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Baseline for a green redesign

Aurora works with UCD to quantify carbon impact

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Professor and Director of the Sustainable Urban Infrastructure Program at the University of Colorado Denver Anu Ramaswami poses March 3 in the North Classroom on Auraria Campus in Denver. (Heather A. Longway/The Aurora Sentinel)

AURORA | Tracking down greenhouse gas emissions for an entire city is a monumental task.

It's an effort that requires the investigative skills of a good detective and the pooled resources of municipal utility and state transportation departments. It means measuring the combined output of the area's automobiles, gauging the amount of emissions from all of its buildings, tracking the emissions that come as a result of transporting materials like food, water and building materials and even finalizing an estimate for gases that stem from waste disposal.

While the scope of such an effort may seem dizzying, it's an essential step in mapping a strategy for future energy efficiency and economic development.

"We need a baseline. We can't determine whether we've improved if we don't have a baseline," said Karen Hancock, Aurora's environmental program supervisor. "(Our) carbon footprint ?" it's a greenhouse gas inventory. There are strategies that we use to reduce that carbon footprint. But you have to know where you started to know if you've improved."

The effort to quantify Aurora's carbon footprint entered its first phase Feb. 23, when the Aurora City Council approved an agreement with the University of Colorado Denver's College of Engineering and Applied Sciences.

Under the terms of the agreement, Aurora would contract UCD to conduct a greenhouse gases inventory, write an official report and produce an action matrix. The cost of the contract is $6,000.

UCD officials have said finalizing the data will span a semester of work for graduate students, which would translate into about three months.

According to Hancock, the data will serve as a groundwork for eventual changes to the city's Comprehensive Plan, a document that will lay the foundation for the city's approach to land use, development and, most significantly, Hancock said, economic and environmental sustainability.

"We are evaluating strategies that meet the definition of sustainability ... We do not want to promote things just because they're green," Hancock said. "If they do not make sense for our community, we need to wait on that.

"We're specifically using it to help us determine strategies that will make our community more sustainable, make our government more sustainable," she said. "I think it will just help us narrow down some of the best strategies for reducing our carbon footprint."

Hancock said that the city chose the UCD inventory program specifically for its novel ways of measuring emissions and for the subjects of its previous surveys. The UCD group, headed by UCD professor and Sustainable Urban Infrastructure Program Director Anu Ramaswami, has previously conducted a carbon footprint study for Denver and has also collected data for Arvada, Central City, Broomfield and Durango. Indeed, the unique features of the UCD methodology made it the sole candidate in the award process.

The UCD program also incorporates new elements into its measurements, such as gauging Aurora citizens' use of regional facilities like the Denver International Airport.

"One of the reasons we liked this program at UCD was because people in Aurora use that airport. We need to be looking at this as a regional effort," Hancock said. "Anu had some really good features for this model ... It's not like you drive from Aurora into Denver, it's just across the street."

Ramaswami also stressed the unique elements of her program. Citing measurement standards that draw on everything from waste disposal to transporting water, Ramaswami said the system helps define a city's individual patterns.

"The inventory really helps you understand what's unique about the city," Ramaswami said. "The footprint then helps guide where you would emphasize your sustainability plan ... That is different for every city, it just depends on the dynamic."

The UCD program isolates each city's pattern by breaking emissions down into three main categories: buildings, transportation and use of materials.

The first two categories are the more obvious sources of emissions. Buildings encompass every type of structure in the city, from homes to office buildings, industrial centers to retail shops; while the second includes greenhouse gases produced by cars, trucks, buses and all other modes of transportation.

The novel element of the model rests in the use of materials, Ramaswami said, a category that incorporates sources that have been overlooked or underestimated in the past.

"Increasingly, people are looking at the material sector to really define a carbon footprint," Ramaswami said. "We use cement in all of our construction. We need water, so what's the energy needed for our water? We all need food, so what's the energy needed to get the food to us? We look at how much carbon is emitted from producing these materials."

For example, Ramaswami said that the survey for Denver revealed that the average person produces six pounds of waste per day, which translates into about 25 metric tons of carbon dioxide per person per year. This compares to an average of about 24.5 metric tons for the state and about 25.2 metric tons for the national average, according to Ramaswami's research.

The challenge of determining a carbon footprint is more than just defining sources. It's also a matter of measuring all of these disparate elements in quantitative terms, a considerable effort that draws data from Xcel Energy, the Denver Regional Council of Governments, the city's water department and local waste disposal companies.

"(UCD) provided us a list of the data that needs to go into the computer model. We have staff working on getting that information," Hancock said. "We've received some information from Xcel Energy. We are working with our own stormwater quality people to get information about things that the city does from a utility standpoint. We are looking at information on square footage of buildings, the average square foot of an Aurora home, they want to know about our waste generation."

All of this data will help determine Aurora's unique carbon footprint, a figure Ramaswami said will be forged by specific qualities of the city's present and future layout. Aurora's light rail stations, its status as a suburb with residents who commute, its shift toward transit-oriented development ?" all of these factors could play into the final emission tally.

"It's really exciting for us, because Aurora's the third largest city in the state," Ramaswami said. "It's high impact ... Once you see the emission baseline, it leads to a plan that's unique to that city."