To: The Chatham County Board of Commissioners

From: The Climate Change Advisory Committee

Re: A Chatham County Climate Action Plan

November 2, 2017

CHATHAM COUNTY CLIMATE ACTION PLAN

INTRODUCTION

On June 19, 2017 the Chatham County Board of Commissioners adopted a resolution, "Supporting a State and National Goal of 100% Clean Energy by 2050 and the Creation of Green Jobs." That Resolution also stated these as goals for Chatham County itself.

Actions to support this goal in Chatham County are important as are related actions to reduce greenhouse gas (GHG) emissions generally and increase carbon sequestration. These actions will promote green jobs locally, improve health and living standards by improving air quality, boost economic growth and tourism and reduce costs incurred by private organizations and by Chatham County and municipalities in the County.

In adopting the LEED policy for County buildings, the Commissioners on February 20, 2017 adopted a "Sustainable Facilities Policy," which reads in part:

> "Sustainable facilities not only provide environmental benefits to the community, they result in economic savings to the County; support the region's sustainable

building industry; and protect occupant health, maximize productivity and encourage sustainable employee behaviors. All these elements are crucial for staff to address when striving to achieve the County's goal of becoming a global leader in environmental sustainability."

Greenhouse Gas Emissions in Chatham County

At the request of the Climate Change Advisory Committee, the original "2015 Greenhouse Gas Emissions Inventory for Chatham County, North Carolina" was prepared by two UNC graduate students, Lauren Joca and Carl Kolosna, during the fall semester of 2016, and an updated and slightly revised version of that report was prepared by Ms. Joca and received from her in June 2017. The report presents a commendable effort to estimate county GHG emissions and offsets using publicly available 2015 data. The report shows estimated GHG emissions, expressed in terms of CO_2 equivalents, for six categories: transportation, industrial, commercial, residential, agricultural, and governmental (see Figure 1).

The report found that transportation was, by far, the largest single source of estimated emissions in the county, accounting for 74% of the total. No other sector even amounted to 10% of the total. Residential (9.74%), industrial (6.66%), and commercial (4.31%) emissions were estimated based exclusively on electricity usage and so are probably underestimated to some degree. The agriculture sector was responsible for 5.15% of the total. However it was probably overstated since it was based on an estimate of the number of dairy cows (which on a per head basis emit nearly twice

the methane of beef cattle) that is considered to be too high by members of the agricultural community.

The researchers also used “i-Tree” software provided by the USDA Forest Service to estimate the amount of CO_2 that is sequestered by tree canopy within the county. The researchers estimated that Chatham County’s tree cover sequesters the equivalent of approximately 1.3 million tons of CO_2 annually. This is slightly more than the amount of carbon the researchers estimated was emitted by transportation.

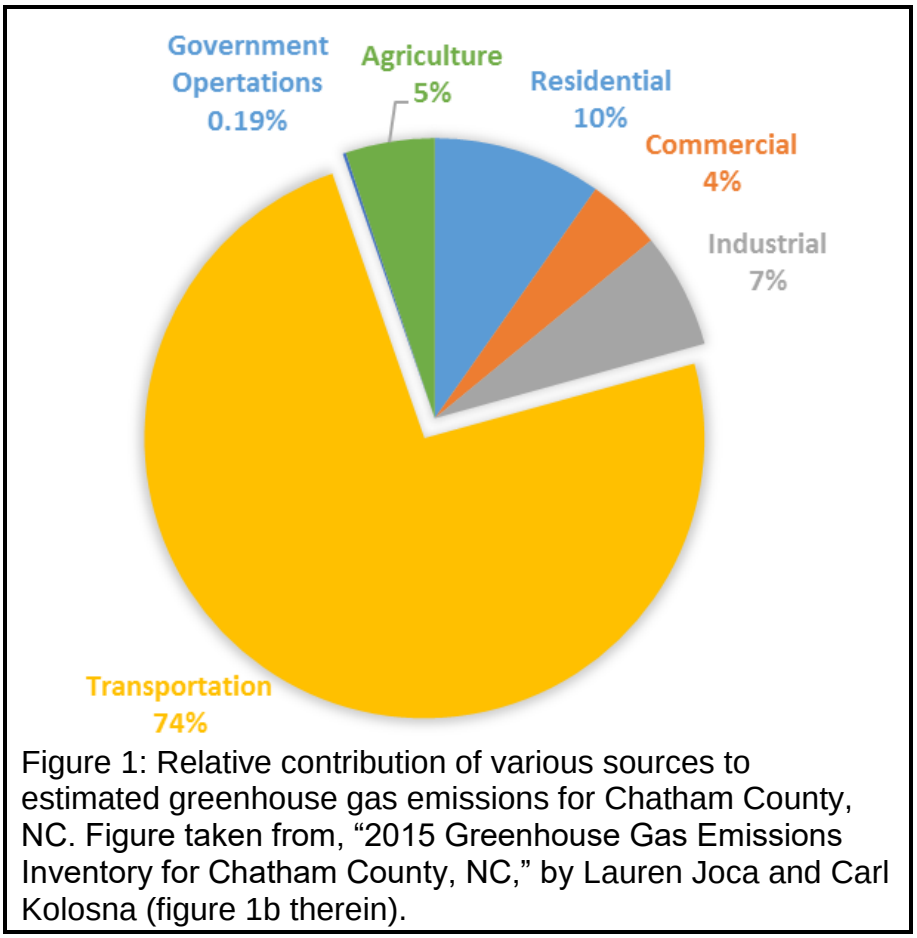

Figure 1: Relative contribution of various sources to estimated greenhouse gas emissions for Chatham County, NC. Figure taken from, “2015 Greenhouse Gas Emissions Inventory for Chatham County, NC,” by Lauren Joca and Carl Kolosna (figure 1b therein).

A CLIMATE ACTION PLAN

The foregoing GHG report shows that there are two primary factors that stand out in the analysis of net emissions in Chatham County: (1) the dominance of transportation emissions as a percentage of the total and (2) the importance of preserving and enhancing the Chatham tree canopy to obtain as much carbon sequestration as possible.

Each of these factors, however, comes with its own set of problems. Reducing transportation emissions is obviously a difficult assignment. Whereas emissions attributed to electricity consumption lend themselves to the obvious solution of substituting renewable sources like wind and solar for fossil-fuel sources, transportation solutions depend on greater use of public transportation, carpooling, biking and walking, home offices and electric vehicles. However, the difficulty with transportation solutions arguably emphasizes the importance all the more of implementing emission reduction measures wherever possible.

With an initial emphasis on transportation, the following consists of recommendations for emission reductions. The tree canopy problem is discussed in Agriculture and Woodland/Forest Conservation, section 3, below.

Emission Reduction Recommendations

A major objective of the Chatham County Comprehensive Plan (referred to herein as the CCCP), which is now emerging in final form, is to encourage future residential and commercial development to be located in or near the towns and other areas that are already the site of such development. To the extent that this objective can be

realized, it would centralize future development, which would help reduce emissions produced by vehicles. It may be hoped that the build-out of Briar Chapel and the onset of Chatham Park, whatever else may be said about these developments, may serve to satisfy demand for residential and, in the case of Chatham Park, commercial, locations thereby lowering the extent of development sprawl elsewhere in the County.

The CCCP may contain other helpful provisions, which will be noted in this document. It may well be useful for both this Action Plan and the CCCP to contain similar, even duplicative, provisions. This Plan recommends actions that may be taken promptly while some of the recommendations of the CCCP may be triggered only with development initiatives.

1. Transportation

A. Promote Electric Vehicles: Many of the world's leading auto manufacturers, including GM and Volvo, have announced their intent to transition to producing only electric and hybrid vehicles in the coming decades, and Chatham County should be preparing for the transition. A good first step is to look at County vehicles. As rapidly as is feasible, County-owned vehicles of all types, including school buses and Chatham Transit, should be converted to use only electric power. Although the County itself does not purchase school buses, it should lobby for the use of electric school buses. The County should act as promptly and effectively as it can to encourage private vehicle owners to use electric vehicles. To accomplish this goal, the County should act to develop charging stations for electric vehicles and encourage apartment owners and homeowners to install charging stations. It should also encourage residential

developments to install charging stations and to provide preferential parking for electric and hybrid vehicles. The County should install networked electric vehicle charging stations to comply with known best practices in asset monitoring and driver services, including availability of stations and energy and greenhouse gas reporting.

B. **Expand Public Transit:** The County should seize every opportunity to increase the use and availability of public transit. While it may be premature for Chatham to be a good candidate for light rail projects, it should keep this possibility in mind for the future and avoid other actions that would complicate the development of light rail. Expanded public transit is a stated goal of the CCCP (pp. 126-27).

C. **Plan Walkable and Bike-able Developments:** The County should act as promptly and effectively as possible to encourage existing and future residential and commercial developments to be walkable and well-designed for bicycle use. The CCCP contains such proposals (pp. 63-65, 128).

D. Mixed Use Development: Mixed use development is important because it provides for land uses that result in housing, jobs, services, schools and shopping being close together thereby avoiding a larger transportation factor. The American Planning Association (APA) Report entitled “APA Policy Guide on Planning and Climate Change” encourages mixed use development because it reduces transportation and makes “alternative travel modes – such as biking or walking – more feasible and likely.” Mixed use development is a major goal of the CCCP (pp. 62-65).

E. Centralized Development: The County should encourage higher density development near town centers and transit stops. This simultaneously lowers transportation

demands and increases the likelihood of “alternative travel modes.” This is also a stated goal of the CCCP (p. 62-65).

F. Smart Growth Clustering: The County should promote the traditional smart-growth approach that involves the clustering of housing units in residential developments with the remainder of the property used for parks and/or woodland. This pattern is even more desirable with climate change objectives in mind since it lowers vehicle miles traveled (VMT) and preserves open land and woodlands as carbon sinks. This is also a stated goal of the CCCP (pp. 62-65).

G. Potential Transit Sites: The County should identify and plan with future transit sites in mind even if public transportation doesn’t presently serve those areas. The APA Report states, “’Transit-ready’ development patterns create centers with more intense, mixed use development compared to their surrounding development pattern.” This is also a stated goal of the CCCP (p. 65).

H. Restrictive Infrastructure Development: The County should engage in compact regional development planning and restricted infrastructure development. The APA Report recommends that local governments seek to develop “compact regions” by extending infrastructure only in areas they wish to see developed. The Report states, “Policy tools that can support compact regional development include establishment of urban growth boundaries, decisions to invest infrastructure funds in already-developed areas, policies regarding extension of urban services, such as adequate public facilities ordinances, and initiatives that create greenbelts around urban development.” This is also a stated goal of the CCCP (pp. 62-65).

I. Sustainable Re-Use Development: The County should encourage and support infill development, redevelopment of existing neighborhoods and preservation of historic structures, as well as the "adaptive reuse of buildings within currently developed areas of communities and regions." APA recommendations state, "Existing neighborhoods and communities are an important asset in efforts to address climate change." Additionally, the County should adopt APA recommendations for "the reuse of remediated brownfield sites." Such sites are frequently located near existing infrastructure. Their development "helps address climate change because it reduces VMT and retains land for vegetation that can serve as a carbon sink." Encouraging infill development is a goal of the CCCP (pp. 62-65).

J. Strategic Location for Public Facilities: The County should require public facilities, including schools, to be located so as to minimize VMT and encourage their accessibility by walking, biking or transit. Also, maximizing school access by means other than private automobile will reduce emissions caused by "idling."

K. Complete Street Design: The County should require "complete street" design both in downtowns and in residential developments, which can reduce VMT and emissions. "Complete street design" means streets that are designed to enable safe access for all users, regardless of age, ability, or mode of transportation, including drivers, transit users, pedestrians and bicyclists.

L. Design for Alternative Transportation Modes: The County should adopt street design requirements that "include right-of-way for existing or future transit options, pedestrian-friendly sidewalks, bicycle lanes and appropriate

bike and pedestrian accommodation, and safe pedestrian and bicycle crossings." These features will reduce the use of automobiles and greenhouse gas emissions. This is also a stated goal of the CCCP (pp. 62-65, 128).

M. Support the "Home Office": The County should encourage home offices, telecommuting and home-based occupations and professions in order to reduce VMT and transportation-related emissions. The county could act as a model for other businesses by allowing its employees to telecommute whenever possible. In this connection, countywide Internet access and broadband are important goals. The CCCP recognizes the importance of countywide broadband.

N. Discourage vehicle idling: As much as possible, the County should discourage drive-through windows and it should encourage parents and others to avoid long vehicle idling times when dropping off and picking up students.

2. Building Energy Efficiency

The Commissioners took a very important step to promote building energy efficiency when at their February 20, 2017 meeting they adopted the LEED standard for County buildings. This step was important because buildings generally account for a substantial percentage of all emissions. The "Sustainable Facilities Policy" adopted by the Commissioners provides that all new buildings and certain renovations will achieve the LEED Version 4 Silver Level or an equivalent 3rd-party certification and will be formally LEED certified and designed to earn ENERGY STAR Certification.

The Policy also provides that certain existing County-owned buildings will become LEED Existing Building: Operations & Maintenance (EBOM) certified and achieve ENERGY STAR Certification over a 10-year phased approach.

In short, while the County's dedication to building efficiency is clear, additional steps should be taken.

A. Green Building Standards: The County should encourage green building standards generally and proactively support and make visible local, private, state and federal incentives available for builders and homeowners. It should encourage developments and neighborhoods to obtain "LEED-ND" certification (Leadership in Energy And Environmental Design Neighborhood Development). There are many opportunities for individual houses to be made energy efficient, such as orienting houses to obtain passive solar heating and using solar panels to capture solar energy.

B. Other Building Efficiency Measures: With public buildings the County should require, and with private buildings, it should encourage various measures such as:

(1) Use of "daylighting" (natural light) whenever possible

(2) Reduce energy used by light fixtures and computers by turning them off when not in use;

(3) Use solar hot water heating

(4) Use motion sensor lighting

(5) Replace incandescent and CFL lighting with LED

(6) Install rooftop solar panels where feasible

(7) Upgrade HVAC systems; seal leaks; add insulation; and replace windows

(8) Install low-flow toilets and faucets

(9) Use higher AC temperature settings and lower heating settings

(10) Replace older appliances with energy-efficient models

C. Water Saving Measures: The County should investigate ways to conserve water in developments, such as requiring the use of water saving fixtures in both new construction and in the retrofit of existing structures, and the inclusion of greywater piping for new developments.

D. Energy Audits: The County should encourage energy audits for private and public buildings with incentives for follow-up retrofits on existing buildings.

3. Agriculture and Woodland/Forest Conservation

The Chatham County Agricultural Land Use Plan states that roughly one-third of the County's agricultural acreage is devoted to each of (1) woodlands, (2) croplands and (3) pasture. To the extent that woodlands fall under the "agricultural" classification, the message is clear: the County needs to protect and expand its woodlands since they play a major role in carbon sequestration. An issue under study now is whether the land use tax system can be used to

discourage clear cutting and encourage reforestation. Also, a pending issue may be the extent to which administration of the land use tax system threatens to require a higher level of tree harvesting, which would impair the sequestration ability of the tree canopy. The County may be facing tough decisions on these points but the underlying fact, as noted, is clear: preservation and expansion of the existing tree canopy is critical to provide carbon sequestration.

In addition to the above, an important specific recommendation relating to woodlands is that the Loblolly pine plantations, traditional and typical in Chatham County, should be replaced with the use of longleaf pines or native broadleaf trees. These latter types, as opposed to the Loblolly pine, sequester more carbon and retain significantly more soil moisture. In an era of climate change, retaining soil moisture is increasingly important.

Properly managed, cropland also has a high potential for carbon sequestration. Many sustainable agricultural practices significantly increase the amount of carbon that can be sequestered in soils. These include planting cover corps, using no-till farming techniques, adding organic material to soil (crop residues, biosolids, compost), planting more deep-rooted perennial crops and eliminating the use of chemical fertilizers, which disrupt natural soil processes.

The Forestlands and Farmlands Subcommittee Recommendations and Report dated June 1, 2017, was presented to the Commissioners at their meeting on June 19, 2017. That Report contained many recommendations for actions by farmers that could reduce emissions. At the Commissioner’s meeting on June 19, however, questions arose about the extent to which the agricultural community would be able and willing to apply these recommendations. Accordingly, the proposal was made that the Commissioners

establish a procedure whereby the agricultural community could be consulted about these recommendations.

For completion of this document, the specific recommendations in the Forestlands/Farmlands Report that could be considered in consultations with the agricultural community, were:

Methane emissions can be reduced through multiple activities including the following:

- Applying manure to soil as soon as possible consistently with other recommendations below;
- Avoiding manure application on extremely wet soils;
- Avoiding manure application when heavy rain is predicted;
- Increasing the digestibility of livestock feed by chopping, grinding or pelleting feed;
- Feeding additives such as ionophores that act to inhibit methane production;
- Structuring manure storing tanks or lagoons so as to allow capture of methane through anaerobic digestion followed by aerobic composting for nutrient recovery;
- Effective composting of manure, optimally, after anaerobic digestion.

Nitrous oxide emissions can be reduced through multiple activities including the following:

- Applying manure shortly before crop growth to allow maximum use of nitrogen;
- Avoid applying manure in the late fall and winter;
- Avoid applying manure when the weather is hot and windy, or before a storm because these conditions can increase nitrogen oxide emissions;
- Spreading manure evenly around fields and pastures;
- Storing manure in below ground facilities;

- Implementing soil and water management practices such as improving drainage;
- Effective composting of manure, optimally, after anaerobic digestion.

4. Expand Renewable Energy Production

Governor Cooper recently signed HB 589, which is expected to double North Carolina's solar capacity over the next four years, which is currently is ranked second in the nation for installed solar capacity. The Governor also issued Executive Order No. 11, Promoting Wind Energy Development, which directs the N.C. Department of Environmental Quality, the Department of Commerce, and other state entities to support and promote the development of wind energy in North Carolina.

These actions at the state level are consistent with the CCCP policy objective to, "Encourage alternative energy in order to lessen dependency on the utility grid (Resiliency Policy 4)." The CCCP proposes that to achieve this we should, "Evaluate barriers to renewable energy installations and consider permitting on-site small-scale renewable energy generation as a principle or accessory use in appropriate zoning districts (Strategy 4.1), " and, "Allow by-right small-scale solar and wind systems; consider relaxed setbacks for these systems (Strategy 4.2)."

To further these policies and strategies of the CCCP, the County should take steps to :

A. Expand Production: The County should act diligently to expand the use of solar and wind power in the County, including the use of solar panels on public buildings

(including schools). It should identify potential sites or areas for the location of renewable energy facilities, including solar farms and wind plantations.

B. Remove Barriers: The County should identify legal and economic barriers to renewable energy installations, and consider means to remove these barriers as quickly as possible.

5. Other

A. Regulation of the Proposed Mega-Sites: The CCCP proposes to encourage industrial development in the proposed mega-sites at Siler City and Moncure. The County should encourage green industries to move to these sites, and should use all available regulatory authorities (e.g., conditional use permitting) to ensure that the mega-sites do not become centers of GHG and other harmful emissions.

The County should consider encouraging one or both mega-sites to use renewable energy to become self-sufficient, sustainable operations.

B. Sustainable Landscaping: The County should require high standards in sustainable landscaping practices, to include parking lot landscaping, perimeter site buffering and tree canopy requirements. Both new commercial and public development projects should be included. Incentives should be provided to remedy deficiencies in existing developments. Chatham County currently has an abundance of large parking lots with grossly insufficient tree canopy. The APA Report states, “Requirements [such as these]

present planners with opportunities to introduce or preserve carbon-sequestering vegetation as sites are developed. Planners should consider examining code requirements with an eye to promoting tree canopy developments, use of native species and xeriscaping practices, and integrating landscaping with storm water management techniques such as rain gardens." Creating and conserving green infrastructure is an objective of the CCCP (pp. 105-08).

C. Habitat Protections and Corridor Connectors: The County should identify natural resource and environmentally sensitive areas that should be protected from residential or commercial development and preserved as carbon sinks. To the extent possible, it should identify "green infrastructure," i.e., an "interconnected network of open spaces and natural areas, such as greenways, wetlands, parks, conservation and preservation areas and flood-prone areas." Conserving such areas is an objective of the CCCP (pp. 66, 68-69, 103-09).

D. Streetlights, Traffic Signals and Other Outdoor Lighting: Incandescent bulbs, mercury vapor (MV) street lights and high pressure sodium (HPS) lights should be replaced with LED lighting, which is less expensive and 60% more efficient than HPS lighting.

E. Plastic Bags: The County should determine whether it can discourage or even prohibit the use of plastic bags by grocery stores and other retailers. At a minimum it should encourage retailers to provide incentives to customers to use reusable bags. It should also discourage the use of single-

use water bottles.

F. Miscellaneous Efficiencies: The County should encourage behavior changes that limit waste and save money, such as printing on both sides of a page and using mugs and glasses instead of disposable coffee cups.

G. Solar Panels and Outdoor Clothes Lines: The County should act (if it can legally do so) to prevent homeowner associations and others from prohibiting solar panels on homes and outdoor clothes lines.

H. Community Outreach: The Climate Change Advisory Committee should prepare a document and a website describing ways in which citizens can lower their carbon footprint and take actions to increase carbon sequestration. After obtaining Commissioner approval, it should consider ways to distribute the document and, if necessary, seek County financial support for the project.