CITY OF DURHAM

Date: February 27, 2019
To: Thomas J. Bonfield, City Manager
Through: W. Bowman Ferguson, Deputy City Manager
From: Steven W. Hicks, Director, General Services Department
Subject: Renewable Energy and Carbon Neutrality Resolution

Summary

The General Services Department recommends the City Council adopt a resolution entitled "Resolution of the Durham City Council Supporting Renewable Energy and Carbon Neutrality". This resolution is focused on the City's Sustainability Roadmap to develop an action plan towards carbon neutrality by 2040 in City operations. Our sustainability philosophy has been to focus on carbon neutrality based on the Sustainability Roadmap, as adopted by City Council.

The Durham Environmental Affairs Board (EAB) has endorsed a separate proposed resolution which sets a goal of transitioning City operations to 100% renewable energy by 2050, with an interim benchmark of 80% by 2030. The resolution recommended by the General Services Department is a reflection of meeting comparable goals with more focus on carbon neutrality. General Services' approach and recommendation was shared with the EAB on January 16, 2019.

The General Services Department supports resolution language that aligns with the City's existing goal as stated in the Roadmap to Sustainability. The goal states that the City will "update the Greenhouse Gas Reduction Plan by 2020, creating a fundable action plan towards carbon neutrality in City operations by 2040." The required action plan toward carbon neutrality will provide firm cost estimates for annual funding consideration that would be required to achieve a transition to carbon neutrality, along with the estimated annual savings that would be achieved.

Recommendation

To adopt a resolution supporting renewable energy and carbon neutrality in City operations.

Background

The resolution reaffirms the City's commitment to renewable energy, energy efficiency, and reduction of greenhouse gas emissions, and calls on the City to develop an action plan towards carbon neutrality by 2040 in City operations. The City currently utilizes four types of fossil fuel-based energy in its operations – electricity, natural gas, gasoline, and diesel fuel. Transitioning away from these energy types will require a capital investment of approximately $150 million over 30 years, purchase or lease of 300 acres of land for solar arrays, and will require wholesale adoption of clean energy technologies. The City's return on investment can be increased if any regulatory changes are adopted during that time.

The City has begun to transition and can continue to transition away from these fuel types towards carbon neutrality by focusing on four areas:

1) Increased energy efficiency
2) Renewable energy generation
3) Fleet changes
4) Offset purchases

The City is making significant strides toward reduced fossil fuel use and carbon reduction in its buildings and operations. Durham became the first local government in North Carolina to adopt a Greenhouse Gas Inventory and Local Action Plan for Emissions Reductions in 2007. The Plan calls for a 30% reduction from 2005 emissions levels by 2030 for the community and a 50% reduction for local government operations. As of 2017, total City operations emissions have decreased by about 8% since 2009. To meet the 2030 goal, the City will need to more than triple its annual decrease in emissions - from 1% to 3.5% - which is about 1,875 tons CO2e per year.

The City has signed on to the U.S. Conference of Mayors Climate Protection Agreement to commit to significantly reduce carbon emissions to combat climate change. The City's Strategic Plan Goal 5 is "Thoughtful planning and operations that ensure the long-term viability of the City's infrastructure, facilities, and environment."

In December 2017, Durham was recognized as a 4-STAR Community for national excellence in sustainability through the STAR Community Rating System, the nation's leading framework and certification program for evaluating local sustainability using standardized performance measures. In July 2017, General Services produced the City's Sustainability report which was the springboard for development and adoption of the City's first ever Roadmap to Sustainability, adopted in March 2018.

The City has implemented several energy efficiency and renewable energy measures including:

- LED lights in ten City facilities
- Solar hot water in six City facilities
- Several electric vehicles in municipal fleet and electric charging stations installed through the City
- Purchasing fuel-efficient vehicles for fleet, including hybrids
- No-idle policy
- Methane recovery system on closed landfill
- Two LEED-certified buildings completed – the new Police Headquarters and Fire Station 17, which includes a rooftop solar array

On October 29, 2018, Governor Roy Cooper signed an executive order, "North Carolina's Commitment to Address Climate Change and Transition to a Clean Energy Economy", which states that North Carolina will honor the 2015 Paris Agreement goals and the state's commitment to the United States Climate Alliance. The executive order requires the state to reduce its greenhouse gas emissions to 40% below 2005 levels by 2025.

On December 14, 2018 and January 22, 2019, General Services Department staff met with representatives from Duke Energy of the Carolinas ("Duke Energy") and Public Service of North Carolina to discuss the feasibility of achieving a successful transition to 100% renewable

energy. Duke Energy reported that their generation mix is progressively getting cleaner as the company retires coal plants and uses more natural gas, along with increased solar generation and battery storage. Most major U.S. utilities are aiming for an 80% reduction in carbon emissions by 2050. Duke Energy's goal is 40% carbon reduction by 2030. Currently, 54% of Duke Energy's electricity is from carbon neutral sources. Attached for reference is a letter from Duke Energy summarizing the above referenced meeting discussion and outlining its goals and strategies. Duke Energy's letter notes the difficulty in providing reliable energy based on current technologies and notes the limitations of solar and other renewable energy sources at this time.

Issues and Analysis

The resolution proposed by the EAB supports an admirable goal of transition to 100% renewable energy by 2050. However, based on staff analysis to date, and dependence upon Duke Energy, as the primary energy provider, the ability to achieve that goal is suspect and currently unattainable based on current technologies and thus not the most beneficial energy policy for the City to adopt at this time. More importantly, the interim goal of 80% renewable and reliable energy by 2030, (in less than eleven years) is not a realistic goal.

For additional context, the City currently utilizes four types of fossil fuel-based energy in its operations – electricity, natural gas, gasoline, and diesel fuel. Transitioning away from these energy types will require a capital investment of approximately $150 million over 30 years, and will require wholesale adoption of clean energy technologies, as well as changes in the current regulatory framework around electric power.

The City has begun, and can continue to transition away from these fuel types towards carbon neutrality by focusing on these four areas:

Increased energy efficiency – Energy efficiency is the most cost-effective way for the City to meet its energy and climate goals, as well as saving taxpayer dollars. It reduces the amount of energy that must be generated. The City continues to conduct energy and water efficiency retrofits in its buildings and to apply requirements that all new facilities be built to the highest standards of energy efficiency, and plans to install high-efficiency LED streetlights throughout the City, using a variety of funding mechanisms as part of the City's energy program.

A Smart Buildings project was approved as part of the FY 19 budget and is supported by the City's strategic plan with a goal to reduce energy consumption and expand the life cycle of City buildings and infrastructure. The Smart Buildings project will provide analytics to reduce energy consumption by more than 5% annually and assist in measuring carbon to meet the City's goal of carbon neutrality by 2040.

Renewable energy generation – Three of the most effective ways to utilize renewable energy are solar, electric heat pumps and cogeneration facilities. The City will continue to install solar installations on City-owned buildings, parking lots, vacant municipal land (such as closed landfills), and water treatment sites, where feasible. In February 2019, the City was awarded a $10,000 grant from the National League of Cities' Leadership in Community Resilience Program to study the feasibility of solar paired with battery storage on critical City facilities. The cost of on-site solar generation has decreased significantly in recent years and indications are that costs will continue to decline. Heating systems in buildings could be switched from natural gas to electric heat pumps. The City could explore cogeneration facilities in its wastewater treatment plants to capture methane and generate heat and electricity.

Fleet changes – This area is a particular challenge because electric alternatives for diesel-powered trucks and other heavy equipment are not yet available. The City will continue to replace its gas and diesel-powered vehicles, including buses, with electric and hybrid vehicles as well as switching from diesel to B20 (20% biodiesel) for non-fire/EMS vehicles where feasible and reliable. Renewable natural gas (biogas) and hydrogen may be viable alternatives to power vehicles in the future at an annual cost of $1.3 million.

Offset purchase – The City could purchase Renewable Energy Certificates (RECs) or green energy through Duke Energy's Renewable Energy Program to offset fossil fuel use that cannot be eliminated by other measures, in order to reach the carbon neutrality goal. The price for RECs has declined significantly over the past eight years. It would cost the City approximately $100,000 annually to purchase RECs to offset its current electric consumption.

Alternatives

The Durham Environmental Affairs Board has endorsed a separate proposed resolution which sets a goal of transitioning City operations to 100% renewable energy by 2050, with an interim benchmark of 80% by 2030. This alternative is not recommended, as Staff cannot provide assurance that this goal, if adopted, is achievable due to current technology and cost considerations.

Financial Impact

Energy efficiency – The City spent $9.2 million on total energy use in FY 2017, including electricity, natural gas, gasoline, and diesel. Energy efficiency measures could reduce the City's energy cost by 30%, yielding an annual savings of $3 million, for a total savings of $60 million by 2030. To accomplish these savings, the City will need to invest initially $30 million in FY21 to benefit on our return of investment in the next 9-10 years to reach 80% by 2030.

Renewable energy generation – The City consumed 7.5 million Kwh (74.32 Mwh) of electricity in FY 2018, costing $7.4 million. To meet its current electricity needs by solar, the City would need a 60.5 Mw solar array, which would cover approximately 300 acres with today's technology. This would cost an estimated $115 million, based on the 2018 cost for utility-scale systems of $1.85/watt), assuming the City did not have to purchase additional land. The City would save at least $220 million in reduced electric costs over 30 years, based on current electricity cost and consumption. This estimate does not include current financial incentives available such as a $0.75 rebate per watt up to $75,000 (for a 100 Kw system) and options for leasing solar that eliminate upfront investment by the City.

It would cost the City approximately $1.3 million to switch to renewable natural gas (biogas), based on a cost of $20/mmbtu, assuming the City could access the fuel.

Fleet – The cost for switching diesel vehicles to B20 biodiesel would be $50,000/year for the City, assuming a contract price for B20 of $0.04/gallon more than diesel, and based on FY 2017 consumption.

Offset Purchase - It would cost the City approximately $65,000 annually to purchase Renewable Energy Credits (RECs) from wind generation to offset all current electric consumption (about 1% of the total $7.4 million electricity cost for the City in FY 2017). It would cost the City $115,000 per year to purchase RECs from NC solar farms, or about 1.5% of the City's FY 2017 electric cost. If the City wanted to purchase NC solar RECs to cover 10% of its electricity consumption, it would cost approximately $12,000 annually.

Attachments
General Services proposed resolution
The Durham Environmental Affairs Board proposed resolution
Environmental Affairs Board Meeting Minutes
Letter from Indira M. Everett, District Manager, Duke Energy
Article on Carbon Neutrality in Cities