



# **Residential Energy Efficiency Study - Kinston, NC**

**Blake Privette  
May 2023**

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# Executive Summary

Initiated by Elizabeth Blount (Kinston Planning Director) and the City of Kinston, the *Residential Energy Efficiency Study – Kinston, NC* was conducted by Blake Privette, student of East Carolina University in the Community and Regional Planning Program between January 9, 2023 and May 1, 2023. The study investigated the existence of energy efficiency related issues in homes in Kinston, and recommended solutions to the potential issues. The focus area of the study was the entire City Limits of Kinston.

## **Demographic and Economic Background**

Kinston's population of 19,900 is mostly comprised of African Americans at 69%. There is a large elderly population as well at 74%. The specialty industries of the city are Transportation, Warehousing, and Utilities and Finance, Insurance, and Real Estate. The median household income is \$33,000 and average home age is close to 60 years.

## **Current Housing Rehabilitation Program**

As the condition of homes in Kinston tends to be age worn, the city currently operates a housing rehabilitation program. The Essential Single-Family Rehabilitation (ESFR) program is a federal loan pool that lends up to \$40,000 to individuals with special needs for home repairs. This loan is forgiven at a rate of up to \$8,000 per year for five years. The ESFR program also currently does not include energy efficiency improvements.

## **Energy Efficiency**

Windows and insulation are the largest contributing factors to a home's energy efficiency. The loss of conditioned air make up about 25% of customer's energy bills that have inefficient homes. During the 1970s is when many of the standards for energy efficient building practices and materials came into effect. Since many of the homes in Kinston were built before 1970, it is safe to assume that those homes are not energy efficient.

## **Field Study**

During visits to Kinston, it was obvious that East Kinston was the area with the most substandard housing. West Kinston contained housing that had been better maintained over time. With the current condition of the homes in East Kinston, it would be better for those to go forward with the ESFR program as there are more dire needs there than energy efficiency. Homes in West Kinston would be great candidates for energy efficiency as the general condition of the homes is better, but inefficient building materials are still present because of the age of the homes.

## Public Input

In the beginning of the project, a public information session about the ESFR program was held by the City of Kinston. This meeting did not mention the need or potential for energy efficiency improvements. Several possibilities of community engagement on energy efficiency were explored, but did not happen. The City of Kinston wanted to protect the citizens from false hope of assistance. The City was conducting a survey concerning energy prices with their citizens and planned to move forward with surveying applicants of the ESFR program about energy efficiency.

## Utilities

Kinston is a part of an electricity organization called ElectriCities that provides electricity to their citizens. It was noted that an ElectriCities could come out to people's homes and do an audit of their current energy efficiency and provide recommendations on how to be more efficient. A comparison was made between Kinston and three other North Carolina cities of similar population that proved Kinston had the cheapest energy rates out of the group.

## Recommendations

This study suggested four recommendations that could be instrumental in helping provide energy efficiency improvement assistance and lowering energy bills for the citizens of Kinston.

**1. Criteria for qualification:** The current criteria used for qualification of the ESFR program will be

effective in selecting applicants for energy efficiency improvements. The physical aspects of the homes selected would include energy efficiency instead of foundational improvements.

**2. Physical aspects of homes in need:** There can be two forms of renovations: on the lighter side and heavier work. The lighter side can include things like replacing appliances and HVAC systems. The heavier work would include things like adding insulation or replacing windows. These categories are based on the severity of work.

**3. Locations of homes in need:** It was recommended that the City focus on providing assistance through the ESFR program to homes in East Kinston and focus on West Kinston for energy efficiency improvements.

**4. Energy Standards:** It would be best for the City to adopt standards regarding energy efficient building practices. These standards would provide a basis for materials to be used in rehabilitation and new homes to be built in the city.

# Project Goals

This project was brought to fruition after the City of Kinston received several complaints about expensive energy bills. As many of the citizens are elderly, they are not able to pay such high bills because of their income. These complaints led the Planning Director and City Manager to ponder the question of are the energy rates in Kinston too high or is there a problem with energy efficiency in the homes. If the answer to the question was that there is a problem with energy efficiency in Kinston, the City thought the best way to help would be to make energy efficiency improvements apart of their current housing rehabilitation program, the Essential Single-Family Rehabilitation Loan Pool. This project would be instrumental in influencing the inclusion of efficiency improvements in that program.

However, as things go in the public service industry, people do not always qualify for assistance when they need it, or funds run out. I thought it would be beneficial to include recommendations of other housing rehabilitation programs that include energy efficiency improvements that the City could consider implementing if it did not work out to include efficiency improvements in their current program. Also, I included a flyer that could be handed out to those who are not able to receive funding using the tips for saving on energy bills from Kinston's Public Services Department.

My role in this project was to dig deeper and find out if the issue was the high energy rates or if energy inefficiency was truly a problem in Kinston. Ultimately, the goal was to help the citizens achieve more affordable energy bills by any means necessary.

# **Chapter 1: Study Area**

# Location and Sponsor

## Location

Kinston is located in Lenoir County which is in the coastal plain region of eastern North Carolina. It is situated along the Neuse River and mostly to the north of the river. Kinston has a land area of about 18 square miles. It is 25 miles southeast of Goldsboro, 35 miles south of Greenville, 35 miles northeast of New Bern, and 70 miles from the coast (North Carolina).

## Sponsor

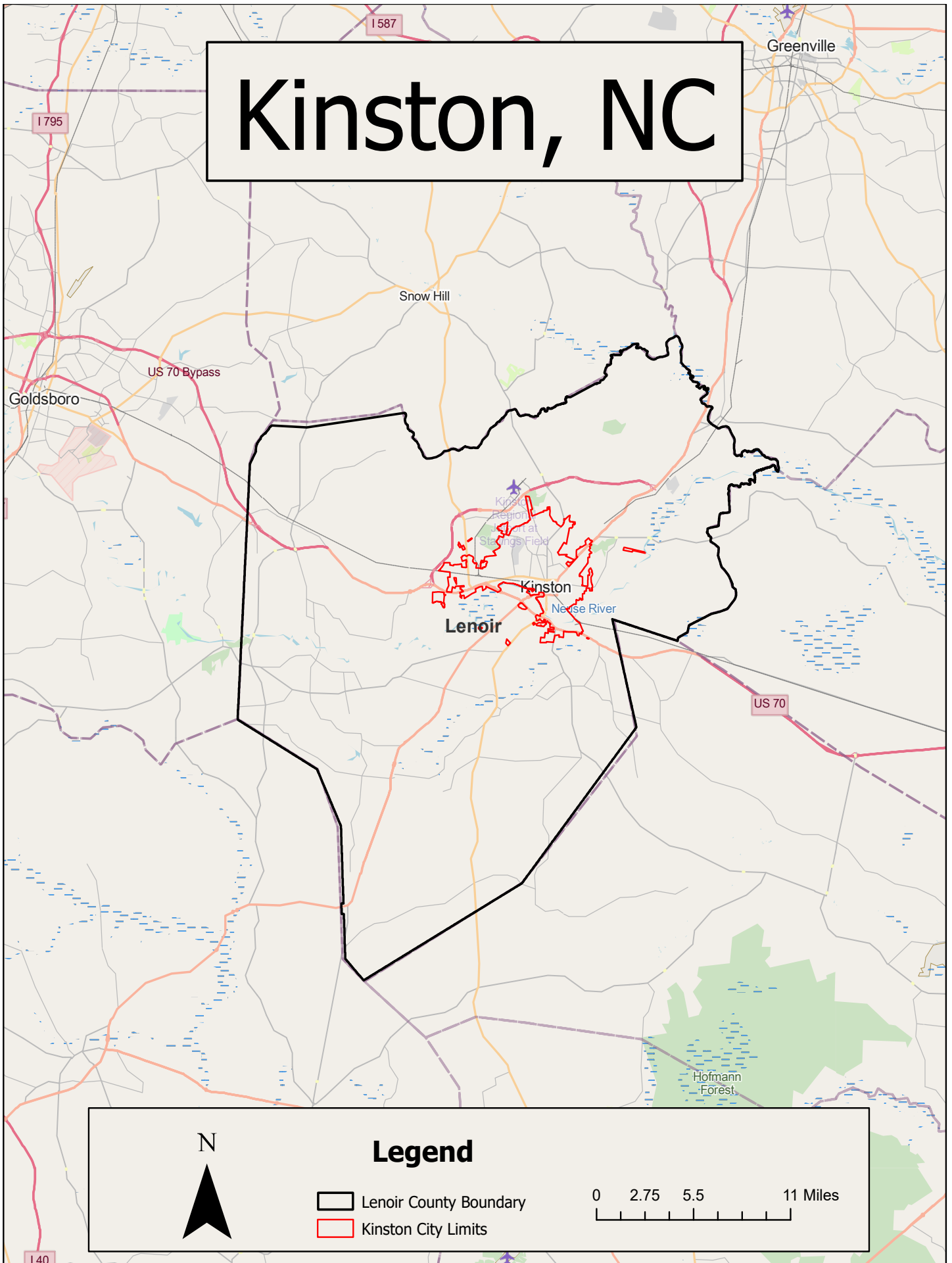
The sponsor for this project is Elizabeth Blount. She is the Planning Director for the City of Kinston and is helping administrate the current housing rehabilitation program. She asked me to look further into energy efficiency in Kinston and the correlation between the inefficiency of the older homes there and the cost of power bills for the residents. This was asked of me in hopes that funding for energy efficiency improvements could be worked into the housing rehabilitation program in the future.

Chip Bartlett is not an official sponsor of the project that I am working on, but he is the project manager for the ESFR program in Kinston. He is a consultant with Insight Planning and Development. He has been a great resource for information about housing rehabilitation programs as he has been a project manager for many cities throughout eastern North Carolina.



Photo 1. Downtown Kinston, NC. Taken by Blake Privette. 2023.

# Kinston, NC



Map 1. Location (Source: NCDOT City Boundary Data & Lenoir County GIS)



# History of Kinston, NC

Kinston was originally established as Kingston in 1762, named after King George III of England. Following the Revolutionary War, the people of Kingston requested that the letter g be dropped out of the name. It was a major hub during the Civil War. There were two camps outside of the city established as training camps and a factory to produce shoes for the military was located in the city. After the war and reconstruction periods, Kinston became a major producer of horse-drawn carriages, cotton, and tobacco. Kinston was incorporated in 1826 and eventually become the location of many merchants, factories, mills, doctors, lawyers. Lenoir County became home to a large cotton economy, but as that declined, tobacco quickly took its place. That resulted

in many tobacco warehouses being built and the county being named the “World’s Foremost Tobacco Center” (Kinston).

Kinston later became a city full of music. It was known as the nucleus of jazz and African American music in North Carolina. There were many clubs and music halls that hosted many talents. Names like James Brown and Otis Redding have performed in the town. The city now hosts an African American Music Trail to remember the region’s musical heritage (James Brown Band). After a period of flourishing in music came darker times with flooding from Hurricanes Fran and Floyd. Flooding from major storms has continued to impact and change the footprint of the City of Kinston.



Figure 1 1950s Census Enumeration District Map Kinston, NC (Source: Media, P.)

# Demographics

According to the 2020 census, Kinston had a population of 19,900. The breakdown of races is 25% White, 69% Black, 0.2% Native American, 1.05% Asian, 0.1% Native Hawaiian, 1% some other race alone, and 4% two or more races. The largest race population in Kinston is Black or African American (U.S. Census Bureau, 2020a).

is around 11,000. This means that there is almost an even amount of people who are close to or are senior citizens as there is people who are not senior citizens. Kinston does not have a dwindling senior population, unlike many other cities (U.S. Census Bureau, 2020b).

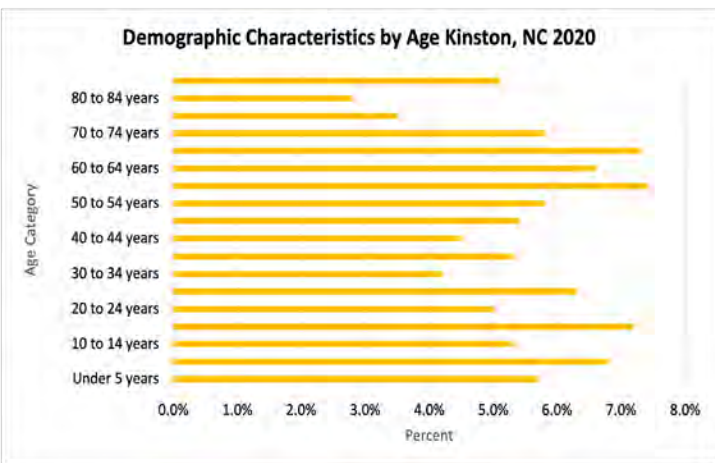
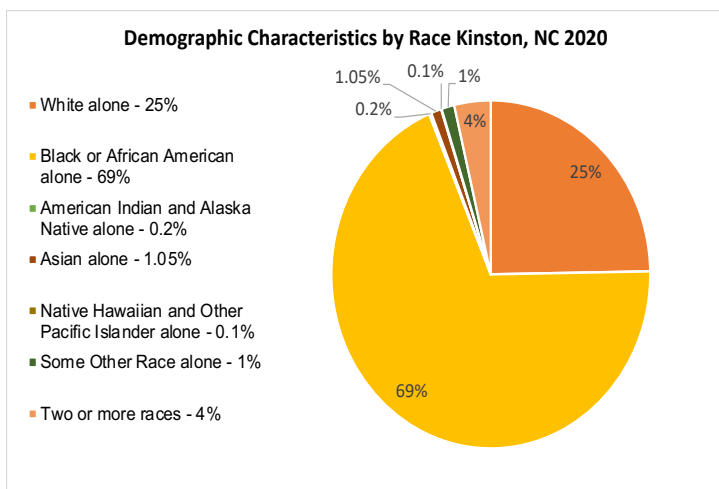


Chart 2 Demographic Characteristics by Age Kinston, NC 2020 (Source: U.S. Census Bureau, 2020b)

Chart 1. Demographic Characteristics by Race Kinston, NC 2020 (Source: U.S. Census Bureau, 2020a)

The age breakdown is almost even across all age categories. The category with the highest amount of people is 55 to 59 years old. The category with the lowest amount of people is 80 to 84 years old. However, the population of 50 and older is around 9,000 while the population of 49 and younger

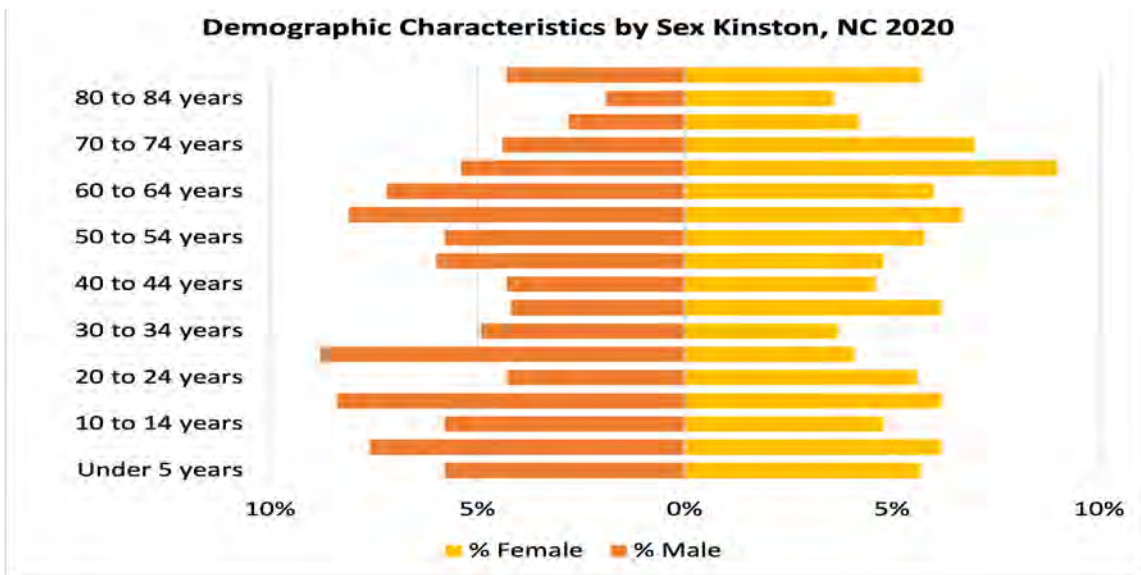


Chart 3 Demographic Characteristics by Sex Kinston, NC 2020 (Source: U.S. Census Bureau, 2020c)

Like age, the sex breakdown in Kinston is almost even across all ages. There is not one age group that has a vast difference of men and women, except for the age group of 25 to 29 years old. In this age group, there is more than double the number of men than there are women in Kinston. Although uncertain, this is likely due less men going to college and leaving Kinston than women (U.S. Census Bureau, 2020b).

African Americans are a statistically underserved community. This also affects housing. With Kinston’s population being comprised of 69% African Americans, much of the community has been underserved in regards to housing. It has always been harder for African Americans to get the jobs to make the money to keep their homes up

to date. They were also unable to move into neighborhoods with nicer homes during times of segregation.

The number of elderly people, women, and elderly women in Kinston also contributes to the condition of the housing in Kinston because of their income and other financial resources. Many of the elderly people have most likely been living in their homes in Kinston since they were built or shortly after, when the standards for energy efficiency were different. They now do not have the physical or financial ability to bring things like windows, doors, and insulation up to date to make their homes more energy efficient (NCRC, 2021).

# Economics

The economy of Kinston employs about 7,200 of the almost 20,000 people that live there. The median household income is around \$33,000. Most workers in Kinston are employed in the Health Care and Social Assistance, and Manufacturing industries (Data USA).

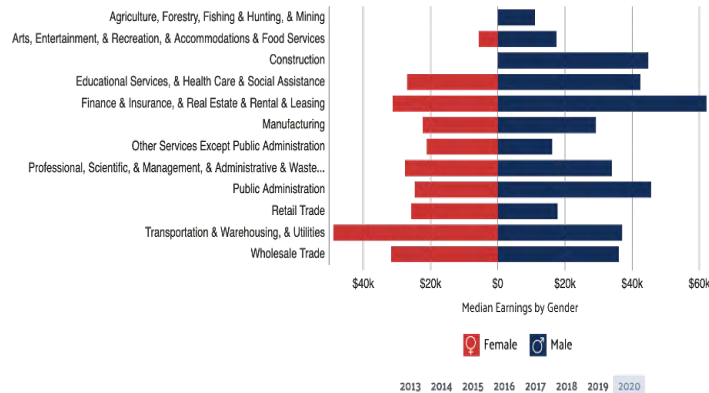


Chart 4 Economic Characteristics by Industry Kinston, NC (Source: Data USA, 2023)

In 2020, the median property value in Kinston was \$98,200. The homeownership rate was 40%. About 65% of those homeowners have a mortgage (Data USA). There are about 10,000 housing units in Kinston and the median year that these homes were built is 1966 (Kinston Demographics).

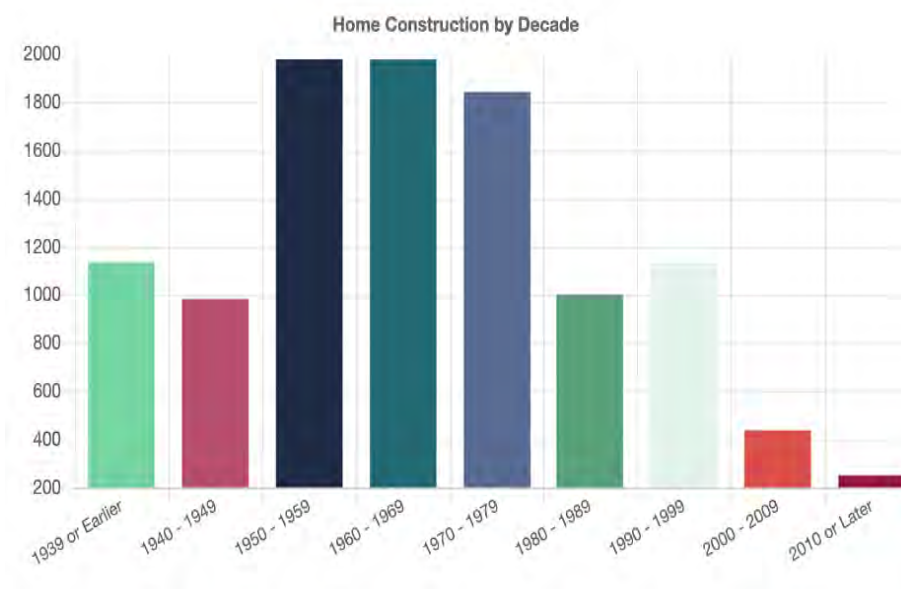


Chart 5 Home Construction by Decade Kinston, NC (Source: Kinston Demographics, 2023)

**Chapter 2:  
Current  
Rehab Program**

# Essential Single-Family Rehabilitation Program

The Essential Single Family Rehabilitation (ESFR) program is a state loan program used to rehabilitate houses for low-income homeowners with special needs. The program defines special needs as anyone who is elderly (62 years old or older), a veteran, disabled (physically or mentally), and households with children 6 and under where lead hazards are present. The home selection criteria for the program are as follows: moderately deteriorated homes, full-time owner-occupied, applicants' annual income must be less than 80% of the median income, the home must be within Kinston city limits, and the rehab cost cannot exceed \$40,000.

The most stressed point of this program is that it is a deferred loan. The loan is established as a lean against the property which is to guarantee that the owner lives in the home after it is rehabilitated. The deferred loan is established for no more than five years with 0% interest and is forgiven at a rate of up to \$8,000 per year. The lien placed against the house can be transferred or paid off in the event of a death or imminent need to sell the home (Appendix A).

It is important to note that this program does not include energy efficiency improvements. This means that they cannot solely work on a home to improve the energy efficiency. If the contractor that is working on a home finds that things that would improve efficiency need to be replaced, they will replace them.



Photo 2. Home in East Kinston



Photo 3. Home in East Kinston

# **Chapter 3: Case Studies**

# Other Programs

In the table below, details are provided about four different housing rehabilitation programs that include assistance for energy efficiency improvements. Some of these programs are in the form of loans and some are in the form of grants.

North Carolina Housing Rehab Programs			
Low Income Energy Assistance Program (LIEAP):	Energy Efficient Mortgage Program (EEM):	Section 203(k) Program:	Weatherization/HARRP Program:
NC DHHS	FHA	HUD	Wages – Goldsboro, NC
One-time payment to help eligible households pay heating bills.	Helps families save money on their utility bills by enabling them to finance energy efficient improvements with an FHA-insured mortgage.	Permits homebuyers and homeowners to finance up to \$35,000 into their mortgage to repair, improve, or upgrade their home. Includes energy efficiency improvements.	Serves Wayne, Greene, Pitt, Wilson, and Lenoir Counties. Helps to reduce the energy cost for low-income households through client education, air sealing, and adding insulation where practical.
Contact local Department of Social Services or NC Division of Social Services	Contact an <a href="#">FHA approved lender</a> .	Contact FHA Resource Center for more information.	Contact Wages of Goldsboro at (919) 734-1178 ext. 223

Figure 2 North Carolina Housing Rehab Programs (Sources: NC DHHS, HUD FHA, SFH, and Weatherization)



# Other Cities

In the table below, details are provided about programs from three different units of government (cities and or counties) that implement housing rehabilitation programs that include funding for energy efficiency improvements. The programs that the municipalities provide may not be eligible for use in Kinston and should be used as a reference point for other areas and how they implement the programs. The municipalities that are implementing these programs may not be comparable in size or function to Kinston, but can serve as a good reference point for how other programs are implemented.

North Carolina Cities with Rehab Programs			
Greensboro, NC	Rowan County, NC	Chatham County, NC	Greenville, NC
BetterBuildings for Greensboro Program	Weatherization Program	Weatherization Assistance Program	Homeowner Rehabilitation Program
To reach a diverse community of low to moderate income households with energy efficiency improvements.	To increase the energy efficiency and safety of homes of elderly, disabled and low-income families.	Assists low-income families and individuals improve comfort level and lower energy costs through the provisions of energy conservation measures and heating/air repair and replacement.	To assist low to moderate income households with making needed repairs to their existing home. Energy efficiency improvements included.
Source of funding: <ul style="list-style-type: none"> <li>U.S. Department of Energy's Better Buildings Neighborhood Program</li> </ul>	Source of funding: <ul style="list-style-type: none"> <li>Salisbury-Rowan Community Action Agency</li> <li>Yadkin Valley Economic Development District</li> </ul>	Source of funding: <ul style="list-style-type: none"> <li>Central Piedmont Community Action, Inc.</li> </ul>	Source of Funding: <ul style="list-style-type: none"> <li>HOME</li> <li>CDBG</li> <li>Affordable Housing Bond</li> </ul>
No longer active.	Currently active.	Currently active.	Currently active.

Figure 3 North Carolina Cities with Rehab Programs (Sources: Program Reaches, Rowan County Weatherization Program,

# **Chapter 4: Energy Efficiency**

# Energy Efficiency Details

Windows are one of the main factors that contribute to energy efficiency in homes, along with doors, insulation, appliances, and HVAC systems. The loss of heat through non-efficient windows makes up about 25% of the utility bills that people pay today. Windows that are most inefficient are single-paned wooden framed windows. These began to be replaced with double-paned windows when they were first introduced in the 1970s. The gap between the pieces of glass made it easier to keep the conditioned air in and the outside air out (The History).

Insulation is another large factor in the efficiency of a home. Building codes did not require that homes be built with insulation in the walls until 1965. Most people would not have chosen to install insulation when they were not required to. You would have needed to be wealthy to install insulation in your home while building it.

Since most of the homes in Kinston were built before 1970, it is safe to assume that many of them were built with single-paned inefficient windows and without insulation. The people that live in these homes likely have not had the money since living in them to upgrade the windows, doors, insulation, appliances, or HVAC systems unless they needed to.

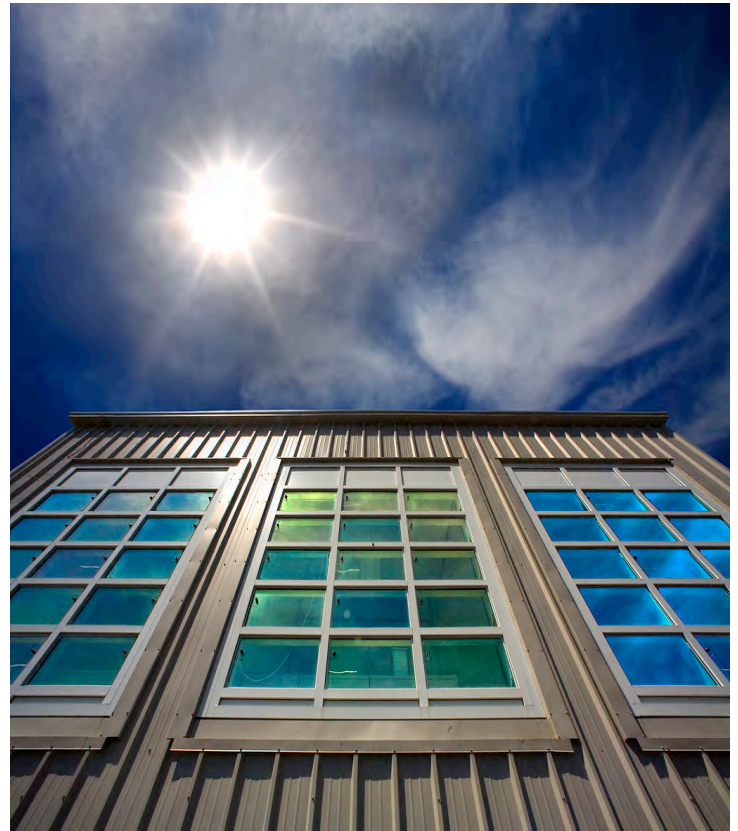


Photo 4. Energy Efficient Windows

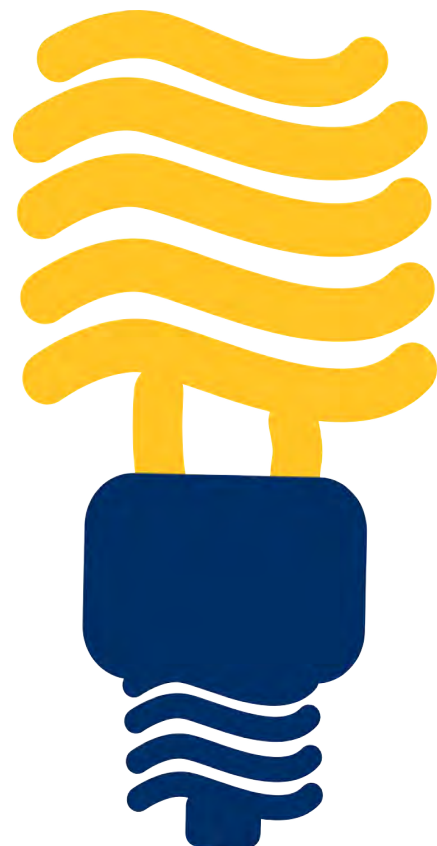


Photo 5. Energy Efficient Light Bulb

# **Chapter 5: Field Study**

# Field Study

A visit was made to Kinston to evaluate the current conditions of housing and take photos to be used as materials for examples. During the visit, it was apparent that much of the housing was quite old and timeworn. The visit also proved the claim that the area of the city east of Queen Street contained the most substandard housing. Although it was challenging to discern the status of the energy efficiency within the homes from an outside point of view, it was easy to spot characteristics and features of the homes that could lead to energy inefficiency.

The materials that were seen the most were single-paned windows, window-mounted air conditioning units, boarded up windows, and windows with holes in them. It was easy to tell that the windows were single-paned because of how old they looked as well as how thin they were. Single-paned windows do not provide enough insulation to keep the conditioned air inside the house or hot or cold external air outside the house. It can be assumed that window units are commonly used because of the age of the homes. It was not common to install central HVAC units during the time that these homes were built. While a window unit may not use as much electricity as a central HVAC unit, having multiple in one home can add up quickly. Also, the window units can cause gaps in the windows where air can escape. Windows with holes and boarded up windows would allow air inside the home to escape and air from outside to enter in.



Photo 6. Home in East Kinston



Photo 7. Home in East Kinston

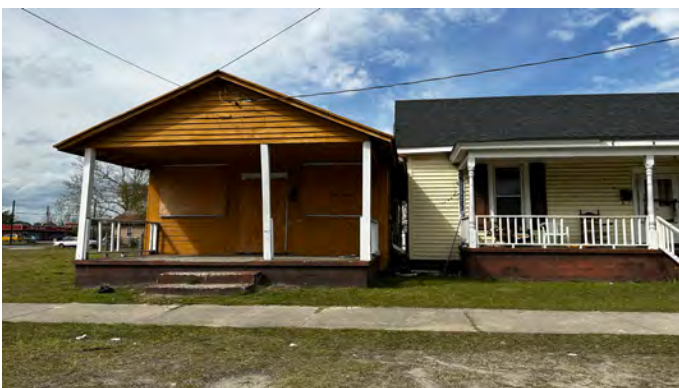


Photo 8. Home in East Kinston

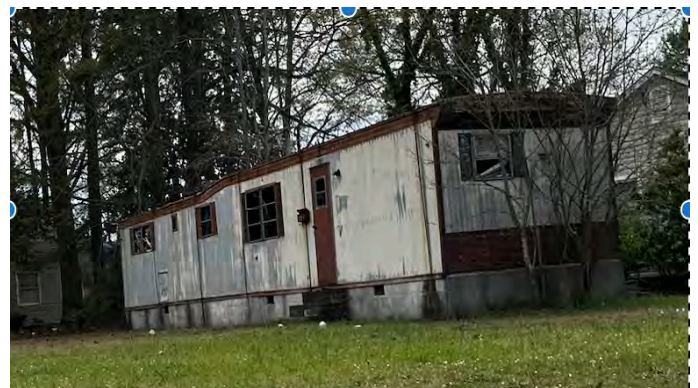


Photo 9. Home in East Kinston

While other areas of the city like west of Queen Street seemed to have been better maintained over time, it was still apparent that the same materials were used to build those homes as well. Materials like single-paned windows were spotted in nearly every home that was seen in Kinston. It is safe to say that even though a home is better maintained over time, it will still have the same inefficient materials that it was built with. I would assume that most of these homes also contain appliances that are 10 to 20 years old, and do not use the most current, efficient light bulbs.



Photo 10. Home in West Kinston



Photo 11. Home in West Kinston



Photo 12. Home in West Kinston

# **Chapter 6: Public Input**

# Public Input

## February 10, 2023

I attended a Public Information Session for the Essential Single-Family Rehabilitation program hosted by Elizabeth Blount, Planning Director and Chip Bartlett of Insight Planning and Development. Chip Bartlett is the project manager of the housing program for Kinston. This information session was to inform residents of the process for applying and receiving funding from the ESFR program.

This meeting was held at 1 PM on Friday, February 10, 2023, in the City Council Chambers in Kinston, NC. There were around 11 citizens in attendance. During the meeting, Elizabeth and Chip explained the program and the criteria of the program. The citizens had many questions like who covers the cost of building permits, does the program cover HVAC system replacement, which income documents to submit, if the home needs to have insurance coverage during construction, and if the taxes need to be up to date to qualify for the program.

## February 16, 2023

I discussed the possibility of having a public meeting about the need for energy efficiency improvements in Kinston with Kinston's Planning Director. She determined that it would be best not to have a public meeting involving the citizens of Kinston so as to not give them any false hope that

something could come out of this project, in case it does not.

## March 28, 2023

I had a zoom meeting with the Planning Director and Public Services Director of Kinston. During this meeting we discussed ideas of doing some public input to be able to hear the thoughts and opinions of energy efficiency in Kinston. We determined that it was too late in the project period to be able to do any kind of public meeting. I asked them their thoughts on me creating a survey and posting that to Facebook groups of which citizens of Kinston are apart. They said that digital surveys may not be the best way to reach the citizens of Kinston as many of them are elderly and may not have the best access to an online survey.

The Public Services Director informed me that his department had been running a survey of their own about energy to the citizens. The survey had been running for over a month at that point and would continue to run for another few weeks. The data from that survey would come back to the city too late for it to be included in this project. We then discussed the possibility of doing a survey via phone call to the applicants of the ESFR program that were not selected for funding. The plan was for me to get the phone numbers of the applicants who were not selected, call them and ask a few questions of my



choosing. I would then summarize the data collected into figures and charts for this report.

### **April 6, 2023**

It was determined by the City of Kinston Planning Director and Public Services Director that it would be best for someone at the City of Kinston to call the applicants of the ESFR program who were not selected. The purpose of these calls would be to hear their opinions on energy efficiency in the city and ask if they would be interested in being a part of potential assistance for efficiency improvements. It would also be best for that process to run congruent to the existing survey that Public Services was already running. They said they would include me in the data for my project. I notified them that at this point I was running on a very tight deadline and unfortunately would not have enough time to be apart of that process.

### **Post Project**

I believe that the data collected, and information provided with this project will be very beneficial and work congruently with the data that the City of Kinston collects from calling the ESFR applicants and their other survey. Hopefully, all of these data sources combined will be able to provide the most assistance with energy efficiency and cost of energy bills to the citizens of Kinston.

# Chapter 7: Utilities

# Kinston Utilities

Kinston is a part of ElectriCities and provides energy to some of the citizens within the city. The rate for residential energy is comprised of a \$14.95 base charge, 7.433 cents/kWh, and a \$9.35/kW demand charge. They have on-peak hours which are May through September from 1:00 PM to 7:00 PM on weekdays, October through April from 7:00 AM to 9:00 AM and 2:00 PM to 8:00 PM on weekdays, and November through March from 7:00 AM to 9:00 AM on weekdays. These on-peak hours do not include certain holidays.

After speaking with the Public Services Director in Kinston, Steve Miller, I learned that the city has data within their utilities system that will identify hotspots of energy usage. Utility personnel can identify houses that are using more or less energy. However, this data is not able to be shared outside of their organization. While that data cannot be summarized into this report, the city can use that data in conjunction to determine the need for energy efficiency in homes. Mr. Miller also stated that through ElectriCities, a representative could come visit a person's home to do evaluations of their current energy efficiency and offer suggestions of how to improve.

# NC Energy Rates Comparison

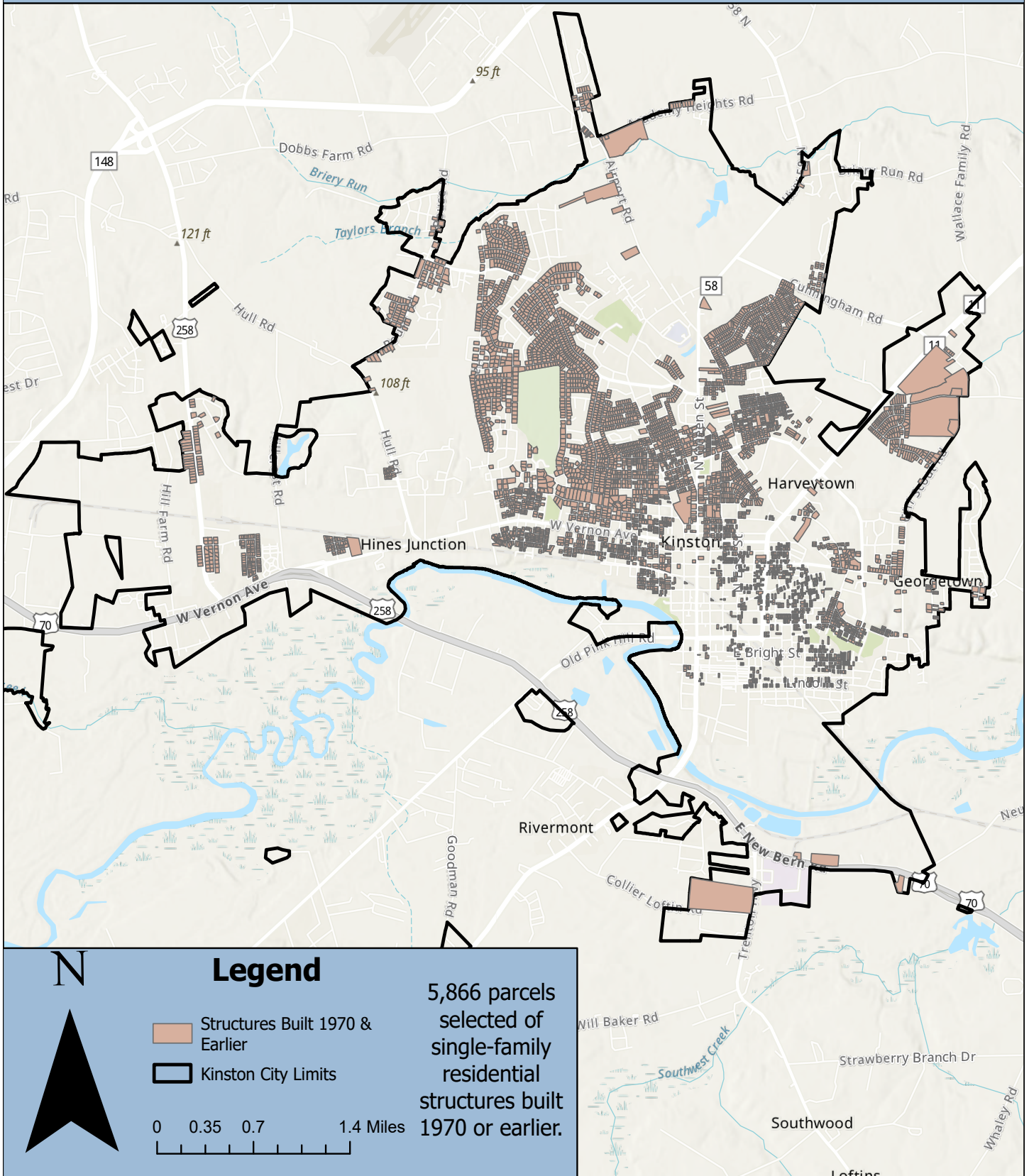
The following table is a comparison of the energy rates in Kinston and three other cities in North Carolina that are similar in size. These cities are Lexington, Elizabeth City, and Shelby. From the data collected, Kinston has the cheapest normal rate for electricity compared to the other three cities. The base charge for electricity in Kinston second lowest of the four. The average energy rate for North Carolina is 11.28 cents/kWh, which is much higher than Kinston’s rate. This data provides evidence that electricity rates should not be the reason for astronomically high energy bills in Kinston as it has cheaper rates as compared to similar cities. This helps prove the point that the reason for high energy bills in Kinston is the result of homes with energy efficiency problems.

NC Cities Energy Rates Comparison				
City	Kinston	Lexington	Elizabeth City	Shelby
<b>Peak Hours</b>	Yes, year-round	Yes, summer	None	None
<b>Base Charge</b>	\$14.95	\$25.00	\$12.48	\$15.48
<b>Rate</b>	7.433 cents/kWh	8.88 cents/kWh	10.94 cents/kWh	8.96 cents/kWh
<b>Demand Charge</b>	\$9.35/kWh	9.44 cents/kWh	None	None

Figure 4 NC City Energy Rate Comparison (Sources: City of Kinston, City of Lexington, City of Elizabeth City, and City of Shelby)

In addition to the charge above, the map following this page highlights the parcels with single-family residential structures that were built before 1970. 1970 being the approximate start of energy efficiency building standards being released and mandated. **The map highlights 5,866 properties that were built before 1970 out of the 10,738 housing units in Kinston** (Kinston Demographics). What can be assumed from that map is that there are potentially 5,866 homes in Kinston that were built with inefficient materials. It is likely that some of the homes have been updated over the years, but that still leaves a high number of homes that are most likely inefficient.

# Structures Built in 1970 or Earlier Kinston, NC 2023



# **Chapter 8: Recommendations**

# Selection Criteria

With my research, I am recommending that the City of Kinston establish energy efficiency improvements into their Essential Single Family Rehabilitation program. I am also recommending selection criteria and geographic areas of the City of Kinston for these programs to be offered. The criteria for qualification of energy efficiency rehabilitation should be the same of those of the current rehabilitation program. These criteria have been researched and set by experts as the best way to judge the need for assistance. The current criteria include things like age, sex, marital status, income, disability status, household size, etc. The type of work needing to be done would not change the criteria of qualification for assistance.

Characteristics of the homes in need of energy efficiency improvements would be different than the current rehabilitation program. Homes built before 1970 should automatically be considered. A home being built before 1970 has a much higher chance of being constructed of inefficient materials. Once there is a pool of homes built before 1970, the homes should be checked for inefficient materials. These materials would be single-paned windows, HVAC units older than 10-15 years old, appliances older than 10-15 years old, insufficient insulation in the floors and walls, doors with a lack of proper air sealing.

It is likely that many people will not qualify or the funds will run out before everyone can receive assistance. For this, I am including a flyer of energy saving tips found on the City of Kinston Public Services website that can be used to help those who are not able to receive assistance.

# HOW TO SAVE ON ENERGY BILL



- 1 Check the filters in your air conditioning and heating systems monthly and change them as needed.
- 2 During the summer months, set your thermostat no lower than 78° F.
- 3 Turn fans off when rooms are unoccupied.
- 4 Close windows, drapes and blinds during the hottest times of the day.
- 5 Turn on the exhaust fan in the kitchen when cooking and in the bathroom when showering.
- 6 During the winter months, set your thermostat between 68° and 72°.
- 7 Limit use of portable space heaters.
- 8 Close the fireplace damper when not in use.
- 9 Check for air leaks in duct systems, fireplace dampers, attic hatches, baseboards and around windows and doors.
- 10 Close the fireplace damper securely when not in use.
- 11 Install weather stripping along the door frame and a door sweep on the bottom of the door.
- 12 To seal windows, use plastic window film, available at home-improvement stores. Seal window edges and cracks with caulk.
- 13 Replace conventional light bulbs with Compact Fluorescent Lamps (CFLs).
- 14 Replace appliances and HVAC systems with Energy Star products.

City of Kinston Public Services Dept.

Phone: 252-939-3282

Email: [utilities.dispatch@ci.kinstonnc.us](mailto:utilities.dispatch@ci.kinstonnc.us)



Physical Address:  
207 E King Street Kinston, NC 28501

Mailing Address:  
P.O. Drawer 339 Kinston, NC 28502



# Physical Aspects of Homes

There are many ways to upgrade a home's energy efficiency that do not involve a total rehabilitation of the home. Appliances can be changed out, HVAC systems can be replaced, light bulbs can be upgraded to more efficient bulbs, and rubber weather stripping can be applied to doors to make them more airtight. New appliances and HVAC systems can be 30% to 50% more efficient than models made in the 1970s and 20% to 40% more efficient than models made 10 years ago (Magazine, S). The national average cost for a new HVAC system is \$7,500 (Tilford, A). The average cost for a complete new set of home appliances is around \$10,000 (Cahill).

If a home needs more of a heavier renovation, replacing windows can save a homeowner about 12% on their energy bill, which is about \$100 to \$600 a year. Energy efficient windows cost about \$300 to \$1,000 per window. The total cost would depend on how many windows the home has (U.S. News). While it seems like replacing windows could be cheaper than replacing an HVAC system or home appliances, I would consider it a heavier renovation because it involves more construction with the removal of the old windows and upfit of the new windows. Also, adding insulation into the walls of a home could be considered a heavier renovation because, depending on the type of walls, they may need to be ripped out and then replaced. There are

some types of spray foam insulation that can be installed by drilling holes throughout the walls and inserting the insulation, but that cannot be done for every type of wall.

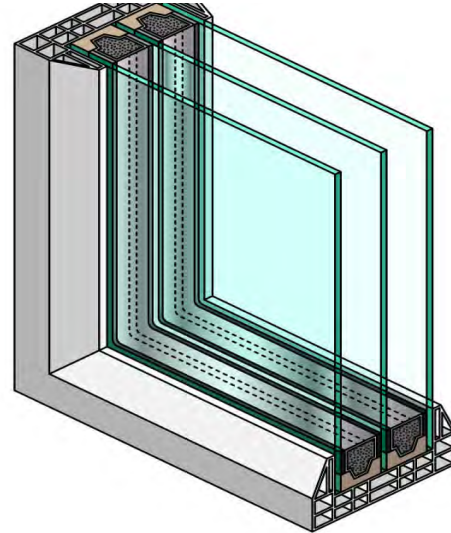


Photo 13 Energy Efficient Windows (Source: Buying Guide)



Photo 14. HVAC Systems



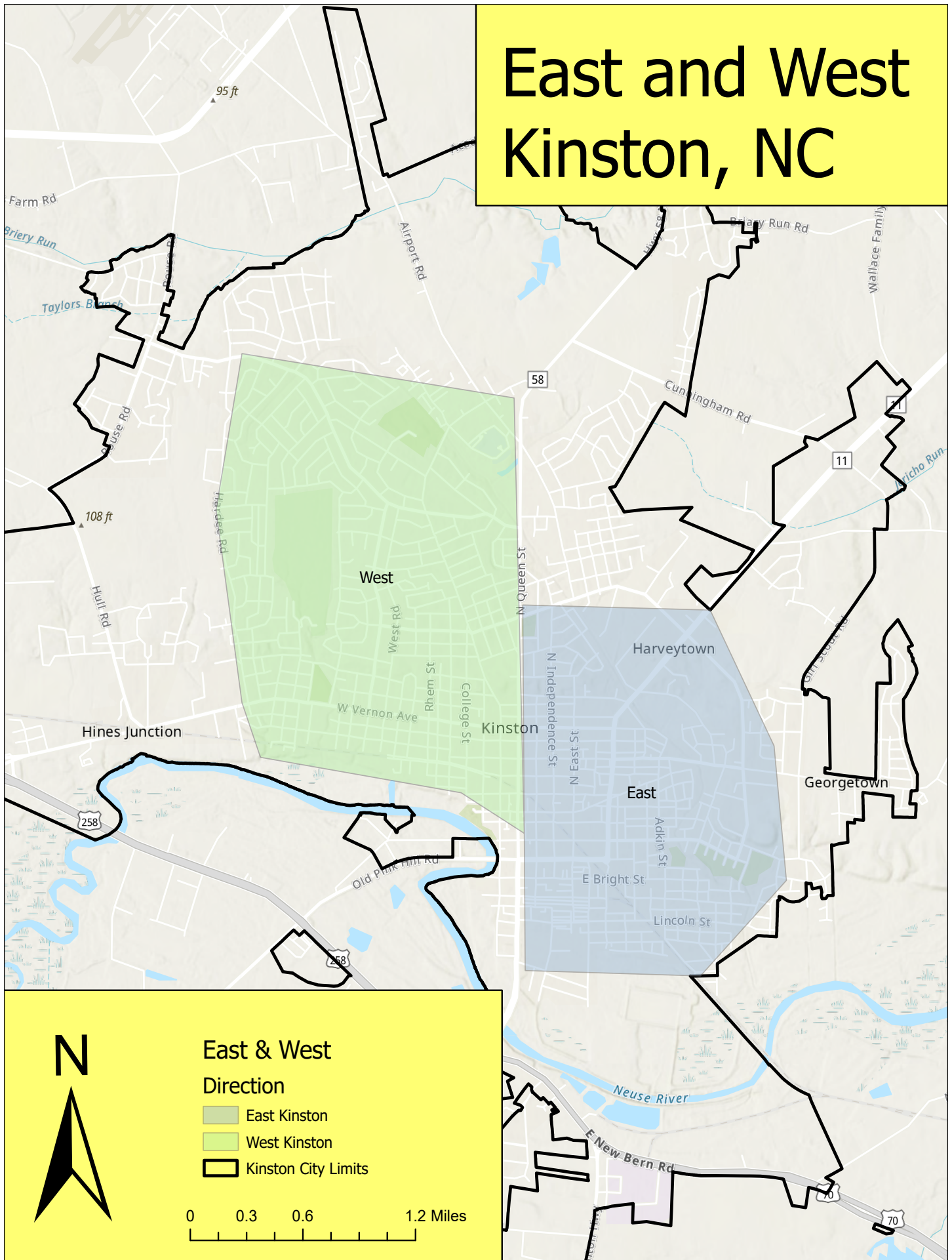
Photo 15. Foam Insulation

# Locations of Homes

I would recommend that East Kinston be the main area of focus for the Essential Single Family Rehabilitation program first, and then be considered for energy efficiency improvements. Unfortunately, these homes need many other repairs that go beyond energy efficiency like roofs, walls, doors, foundations, etc. I do not think it would make much of a difference to try and improve the energy efficiency of these homes before the basic structure is repaired. After those improvements are completed, it would be great to get them up to standard on energy efficiency.

Areas that I would recommend being considered for energy efficiency improvements would be central and west Kinston. The homes in these areas do not need as many improvements to the basic structure and function. It would be great to provide assistance that would improve energy efficiency to the homeowners as their other needs are met. The purpose of the improvements would be to save the homeowners money.

# East and West Kinston, NC



Map 3. East and West Kinston (Source: NCDOT City Boundary Data & Lenoir County GIS)

# Energy Efficient Building Standards

Many cities or organizations that provide energy to customers have programs or policies in place that set the standards for energy efficient building practices. I would recommend that the City of Kinston adopt a policy of the same nature for the efficiency rehabilitation as well as any homes that may be built and connect to electricity in Kinston in the future. An example of a program like this is the E-300 program by Greenville Utilities Commission in Greenville, North Carolina. This program set standards for energy efficiency building practices.

The E-300 program incorporates the most up-to-date, cost-effective technologies, procedures, materials, design, and equipment recommendations for building energy-efficient homes. To meet E-300 program requirements, builders and homeowners submit plans for evaluation by an Energy Specialist. Recommendations for insulation and other energy-saving features are made based on a computerized load calculation. If the structure's heat loss falls within acceptable levels, the house qualifies for the E-300 award. To verify installation of energy efficient features, the structure is carefully inspected at several stages of construction (E-300, 2018).

Seth Shoneman, a representative of the E-300 from Greenville Utilities Commission, provided details that the program does not have its own standards for energy efficient building materials. The program uses the State Building Code standards

for things like type of insulation or windows. The program is used to work with customers and builders to ensure that materials are being installed correctly and most efficiently. A building inspector will go into a home under construction and verify that the right materials are being used and then representatives from the E-300 program will go in and make sure the materials are being installed correctly.

The E-300 program is also only used for new houses being built. They use their energy audit program to provide recommendations and work with customers on best practices to save on energy for currently built homes. The program is used to recommend materials that go beyond the state building code. I would recommend that if Kinston were to implement a program like E-300, that it be used for homes undergoing rehabilitation and new construction.

Another thing that Seth recommended to keep an eye out for to potentially use in the future is the Inflation Reduction Act. This act is coming from the NC State Energy Office. It will start being rolled out next year and will provide incentives to homeowners for installing high efficiency materials, systems, and appliances.

# Chapter 9: Resources

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# APPENDIX



# Appendix A: ESFR Program Handout

## Essential Single Family Rehabilitation Program

### Information Session

February 10, 2023

#### What is Essential Single Family Rehabilitation Program?

- Loan Pool to fix up houses for low-income homeowners with special needs.

#### Who are SPECIAL NEEDS?

- Elderly (*62 years old or older*)
- Veteran
- Disabled (*physical or mental impairment*)
- Household with child <6 years old or younger where lead hazards are present

#### Selection Criteria:

- Moderately deteriorated houses or modular home
- Owner occupied FULL TIME
- Annual Income less than 80% Median Income
- Home in City of Kinston or Lenoir County
- Rehab cost cannot exceed \$40,000

**Low Income:**

<b>Number in Household</b>	<b>30% of Median Income</b>	<b>50% of Median Income</b>	<b>80% of Median Income</b>
1	\$13,750	\$22,900	\$36,650
2	\$15,700	\$26,200	\$41,850
3	\$17,650	\$29,450	\$47,100
4	\$19,600	\$32,700	\$52,300
5	\$21,200	\$35,350	\$56,500
6	\$22,750	\$37,950	\$60,700
7	\$24,350	\$40,550	\$64,900
8	\$25,900	\$43,200	\$69,050

**How much does it cost?**

- This is a loan!
  - 0% Interest
  - \$8,000 forgiven per year
  - Maximum 5 years
  - Owner must remain in the home
  - Lien

**Application Selection:**

- Many more eligible than we can assist
- Scoring Criteria
- Notified either way
- Unrestricted Pool Funds

### **What kind of work can be done?**

- Improvements for Decent, Safe, & Sanitary Living Conditions
- No imminent threats
- **Occupants nor structural**

### **Who will do the work?**

- Approved Contractor Registry
- Suggested General Contractors
- Contractor bids
- Walkthrough
- Quality Work

### **Steps in the Process:**

1. Complete Application
2. Preliminary Inspection
3. Screening of Applicants
4. Written Agreement
5. Pre-Rehab Inspection and Writeup
6. Contractor Selection
7. Loan Closing
8. Construction

### **How to turn in application:**

- Mail: P.O Box 339 Kinston, NC 28504
- Drop off at City Hall between hours 8:00am-4:45pm

### **Questions?**

- **Elizabeth Blount: 252-939-3271**
- **Chip Bartlett: 910-392-0060 ext. 106**

### **Key Dates:**

- Applications are available **NOW.**
- Submission deadline – **March 17**
- Selection of homes – **March 29**

# Appendix B: ESFR Program Application

**AGENCY MODIFY**  
**ESFRLP PROGRAM**

*Pre-Application & Eligibility Certification*

(page 2 of 2)

**Applicant Data**

Name of Homeowner(s) (First, MI, Last): \_\_\_\_\_

Street Address: \_\_\_\_\_

**Qualifying Income Table (for reference) Maximum Gross Household Income**

Household Size	1	2	3	4	5	6	7	8
a) County: 30%								
b) County: 50%								
c) County: 80%								

Note:

**Qualifying Questions**

Does the applicant own this home?    YES     NO

Does the applicant's household qualify based on the income criteria?    YES     NO

Mark all Special Need(s) by which the Applicant qualifies:

Owner 62+     Member Disabled     Veteran\*\*\*     EBLL threat to child under 6

**Eligibility Certifications**

I hereby certify that:

- 1) All of the above information has been reviewed or documented in accordance with the ESFRLP Program Guidelines and the ESFRLP Assistance Policy.
- 2) The Applicant is eligible for assistance under the ESFRLP Program;
- 3) There is no other state or federal source of funds available now, or likely to be available within the next six months, which could pay for the proposed repairs.

Authorized Officer

Organization

Date

**Eligible ESFRLP Rehabilitation Needs:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Case Notes (for office use only) Name of interviewer:**

Non-housing problems:

\_\_\_\_\_

\_\_\_\_\_

Action taken for referrals?    YES     NO     If yes, specify:

\_\_\_\_\_

\_\_\_\_\_

Other:

\_\_\_\_\_

\*Race Code: White (11); Black/African American (12); Asian (13); American Indian/Alaska Native (14); Native Hawaiian/Other Pacific Islander (15); American Indian/Alaskan Native & White (16); Asian & White (17); Black/African American & White (18); American Indian/Alaska Native & Black/African American (19); Other Multi-Racial (20); and, Asian/Pacific Islander (21).

\*\*Hispanic: Yes or No.

\*\*\*Veteran: A person who served in the active military as evidenced by a DD-214 form.

**AGENCY MODIFY**  
**Essential Single-Family Rehabilitation Loan Pool**  
**Pre-Application & Eligibility Certification**

(page 1 of 2)

**Applicant Data**

Name of Homeowner(s) (First, MI, Last): \_\_\_\_\_  
 Street Address: \_\_\_\_\_  
 City: \_\_\_\_\_ County: \_\_\_\_\_ Zip Code: \_\_\_\_\_  
 Home Phone: \_\_\_\_\_ Work Phone: \_\_\_\_\_

**If the Applicant was referred by someone other than self, complete the following:**

Contact Name: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Relationship to Owner: \_\_\_\_\_  
 Notes: \_\_\_\_\_

**Household Membership**

Name (First, MI, Last)	Sex	Birth Date	SS# (9 digits required)	Race Code*	Hispanic**	Relation to Homeowner
a.						
b.						
c.						
d.						
e.						
f.						
g.						

**Gross Income Work Table**

**Dollars / Household Member / MONTH**

Source	a	b	c	d	e	f	g	Total
1) Wages								
2) Retirement/Pension								
3) Social Security								
4) Supplemental Security Income								
5) Public Assistance								
6) Child Support								
7) Interest								
8)								
9)								
10)								
Monthly Sub-Total (sum rows 1-10)								
Annual Sub-Total (12 x row above)								

Annual Gross Household Income (sum Annual Sub-Total for columns a-g): \_\_\_\_\_

**Applicant Certifications**

**I hereby certify that:**

- 1) I own and occupy the home described above as my primary residence;
- 2) The household and income information listed above is complete and true to the best of my knowledge;
- 3) This information is provided to qualify me for the Essential Single-Family Rehabilitation Loan Pool (ESFRLP). The Program is intended to assist low- and very low-income homeowners with special needs in correcting substandard housing conditions which pose a threat to life, health or safety or in performing accessibility modifications or other repairs necessary to meet the Essential Rehabilitation Criteria of ESFRLP.
- 4) I give permission for \_\_\_\_\_ and NC Housing Finance Agency to access information to verify the contents of this pre-application and to facilitate the rehabilitation of my home to meet Essential Property Standards or the Minimum Housing Code.
- 5) I understand that the secured, 0% interest, forgiven at the rate of \$8000/year loan provided via the ESFRLP is secured with a Deed of Trust.
- 6) I have been advised that my gender, race and ethnicity will be determined based upon observation and/or surname if I do not self-disclose the information.

Applicant Signature \_\_\_\_\_ Date \_\_\_\_\_ Co-Applicant Signature \_\_\_\_\_ Date \_\_\_\_\_