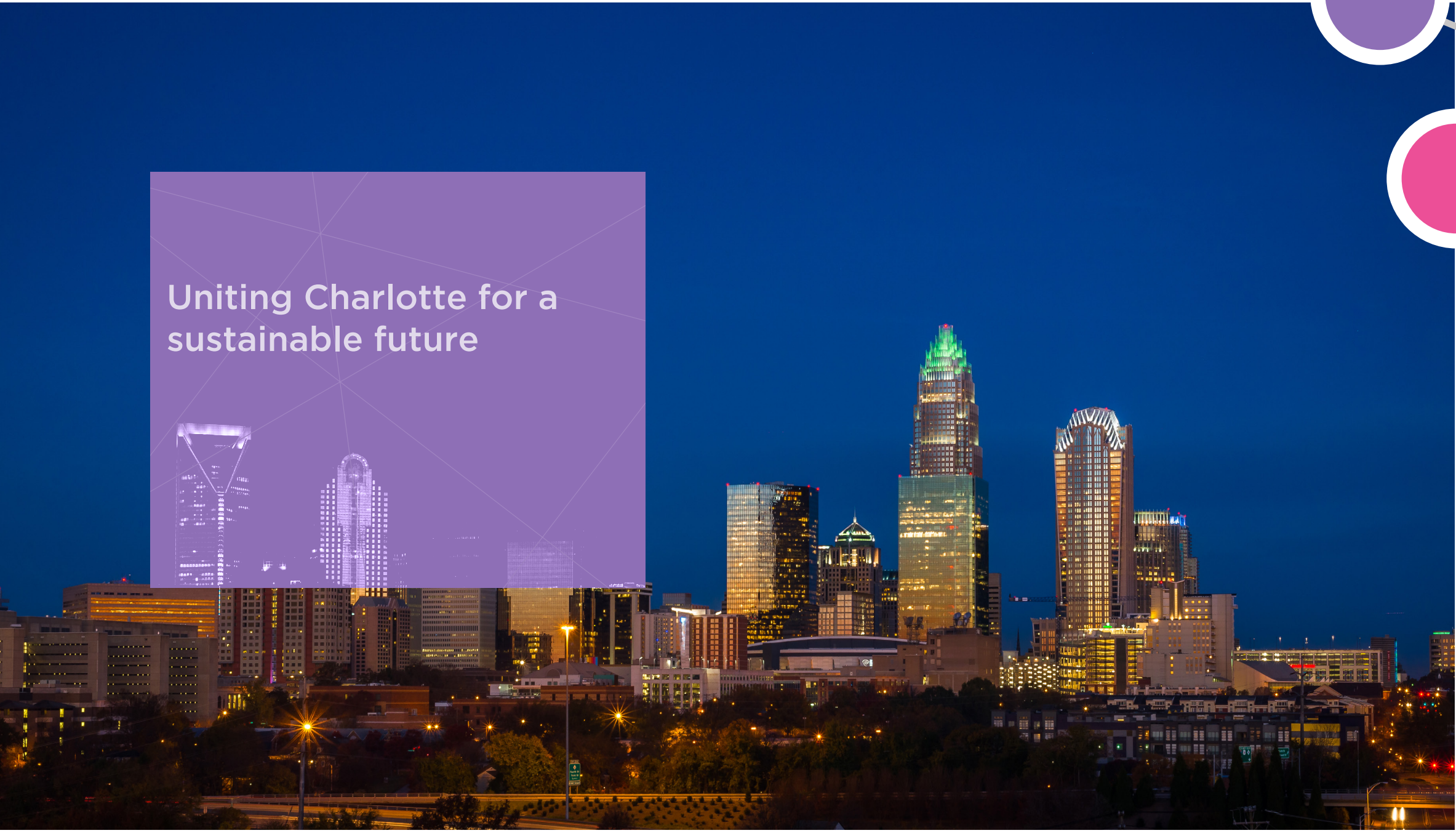




## Uniting Charlotte for a sustainable future



Envision Charlotte is a public private plus collaborative that leads Charlotte's progress as a global Smart City through innovations that strengthen economic competitiveness, environmental sustainability and positive community impacts.

This report was funded as part of a grant from the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy Building Technologies Office



## Energy Report

Charlotte, North Carolina has been emerging as an energy hub and Envision Charlotte has been one of the groups in the forefront. In 2011, a group of city leaders led by then Duke CEO Jim Rogers came together to form what is now Envision Charlotte – a non-profit focused on increasing sustainability in our urban core. The first initiative launched focused on energy efficiency.

In this endeavor, Envision Charlotte created a public-private-plus partnership, which included both the utility and university. The group started with a narrow focus – large commercial buildings that were greater than 10,000 square feet and located in Charlotte’s Uptown. At that time, 64 buildings met that criteria. The group secured agreements with 61 of those buildings that included: an energy pledge to reduce energy by 20%, installation of shadow meters and placement of kiosks in building lobbies.

Over the next several years, many actions were implemented to achieve this goal. Duke Energy launched Smart Energy in Offices, a program designed to focus on the behavior piece of the puzzle. This program empowers property managers to educate tenants about simple changes to their daily routine which can add up to big energy consumption savings.

In addition, a program called the Energy Roundtable was designed to work with building operators and property engineers to identify

and better understand the best path towards energy efficiency through equipment upgrades. The University of North Carolina at Charlotte (UNCC) brings in students and professors for an unbiased look at the buildings with recommendations for equipment updates, with a focus on the return on investment.

This program was both an innovative approach to driving energy efficiency in commercial buildings and a great vehicle for engaging students in practical applications. ●

As of early 2017, the participating buildings saw a 19% reduction in energy consumption. This reduction of kWh represents a savings of \$26,000,000.



## Department of Energy Grant

Envision Charlotte's initial energy programming was so successful in its ability to reduce energy consumption, that Envision Charlotte applied for, and was successfully awarded, a grant from the **U.S. Department of Energy's Office of Energy Efficiency & Renewable Energy (EERE) Building Technologies Office (BOT)** to build upon the success of the original energy reduction initiative. The three-year (2015-2018) grant provided funding to develop and implement Energy Roundtables (ERT) and Building Performance Training (BPT), and to develop an Eco-Network, all while expanding the program enrollment to include an additional 200 buildings outside of the Uptown area. The grant also expands the targeted building sectors to include: real estate, hospitality, higher education, healthcare and retail.

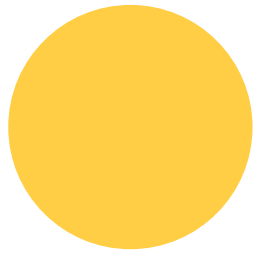
In addition to Envision Charlotte's original partners, this grant allowed the organization to collaborate with additional partners including UNC Charlotte's Center for Sustainably Integrated Buildings and Sites (UNCC SIBS), Center for Climate and Energy Solutions (C2ES), Charlotte Center City Partners (CCCP), the City of Charlotte, and Carolinas HealthCare System (CHS).

Like the original energy program, the grant focuses on a two-tiered approach that first targets operational energy savings and then seeks to determine capital improvements, while also incorporating a behavioral change component as a vehicle for broad sustainability messaging and engagement to ensure that investments achieve

their full potential over the long-term. In other words, to sustain building operator-implemented energy savings over the long-term, it is essential that there be a component of education and behavioral change on the tenant side.

The grant has three goals: 1) to realize a 20 percent aggregate energy savings across more than 200 buildings in the Greater Charlotte region; 2) Develop and implement a comprehensive behavioral change component to ensure sustainable energy savings beyond the period of the project; and, 3) Utilize smart city initiatives to create a scalable, replicable model for market transformation. ●





## Energy Roundtables

Once buildings are recruited into this program, the student teams, led by Dr. Rob Cox and Dr. Ben Futrell, pair with a building and that building's operator for a semester. The students then work through a three-step process:

1. Identify opportunities for improved schedules and removal of manual overrides
2. Identify opportunities to optimize air distribution
3. Identify opportunities to optimize the central plant and economizing

Each student team is given access to the building automation system (BAS) and interval data through the Energy Charting and Metrics Tool (ECAM) tool. By working through the ERT process, the students develop recommendations and final summary reports that ultimately provide the participating building operators with

a third-party, vendor-neutral set of recommendations for the building to reduce their energy use. Most importantly, for the students this experience is invaluable as they are growing their network of contacts and gaining real world learning experiences in the local community. ●

# 83

Number of students that have participated in the program since the start

# 26

Original class size

# 42

Current class size

**Majors that can participate:** Engineering  
Undergraduate and graduate students participating

Through participating in the DOE Grant, a building within Carolinas HealthCare System's portfolio was able to see a 40% energy savings. The Building Operator made recommended operational changes resulting in an immediate 30% energy savings, and repaired a broken valve which achieved an additional 10% energy savings.

## Building Performance Training (BPT)

Another key component of the DOE grant is utilizing the Building Re-tuning Training (BRT) program and materials out of DOE's **Pacific Northwest National Lab (PNNL)** to help drive energy efficiency efforts in buildings. Focusing on the Carolinas HealthCare System's portfolio of buildings, Dr. Cox and Dr. Futrell are working closely with Carolinas HealthCare System (CHS) leadership and building operators to develop and refine a process that teaches operators how to understand building performance. UNCC has held several training rounds utilizing BRT materials and conducted meetings with building operators to refine the designed curriculum and interventions.

The BRT is a structured process for investigating building/ HVAC system operations to identify and correct common faults that lead to energy waste. By using the BRT approach, UNCC can detect energy savings opportunities and implement improvements. The building performance training provided by the UNCC team, with support from the DOE grant, provides the building operators with the valuable in-depth understanding of how commercial buildings operate, and empowers them with the skills to identify and fix no- to low-cost operational problems that are endemic to commercial buildings. ●

“Energy savings and occupant comfort are achieved quickly and permanently when building operators and engineers are empowered and given the chance to solve building performance issues as part of the building management team.”

**Kady Cowan**

Acting Assistant Vice President  
Environmental Sustainability Solutions  
Carolinas HealthCare System

	PROGRESS (month 20)	GOAL (month 36)
Buildings reached with ERT/BPT	116	200
Operators Enrolled in BPT	46	50
Individuals engaged through EcoNetwork	847	1000



## **ECONETWORK**

ENVISION CHARLOTTE

Envision Charlotte, with support from Center for Climate and Energy Solutions, developed the EcoNetwork - a community engagement initiative focused on establishing and supporting efforts that reduce energy use, reduce waste, conserve water, and improve air quality in Charlotte. The inclusive network welcomes all Charlotte citizens and works closely with Charlotte employers.

The EcoNetwork has a mission to create a thriving, sustainable Charlotte by fostering collaborative action and leadership among our community’s unique citizens. Through education, networking, and action campaigns, Envision Charlotte’s EcoNetwork continues to provide opportunities for individuals, businesses and communities to work together to reduce environmental impacts and make Charlotte a truly remarkable city.

All Charlotte citizens can be EcoNetwork members, including city and private sector employees, facilities managers, Envision Charlotte Board members, Smart City Council members, local university students, and more.

The EcoNetwork is built on the idea that connecting motivated individuals with larger collaborative efforts will spur positive and sustained change in Charlotte. With that in mind, Envision Charlotte continues to be committed to collaboration within the network and beyond. In this way, the EcoNetwork supports and amplifies community initiatives hosted by complementary Charlotte organizations. ●



## EcoNetwork Speaker Series

Envision Charlotte is developing a quarterly speaker series that will create a platform for quality engagement of citizens throughout the city and county on sustainability and smart cities topics. Envision Charlotte is leveraging their global and local network to identify speakers and presenters that can speak to how local acts of sustainability can address global challenges. By facilitating a robust dialogue locally, Envision Charlotte hopes to create more systemic and sustainable change to help make Charlotte a more sustainable and smart city.

The speaker series launched in April 2017 with much excitement as Envision Charlotte hosted his Excellency, Henne Schuwer, Ambassador of the Netherlands to the United States. His keynote address spoke to the ever-increasing importance of global engagement and transatlantic partnerships as cities strive to become

more sustainable. Following his address, Amy Aussieker interviewed him to explore how transatlantic partnerships at the local level can help facilitate the exchange of best practices and to learn more about the concept of a circular economy. The event wrapped up by opening it up to the audience for Q+A. ●

One of the things we have learned at Envision Charlotte is that there are a lot of solutions for buildings in their quest for energy efficiency. It can be overwhelming and confusing to sort through all of them, so this program was really designed to help figure out best options depending on the buildings goals. This partnership between UNCC, Envision Charlotte and the buildings has been very beneficial for all parties and we look forward to continuing and expanding this program.

**Amy Aussieker**  
Executive Director  
Envision Charlotte