience hubs during power outages. By fostering partnerships with CDFIs, nonprofit housing developers, and solar installers, NCCEF is paving the way for innovative solutions like microgrids that can deliver clean energy to multiple buildings or households, offering greater reliability and sustainability.

NCCEF is also an active participant in federal initiatives like the Solar for All program, aiming to integrate subsidies and rebates with existing weatherization and electrification efforts to maximize energy savings for households.

NCCEF and partners have also launched the first program in NC focused on home electrification, particularly air-source heat pumps. It includes a financing program from Self-Help Credit Union with financial support from Wells Fargo Foundation, called the Electrify Asheville-Buncombe County Program. NCCEF developed this loan program with a reserve fund allocated by Buncombe County to be accessible to people with low or limited credit.

Through these efforts, NCCEF is not only addressing immediate financial, and infrastructure needs but also contributing to long-term resilience and clean energy adoption in underserved and disaster-impacted communities across North Carolina.

(M. Malkin-Weber and J. Weiss, personal communication, December 2024).

CDFIs are key partners for NCCEF. They provide essential financing to support energy efficiency, renewable energy projects, and broader community development efforts. Their localized focus and mission-driven approach align with NCCEF's objectives by addressing the unique needs of vulnerable populations. Below are several examples of the CDFIs NCCEF works with, especially as it pertains to rebuilding Western NC:

- **Self-Help Credit Union** leverages its experience in community lending to finance consumer energy efficiency upgrades and renewable energy projects that directly benefit low- and moderate-income households.
- **Partner Community Capital** supports small businesses, nonprofits and community initiatives, fostering sustainable development through clean energy investments.
- **Institute Capital** focuses on financing innovative solutions for clean energy access and energy-efficient housing.
- **Mountain BizWorks** empowers small businesses in Western North Carolina, helping to drive economic development while integrating clean energy opportunities.
- **Appalachian Community Capital** channels capital into underserved Appalachian communities, supporting initiatives that enhance energy affordability and resilience.
- **Green Bank for Rural America** prioritizes clean energy investments in rural areas, addressing the unique challenges these communities face in transitioning to sustainable energy systems.
- **Mountain Housing Opportunities** integrates energy efficiency into affordable housing projects, ensuring that vulnerable populations benefit from cost savings and improved living conditions.

Advocacy, Technical Assistance, and Other non-profit organizations

Appalachian Voices and the NC Justice Center have laid a solid foundation for reducing energy burdens in North Carolina by advocating for energy efficiency, affordability, and equitable solutions. Appalachian Voices focuses on addressing the disproportionate energy costs faced by low-income households (Appalachian Voices, 2020), while the NC Justice Center has actively opposed rate hikes, developed programs to improve energy efficiency, and mapped disparities in energy burdens statewide (North Carolina Justice Center, 2023). NCCEF builds on these efforts by leveraging its financial toolkit to advance energy solutions, creating a collaborative approach to tackling the state's energy burden challenges.

Additional organizations further support NCCEF's mission, each contributing unique expertise:

- **Southeast Energy Efficiency Alliance (SEEA)** works across the Southeast region to promote energy efficiency as a driver of economic growth, environmental sustainability, and energy resilience, aligning with NCCEF's goals.
- **NC League of Conservation Voters** advocates for policies that prioritize clean energy and environmental justice, ensuring community voices are central to state energy strategies.
- **Just Environments** addresses the intersection of environmental justice and energy equity, advancing initiatives that ensure marginalized communities benefit from clean energy solutions.
- **NC Sustainable Energy Association (NCSEA)** focuses on building a clean energy economy through policy advocacy, market development, and stakeholder engagement, complementing NCCEF's financial efforts.
- **Clean Energy States Alliance** supports state-level clean energy initiatives with technical expertise and collaboration models, helping NCCEF integrate best practices.
- **Lawyers for Good Government** provides legal support to advocate for equitable energy policies and defend against actions that exacerbate energy burdens.

- **Environmental Protection Network** offers regulatory expertise and guidance to ensure energy programs align with environmental protections and community needs.

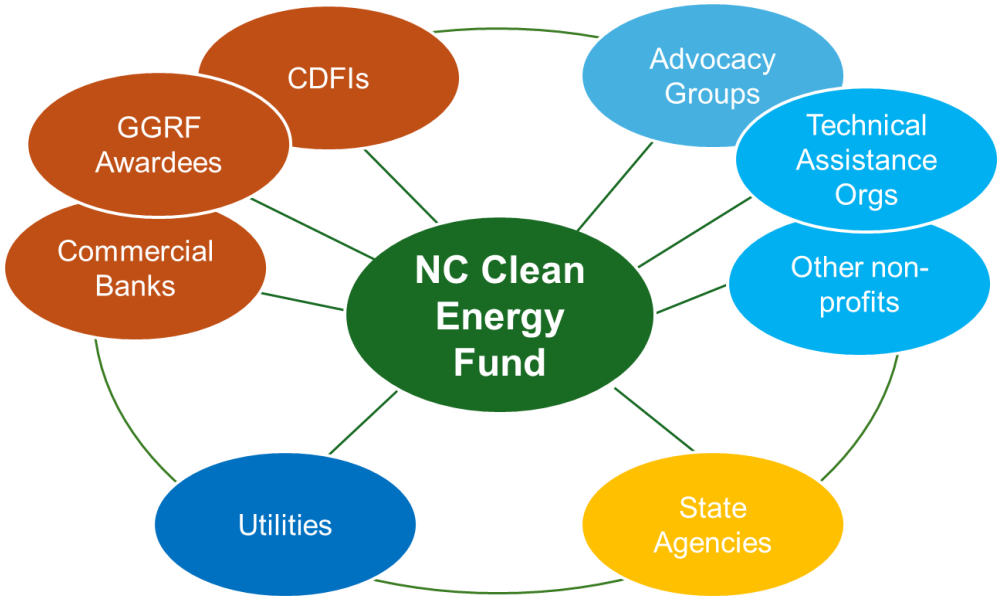
Utilities

- **Duke Energy** contributes to this landscape through its investments in grid modernization, renewable energy, and energy efficiency programs. These initiatives are vital for scaling clean energy solutions and addressing systemic energy inequities.

State Agencies

- **NC Department of Environmental Quality (DEQ)** provides a regulatory framework and environmental policy oversight to ensure that clean energy transitions are equitable and align with environmental justice principles.

NCCEF serves as a vital connection between all these diverse stakeholders and more. By leveraging its financial toolkit and fostering collaboration, NCCEF aligns the efforts of (other) GGRF Awardees, CDFIs, Commercial Banks & Community Lenders, Advocacy Groups, Technical Assistance Organizations, & Other non-profit organizations, Utilities, and State Agencies to drive scalable and equitable clean energy solutions. This integrated approach aims to ensure that resources, policies, and investments are effectively coordinated, maximizing their impact on reducing energy burdens and promoting energy resilience across the state and especially in Western NC given the recent destruction from Hurricane Helene. Together, NCCEF and its partners are building a unified framework for building a more inclusive and sustainable energy future in North Carolina and beyond:



Source: John Day

Challenges

1. **Coordination amongst stakeholders:**
   North Carolina's energy funding landscape includes programs like the Weatherization Assistance Program (WAP), Inflation Reduction Act (IRA) rebates, and the Greenhouse Gas Reduction Fund (GGRF). However, limited integration and coordination among these funding sources reduce efficiency. Additionally, gaps in Health & Safety funding hinder the deployment of energy efficiency and clean energy projects, especially through WAP.
2. **Scaling projects beyond individual households:**
   Current efforts often focus on single-household retrofits, which can be slow and inefficient. Addressing energy burdens on a larger scale, such as neighborhood or county-wide initiatives, could yield greater impact, especially in areas with the highest energy burdens. Outreach remains fragmented, limiting the effectiveness of these broader efforts.
3. **Technical assistance and community engagement:**
   Many rural communities in North Carolina lack access to the technical assistance needed to navigate and utilize energy efficiency initiatives. While resources like fact sheets exist, they are not always easily accessible and/or understandable to the public, leaving gaps in awareness. Behavior-based solutions and renter-friendly programs also require better outreach and education to achieve their full potential.
4. **Insufficient private capital:**
   Increased private investment, in tandem with NCCEF, to support energy efficiency and clean energy projects is needed. A dedicated focus on building relationships with commercial banks and other financial stakeholders is necessary to increase funding and scale these initiatives effectively.

Recommendations

First, improving coordination between stakeholders is essential. NCCEF could take a leadership role in outreach efforts to align WAP, IRA rebates, and GGRF, ensuring projects are implemented more efficiently. Addressing the Health & Safety funding gap would also improve the deployment of energy efficiency initiatives, enabling smoother project completion. Identifying a source of the funding for Health & Safety is key to getting the needed additional subsidy flowing into projects. Funding to address this issue should 1) be easily accessible, 2) have a low barrier to entry for applicants, including a pathway for renters, and 3) offer forgivable options. Many individuals facing challenges like mold or the need for roof replacements cannot afford private loans, or they would have pursued them already.

Second, efforts should shift from targeting single households to regional approaches. Prioritizing counties with the highest energy burdens and engaging community-based organizations through programs like Solar for All and WAP can maximize outreach and impact. By addressing multiple homes within a neighborhood or county simultaneously, these projects can create scalable solutions while fostering local trust and participation.

Third, expanding technical assistance and outreach efforts is vital. Enhanced partnerships with groups such as North Carolina League of Conservation Voters, Lawyers for Good Government, and Environmental Protection Network could support education and grant-writing efforts in rural communities. Additionally, leveraging volunteer hours from various stakeholders could enhance

one-on-one education and engagement efforts. Existing resources should also be adapted into more accessible formats, such as short videos, to reach a broader audience.

Finally, increasing private capital investment requires dedicated capacity. Hiring a Director of Development at NCCEF to focus on engaging commercial banks and other private stakeholders would strengthen partnerships and expand funding opportunities. This role would also support the alignment of diverse stakeholders to scale clean energy projects more effectively. Commercial Banks should also be proactive in pursuing partnerships with NCCEF if they want to play an active role in contributing to North Carolina's clean energy future, particularly in alleviating energy burdens for low-income and disadvantaged communities. By collaborating with NCCEF, banks can help increase the resiliency of the most vulnerable populations, such as those in affordable housing, while also supporting projects that advance environmental justice. This collective effort can ensure that clean energy solutions reach those who need them the most, fostering long-term sustainability and equity in the state's energy transition.

References

U.S. Department of Energy. (2024). *Low-Income Energy Affordability Data (LEAD) Tool and Community Energy Solutions*. Retrieved from https://www.energy.gov/scep/low-income-energy-affordability-data-lead-tool-and-community-energy-solutions

American Council for an Energy-Efficient Economy. (2021). *How high are household energy burdens?* Retrieved from https://www.energy.gov/sites/default/files/2021-12/ACEEE%2C%20Household%20Enegy%20Burdens.pdf

Southeast Energy Efficiency Alliance. (2024). *Energy Insecurity in the South*. Retrieved from https://www.seealliance.org/initiatives/energy-insecurity/

U.S. Department of Energy. (2018, 12). *Low-income household energy burden varies among states — Efficiency can help in all of them*. Retrieved from https://www.energy.gov/sites/prod/files/2019/01/f58/WIP-Energy-Burden_final.pdf

Southeast Energy Efficiency Alliance. (2021). *Energy Insecurity Fundamentals for the Southeast*. Retrieved from https://issuu.com/seealliance/docs/report_energyinsecurity_02_15_2021_v1

Moleka, E. (2022.) *A call to action: Analyzing rural energy burdens in North Carolina*. Groundswell. Retrieved from https://groundswell-web-assets.s3.amazonaws.com/report/The+Report+NC+rural+burden+-+FINAL.pdf

Marshall, J., Sawyer, C., King, H., DeSalvo, B., & Peacock, W. (2024, October 11). *Hurricane Helene's impact on the socially vulnerable in North Carolina*. U.S. Census Bureau. https://www.census.gov/library/stories/2024/10/hurricane-helene.html

Mehta, G. (2024, October 8). *Hurricane Helene brought devastation - and an opportunity - to Appalachia's power grids*. Grist. Retrieved from https://grist.org/extreme-weather/hurricane-helene-electricity-grid-north-carolina/

Harvey, C & Frank, T. (2024, October 3). *Why North Carolina wasn't prepared for Helene.* POLITICO. Retrieved from https://www.politico.com/news/2024/10/03/helene-climate-western-north-carolina-00181959

U.S. Environmental Protection Agency. (2024). *About the Greenhouse Gas Reduction Fund*. Retrieved from https://www.epa.gov/greenhouse-gas-reduction-fund/about-greenhouse-gas-reduction-fund

U.S. Environmental Protection Agency. (2024b). *Greenhouse Gas Reduction Fund*. Retrieved from https://www.epa.gov/system/files/documents/2024-04/ggrf-charge-discussion-to-efab-capital-mobilization.pdf

U.S. Environmental Protection Agency. (2024c). *Biden-Harris Administration Announces $20 Billion in Grants to Mobilize Private Capital and Deliver Clean Energy and Climate Solutions to Communities Across America*. Retrieved from https://www.epa.gov/newsreleases/biden-harris-administration-announces-20-billion-grants-mobilize-private-capital-and

Misbrener, K. (2024, April 22). *EPA announces recipients of $7 billion in residential Solar for All grants*. Solar Power World. Retrieved from https://www.solarpowerworldonline.com/2024/04/epa-announces-recipients-of-7-billion-in-residential-solar-for-all-grants/

U.S. Environmental Protection Agency. (2024d). *NCIF Selected Applicant Details*. Retrieved from https://www.epa.gov/greenhouse-gas-reduction-fund/ncif-selected-applicant-details#CAF

U.S. Environmental Protection Agency. (2024e). *CUF narrative proposal*. Retrieved from https://www.epa.gov/system/files/documents/2024-04/cuf_narrative_proposal1.pdf

U.S. Environmental Protection Agency. (2024f). *National Clean Investment Fund*. Retrieved from https://www.epa.gov/greenhouse-gas-reduction-fund/national-clean-investment-fund

U.S. Environmental Protection Agency. (2024g). *CGC narrative proposal.* Retrieved from https://www.epa.gov/system/files/documents/2024-04/cgc_narrative_proposal1_0.pdf

U.S. Environmental Protection Agency. (2024h). *PFC narrative proposal*. Retrieved from https://www.epa.gov/system/files/documents/2024-04/pfc_narrative_proposal1.pdf

Appalachian Voices. (2020, February 25). *Clean energy that leaves no one behind.* Retrieved from https://appvoices.org/2020/02/25/clean-energy-that-leaves-no-one-behind/

North Carolina Justice Center. (2023). Annual Impact Report 2022-2023. Retrieved from https://www.ncjustice.org/wp-content/uploads/2023/10/NCJC-Annual-Report-2022-23.pdf