Can Town and Country Both Be Green? A Comparative Study of Green Building Programs and Policies in Urban and Fast-Growing Rural Counties in North Carolina

by

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# **INTRODUCTION**

Interest in green building has exploded in recent years due to a number of factors. Evidence of global climate change, national security issues relating to dependence on foreign oil, and an economic recession have all helped spur policy makers in the direction of energy efficiency and renewable energy use. While the federal government has enacted a few policies that address green building, the main impetus for addressing energy efficiency in buildings has come from state and local governments. Many state governments, including North Carolina, have adopted legislation meant to promote green building through the use of various financial incentives. Within North Carolina there have been a number of counties and municipalities have adopted policies meant to promote green building as well. "Green public facility" requirements, financial incentives, and permit streamlining have all been ways that local governments have tried to encourage green building practices in North Carolina. The majority of green building policies in place are in urban areas such as Raleigh, Durham, Asheville and Winston-Salem; the vast majority of rural counties and municipalities in the state, which are home to nearly half of the state's residents (NC Rural Center, 2009), do not have any such policies in place. With much of the population growth in the coming decades expected to occur in presently rural areas close to major urban centers (Ibid), building and energy policies in these areas will likely play an increasingly important role in the state's efforts to address global climate change.

The purpose of this study is to determine how green building practices can effectively be incorporated into local development policies in fast-growing rural areas that are close to urban centers so as to reduce the environmental impacts of current and future development in

these areas. Through a series of five exploratory case studies involving in-depth program analysis and a series of interviews, this study examines 1) why there has been a relative lack of green building initiatives in rural versus urban areas; 2) how different stakeholders influence the adoption and implementation of green building policies; and 3) which policies or programs can most effectively promote green building in fast-growing rural areas. Understanding some of the common constraints to green building and determining ways to effectively promote green building at the local level can provide a tool for local governments to proactively address global climate change and other environmental and economic issues related to rapid growth and development.

Qualitative research is ideal for exploratory analysis about, in this case, the factors that support or hinder the implementation of local policies promoting green building. For this study I relied on a mix of ethnographic techniques, including policy analysis (reviewing existing policies and programs and reviewing and coding existing land use plans and ordinances) and a series of in-depth semi-structured interviews with key informants (Patton, 2001; Ulin et al., 2004). Analysis of policies and ordinances for each of the five counties helped to create a context for interview findings.

I begin by providing background information on green building initiatives in North Carolina, followed by a brief overview of some of the local green building policies and programs currently in place therein. Next, I present my methodology, followed by an analysis of my results. I finish with a discussion of the implications of this work on informing and improving green building policy implementation in fast-growing rural areas.

# BACKGROUND

#### **Climate Change and Energy Use**

One of the primary reasons for the recent surge in green building interest is concern over increasingly irrefutable evidence that global climate change is occurring as a result of anthropogenic factors. Within this context, it is well known that the built environment is a major consumer of energy in the United States, accounting for 40% of total energy consumption (US DOE, 2009), 65% of electricity consumption, and 30% of greenhouse gas emissions (USGBC, 2009). Thus, as evidence of global climate change continues to mount, so too does the recognition on behalf of government at all levels that more must be done to address energy efficiency in the built environment.

While federal policies meant to address energy efficiency have been present since 1978, when the National Energy Act was passed, increasing international pressure and mounting scientific evidence have spurred a host of new policies in recent years. The Intergovernmental Panel on Climate Change, which was created by the World Meteorological Organization (WMO) and the United Nations Environmental Programme (UNEP) in 1988, has been a leading provider of research on global climate change, and declared in its 2007 synthesis report that "warming of the climate system is unequivocal." This and other reports over the last number of years (NOAA, 2006; NASA, 2007), combined with growing national security concerns relating to dependence on foreign oil, have resulted in a number of federal policies meant to address energy efficiency, including the Energy Policy Act of 2005 and, most recently, the Energy Independence and Security Act of 2007. Both of these Acts are meant to promote energy conservation and efficiency in all areas, as well as to promote domestic production of renewable energy (US DOE, 2009). While these Acts represent a positive step in the right direction on the part of the federal government, the main impetus for addressing global climate change has come from states.

As of 2006, 15 states had mandated adoption of green building practices for state buildings or other public facilities, and many other states have passed legislation that far surpasses the federal standards in terms of providing incentives, standards, or requirements for reducing energy usage (May and Koski, 2007). Also, the U.S. Conference of Mayors Climate Protection Agreement, created in 2005 by Seattle Mayor Greg Nickels as a response to the refusal of the U.S. government to sign the Kyoto Protocol, has become a major vehicle through which over 500 cities throughout the country have joined together to address climate change through local policies and programs (U.S. Conference of Mayors, 2008).

### **Green Building**

While there are many definitions of green building, perhaps the most comprehensive definition is offered by the United States Environmental Protection Agency (US EPA), which states: "Green or sustainable building is the practice of creating healthier and more resource-efficient models of construction, renovation, operation, maintenance, and demolition" (US EPA, 2009). There are currently numerous different rating systems offering third-party certification for green building. Between 2000 and 2006 the number of green buildings grew from only a few to over 5,000 projects actively seeking some kind of third party certification, and continues to grow today (Yudelson, 2008).

While the dramatic rise in interest in green building is relatively recent, sustainable building practices have been around for decades. Energy efficiency, renewable energy, low impact building practices, and indoor environmental quality have all been present in various building paradigms since the 1960's, but until recently were not marketed or quantified

collectively as a comprehensive building technique. In 1993 the United States Green Building Council (USGBC) was founded in an attempt to provide a comprehensive definition of green building, as well as education, marketing, and other resources meant to advance the burgeoning field (USGBC, 2009). In the year 2000 the USGBC launched the LEED (Leadership in Energy and Environmental Design) Green Building Rating System to provide a concrete definition and standard process to measure and rate green buildings. Since then a number of other rating systems have been introduced, but LEED has remained the most widely used, and continues to dominate the green building market (Makower, 2009; USGBC, 2009). Research from the first 200 LEED-certified projects show that on average, such projects reduce water usage by 30 percent and produce energy savings of 30 to 55 percent, depending on the level of certification (Yudelson, 2008). Furthermore, LEED and other green building practices have been shown to dramatically decrease the negative environmental impacts of the built environment while simultaneously providing long-term financial benefits as well (Kats, 2003; Davis Langdon, 2007; GSA, 2008).

### North Carolina Green Building Initiatives

At the state level, North Carolina has taken many steps to address global climate change through promotion of green building practices in both the residential and commercial sectors. North Carolina is one of many states throughout the U.S. that has adopted a statewide energy code equivalent to some version of the International Energy Conservation Code (IECC). The IECC is one of the International Codes developed by the International Code Council, a widely recognized building code development organization. The IECC is applicable to all residential and commercial buildings and provides the minimum energy efficiency provisions for residential and commercial buildings (Building Code Assistance

Project, 2008). North Carolina residential energy codes are currently based on the 2006 IECC, and are scheduled to be changed to the 2009 IECC, which contains numerous amendments to the 2006 codes to achieve greater energy efficiency, in 2012 (NC Building Code Council, 2009).

While building and energy codes set the minimum standards that new construction must meet, there are a number of other state policies that are meant to encourage local governments and private developers to go beyond the minimum requirements to attain green building certification. The United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) program, the Green Building Initiative's (GBI) "Green Globes" program, and the National Association of Homebuilder's (NAHB) Green Building Guidelines are examples of third-party rating systems that have gained market recognition in North Carolina and abroad. These programs offer professional third-party verification of a project's "green" features, and provide certification based on widely recognized standards. North Carolina General Statutes allow for cities and counties to "charge reduced building permit fees or provide partial rebates of building permit fees for buildings that are constructed or renovated using design principles that conform to or exceed" standards set forth by LEED, Green Globes, or another nationally recognized green building certification system (N.C. Gen. Stat. § 153A-340). S.L. 2007-241 also granted authority to a few select jurisdictions to provide density bonuses, make adjustments to otherwise applicable development requirements, or provide other incentives to a developer or builder who builds or reconstructs developments which make a significant contribution to the reduction of energy consumption (DSIRE 2009).

Other policies include H.B. 1473 (2007), which created the North Carolina Green Business Fund (NCGBF). The NCGBF provides grants of up to \$100,000 to small business and local governments involved in developing commercial innovations and applications of various "green" industries including the green building industry. Statewide incentives include renewable energy tax credits that provide credits to both businesses and individuals worth 35% of the cost of renewable energy property constructed, purchased, or leased in the State during the taxable year (N.C. Gen. Stat. § 105-129.15 et seq.). There is also an Energy Improvement Loan Program that provides low interest loans to "businesses, local governments, public schools, community colleges, and nonprofit organizations for projects that include energy efficiency improvements and renewable energy systems", as well as various other tax incentives for green technologies (DSIRE, 2008).

Despite the state's relatively progressive stance on environmental issues relating to the built environment, green building has not been embraced by all of the counties and municipalities herein. This is in part due to the fact that North Carolina is a Dillon's Rule state. As a Dillon's Rule state, municipalities and counties in North Carolina are created by the State and can exercise only those state powers that have been delegated to them by the General Assembly (Owens, 2001). While cities and counties in North Carolina do have statutorily provided authority "to provide reductions or partial rebates for building permit fees" (N.C. Gen. Stat. § 153A-340, 160A-381), S.L. 2007-241 only extended authority to "provide density bonuses, make adjustments to otherwise applicable development requirements, or provide other incentives" to certain cities, towns, and counties. This means that while all local governments can offer certain incentives, not all governments have equal access to a full "toolbox" when it comes to green building. Hence, the vast majority of green

building projects has occurred and continues to occur in urban areas (NC Green Building Technology Database, 2008), even though approximately half of North Carolina's residents live in rural areas (NC Rural Economic Development Center, 2006). Also, while each of the top ten fastest growing cities in North Carolina have signed on to the U.S. Conference of Mayors Climate Protection Agreement, there has not been a comparable amount of effort on behalf of the fastest growing rural counties to address climate change.

The clustered nature of local policies promoting green building in North Carolina suggests that state policies and tax incentives are subsidizing green building primarily in urban areas due to their roles as centers of population and business. While this is certainly not a bad thing, as reducing the impact of urban areas is a critical component of addressing environmental and energy concerns related to the built environment, it is not optimal. Especially in a state such as North Carolina, where much of the growth is occurring in the form of suburban and exurban development in rural or semi-rural counties close to major urban centers (NC Rural Center, 2006), it is critical that green building programs not be restricted to major urban centers.

### Growth and Development in Rural Counties in North Carolina

In the last twenty years, many of the historically rural counties in North Carolina have been developing at a rapid pace. In the 1990's, rural counties grew by 18 percent and added over 600,000 new residents. In comparison, urban areas grew by 25 percent and added 800,000 people (NC Rural Center, 2009). Many of the fastest growing rural counties are either adjacent to major urban centers, "high amenity" counties that attract tourists and retirees, or both. One study of development trends in North Carolina found that the highest growth rates can be expected in areas that are currently low-density, close to city centers, and

with high per-capita income (Hartgen, 2003). This may be due to the fact that many of the people employed in major urban centers such as Charlotte, the Triangle and Wilmington have been moving farther out into the surrounding rural areas in order to enjoy the natural amenities and lifestyle that rural areas afford while still living close enough to their place of employment to commute. Whatever the causes, the fact remains that rural counties throughout the state are going to continue to receive a large share of population growth. On a local and regional scale, this rapid development creates numerous problems associated with adequate provision of services, traffic congestion and other transportation issues, loss of rural character, and air and water pollution (Powell et al., 2003). While certain growth management tools such as subdivision regulations and impact fees are becoming increasingly commonplace in many rural counties, there has for the most part been little thought given on the part of local governments as to how buildings and the processes through which they are constructed, maintained, remodeled, and demolished affect broader questions of sustainability. Economic development, transportation, and loss of rural character associated with changing land use patterns are often at the forefront of planning concerns in fastgrowing rural areas. Largely absent in the policies and regulations of rural areas is any mention of the effects that development in rural areas has on state, national, and global attempts to reduce energy consumption and mitigate global climate change.

#### Local Green Building Programs and Policies

Since local green building programs are a relatively recent phenomenon compared to federal policies, differ greatly between regions, and affect only relatively small areas, data on their effectiveness has not been collected and reviewed in a comprehensive manner. However, numerous recent studies have cited local programs as having an important effect

on green building proliferation, and have stressed the need for further research (USGBC, 2002; Friedman, 2006). While there has not been much in the way of systematic policy evaluation, there have been a number of green building advocacy groups that have published policy guidelines and handbooks for state and local governments wishing to enact green building programs (USGBC, 2002; BCAP, 2008; Global Green USA, 2008). There has also been a growing movement to incorporate green building into affordable housing initiatives, and some affordable housing advocacy groups have also produced reports addressing state and local green building policies (Proscio, 2007, 2008; Tassos, 2006, 2007; Williams, 2008). While the research has been somewhat disparate, there are a number of overlapping issues that have been addressed by nearly all of the research. Specifically, as Wilson et al. (2008) point out, local building codes, zoning regulations and other land use ordinances, tax incentives, and comprehensive plans can have a major influence on whether green building occurs in a given county or municipality.

#### **Green Building in Rural Areas**

Very little research has been done on encouraging green building in rural areas, and almost none has been done on green building policies in fast-growing rural areas. While there has been recent research showing that green building activity varies across different regions and addressing the need for greater spatial specificity in green building certification standards (Cidell and Beata, 2008) as well as research showing that the distribution of green building certification professionals matches existing concentrations of population (Cidell, 2009), neither of these studies addresses the micro-scale political, economic, and cultural differences between urban and rural areas that may help explain why green building is disproportionately concentrated in urban areas.

What little research has been done on green building in a rural context has focused primarily on either affordable housing (Kudlowitz, 2007) or strategies for areas that are expected to stay rural (King County, WA, 2007). Findings from research on green affordable housing offer insight into broader rural concerns, as they examine green building assuming a relative scarcity of funding, which is a common concern for many rural local governments Cowan, 2007). The Wisconsin Environmental Initiative (2005) found that many of the land use challenges to developing green affordable housing are created through local ordinances, zoning, or subdivision regulations. Kudlowitz (2007) finds that common barriers to providing green affordable housing in rural areas include funding challenges, less opportunity for infill development, less access to specialized building materials, restrictive local land use regulations and challenges of finding third party verifiers. Both of these studies address the need for green building practices in developing affordable housing but do not address how fast-growing rural areas that are attracting middle and upper-middle class residents can influence residential development at that income level. By contrast, what research has been done on promoting green building in market-rate housing has largely neglected to address concerns that are specific to rural areas. Taking this into consideration, along with the research pointing to the importance of local programs, it is clear that more research is needed on how green building can be promoted in fast-growing rural areas for housing at all income levels.

# Methodology

In order to understand how green building can be more effectively integrated into local development policies, I designed my research methodology to explore policy implementation from a variety of key perspectives. The study design also endeavored to

explain the contextual circumstances that may influence individuals' perceptions of green building as well as broader market demand. To do this I relied on a mix of ethnographic techniques, including policy analysis (reviewing existing policies and programs and reviewing and coding existing land use plans and ordinances) and a series of in-depth semistructured interviews with key informants (Patton, 2001; Ulin et al., 2004). Analysis of policies and ordinances for each of the five counties helped to create a context for interview findings.

First, I conducted an in-depth program analysis, gathering information from each of the county's respective websites, as well as from the websites of the cities of Durham and Asheville. Unified development ordinances (UDOs), subdivision and zoning regulations, and other land use and development-related policy documents provided contextual information on each county's current development policies and helped provide insight into current levels of interest in environmental or energy-related issues and topics.

The study compares the plans and ordinances of two urban counties that have marketed themselves as being "green" with those of three fast-growing rural counties. The plans were reviewed and coded using a best practices template that captured information on 33 elements of each county's plans and ordinances that were thought to be directly or indirectly associated with green building policy implementation (Cepe et al., 2009; USGBC, 2002; Eisenberg et al., 2002). Table 1 quantifies the policies of each of the five counties to provide an idea of some of their strengths as well to identify some common deficiencies and areas in need of improvement.

Finally, I performed a series of semi-structured, in-person interviews with state employees, members of local government, and building professionals from each of the five

counties to gather information on policy perceptions and location-specific factors relating to green building activity (Berg, 2001). The semi-structured interview involves the implementation of predetermined questions and/or special topics, but allows the interviewees to digress and explore answers that may stray from the original question in order to provide insights that they find important or unique (Ibid). Interviews were conducted systematically so as to contact: 1) a diverse cross-section of building professionals (with diverse viewpoints), 2) members of local government who influence policy decisions, 4) an expert on North Carolina building and energy codes, 5) an expert on state green building initiatives, and 6) a representative of a green building advocacy organization. Purposive sampling methods were used to select interviewees based on their professional knowledge of and interest in local green building policies and regulations (Ibid)

I created three interview guides; one for state officials and employees, one for members of local government, and one for developers, homebuilders, and green building advocacy groups. While each of the 3 guides was tailored to a specific occupation, each guide contained questions that addressed the central components of the study. All interviewees were asked about their opinions on federal, state, and local policies encouraging green building, as well as which types of policies they consider most effective at encouraging green building. Other questions were aimed at discovering interviewee perceptions on the role of green building in rural areas, specific opportunities and constraints to green building in urban and fast-growing rural areas, and different stakeholder roles in the implementation of green building policies.

In total, I conducted in-depth semi-structured interviews with 19 key informants from December 2008 to February 2009. Key informants held diverse positions and experiences;

state employees included the Director of the North Carolina Board of Science and Technology<sup>i</sup>, the agency tasked with overseeing the state's Green Business Fund, an engineer at the NC Department of Insurance, Energy Division<sup>ii</sup>; members of local government included the chairman of the Chatham County Board of Commissioners<sup>iii</sup>, a City Councilwoman for the city of Asheville<sup>iv</sup>, two local planners (one from Lincoln County<sup>v</sup> and one from the City and County of Durham<sup>vi</sup>), and the Sustainability Coordinator for the City and County of Durham<sup>vii</sup>; representatives of the building industry included one green builder and co-chair of the Wilmington Cape Fear HBA Green Building Commission<sup>viii</sup>, one green builder and former president of the Asheville HBA<sup>ix</sup>, one green builder and member of the Chatham County Green Building Task Force<sup>x</sup>, two regional developers involved in largescale green development<sup>xi,xii</sup>, a green builder and architect<sup>xiii</sup>, two HBA employees specializing in local government relations<sup>xiv,xv</sup>, and two HBA employees<sup>xvi,xvii</sup>, a project manager for a national development firm<sup>xviii</sup>; the Director of the Western North Carolina Green Building Commission<sup>xix</sup>, a non-profit green building advocacy group, was also interviewed.

Key informants provided green building-specific policy recommendations and information on key issues surrounding local government promotion of green building. Although the roles of interviewees were diverse, the experiences and views on green building policies were generally similar, and interviews were conducted until saturation (similar question responses) was achieved (Patton, 2001). Interviews usually lasted 1 hour. All interviews were tape recorded and transcribed. Open (inductive) coding, whereby interviews were read for content and thematic patterns without a prior analytical schema, was used to allow interviewee perspectives to emerge. Once coding was complete, codes were arranged

under broad themes relating to constraints to and opportunities for green building, perceptions on green building policies, and perceptions on future location-specific green building activity levels.

### **Study Areas**

As mentioned above, the areas included in this study were five counties in North Carolina (see figure 1): two urban counties (shown in grey) were studied along with their primary cities, and three rural counties (shown in black) were studied. The two urban counties, Buncombe and Durham, were chosen because they contain cities with policies encouraging green building and also have county-level environmental and energy initiatives in place. While policies at the county level were reviewed and provided some useful information, Asheville and Durham were the primary focus within the urban counties.

The three rural counties of Brunswick, Chatham, and Lincoln were chosen because they all share certain characteristics that make them what I consider "transition" counties. They are all counties with a majority of residents living in rural areas (2000 census) that are adjacent to fast-growing urban counties (Brunswick to New Hanover, Chatham to Wake, and Lincoln to Mecklenburg, respectively), they are all listed in the 2000 Census as in the top 20 fastest growing counties in North Carolina, and they are all listed by the N.C. Department of Commerce as "Tier 3" counties, meaning that they are among the top 20 least economically distressed counties in the state (NC Dept. of Commerce, 2009). These counties represent the middle ground that I believe many of the now rural counties in North Carolina and throughout the country will progress through as development and urbanization continue to expand in coming years.



Figure 1 (Urban counties shown in grey, rural counties shown in black, and urban areas shown in blue)

### The City and County of Durham

The City of Durham has adopted a mission statement that "Durham will be North Carolina's leading city in providing an excellent and sustainable quality of life" (City of Durham and Durham County, 2007). The City of Durham is also a signatory to the United Nations Urban Environmental Accords, which sets forth actions that cities can implement to move towards environmental sustainability. In 1996, the City of Durham joined the Cities for Climate Protection (CCP) and committed "to achieving quantifiable reductions in local greenhouse gas emissions, improved air quality, and enhanced urban livability and sustainability" (Durham, 2007). In 1999, the City of Durham completed a greenhouse gas inventory and action plan as part of the CCP. In September of 2007, the City and County of Durham published its updated "Greenhouse Gas and Criteria Air Pollutant Emissions

Inventory and Local Action Plan for Emission Reductions (Action Plan)," and in October the County adopted the "Durham County NC Resolution to Reduce the Risks of Climate Change." The targets for GHG emissions reductions proposed for the City and County of Durham as a result of this resolution include a 30% reduction from 2005 emissions levels by 2030 for the community and a 50% reduction from 2005 emissions levels for local government operations (Action Plan, p. 10). The action plan contains numerous strategies intended to reduce greenhouse gas emissions, including policies that promote residential green building. The plan states: "policies and incentives can be developed within the community to encourage developers to meet higher energy efficiency standards for new construction (such as LEED or the Durham Orange Chatham Counties Homebuilders Association Green Building Standard)" (p.49). The plan also mentions using education and incentives to encourage homeowners to look into green energy tags or renewable energy generation. In 2007 the city hired a full-time Sustainability Coordinator to help implement the plan as well as research new strategies for reducing the city's carbon footprint. Also, the city recently formed a "Green Team" made up of representatives from each City department to help increase environmental awareness and practice within the City government (City of Durham, 2009).

Perhaps the most significant policy affecting green building that Durham has adopted is the "Durham County High Performance Building Resolution," adopted in 2008. The resolution stipulates that "New construction of public buildings and facilities over 10,000 square feet shall achieve a minimum rating of LEED Gold or any comparable performance criteria, and strive to achieve the highest rating." The resolution also requires LEED Silver or equivalent for smaller buildings, LEED certification for renovations of public buildings in

excess of 25% of the building, and "green building practices to the maximum extent possible through the use of the USGBC LEED checklist or other comparable performance criterion in the planning, construction, renovation, maintenance and operation" of public facilities. While these policies do not affect residential construction practices directly, they show a willingness on the part of local government to endorse green building practices, which has been recommended by green building advocacy groups as a way to expand the market and increase interest in green building in the private sector (USGBC, 2002; Cepe et al., 2007; USGBC 2008). While many of the recommendations and policies laid out in the 2007 Action Plan have yet to be implemented and others are still too new to be accurately evaluated, the City and County of Durham has, at least nominally, taken numerous steps to promote green building.

#### **Buncombe County and the City of Asheville**

Asheville sits alongside Durham as one of the leading cities in North Carolina in terms of environmental initiatives. Situated in Buncombe County, Asheville has a long history of environmental stewardship. While Asheville has been the primary driver of environmental policy in Buncombe County, the county also has a number of policies in place that address climate change. A countywide recycling program, compact fluorescent lighting in all county buildings, preventative building maintenance, reflective roof systems and other green building materials in county buildings, and hybrid vehicle/alternative fuel programs for county vehicles are all policies currently in place meant to reduce the carbon footprint of Buncombe County. Other county initiatives include the "Buncombe Bioreactor," a landfill that digests garbage at an accelerated rate thereby reducing the amount of land needed for landfills, and the Landfill Methane Gas Program, through which landfill gas is captured,

converted to energy, and sold to residents and businesses across North Carolina through NC GreenPower.

At the local level, there are a number of policies in Asheville that are meant to promote green building. The city waives fees for building permits and plan reviews for certain renewable energy technologies and green building certifications for homes and mixed-use commercial buildings. Waivers for building permit fees (\$100) may apply to residences that achieve Energy Star Rating or HealthyBuilt Home certification, and the city also waives \$50 for each green feature that a residential building incorporates, including geothermal heat pumps, solar-energy systems, wind turbines, and storm water (gray water) collection device for reuse in yard sprinkler or elsewhere (City of Asheville Permit Fees, 2008). These fee waivers also apply to mixed-use commercial buildings if they include residential space. The city will also reduce plan review fees by 50% for any building that is seeking LEED certification. For each of these policies developers must pay regular fees in full but are given rebates upon certification.

In April 2007, the Asheville City Council adopted carbon emission reduction goals and set LEED standards for new city buildings. The council committed to reducing carbon emissions by 2% per year until the city reaches an 80% reduction from baseline year 2001-02 emissions. To work towards this goal, the council adopted Resolutions 07-90 and 07-91, which state that all new occupied city-owned buildings greater than 5,000 square feet will adhere to the LEED "Gold" standard, and that new city buildings less than 5,000 square feet will achieve the LEED "Silver" standard. The resolutions require city planners to strive for the highest LEED certification possible when project resources and conditions permit. Buildings greater than 5,000 square feet must meet an energy savings payback period of 10

years or less. If the payback period exceeds 10 years, city planners must instead construct the facility to meet the LEED "Silver" standard.

Asheville's green public facilities requirements, which are similar to Durham's except for their adherence to LEED standards specifically, are another example of a local government acting as a steward and leader in the promotion of green building. The permit fee waiver program is also a testament to the fact that the city is trying not only to influence public building practices, but private development as well. Again, as in the case of Durham, the relative newness of these policies makes it difficult to determine their effectiveness at encouraging green building on a broad scale. However, since both Durham and Asheville have high levels of green building activity and have demonstrated local government leadership in the promotion of green building, both cities will be used as examples of areas that have both high market demand for as well as a political and economic environment conducive to green building. Durham's policies and programs will be analyzed in conjunction with those of Buncombe County and Asheville to highlight certain "best practices" that may be applicable to rural areas as well as to provide contrast and highlight some of the differences between urban and rural local government motivations and capabilities.

#### **Brunswick, Chatham, and Lincoln Counties**

The policies of Durham and Asheville represent best practices within the state and provide examples of what local governments are doing to promote green building in established urban areas. However, many of the rural counties close to urban centers such as these do not have similar policies in place. Many of these rural areas are in some stage of transition from "traditional" rurality (i.e., very low-density, predominantly agricultural, high

poverty rates) (Cowan, 2007) to more suburban forms (i.e., low to medium density, high percentage of out-commuters, low poverty rates). Brunswick, Chatham, and Lincoln Counties all share certain characteristics that make them what I consider "transition" counties. They are all counties with a majority of residents living in rural areas (2000 census) that are adjacent to fast-growing urban counties (Brunswick to New Hanover, Chatham to Wake, and Lincoln to Mecklenburg, respectively), they are all listed in the 2000 Census as in the top 20 fastest growing counties in North Carolina, and they are all listed by the N.C. Department of Commerce as "Tier 3" counties, meaning that they are among the top 20 least economically distressed counties in the state. These counties represent the middle ground that I believe many of the now rural counties in North Carolina and throughout the country will progress through as development and urbanization continue to expand in coming years.

In all three of the transition counties, considerable development pressure in recent years has led to increased efforts on behalf of local governments to influence development patterns through policy, though this has not been directly correlated with local government interest in green building. Chatham, Lincoln, and Brunswick Counties have all adopted new ordinances within the last two years meant to manage growth and development. Both Brunswick and Lincoln Counties have newly adopted Unified Development Ordinances, and Chatham County has recently amended its zoning and subdivision ordinances. Both Lincoln and Chatham Counties offer 10% density bonuses for cluster development, and have adopted new stormwater and sedimentation control ordinances as well (Chatham County Stormwater Ordinance, 2008; Chatham County Erosions and Sedimentation Control Ordinance, 2008; Lincoln County Unified Development Ordinance (UDO), 2008). Chatham County also has

impact fees for recreational facilities and educational facilities. Lincoln County has an adequate public facilities program meant to control the location of growth (Lincoln County UDO, 2008). Also, both Chatham and Lincoln County have newly elected commissioners that have been described as being environmentally conscious <sup>iii, xvi</sup>.

# RESULTS

Case studies revealed a number of factors that may help to explain the apparent difference in green building activity in transition versus urban areas. Program analysis helped identify policies common across all study areas, and also helped to differentiate areas in terms of their respective approaches to development and green building. Table 1.1 shows information on 33 elements of each study area's plans and ordinances that were thought to be directly or indirectly associated with green building policy implementation (Cepe et al., 2009; USGBC, 2002; Eisenberg et al., 2002). Results showed that the City of Asheville and the City and County of Durham have the most policies in place supporting green building, respectively. Among the three transition counties, Chatham has the most policies in place supporting green building, with Brunswick and Lincoln Counties following in a tie. Table 1.2 provides descriptions of the criteria contained in Table 1.1.

| TABLE 1.1: Program Analysis Results |           |                     |           |         |                          |          |  |
|-------------------------------------|-----------|---------------------|-----------|---------|--------------------------|----------|--|
| Criteria                            |           | Name of County/City |           |         |                          |          |  |
|                                     | Brunswick | Buncombe            | Asheville | Chatham | City/County<br>of Durham | Lincoln  |  |
| Green building requirements         |           |                     |           |         |                          |          |  |
| for public buildings                | N         | N                   | Y         | Y       | Y                        | N        |  |
| Green Building guidelines           | N         | N                   | N         | Y       | N                        | N        |  |
| Green Building team/task            |           |                     |           |         |                          |          |  |
| force                               | N         | N                   | N         | Y       | N                        | N        |  |
| Financial incentives for green      |           |                     |           |         |                          |          |  |
| building                            | N         | N                   | Y         | N       | N                        | N        |  |
| Financial incentives for other      | V         | V                   | V         | V       | V                        | N        |  |
| types of development                | Y         | Y                   | Y Y       | Y Y     | Y Y                      | N        |  |
| Sustainability policies             | N         | Y                   | Y         | Y       | Y                        | N        |  |
| Educational materials               | NT        | v                   | v         | v       | v                        | NT       |  |
| Coshon reduction resolution         |           | I<br>V              | I<br>V    | I<br>V  | I<br>V                   | IN<br>NT |  |
| Carbon reduction resolutions        | N         | Y                   | Y         | Y       | Y                        | N        |  |
| Energy efficiency goals             | N         | N                   | Y         | N       | Y                        | N        |  |
| State/local utility rebate          |           |                     |           |         |                          |          |  |
| programs                            | Ŷ         | Ŷ                   | Ŷ         | Ŷ       | Ŷ                        | Y        |  |
| Renewable energy rebates            | N         | N                   | Y         | N       | N                        | N        |  |
| Waste reduction goals               | N         | Y                   | Y         | Y       | Y                        | N        |  |
| Recycling program                   | Y         | Y                   | Y         | Y       | Y                        | Y        |  |
| Solar easement/access               |           |                     |           |         |                          |          |  |
| requirements                        | N         | N                   | N         | N       | N                        | N        |  |
| Conservation district/policies      | Y         | Y                   | Y         | N       | N                        | Y        |  |
| Watershed protection                |           |                     |           |         |                          |          |  |
| ordinance                           | Y         | Y                   | Y         | Y       | Y                        | Y        |  |
| Stormwater management               |           |                     |           |         |                          |          |  |
| programs/ordinance                  | Y         | Y                   | Y         | Y       | Y                        | Y        |  |
| Encourages low-water use            | NT        | N                   | V         | N       | V                        | N        |  |
|                                     | IN        | IN                  | Y         | IN      | Y                        | IN       |  |
| provisions for pervious             | v         | v                   | v         | v       | v                        | v        |  |
| Growth Management Policies          | I<br>V    | I<br>V              | I<br>V    | I<br>V  | I<br>V                   | I<br>V   |  |
|                                     | I         | I                   | I         | I<br>V  | I                        | I        |  |
| Encourages IOD                      | N         | N                   | Ŷ         | Ŷ       | Y                        | N        |  |
| Mixed Use zoning                    | N         | N                   | Y         | Y       | Y                        | Y        |  |
| Incentives for mixed use            | N         | N                   | Y         | N       | N                        | N        |  |
| Allows for cluster                  |           |                     |           |         |                          |          |  |
| development                         | N         | Y                   | Y         | Y       | Y                        | Y        |  |
| Incentives for cluster              | NT        | V                   | v         | v       | V                        | v        |  |
| DUD standards                       | IN        | Ŷ                   | Y         | Y       | Y                        | Ŷ        |  |
| r OD statuarus encourage            |           |                     |           |         |                          |          |  |
| transportation                      | v         | v                   | v         | v       | v                        | v        |  |
| FIS required                        |           | v v                 | v v       | v v     | v                        | I<br>V   |  |
| Public meeting required in          | 1         | 1                   | 1         | 1       | 1                        |          |  |
| subdivision approval                | Y         | Y                   | Y         | Y       | Y                        | Y        |  |
| Technical Review Committee          | v         | v                   | V         | V       | v                        | v        |  |
| - common no new commute             | L.        | 1                   | 1         | 1       | 1                        | 1        |  |

| Urban heat island mitigation |          |          |         |         |         |          |
|------------------------------|----------|----------|---------|---------|---------|----------|
| measures                     | Y        | Ν        | Y       | Ν       | Y       | Ν        |
| Affordable housing program   | Y        | Y        | Y       | Y       | Y       | Ν        |
| Voluntary Agricultural       |          |          |         |         |         |          |
| District Program             | Y        | Y        | Y       | Y       | Y       | Y        |
| Green Marketing              | Ν        | Y        | Y       | Y       | Y       | Ν        |
| Totals:                      | 15Y, 18N | 21Y, 12N | 30Y, 3N | 25Y, 8N | 26Y, 7N | 15Y, 18N |

| TABLE 1.2: Description of Criteria                  |   |  |  |  |
|---|---|--|--|--|
| Criteria  | Description of Criteria   |  |  |  |
| Green building requirements for public buildings    | Has adopted a policy requiring green certification for construction/renovation of public facilities   |  |  |  |
| Green Building guidelines                           | Provides green building guidelines in plans or through website  |  |  |  |
| Green Building team/task force                      | Has created a task force specifically to provide<br>recommendations to local government on green building-<br>related issues  |  |  |  |
| Financial incentives for green building             | Provides financial incentives for builders/homeowners who<br>obtain third-party green certification   |  |  |  |
| Financial incentives for other types of development | Provides financial incentives for other types of development<br>such as affordable housing  |  |  |  |
| Sustainability policies                             | Mentions sustainability as an overarching goal and provides policies supporting goal  |  |  |  |
| Educational materials provided                      | Local government website provides links to sources of information on green building or sustainability   |  |  |  |
| Carbon reduction resolutions                        | Has adopted an official policy statement setting carbon emission reduction goals  |  |  |  |
| Energy efficiency goals                             | Has adopted an official policy statement setting goals for energy usage/reduction   |  |  |  |
| State/local utility rebate programs                 | State or local utility providers offer rebates or discounts for<br>Energy Star or other green certified homes   |  |  |  |
| Renewable energy rebates                            | Local government provides permit or tax rebates to<br>builders/homeowners for renewable energy features   |  |  |  |
| Waste reduction goals                               | Plans mention reduction of waste as goal and provides supporting policies   |  |  |  |
| Recycling program                                   | Has a waste recycling program in place  |  |  |  |
| Solar easement/access requirements                  | Includes prohibitions against covenants or other conditions<br>of sale that restrict or prohibit the use, installation or<br>maintenance of solar collection devices. |  |  |  |
| Conservation district/policies                      | Requires land conservation through zoning or other ordinances   |  |  |  |
| Watershed protection ordinance                      | Limits development in critical or sensitive watersheds  |  |  |  |
| Stormwater management ordinance                     | Has ordinance requiring stormwater management measures<br>by new development  |  |  |  |
| Encourages low-water use landscaping                | Design standards encourage or require low-water use landscaping   |  |  |  |
| Provisions for pervious paving materials            | Development standards allow use of pervious paving materials  |  |  |  |
| Growth Management Policies                          | Plans contain growth management policies such as urban  |  |  |  |

|  | service districts, adequate public facilities ordinances, or |  |  |
|--|--|--|--|
|  | "new urbanist" design standards                              |  |  |
| Encourages TOD                                   | Plans mention transit oriented development as a goal and     |  |  |
|  | provide supporting policies                                  |  |  |
| Mixed Use zoning                                 | Zoning code includes mixed use zoning districts              |  |  |
| Incentives for mixed use                         | Provides financial incentives for mixed use development      |  |  |
| Allows for cluster development                   | Allows developers to choose between conventional and         |  |  |
| Allows for cluster development                   | conservation subdivision design                              |  |  |
| Incontines for cluster development               | Provides financial incentives such as density bonuses for    |  |  |
| incentives for cluster development               | conservation subdivision design                              |  |  |
| PUD standards ancourage podestrian/biovale       | Subdivision and/or planned unit development guidelines       |  |  |
| ron standards encourage pedestrial/orcycle       | encourage or require pedestrian/bicyclist-oriented design    |  |  |
| transportation                                   | features   |  |  |
| FIS required                                     | Environmental Impact Statement required for new              |  |  |
| Els lequiled                                     | development projects   |  |  |
| Public mosting required in subdivision approval  | Subdivision approval process includes mandatory public       |  |  |
| r ubite meeting required in subdivision approval | meeting  |  |  |
| Tashniasl Bayiaw Committee                       | Technical Review Committee analyzes development plans        |  |  |
| Technical Review Committee                       | for compliance with environmental regulations                |  |  |
| Urban haat island mitigation massures            | Design standards mention reduction of urban heat island      |  |  |
| orban neat island mitigation measures            | effect as a goal and provide supporting policies             |  |  |
| Affordable housing program                       | Plans include policies promoting or requiring affordable     |  |  |
| Anordable housing program                        | housing  |  |  |
| Voluntary Agricultural District Program          | Has VAD Program in place that supports preservation of       |  |  |
|  | farmland through preferential taxation or other means        |  |  |
| Green Marketing                                  | City or County is marketed on website as being 'green'       |  |  |

Sources: 2007 Brunswick County Unified Development Ordinance, 2007 Brunswick County CAMA Core Land Use Plan, Brunswick County Website, 2006 Buncombe County Comprehensive Land Use Plan Update, 2006 Buncombe County Solid Waste Management Plan, 1993 Buncombe County Subdivision Ordinance, Buncombe County Website, "Asheville City Development Plan 2025, 2008 City of Asheville Building Safety Department Permit Fees, 2008 City of Asheville Code of Ordinances, City of Asheville Website, 2004 Chatham County Compact Communities Ordinance, 2008 Chatham County Subdivision Ordinance, Chatham County Green Building Guidelines, Chatham County Website, 2007 City and County of Durham Greenhouse Gas and Criteria Air Pollutant Emissions Inventory and Local Action Plan for Emissions Reductions, 2007 Durham County Climate Change Resolution, Durham County High Performance Building Policy, 2007 City and County of Durham Comprehensive Plan, City of Durham Website, 2008 Lincoln County Subdivision Ordinance, 2008 Lincoln County Unified Development Ordinance, Lincoln County Website

Program analysis provided information on the types of policies each county has in place, while interview results offered insight into a number of other factors that were found to have an influence on green building activity levels. Interview results also showed differences in perceptions and ideas between occupations in different areas about what types of policies are most effective at encouraging green building. The interview summary process allowed me to rank specific constraints to green building policy implementation in transition areas, and also revealed some of the potential reasons for these constraints. A lack of awareness among both builders and the public on the processes and benefits of green building, inadequate financial incentives, and a lack of both vertical and horizontal coordination between government agencies, homebuilders associations, and green building advocacy groups were all found to be constraints to green building in transition areas. Reasons for these constraints include resistance on the part of some rural residents and builders to accept ideas that seem new or foreign, widespread confusion as to what "green" actually means, varying levels of access to education and outreach and ineffective federal and state policies.

Interviews also revealed a number of potential opportunities for green building proliferation unique to these areas, including a strong sense of environmental stewardship among rural residents, an abundance of open space that may allow for better siting and design of buildings and developments, the ability to better influence development due to high growth pressure, a more relaxed political atmosphere, and high levels of education among residents of areas close to urban centers. I will first discuss some of the common constraints to green building found in transition areas, followed by a brief description of some of the unique opportunities for green building proliferation.

### **Constraints to Green Building in Transition Areas**

The main constraints to green building in transition areas fell into four broad categories, including 1) lack of education among consumers and builders, 2) lack of knowledge within local governments about green building standards and procedures, 3) lack of incentives for builders and developers, and 4) inadequate coordination both within and between organizations involved in the creation and implementation of green building

policies. These four categories are general representations of the constraints found in the three transition areas included in the study, however there were exceptions within each category as well as differences in causes for certain constraints between areas. As will be discussed below, while all of the constraints included in these categories were found to some degree within each of the transition areas in the study, they did not apply equally to each area.

While interview results showed that the urban areas have greater access to education and outreach and program analysis showed that urban areas tend to have more active local governments in terms of policies promoting green building (see Table 1.1), a lack of awareness is not unique to transition areas; this was considered by all interviewees to be the main constraint to green building in both urban and non-urban areas. Similarly, builders who operate in both urban and transition areas cite inadequate and/or ineffective financial incentives and a lack of interagency coordination as being problems in urban areas <sup>ix, xi, xii</sup>. However, as will be described below, these constraints tend to be more prevalent in transition areas.

#### **1. Lack of Consumer and Builder Education**

Interview results showed that many of the interviewees considered a lack of consumer education a major constraint to green building in transition areas <sup>iii, iv, v, viii, ix, x, xii, xv, xvi, xix</sup>. One HBA employee in Lincoln County pointed to a lack of "knowledge; knowledge of what [green building] can do for us and how it can work for us" <sup>xvi</sup> as the main constraint to green building in that area. This sentiment was especially prevalent among builders and developers, as was shown by the response of a Brunswick County builder <sup>viii</sup>:

"The rural areas, you know, don't have the population that can come in and say 'all right, well, we all think this would be good.' It's just these scattered people, and they're not aware of it, for the most part, not aware of the benefits".

Another developer simply stated: "The consumer needs to want it" <sup>xii</sup>, referring to the fact that in areas where awareness is low there is no market for green building, so developers and/or local governments do not have any motivation to pursue it.

All of the private developers <sup>xi, xii, xviii</sup> agreed that increasing knowledge on the costs and benefits of green building translates to an increased market demand and subsequently a growth in green building activity. However, while there was agreement that more public education is needed, several interviewees argued that there are certain constraints to providing education in rural areas <sup>iii, xii, xiv, xvi, xix</sup>. Constraints specific to rural areas include 1) a resistance on the part of rural residents to accept new information from people they are not familiar with, or "outsiders" <sup>iii, xvi, xix</sup>, 2) a general unwillingness on the part of some rural residents to depart from "traditional" rural values such as independence from government and a strong belief in property rights <sup>iii, xii, xiv</sup>, and 3) the need for educational efforts in rural areas to focus on the economic benefits of green building rather than the environmental benefits <sup>v, viii, xii</sup>.

Several interviewees mentioned that education and outreach in rural areas must be provided by individuals or organizations with which rural residents are familiar in order for it to be effective <sup>xii, xvi, xix</sup>. According to the Director of the WNCGBC, "you can't [promote green building] as an outsider" <sup>xix</sup>. An employee of the Lincoln County HBA confirmed this

idea when discussing Lincoln County residents: "People want to know what [green building] is going to do for them in particular...not what everybody else is doing. In that respect we're very old fashioned here" <sup>xvi</sup>. Furthermore, several interviewees felt that residents of urban areas tend to be more responsive to the environmental arguments for green building than residents of rural areas. As the Director of governmental Relations for the DOC-HBA pointed out: "right now, [for the environmental argument to work] it has to be the kind of people who buy a Prius" <sup>xiv</sup>. A Triangle area green developer agreed with this sentiment, arguing that in rural areas where economic concerns are more prevalent, "if you stand there and try to sell somebody on the environmental benefits…you're not going to get very far" <sup>xii</sup>. The need for education to come from a familiar source and to be focused on economic benefits is further compounded by certain "traditional" rural values. Several interviewees mentioned the fact that rural residents often "don't want to be told what to do on their land" <sup>iii</sup>, and thus may be hesitant to trust educational efforts that they perceive as being intended to influence their behavior <sup>iii, xii, xiv</sup>.

Another commonly cited constraint was a lack of awareness of green building amongst builders and subcontractors in transition areas <sup>viii, ix, x, xi, xiii</sup>. Especially in rural areas where many builders have been working in the same area for a long time, there is an unwillingness to change from accepted building practices. One builder summarized the resistance of builders to change their practices in this way: "There's a learning curve, and you know, most people don't like change...most people just don't want to bother with it" <sup>ix</sup>. Another builder and architect who has experience working on green building projects in rural counties near Charlotte reported having a very difficult time finding subcontractors (i.e. plumbers, site graders, etc.) who were familiar with green building, and having to "educate every single sub

[contractor]... as to what "green" meant and what their part played in the overall big picture" xiii

Reasons for a lack of familiarity with green building on the part of builders in transition areas included: resistance to incorporate green building practices into a project due to perceptions that it will add significantly to project costs <sup>ii, iv, xxi, xii, xiii, xvii</sup>, general resistance on the part of established builders to change/ learn new techniques <sup>ix, xiii, xvii</sup>, perceived administrative and logistical difficulties of the green building certification process <sup>x, xi, xiii</sup>, and general confusion on the part of both builders and local governments as to which green building standards are best or most appropriate <sup>viii, x, xi, xv, xviii</sup>.

An interesting aspect of interviewee perceptions on consumer and builder education/awareness relates to the recent economic downturn. Some interviewees reported that many constraining factors have been exacerbated by the current market downturn, which has increased concerns among builders and developers over project costs and made many builders even less likely to dramatically change their business and/or building practices <sup>xii, xvii,</sup> <sup>xviii</sup>. Other interviewees had different views of the economic downturn, however. Some interviewees considered the downturn as a positive, and reported that interest in green building among builders and developers has actually increased since the market has slowed down due to builders viewing green building as a marketing tool <sup>iv, viii, xiii, xv, xix</sup>. As the Director of the WNCGBC stated: "We're excited about the downturn" <sup>xix</sup>. Some of the builders and developers interviewed acknowledged that while the downturn has negatively affected green building proliferation, builders who were already building green prior to the downturn have gained a market advantage, and that this is likely to increase the number of green builders in the long run as other builders try to remain competitive <sup>viii, xviii</sup>.

Interviewees all felt similarly that the economic downturn has been a positive thing in terms of increasing consumer interest in the cost saving attributes of green building.

### 2. Lack of Awareness Among Local Governments

Questions aimed at deciphering levels of interest in and knowledge of green building by members of local government in transition areas showed similar findings between interviewees. While all of the local government affiliates displayed a basic awareness and understanding of green building <sup>iii, iv, v, vi, vii, x</sup>, interviewees in transition areas tended to consider themselves as minorities among peers in this respect <sup>v, x</sup>. One such planner, when asked whether other members of local government were interested in green building, said "a couple of them, yeah...but requiring LEED certification [for public facilities] does not have a lot of traction here"<sup>v</sup>. The Chairman of the Chatham County Green Building Task Force, a commissioner-appointed citizen group that is relied on by the county commissioners "for policy recommendations" <sup>iii</sup> said that local government officials "know the words, but not the details" <sup>x</sup>. Both a Lincoln County planner <sup>v</sup> as well as a Chatham County commissioner <sup>iii</sup> mentioned LEED standards in general terms in their descriptions of what green building meant to them, but did not mention any other rating systems in their discussions of potential policies. When asked how they became familiar with green building, one planner said "independent research primarily," <sup>v</sup> another said "simply through being in the planning field for a long time," vi while a county commissioner confessed to relying "on the expertise of others" iii.

All interviewees acknowledged that awareness of green building and other environmental initiatives is increasing both in the public and in local government. Among builders, developers, and HBA employees, perceptions as to the level of government
awareness and interest in green building varied significantly. As one Brunswick County developer put it, "They're kind of learning [about green building] as is everyone, with [green building] kind of becoming the new buzz word" <sup>xi</sup>. Several interviewees <sup>iii, xi, xv, xvi, xvii, xvii</sup> felt that current awareness of green building within local governments in transition counties is adequate and does not present a major constraint. Many other building industry interviewees felt that local government staff and officials have inadequate knowledge of green building, and that this is an impediment to the promotion of green building in both urban and transition areas <sup>viii, ixx, xii, xiii, xiii, xix</sup>. A member of the WCFHBA Green Building Council described this:

"Half the builders aren't [knowledgeable about green building], so how are the people who aren't in the industry going to be? I guess because it hasn't been necessary, they have other things that they're looking at"<sup>viii</sup>.

Interview results also showed that inspections and code enforcement are areas in which local governments in transition areas are in need of improvement <sup>ii</sup>, <sup>iv</sup>, <sup>ix</sup>, <sup>x</sup>. Some interviewees reported that having a lack of code enforcement officers and inspectors who are familiar with green building has resulted in added costs for builders and developers trying to incorporate green features into their homes <sup>iv</sup>, <sup>x</sup>, <sup>xii</sup>. An engineer with the Energy Division of the NC Department of Insurance <sup>ii</sup> involved in the development of the statewide energy code stated:

"They're [inspectors] going to look to see that the minimum requirements have been satisfied...that's all that's required. If someone wants to do more they can, but the code officials are only going to be checking for minimums"

This idea that building inspectors and code enforcers are not actively engaged in the facilitation of green building certification was further promulgated by a regional developer based in Durham who also has experience working in rural areas, who said: "the technical folks [are] for the most part just working through the day, I mean, they're just trying to do the job, fill out the forms right" <sup>xii</sup>. One builder and green building task force member explained that building inspectors who are not familiar with green building often require explanations on green features from a builder, which can delay project completion and add costs <sup>x</sup>. Only one developer <sup>xi</sup> pointed to inspectors in her area as being adequately familiar with green building standards, which she attributed to their previous employment in both rural and urban areas.

#### I. Lack of awareness is due to a number of different factors

While a lack of awareness among local government, builders, and the public is the primary constraint to green building in transition areas, determining the reason for this lack of awareness is difficult. This is in part due to the fact that there is no single cause; indeed there are numerous factors that have made and will continue to make education difficult. While the factors discussed in the previous sections are generally location and/or culture-based, there are other factors that are more market-based. One such factor that has an effect on the ability of groups or individuals to become familiar with green building is the sheer volume of material available and the lack of consistency as to what "green" really means <sup>viii, ix, xv</sup>. Indeed, with research having shown that it is extremely difficult to comprehensively measure the difference in 'greenness' between the various green building standards available to consumers (Burnett, 2007), it is not surprising that there is confusion across all sectors as

to what differentiates one green building standard from another.

Another factor that became apparent during the interview process is the self-reinforcing nature of education and outreach programs. Areas that have educational programs and policies that promote green building tend to have more green building activity as well. However, it is difficult to differentiate the causes from the effects of this "snowballing." Similarly, in areas where there is less green building activity it is difficult to determine whether this is a cause or effect of a lack of green building programs and policies. The relationship between green building activity and education and outreach will be discussed in greater detail using examples from each of the five counties below.

# a. Difficulty in determining what 'green' means

Surprisingly, one of the main impediments to greater knowledge of and familiarity with green building is just how popular 'green' has become. While 'green' has arguably become the new buzzword in both government and mainstream media, interviews showed there is still substantial uncertainty among local government, builders, and the public as to what 'green' building actually entails. The USGBC's LEED rating system is still the most widely used rating system in the U.S. (Makower, 2009; USGBC, 2009), however other rating systems are beginning to gain more widespread consumer recognition (Makower, 2009; Ervin, 2005). As with any new trend, the initial stages of green building's market proliferation have been somewhat chaotic as various rating systems scramble to find a niche and make a profit.

Many of the interviewees mentioned the fact that the seemingly ubiquitous presence of the word 'green' in the media has actually led to more confusion than familiarity. As one interviewee noted, "It's moving so quickly that it's hard to put a finger on exactly what's

going which way. I don't want to say it's the wild, wild west but you know, what constitutes 'green?' Determining that is the major hurdle"<sup>xv</sup>. This confusion as to what constitutes green is at the heart of the lack of awareness problem.

Only recently, with the NAHB's National Green Building Standard becoming the first and only green building rating system to be approved by American National Standards Institute (ANSI) as a national standard, has an official industry-wide consensus on a definition of green been achieved. Still, other national (LEED, GreenGlobes) and regional rating systems (NC Healthy Built Homes) may have more market recognition in certain areas or among certain groups. Thus, it may be difficult for local governments, builders, and consumers to decide which system is best or most appropriate for their goals and/or budget. As one green builder put it, the new growth in the number of organizations claiming to build 'green' has tended to ''confuse people with ten different organizations and ten different certifications'' <sup>viii</sup>. In rural areas where there are already constraints to education and outreach, this confusion may help explain why there has been a lack of political unification around the promotion of green building.

#### b. Education and outreach: vicious and virtuous cycles

As mentioned above, green building education and outreach seem to be selfreinforcing; areas that have green building programs and policies in place tend to also have high levels of green building activity and areas with less green building activity tend to have fewer programs or policies in place. Results of both interviews and program analysis support this idea, and have revealed a number of factors that may help explain why certain counties have more green building activity than others. Specific factors that were found to be directly related to green building activity included 1) local government leadership through 'green' initiatives and policies, 2) local or regional homebuilders associations with green building committees and/or other non-profit green building advocacy groups, and 3) a college or university with some sort of green initiatives or programs in place. In every county, the level of green building activity is closely related to the degree to which the above factors are present. Interview results and program analysis also showed that the spatial location of these factors (i.e., whether they were "internal," meaning located within the county, or "external," meaning that they were located outside of the county) is an important determinant of the amount of influence each factor has in a given area.

Durham and Buncombe Counties are examples of counties in which all of the above factors are present "internally." First, they both have local governments either at the city or county level with green public facilities requirements in place (Durham County High Performance Building Policy, 2007; City of Asheville Resolutions 07-90, 07-91, 2007). Second, they both contain major universities (Duke University in Durham and UNC Asheville in Buncombe, respectively) with green initiatives in place. In 2003, as part of its "Duke University Greening Initiative," Duke University adopted a LEED Building Policy endeavoring "to have all new construction and renovations LEED certified, at a minimum" (Duke University, 2009). Since the policy's adoption 20 buildings have been built to LEED standards, with 9 of them achieving a LEED "silver" rating or higher (Ibid). While UNC Asheville has not adopted LEED-specific policies, it has built a number of facilities with green features in recent years, and has a number of green initiatives managed by the Student Environmental Center (UNC Asheville, 2009).

Finally, and perhaps most significantly, both Durham and Buncombe Counties have

cities acting as hubs supporting the function of advocacy groups and trade organizations. Not surprisingly, interviewees reported high levels of community interest in green building in these counties <sup>iv, vi, vii, ix, xvii, xix</sup>. Also, both of these counties are home to numerous green builders and developers, with over 30 builders who are advertised as 'green' located in Buncombe County (Western North Carolina Green Building Council, 2009), and over 20 green builders located in Durham (Green Home Builders of the Triangle, 2009). Both Durham and Buncombe Counties are examples of areas that are undergoing a virtuous cycle of green building activity, with high levels of green building. Interviewees in both of these counties felt that community interest was increasing and that further efforts would be made on the part of local governments in these areas to promote green building <sup>vi, vii, ix, iv</sup>.

Of the three transition counties in this study, Chatham County has the most green building activity and also the best access to education and outreach. While, similar to Brunswick and Lincoln Counties, its proximity to urban areas provides access to a number of external factors, Chatham County is unique in that it is the only transition county containing a college with green building programs in place and it is the only transition county that has adopted green public facilities requirements <sup>iii, x</sup>. The Central Carolina Community College, which is located in Chatham County, has made green industries its main focus, and offers programs in Green Building and Renewable Energy (CCCC, 2009). Chatham County is also close to three other major universities (Duke, UNC Chapel Hill, and NC State University) as well as the two major cities of Durham and Raleigh. The Green Home Builders of the Triangle, while located in Durham, is active regionally and has over 10 members located in Chatham County (GHBT, 2009). Also, the annual "Green Homes Tour," an educational

program coordinated by the GHBT that allows people to tour certified green homes and ask the owners questions, regularly features a dozen or more homes located within Chatham County (Ibid.). Overall, a virtuous cycle of green building activity is well established in Chatham County, and interviewees felt similarly to those in the urban study areas that interest is increasing among residents and that the local government would continue to implement new policies to promote green building <sup>iiix</sup>.

Program analysis showed that besides having multiple extra-governmental sources of education and outreach, the three local governments in this study that have exhibited strong leadership in the promotion of green building (Chatham County, Durham County, and the City of Asheville) all have a task force and/or a full-time employee whose job it is to research environmentally sustainable practices and provide information and recommendations to members of government. While in each county these positions were created after local leadership had already begun (i.e., in Asheville and Durham after each city had already adopted climate change policies), these intra-governmental "champions" were cited time and time again by interviewees as being critical for improving government and helping create and implement green building policies <sup>iii, iv, vii, x, xvi, xix</sup>.

Both of the officially appointed "champions" interviewed for this study, the chair of the Chatham County Green Building Task Force (GBTF) and the Sustainability Coordinator for the City and County of Durham, stressed the importance of having multiple "champions" or leaders in local government in order for green building policies to work effectively. As the Chair of the GBTF pointed out: "[The Green Building Task Force] can come up with policies, but if there's nobody there to implement it or follow through or try to find where

you can get money from then it doesn't matter"<sup>x</sup>. The Sustainability Coordinator for Durham felt similarly, saying: "so much of [promoting green building] comes from local leadership...and I don't think there can just be one champion...there have to be a couple champions" <sup>vii</sup>.

Results showed that champions are considered important for improving local government leadership not only in terms of policy implementation and raising intragovernmental awareness, but also by helping coordinate education and outreach efforts <sup>vii, x,</sup> <sup>xix</sup>. Especially considering the aforementioned resistance on the part of some people in transition areas to listen to "outsiders," a champion within local government can act as a facilitator and liaison between local interests and regional advocacy groups. The WNCGBC Director expressed the importance of a champion in facilitating education and outreach efforts by outside parties as follows:

"A lot of our success has come from individuals, let's say in a planning office [who] decide that this is a priority for them, and in their job position they can... mold policy [and] look for grants to green different aspects of their community...you really just need those individuals that are pushing it... there's got to at least be a seed planted there already, and the expertise that [advocacy groups] bring...has to be behind the seed" <sup>xix</sup>.

While this statement highlights the importance of intra-governmental champions in raising awareness within local government and thus facilitating local government leadership, it also supports the idea of education and outreach being a critical component of a virtuous cycle of green building activity. The idea of a "seed" being needed in order for education and outreach to effectively influence local governments may help explain why Brunswick and Lincoln Counties are behind Chatham in terms of local government leadership.

Of the three transition areas in the study, Brunswick ranks second in terms of green building activity. While there are currently three large-scale developments in the pipeline that are pursuing green certification <sup>v</sup>, there very few green builders located there and no government policies promoting green building in any way (Brunswick County Unified Development Ordinance, 2007). In the case of Brunswick County, education and outreach efforts have come primarily from the adjacent urban area of Wilmington, which is home to two advocacy groups as well as a major state university. UNC Wilmington has a number of sustainability initiatives in place, as does the city itself, which has a permit fee rebate program for green buildings in place (S.L. 2007-241). Also, both the WCFHBA-GBC and the Cape Fear Green Building Alliance (CFGBA) have been very active in terms of regional education and outreach programs. Thus, Brunswick County's relatively low green building activity levels may be attributable to the fact that while access to external education and outreach is high, there is no internal source of education and outreach as exists in Chatham County, and there is no local government leadership. However, both a developer <sup>xi</sup> and an employee of the WCFHBA <sup>xv</sup> felt that community awareness is on the rise and that it is likely local governments in Brunswick County will implement policies encouraging green building in the near future. Whether green building activity levels will increase in Brunswick County remains to be seen, but results suggest that regional advocacy groups have been successful in beginning a virtuous cycle of green building activity.

Lincoln County has the least amount of green building activity of any of the three

transition counties in the study. There has been little, if any, green development (there is a single large-scale commercial project in the pipeline pursuing LEED certification), and there are no government policies in place encouraging green building (Lincoln County Unified Development Ordinance, 2008). As can be expected, Lincoln County also has the lowest levels of education and outreach. Neither of the HBAs in the county has a green building council. Also, the community college located there does not have any 'green' programs or courses in place such as the ones offered by CCCC (Gaston College, 2009), nor does it have any sustainability initiatives such as the ones found at Duke or UNC Asheville. While the Lake Norman HBA, a regional HBA that is based in the neighboring Iredell County and has members in Lincoln County, has a Green Building Council, there is only one certified green builder located in Lincoln County (Lake Norman HBA Green Building Council, 2009). While one interviewee mentioned that there was significant community interest in green building in the Lake Norman area, she did not specify the extent to which that interest had spilled over into Lincoln County <sup>xiii</sup>. The other two interviewees did not consider community interest to be high, nor did they think that the county would adopt any policies promoting green building in the near future.

In terms of proximity to external sources of education, Lincoln County is very similar to Brunswick and Chatham Counties. As shown in Figure 1, Lincoln County is adjacent to Mecklenburg County and the City of Charlotte. Charlotte is home to a major state university (UNC Charlotte), as well as two green building advocacy groups: the USGBC Charlotte Region Chapter and the Charlotte HBA Green Building Council. UNC Charlotte has an Office of Sustainability that coordinates various environmental initiatives (UNC Charlotte, 2009), and the City of Charlotte is also involved in the permit fee rebate program under S.L.

2007-241. The primary difference between Lincoln and Brunswick Counties is the level of inter-county outreach. As was mentioned before, the Lincoln County HBA representative interviewed was unfamiliar with the City of Charlotte's permit fee rebate program <sup>xvi</sup>, whereas both interviewees from Brunswick County made several references to the permit fee rebate program in the adjacent city of Wilmington. While the local planner interviewed mentioned Charlotte as a potential source of information on green building, he also said that no efforts had been made to either obtain such information or disseminate it to builders or the public  $^{v}$ .

Lincoln County is an example of a vicious cycle in that while there is some awareness of green building, there is limited access to education and outreach, there is no local government promotion of green building, and green building activity is all but absent. While it is difficult to determine if a lack of education and outreach is the primary factor that has led to a lack of activity, neither of the interviewees representing potential internal sources of education and outreach (the principal planner for Lincoln County and the Lincoln County HBA employee) expressed optimism that green building activity would increase in Lincoln County in the near future <sup>v, xvi</sup>.

All of the examples listed above serve to highlight the self-reinforcing nature of education and outreach. Comparing the three counties with the highest levels of green building activity (Buncombe, Durham, and Chatham, respectively) with Brunswick and Lincoln Counties shows that the presence of the three factors that influence green building activity (local government leadership, universities, and green building advocacy groups) is directly correlated with green building activity in urban and transition counties alike. Examining the three transition counties shows that the location of certain of these factors

(i.e., universities) is also important. However, a comparison of green building activity in Brunswick and Lincoln Counties shows that in areas that have similar characteristics in terms of the location of the factors that influence green building, differences in access to education and outreach can lead to different levels of green building activity.

# 3. Lack of Incentives

Besides highlighting shortcomings in consumer and local government understanding of green building and providing insight into the many causes of this lack of understanding, results showed that a lack of financial incentives is also considered to be a major constraint to the proliferation of green building in transition areas. Program analysis and interviews revealed that none of the three transition counties in this study have any types of incentive programs in place to encourage green building <sup>v, x, xi</sup> (see Table 1.1). Chatham County promotes green building to a certain extent through its subdivision requirements, which require developers to attend a pre-application meeting during which time County staff provides them with a "Green Building Checklist," however it is entirely up to the developer whether or not to use the checklist and there are no incentives provided to do so (Chatham County Subdivision Ordinance, 5.2 (B) 1, 2008). Indeed, in none of the ordinances or regulations of the transition counties is there any policy that provides financial incentives for builders that obtain third-party green building certification.

All interviewees considered financial incentives important in encouraging green building. While not every interviewee agreed on which types of incentives are best, the general consensus was that making the green building certification process more costeffective for builders is the most direct way that a government can encourage green building. As one Brunswick County developer put it, "to affect a builder's willingness to build green

and get [homes] certified green, unfortunately in this day and time money is everything" <sup>xi</sup>. Some interviewees considered incentives especially important for getting builders who currently use conventional building practices to pursue green building certification <sup>viii, ix, xi, xii, xvi, xvii</sup>. Permit fee reductions/rebates, expedited permit review, tax incentives, and provision of monetary credits for green certification were all commonly cited types of incentives among interviewees. Interview results showed that federal, state and local incentives are all considered important, though the amount of importance assigned to each varied between interviewees.

# I. Federal and State incentives

Numerous interviewees considered state-level incentives at least as important as local incentives in encouraging green building <sup>iii, iv, i, vii, ix, xi, xviii</sup>. Among these interviewees, there was unanimous agreement that more incentives are needed at the state level. There were also a number of problems identified with current state incentives. Several builders and developers complained that federal and state tax incentives are difficult to obtain for many builders, and that this has been a disincentive for some builders to look into certain green features <sup>ix, xii, xviii</sup>. All of the developers argued that federal and state tax incentives are not cost-effective for many developers looking to provide "affordable" homes <sup>xi, xii, xviii</sup>.

Both of the developers interviewed who build homes primarily for first-time homebuyers indicated that it is a challenge to achieve green certification while keeping homes affordable <sup>xi, xii</sup>. These developers also agreed that the requirements of the federal and state tax incentive programs "cost more than they're worth" <sup>xi</sup> meaning that in order to be eligible to receive federal or state tax rebates a developer has to install features that, even after the rebates, add so much to the cost of a home that it is no longer affordable for the

intended market. One developer <sup>xi</sup> explained: "the problem is the requirements. To get that credit you've got to put so much more money into the house that...it's like a \$2,000 credit and you spent \$20,000 to get it." All three of the developers interviewed argued that providing incentives for green building at the lower end of the market would have the greatest impact on overall environmental quality because, as one developer pointed out, in terms of total number of new homes purchased every year, "average homebuyers…are the ones who make the difference" <sup>xii</sup>.

While numerous builders interviewed described their reasons for building green as mainly ethical, meaning that they "think it's the right thing to do" <sup>xi</sup> for the environment, these same builders acknowledged that they would like to see more incentives and that financial incentives are necessary in order to get more builders and developers involved in green building <sup>viii, ix, xi, xii, xviii</sup>.

# **II.** Local incentives

Many interviewees also considered a lack of local incentives as a major constraint to green building. Especially among builders and developers, local permitting fees, impact fees, and development review processes were considered to be major constraints <sup>xi, xii, xv, xvi, xvii</sup>. Two developers from Brunswick and Lincoln Counties, respectively, as well as a DOC-HBA employee who works with Chatham County builders all considered permitting fees in these counties a constraint, and also mentioned that expediting the permit review process would be helpful <sup>xi, xiii, xvii</sup>. The Brunswick County developer <sup>xi</sup> explained: "Impact and permitting fees are just astronomical. I have \$10,000 in a lot by the time I clear it and [obtain] the permit and I haven't even started building the house."

One reason that a lack of financial incentives has slowed the spread of green building in transition areas relates to the aforementioned reasons for lack of builder awareness, i.e., perceived higher costs and administrative difficulties and resistance to change. A green builder and former president of the Asheville HBA addressed the "resistance to change" idea: "Builders who have been building out there for 20 or 30 years – they're not going to change the way they're building unless you offer some kind of incentives" <sup>ix</sup>. Other interviewees expressed similar sentiments <sup>ii, x, xi, xii, xv</sup>.

#### a. State Actions Matter

Many interviewees felt that state policies in North Carolina have made it difficult for local governments to offer meaningful incentives for green building. Local government interviewees all mentioned that they would like to see more action on behalf of the state in promotion of green building <sup>iii, iv, v, vi, vii</sup>, and many of the builders and developers interviewed felt similarly that state policies do not adequately promote green building <sup>viii, ix, xii, xiii, xviii</sup>. While many of the builders and developers cited local government policies such as permit fee rebates <sup>ix, xi</sup> or expedited permit review <sup>xii, xviii</sup> as being the most important types of green building incentives, both interview results and program analysis suggest that local government capabilities to enact such policies are hindered by policies at the state level.

As mentioned before, S.L. 2007-241 only extended authority to "provide density bonuses, make adjustments to otherwise applicable development requirements, or provide other incentives" to certain cities, towns, and counties. This means that while all local governments can offer certain incentives, not all governments have equal access to a full "toolbox" when it comes to green building. Second, without the provision of funding mechanisms for local governments, many of the incentives, even though they are allowed,

are still too expensive for some local governments to consider <sup>iiiiv, vii</sup>. The Sustainability Coordinator for the City and County of Durham summarized the problem: "Providing incentives is very difficult when you don't have a pot of money to use" <sup>vii</sup>.

Besides costs, there are other problems with the incentive toolbox provided by the State. In Chatham County, one interviewee reported, expediting the permit review process "doesn't matter as much because there's not that much to go through to begin with" <sup>x</sup>. Even in areas where permitting might take longer, expedited permitting can be difficult, as another interviewee explained: "politically, what you're saying is that everyone else is getting slow review, and we don't want to say that" <sup>vii</sup>. Finally, certain state policies may actually decrease the amount of leverage that local governments have to provide incentives. One state-level policy that may inhibit the ability of local governments to offer incentives is North Carolina's Express permitting option, which allows developers to pay higher fees for expedited review of various environmental permits (NCDENR, 2009). One interviewee pointed out the fact that these fees "have just been added to the cost of doing business at this point" <sup>xviii</sup>, meaning that most developers already pay for expedited permit review for state permits and thus may not be as interested in such incentives at the local level.

Not all state policies have hindered green building incentives. N.C. Gen. Stat. § 62-133.8 requires all investor-owned utilities in the state to supply 12.5% of 2020 retail electricity sales (in North Carolina) from renewable energy resources by 2021, with slightly lower requirements for municipal utilities and electric cooperatives (DSIRE, 2009). In response to this requirement, presumably to reduce the amount they have to invest in renewable energy in the long run, the three investor-owned utilities (Progress Energy, Duke Energy and Dominion North Carolina Power), as well as numerous municipal utilities and

electric cooperatives have begun providing utility rate discounts to residential customers whose homes meet Energy Star standards. Progress Energy has gone a step further by instituting the "Home Advantage" builder rebate program, which provides builders cash rebates of between \$300 and \$400 for building Energy Star certified homes, and additional incentives ranging from \$300-\$600 per unit for HVAC equipment that surpasses Energy Star requirements (Progress Energy, 2009). Every builder and developer interviewed, as well as a number of HBA employees <sup>xv, xvii</sup> and a local government representative <sup>iv</sup>, mentioned this program as being an excellent incentive for promoting green building. This program, as well as the utility rate discount programs, is an example of how state policies can positively affect local and regional policies promoting green building.

#### 4. Lack of Coordination Within and Between Organizations

Interviews with representatives of local and state governments demonstrated a lack of coordination both within and between agencies involved in the creation and implementation of green building programs and policies. Coordination was found to be lacking between (in order of importance) 1) state agencies and local governments <sup>ii, iii, iv, vii</sup>, 2) local government and local HBAs/ non-profit advocacy groups <sup>viii, xiii, xiv, xix</sup>, 3) local governments in adjacent counties/municipalities <sup>x, xiv, xvi</sup>, and 4) various state agencies involved with the creation and updating of building and energy codes <sup>ii</sup>.

As far as coordination between state and local agencies, results suggested that local governments in both urban and transition areas are generally dissatisfied with current levels of coordination and with state efforts to promote green building. As mentioned above, each member of local government expressed a desire to see increased efforts to promote green building on behalf of the state <sup>iiiiv, v, vi, vii</sup>. Only one of these interviewees expressed that she

thought current state policies promote green building, though she admitted that they only do so for state facilities and do not really affect local government or the private sector <sup>vii</sup>. The Chatham County Commissioner described the state as putting forth "a lot of lip service but very little action" <sup>iii</sup>. A state employee explained it this way: "It's a big priority, but it takes a long time to redirect an aircraft carrier...it's going to take a while for priorities to change" <sup>i</sup>.

While a lack of effort on behalf of the state to coordinate with local governments was found to be problematic in both urban and transition areas, interviewees <sup>i, vi</sup> pointed out that this problem may be more prevalent in transition due to the tendency for rural areas to be "not as involved in regional and statewide planning efforts" <sup>vi</sup>. One interviewee from Durham mentioned that she and other sustainability coordinators from surrounding urban municipalities and universities get together on a monthly basis to share ideas on green building and general sustainability policies. This "sustainability therapy" <sup>vii</sup>, as she jokingly referred to it, has been very helpful in allowing these urban areas to formulate ideas on how to best leverage available state resources.

As mentioned previously, the Dillon's Rule nature of North Carolina implies a "top down" approach to governance, and interviews results suggest that this creates a disconnect between state and local governments that may be a constraint to implementation of green building policies at both the state and local levels. This disconnect was shown by the comments of an engineer at the Energy Division of the NC Department of Insurance (DOI), who when asked if he thought local governments were satisfied with current building and energy codes (which he is involved in writing) said that he is "at a disadvantage to know because of [his] position" <sup>ii</sup>, implying that by virtue of his position as a state employee he does not communicate with local governments.

While the engineer in the Energy Division of the NC DOI, who is responsible for updating the statewide energy code, displayed limited knowledge of green building practices, he confessed that he was "not familiar" with specific federal or state green building incentive programs. Also, while he professed to work with the Energy Division and other state agencies on energy code issues, he added that there were "no monthly meetings or anything like that." In general, while he said that there was "no reason for [green building] not to be [encouraged in transition areas]", he stressed that "our codes are not directed toward green building requirements" <sup>ii</sup>.

There was also a lack of coordination revealed within and between government agencies at the local level. The chair of the Chatham County Green building Task Force (GBTF) mentioned that the GBTF had made a recommendation to provide density bonuses for green building only to learn that this was not allowed by State laws. According to him, this mistake was the result of a lack of interagency coordination and support, for as he pointed out: "when you don't know what the laws are, there's a lot of education that needs to happen" <sup>x</sup>. Addressing the lack of support issue, two interviewees also stressed that elected officials are more concerned with "responding to complaints" than working proactively with local government agencies in policy decision-making <sup>xii, xiv</sup>. Even in Asheville, where green building incentives do exist, a city councilwoman referred to "a lot of good stuff on the books right now that isn't being enforced," as well as inadequate advertising of incentives by the permit office <sup>iv</sup>. This was mirrored by the director of the WNCGBC, who mentioned that fact that they had certified over 50 green homes but only around 10 had received rebates from the City of Asheville due to a lack of advertising on behalf of the city <sup>xix</sup>.

The fact that Brunswick and Lincoln Counties, which are both adjacent to urban areas that provide financial incentives for green building (Wilmington and Charlotte, respectively) do not mention green building in their Unified Development Ordinances also indicates that there is a disconnect between local governments in adjacent counties/municipalities. An employee of the Lincoln County HBA who was familiar with the State Energy Improvement Loan Program was not even aware that Charlotte had an incentive program in place <sup>xvi</sup>.

Other perceived constraints to green building in transition areas include local government staffing and finance capabilities (lack of resources) <sup>vii</sup>, zoning and other land use regulations and policies <sup>xiii, xiv, xviii</sup>, lack of access to new technologies <sup>i, x, xiii</sup>, and the tendency for rural areas to be politically resistant to change and/or new ideas <sup>vi, xii, xvi, xix</sup>.

# **Opportunities for Green Building in Transition Areas**

Despite the numerous constraints found to be present in the transition areas included in the study, there were a number of opportunities revealed as well. The opportunities revealed by the interview summary process included: a strong sense of environmental stewardship among rural residents <sup>iii, x, xiv, xv, xvi</sup>, an abundance of open space that may allow for better siting and design of buildings and developments <sup>ii, iii, xiii, xvi</sup>, the ability to better influence development due to high growth pressure <sup>iii, vii, x</sup>, a more relaxed political atmosphere <sup>viii, xv, xvi</sup>, high levels of education among residents of areas close to urban centers <sup>iii, v, xii</sup> and opportunities for regional specialization in green industries <sup>i, xvi</sup>.

Several interviewees from transition counties pointed to a strong sense of environmental stewardship among residents. The reasons behind this included geographic location, the presence of natural amenities, and feelings of community pride. One HBA member in Brunswick County mentioned that the county's geographic location on the coast

helps create a high level of environmental consciousness among residents by instilling an aesthetic appreciation of nature <sup>xi</sup>. An HBA employee from Lincoln County explained how the presence of natural amenities has created a sense of community stewardship: "living in a lake area, we have to be more aware of what's going to be ecologically sound for...the community" <sup>xvi</sup>. The presence of lakes was again mentioned in Chatham County as a factor that has raised awareness of water quality issues <sup>iii</sup>. Both a county commissioner and a green builder also pointed to high levels of community pride and involvement as having contributed to community interest in environmental issues such as green building and water quality <sup>iii, x</sup>. This idea of community pride as contributing to environmental stewardship was mentioned by the Lincoln County HBA employee as well, who mentioned residents' desire to "help each other out" <sup>xvi</sup> as a potential opportunity for raising awareness on the environmental benefits of green building.

The ideas on environmental stewardship expressed by interviewees in the transition counties are also visible in the urban study areas as well. One of the first things that the Director of the City and County of Durham Planning Department mentioned when discussing Durham's development priorities related to the geography of the area. According to him, the fact that there are 4 reservoirs either contained in or shared by Durham County has made water quality and runoff "huge concerns," and contributed to the County's decision to adopt LEED requirements for public facilities <sup>vi</sup>. Every interviewee from Asheville <sup>iv, ix, xix</sup> mentioned the city's geographic location in the mountains as contributing to a strong sense of environmental stewardship and community interest in green building. A city councilwoman also mentioned Asheville's strong sense of independence and community involvement as being very significant in both creating high levels of awareness in green building as well as

creating a political atmosphere that is conducive to new policies aimed at promoting green building <sup>iv</sup>. Besides the current permit fee rebate program, another policy that Asheville city council members are reportedly considering is a point-based incentive system aimed at encouraging both affordable housing and green building <sup>iv</sup>.

Several interviewees argued that an abundance of open space and farmland in rural areas can facilitate green building by allowing more flexibility in the siting and design of buildings and developments <sup>ii, xiii, xvi</sup>. These interviewees mentioned that having more open space could facilitate orienting buildings to allow for active and passive solar design, and one also argued that developments could be designed around existing farmland to allow for intradevelopmental food sources <sup>xiii</sup>. Farming and natural resources were also considered important by both the Director of the NC Board of Science and Technology and the Lincoln County HBA employee for allowing regional specialization in green industries. The Lincoln county HBA employee mentioned that Lincoln County has an abundance of bamboo, which could be used to provide sustainable building materials for green projects throughout the state <sup>xvi</sup>.

An abundance of open space in the rural parts of transition counties is not the only opportunity afforded by rurality; the political atmosphere may present opportunities as well. Counter to the interview results that showed a tendency on the part of builders and residents in rural areas to be hesitant to accept new or foreign ideas, several interviewees from transition areas mentioned that the political process in rural areas can be less restrictive than in urban areas <sup>viii, xv, xvi</sup>. An employee of the Wilmington Cape Fear HBA who specializes in government relations humorously explained: "You're not coming in and drawing a plan on the back of a napkin and getting it approved, but there might be an ease of doing business [in

rural areas] that you won't see in a more urban environment"<sup>xv</sup>. The HBA employee from Lincoln County addressed the difference between rural and urban politics in terms of citizen participation, noting that "town forums," which are informal meetings with members of local government and are typically well attended, are often where residents gather information <sup>xvi</sup>.

Aside from the opportunities provided by the rural aspects of transition counties, there are other opportunities provided by the rapid rate at which these areas are being developed. Results showed that development pressure was seen by some interviewees as providing local governments with more leverage in terms influencing developers <sup>iii, vi, vii, x</sup>, and also that residents moving to transition areas from nearby urban areas tend to be well-educated and thus more likely to support green building policies <sup>iii, xii, v, xiv</sup>.

Several interviewees <sup>iii, vi, vii, x</sup> mentioned that local governments in fast-growing areas may be better able to implement policies that affect the built environment. Certain interviewees considered development pressure more important in terms of allowing local governments to influence developers directly through bonding requirements <sup>vii</sup> or subdivision regulations <sup>x</sup> while other interviewees considered it more important in terms of mobilizing citizen support for growth management <sup>iii</sup> and/or land conservation policies such as urban service boundaries or conservation subdivision requirements <sup>vi</sup>. Indeed, development pressure was cited by urban interviewees as one of the main reasons why urban areas have generally been more proactive than rural areas in terms of both growth management and green building initiatives <sup>vi, xiv</sup>.

While these results show that the rapid growth that characterizes transition areas may thus present certain opportunities for local governments to promote green building through added regulations, not all interviewees felt that this is an effective way to increase green

building activity. The Government Affairs Director for the Durham-Orange-Chatham HBA warned that even in high-growth areas, increasing development costs through growth management policies such as bonding requirements or strict subdivision regulations can act as a push factor for developers, thereby leading to "leapfrog development" and/or a transfer of development pressure to areas with less strict development regulations <sup>xiv</sup>.

An idea that several interviewees expressed which relates to both the rapid rate at which transition counties are developing as well as the counties' proximity to urban areas is that the residents who comprise much of the new growth in transition areas tend to have high levels of education. Several interviewees <sup>iii, v, xii, xiv</sup> felt that new residents moving to transition areas from urban centers tend to be more educated, and that this can support community interest in green building. A planner in Lincoln County pointed to the large number of new residents moving to Lincoln from the Charlotte area as having allowed for spillover of "some of Charlotte's progressive thinking [on environmental issues]" <sup>v</sup>. Similarly, the Chatham County commissioner mentioned the county's proximity to several universities as contributing to a high level of education among many new residents <sup>iii</sup>.

The owner of Cimarron Homes, a Triangle-area development firm that specializes in green-certified homes for first-time buyers <sup>xii</sup> in both urban and rural areas stressed that there is a large difference in the market for green building between "traditional" rural areas (areas in transition counties that are relatively far way from urban areas) and "bedroom communities," which are the areas in transition counties close to urban centers with a majority of residents commuting to urban areas for work. The latter, he argued, are more educated and "more liberal-weighted...[these] people already know what [developers] are talking about [when they are explaining green home features]...the further out you go [away

from urban areas], it gets to be a tougher sell" <sup>xii</sup>. This dichotomy between fast-growing areas in transition counties and the more "traditional" rural areas was also mentioned by the Lincoln County planner, who argued that areas closer to urban centers with higher growth rates are more likely to support green building and growth management policies than the more rural areas farther away from urban centers <sup>v</sup>.

# Discussion

This study shows that there are considerable differences between the amount of green building activity and the level of interest in green building among local governments in different transition counties in North Carolina. Study results also showed numerous factors that have provided urban areas with a comparative advantage in terms of proliferation of green building. While it seems that, compared to rural counties that are not close to any urban centers, transition areas are at an advantage in terms of access to education and outreach due to their locations, there are still a number of constraints that must be overcome in order for green building to proliferate in these areas to the extent that it has in the State's urban centers.

The main constraint to green building in all areas, including transition counties, is a lack of awareness of the processes and benefits of green building; however, this constraint is compounded in transition areas by a number of factors, including but not limited to an unwillingness on the part of both builders and residents to change from traditional practices and behaviors, widespread confusion as to what the term "green" actually means, and the tendency for a lack of education and outreach to be self reinforcing, or to create "vicious cycles."

Federal, state, and local policies also play a role in the inhibition of green building in

transition areas; Federal and State financial incentives are inadequate and not cost-effective for large developers of "affordable" green homes, State policies do not provide an adequate "toolbox" for local governments to effectively incentivize green building and in some cases even detract from local governments' ability to provide incentives, and a lack of coordination between government agencies at the state and local level has made both creation and implementation of policies to promote green building difficult. Findings from both urban and transition areas suggest that while these problems exist in all areas, urban areas are less affected due to a number of factors including but not limited to greater market demand for green building and more regional and statewide collaboration.

Another advantage that urban areas have over transition areas that became apparent during this study relates to the growing national "green city" movement; that is, by virtue of being geographically and politically defined centers of both population and economic activity, cities are naturally inclined to take steps to differentiate themselves from other such centers. This competition between urban areas for recognition and "place definition" means that urban areas are more motivated than transition areas to use green building and other green initiatives as marketing tools, and are thus less dependant on outside funding and education to act as stimuli for green building activity. Since transition areas by definition embody a dichotomy between urban and rural and are in a state of flux both geographically and politically, they do not seem to have formed the type of group identity that many cities have. Thus, some transition areas lack the impetus to separate themselves from other transition areas through the adoption of progressive policies such as green building or other sustainability initiatives.

This inability to embrace the idea of transition as a source of identity is further

compounded by the fact that transition areas did not become so by choice, and are thus resistant to alter their rural identity that they perceive as being infringed upon by their urban neighbors. There is a certain irony to this "identity crisis," in that by trying on the one hand to preserve their rural character, transition areas such as Brunswick and Lincoln Counties are resisting incorporating certain "urban" strategies (i.e., green building) into their development policies that would actually help them prepare for and even benefit from the impending growth and development. This unwillingness to incorporate what they perceive as urban ideas and policies into their existing rural identity may help explain why some transition counties are not exhibiting the same degree of local government leadership in the promotion of green building as urban areas.

The number of new growth management policies in place in each of the transition counties supports the idea that these counties are changing politically and suggests that concerns over sustainable development are becoming more prevalent. While both Brunswick and Lincoln Counties have growth management policies in place that are similar to those in Chatham County, Chatham has gone a step farther in that it has begun to incorporate green building into its development policies in order to address concerns over sustainable development. In this sense, Chatham is addressing the problems associated with its proximity to urban areas by taking advantage of the many resources that such proximity provides, and is thus perhaps starting to formulate a transition-based identity. While there are still significant gaps between land use planning and green building in the other two transition counties in this study, results provide hope that as development continues to spread from urban areas outward throughout the country and green building continues to grow and become more widely used, these and other transition areas will begin to realize their

collective role in the sustainability movement and begin to bridge these gaps.

# Implications

This study has a number of relevant implications that could potentially help shape policies at both the state and local level to more comprehensively promote green building in fast-growing rural areas throughout North Carolina and the United States. By highlighting constraints and opportunities for green building in transition areas, this study addresses a major gap in the current literature on green building, the vast majority of which has neglected to address rural considerations, and almost none of which has addressed the relationship between green building and fast-growing rural areas. By analyzing trends in fast growing rural areas as well as identifying common constraints and opportunities for green building in these areas, this study will allow both green building advocates and policy makers alike to make targeted and spatially specific recommendations for how to better promote green building in transition areas. While this study was constrained by time and a lack of funding, it serves as an important first step in what will hopefully become a growing body of research addressing green building policies within the context of the transition taking place across the United States from rural to urban. However, much more research is needed in order to fully understand how green building can be integrated with growth management policies and better incorporated into the development policies of transition areas.

# **Conclusion and Recommendations**

This study builds upon research showing that there are a number of constraints to green building in rural areas (Kudlowitz, 2007), as well as research showing that levels of green building are affected by geographic and spatial factors (Cidell and Beata, 2009; Cidell, 2009). While the findings of Cidell and Beata, (2009) show that green building activity

varies across different regions and address the need for greater spatial specificity in green building certification standards and Cidell (2009) finds that the distribution of green building certification professionals matches existing concentrations of population, questions remain as to what political, social, economic, and cultural factors exist at the micro-scale that contribute to these macro-scale variations in green building activity. This study begins to address these questions, and shows that both macro- and micro-level factors have a significant influence on the proliferation of green building. Furthermore, this study shows that while there are a number of geographic factors that influence the amount of green building activity in a given area, there are a number of political, economic, and cultural factors that play significant roles as well. Finally, the findings of this report support those of Brown and Southworth (2006), who argue that green building needs to be integrated with smart growth and other land use policies in order to comprehensively address global climate change.

This study shows that while green building is undoubtedly increasing in popularity in both urban and non-urban areas, awareness of green building in non-urban areas generally lagging, and this has translated to a lack of policies promoting green building in these areas. Recommendations for how to more effectively promote green building in transition areas are not focused on any one specific group or agency. This is because of the fact that, as discussed in the previous two sections of this report, there are many different factors that influence green building activity. However, there are certain recommendations that I believe will lead to green building becoming more integrated into the policies of local governments in transition areas. These recommendations include approaches that start at the local government level as well as approaches that target changes to state and federal policies, and also involve both short-term as well as long-term implementation timeframes. The following

section will provide detailed descriptions of these recommendations.

#### **1. Local Government Approaches**

There are numerous ways that local governments in transition areas can more effectively promote green building. Certain strategies are regulatory; such strategies are often referred to as "sticks," and involve the creation and implementation of ordinances designating certain standards that must be met and requiring certain actions by private entities. Regulatory measures include 1) passing an ordinance requiring the recycling of certain construction and demolition (C&D) materials, 2) amending subdivision regulations to require or allow for certain green features such as clustering or solar access, 3) enhancing environmental ordinances such as stormwater or erosion and sedimentation control ordinances, 4) amending zoning regulations and/or creating new conditional use zoning regulations to encourage or require green design, and 5) passing "green public facilities" ordinances.

Other strategies are market-based; these strategies are "carrots," and involve nonregulatory measures meant to facilitate market processes and provide incentives for green building. Recommended market-based strategies include 1) creating a permit fee rebate program and/or providing expedited permit review or other financial incentives for green projects, 2) coordinating with advocacy groups to provide education and outreach, and 3) providing free advertising for green builders via the local government website, local newspaper columns, and local and regional multiple listing services (MLS).

This study has shown that education and outreach are the most critical factor in beginning and sustaining a virtuous cycle of green building activity in transition areas. In areas where there has been little impetus to pursue green building, it is hard to tell whether

champions will surface and take the initiative to begin the education and outreach process. However, it is also clear that once interest begins to manifest itself, local governments are more likely to jump on the bandwagon. Therefore, local and regional green building advocacy groups, HBAs involved in green building, and local governments with green building policies in place need to expand their efforts to communicate with HBAs and local governments in surrounding areas and begin to provide education and outreach and technical assistance. Regional cooperation and information sharing are critical for the successful creation and implementation of green building policies by local governments; just as the benefits of green building extend beyond the borders of any one county or municipality, so too should the efforts to promote it.

### **Federal and State Approaches**

The Obama Administration has pledged in its Obama-Biden New Energy for America Plan to "establish a goal of making all new buildings carbon neutral, or produce zero emissions, by 2030. They will also establish a national goal of improving new building efficiency by 50 percent and existing building efficiency by 25 percent over the next decade to help us meet the 2030 goal" (Obama for America, 2008). If these goals are to be achieved, many policy changes are needed at the Federal level. First, the Federal government should make significantly more money available to states for the creation of climate change programs that include green building components. Only with increased funding will states be able to effectively promote green building through education and outreach as well as the provision of incentives.

Federal programs should also be used to incentivize local governments to create sustainability positions such as the ones found in Durham and Asheville. Just as Section 322

of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, enacted under Section 104 the Disaster Mitigation Act of 2000 (DMA), requires state and local hazard mitigation plans as a condition of eligibility for pre- and post-disaster mitigation funding under such programs as the Hazard Mitigation Grant Program and the Pre-Disaster Mitigation Grant Program (sections 404 and 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, respectively), future infrastructure and energy funds should be contingent on state and local governments having federal agency-approved sustainability plans. These grant programs, like the Hazard Mitigation Grant Program, would require the inclusion in state plans of a component addressing coordination with local government planning efforts, and would require local sustainability plans by municipalities wishing to receive sub-grant funding (44 CFR 201.6.). By requiring local governments to create sustainability plans to assist broader state efforts, states could ensure that local governments give sustainability more policy attention. Just as states' desire to receive federal disaster mitigation funding has led some states such as Florida to create state grant and technical assistance programs to help local governments create hazard mitigation plans, competition for federal funding for energy and infrastructure would likely lead to state programs offering funding and technical assistance for sustainability plans, both of which would be very helpful for local government promotion of green building in the private sector.

Given current budget constraints and assuming a lack of increased federal funding, there are still a number of things North Carolina could do to increase green building across the State. First and foremost, North Carolina should amend the statewide building codes to be at least the equivalent to the 2009 iteration of the ICC, and should continue to keep codes at whatever the most recent standard is. Another idea that was passed on by the

Sustainability Coordinator for the City and County of Durham is to create a separate green building code that local governments could opt to use instead of the conventional code. By having an optional green building code that is standardized across the state, North Carolina would maintain the consistency and predictability afforded by the current building code while providing more flexibility to local governments wishing to pursue green building.

There are also a number of non-regulatory measures that the State should consider to help local governments promote green building. One potential funding mechanism is for the State to make low-interest loans available for local governments for green public facilities requirements and/or green demonstration projects. Funding could also be in the form of a large-scale bonding program for cities and counties, wherein a local government receives money from the State for the specific purpose of providing loans to homeowners who buy or build green homes. The homeowners' property taxes would then be raised by a certain percent, the proceeds of which would go back to the local government to pay back the State loan. This type of program would incentivize green building by providing financial incentives while also allowing the cost-saving benefits of green building to be realized during the loan repayment process. At the most basic level, state tax incentives should be made more cost-effective for large-scale developers and smaller builders alike. While photovoltaic solar technology is very important, it is at this point still too expensive even with a tax rebate to incorporate into homes for buyers at the low end of the market. The State should tax incentives should target the "low hanging fruit" of the green building industry such as basic green materials, rainwater cisterns, HVAC systems, or other features.

The most important step that the State can take is to coordinate efforts to provide education and outreach to local governments as well as the general public. While the NC

Solar Center and the State Energy Office have been very active in encouraging and promoting green building, more targeted education is need for transition and rural areas. The State should increase marketing and advertisement efforts, and work with the university system to provide more green- building related courses and curricula such as those found at Central Carolina Community College in Chatham County. North Carolina should strive to become a leader in the sustainability movement and a model for other states to follow, and green building offers to help the State achieve this goal.

# **Appendix 1: Interviewees**

<sup>ii</sup> Billy Hinton, North Carolina Department of Insurance, Engineering Division, Raleigh, N.C. Interviewed on January 8, 2009.

<sup>iii</sup> George Lucier, Chair, Chatham County Board of Commissioners, Pittsboro, N.C. Interviewed on January 9, 2009.

<sup>iv</sup> Robin Cape, City Councilwoman for the City of Asheville, Asheville, N.C. Telephone interview conducted on January 9, 2009.

<sup>v</sup> Randy Williams, Principal Planner, Lincoln County Office of Building & Development, Lincolnton, N.C. Telephone interview conducted January 8, 2009.

<sup>vi</sup> Steve Medlin, Director, Planning Department of the City-County of Durham, Durham, N.C. Interviewed on December 8, 2008.

<sup>vii</sup> Tobin Fried, Sustainability Coordinator, City and County of Durham, Durham, N.C. Interviewed on December 12, 2008.

<sup>viii</sup> Dean Snyder, Chair of Green Building Commission, Wilmington-Cape Fear HBA; Owner, Bluewater Designs LLC, Wilmington, N.C. Telephone interview conducted on January 10, 2009.

<sup>ix</sup> Sean Sullivan, Owner, Livingstone Construction; 2008 president, Asheville HBA, Asheville, N.C. Telephone interview conducted on January 21, 2009.

<sup>x</sup> Paul Konove, Founder and owner, Carolina Country Builders of Chatham County, Inc.; Member, Chatham County Green Building Task Force, Pittsboro, N.C. Interviewed on January 7, 2009.

<sup>xi</sup> Robin Hackney, NAHB Certified Green Professional; Co-owner of Signature Homes, Wilmington, N.C. Telephone interview conducted on January 16, 2009.

<sup>xii</sup> Craig Morrison, President, Cimarron Homes, Durham, N.C. Interviewed on December 9, 2008.

<sup>xiii</sup> Jenny Pippin, AIBD, CPBD, Owner of Pippin Home Designs Inc., Sherrills Ford, N.C. Telephone interview conducted on February 5, 2009.

<sup>xiv</sup> Frank Thomas, Director of Governmental Relations, HBA of Durham, Orange, and Chatham Counties, Durham, N.C. Interviewed on December 12, 2008.

<sup>xv</sup> Tyler Newman, BASE Director of Government Affairs, Wilmington-Cape Fear HBA, Wilmington, N.C. Telephone interview conducted on January 10, 2009.

<sup>xvi</sup> Vicki Cochran, Executive Officer, Lincoln County HBA, Lincolnton, N.C. Telephone interview conducted on January 10, 2009.

<sup>xvii</sup> Leigh Scott, Director of Green Building Programs, Green Home Builders of the Triangle, Durham, N.C. Interviewed December 12, 2008.

<sup>&</sup>lt;sup>i</sup> Jon Hardin, Executive Director, North Carolina Board of Science and Technology, Raleigh, N.C. Interviewed on December 12, 2008.

<sup>xviii</sup> Lee Bowman, Project Manager, Newland Communities, Chapel Hill, N.C. Interviewed on January 8, 2009.

<sup>xix</sup> Matt Siegel, Director, Western North Carolina Green Building Council, Asheville, N.C, Telephone interview conducted on January 9, 2009.

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