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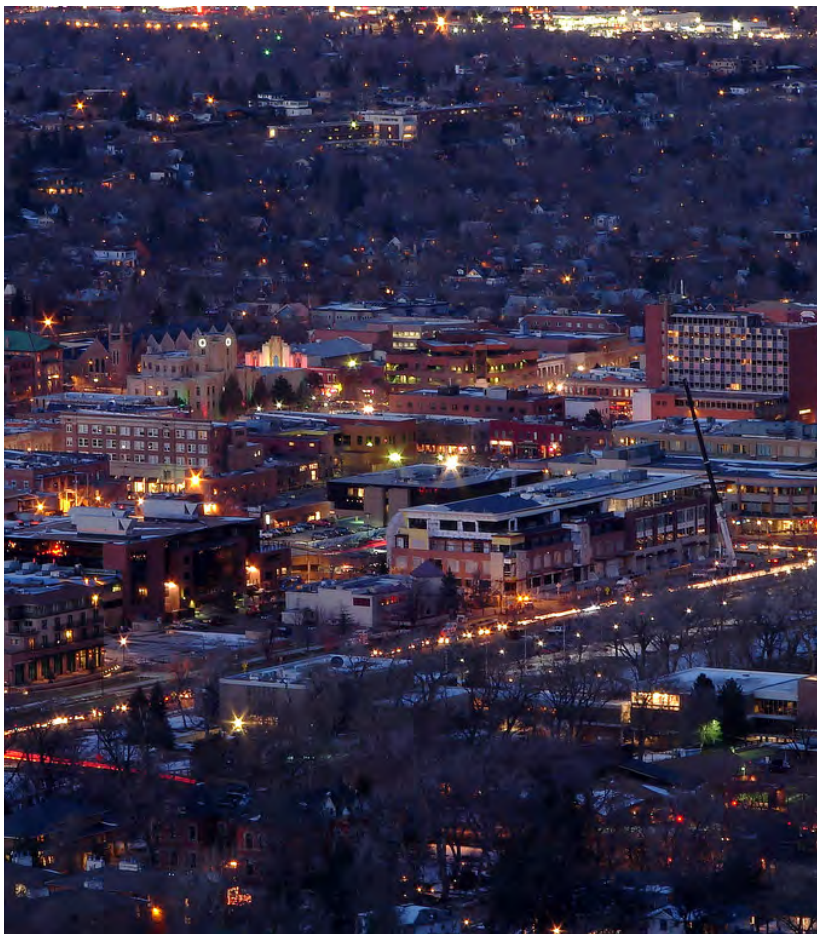
REIGNING IN CARBON EMISSIONS THROUGH TRANSPORTATION AND LAND USE INITIATIVES

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15-minute neighborhoods and travel behavior in Boulder

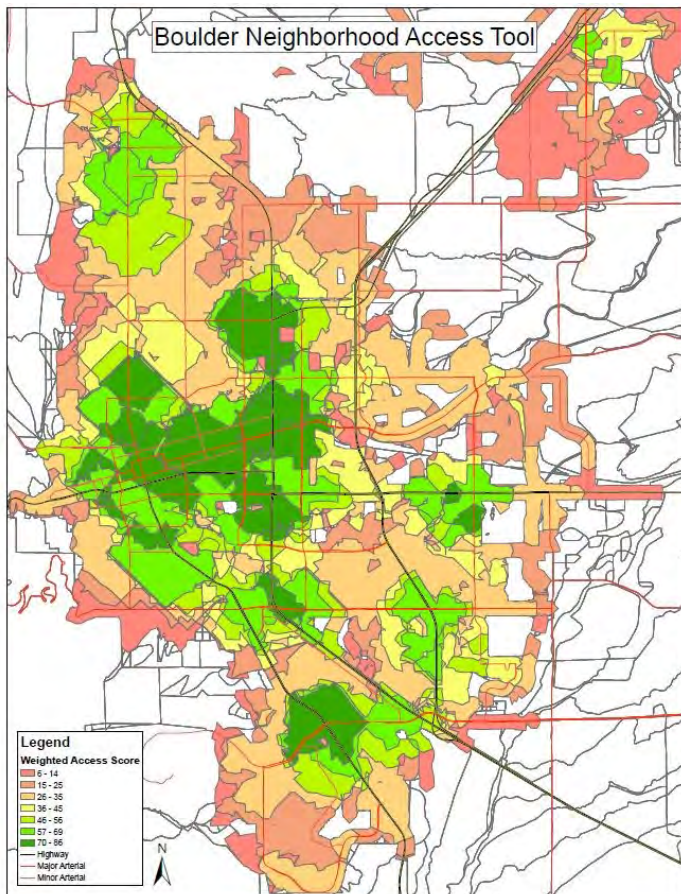
By Eric Stonebraker

Eric Stonebraker is a travel behavior researcher who recently graduated with a master of engineering in transportation systems engineering and also holds a MURP from the University of Wisconsin -Madison. This article is excerpted from his master's report. Eric's professional interests relate to sustainable built environments through human-scaled development that enable active travel modes and healthy behaviors.



When discussing carbon emissions reduction efforts, policy experts consider the relative contribution from buildings (39%), industry (29%) and transport (33%) and explore means to reduce emissions from each. The transportation-land use nexus may be an area that could yield significant reductions in both transport- and buildings-related carbon emissions. This article recounts the results of a study of neighborhood access and associated trip generation and daily miles traveled in Boulder, Colorado.

Boulder, Colorado's 2014 Transportation Master Plan (TMP) update establishes ambitious goals to increase the population living within 15-minute walkable neighborhoods to 80 percent from 26 percent and reduce resident per-capita vehicle miles traveled (VMT) to 7.3 miles from the 2014 average of 11.2 miles by 2035. These efforts will largely be achieved through increasing destinations in closer proximity to households. This study provides a snapshot of Boulder's progress based on the results from the Boulder travel diary survey with all trips

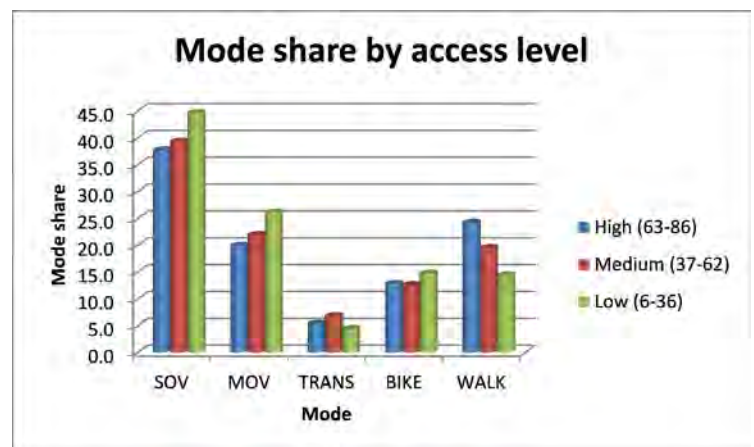


from 2000 to 2012.

Extensive academic literature has focused on the relationship between the built environment and vehicle miles traveled (VMT). Increases in land use mix and intensity will reduce the need for long trips and make multi-modal travel more feasible, though the built environment has greater effect on trip distances than frequencies (Kockelman 1996). We also know that socio-economic status affects mode choice as much by socio-economic status as the built environment in most settings (Ewing and Cervero 2001). The concept of the 15-minute neighborhood, and related quarter- or half-mile walkshed, comprises the idea that within smaller geographic areas, the distribution of amenities that serve people's basic needs (i.e., parks, food, etc.) are easily accessible by walking, biking or transit.

The city of Boulder's recently developed GIS-based neighborhood access tool allows us to locally confirm the value of the 15- minute neighborhood to travel behavior. This tool comprises land use measures such as the presence of a variety of amenities (schools, libraries, social attractions, shopping, bus stops, population density, slopes, etc.). Paired with five iterations of Boulder's household travel diary data, we are now able to provide a preliminary snapshot of how Boulder's

infrastructure performs. I use a subset of the collected, residential travel data that is geo-referenced to the nearest intersecting streets with 5,379 respondents and 24,702 trips. I investigate differences in modal split and daily miles traveled (DMT) for all trips in relation to



neighborhood access score.

The results reveal that neighborhood access score is a statistically significant and positively correlated predictor of DMT. DMT varied significantly between low, medium, and high NA scores. Median DMT increases from high to low neighborhood access level from 10.96 miles (High), 11.36 (M) and 14.17 (Low). As you move from low to high neighborhood access, SOV mode share decreases from 44.6% to 37.7%, for a relative decrease of 36.7%.

While the household surveys do not capture attitudes toward travel modes, city of Boulder goals to increase the proportion of the population living within 15 minute walkable neighborhoods, are liable to shift more trips to lower carbon emitting modes and reduce trip distances. Combined with vehicle technology, the emerging role of ride sharing (i.e., Lyft and Uber), the nexus between land use and transportation is one of many options toward mitigating carbon emissions.



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