



Discovering Location Efficiency In Cities

The Shifting Paradigm of the City
Rail~Volution
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Washington DC

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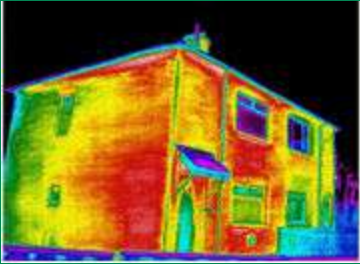
- Non-profit applied research “think and do tank” based in Chicago
- Develop and implement strategies that benefit the environment and the economy
- Bridge information gaps and asymmetries between supply & demand for essential public goods and services
- Work includes energy efficiency, transportation efficiency, green infrastructure



Location Efficiency

- Degree to which a neighborhood's layout, design, and amenities decreases its households' costs and impacts.
 - Need to get groceries
 - Drive 15 miles to store - ☹️
 - Live in neighborhood with stores within walking or short drive - 😊
 - Need to get to work
 - Commute in a single occupancy vehicle - ☹️
 - Live near work and bike - 😊

Analogy: Energy Efficiency



Thermal image of a home without insulation



Thermal image of a home with insulation



- Don't invest in a house with good insulation, tight windows, and doors
- Pay for lots of fuel
 - Be cold
 - Worry about global natural gas prices
 - Add to climate change

- Invest in a house with good insulation, tight windows, and doors
- Amortize the cost over the lifetime of the house
 - Be Warm
 - Add value to house
 - Help build sustainable communities

Neighborhoods



Personal Photo – Peter Haas



<http://rentrodger.com/rentals/equincoxapartments.htm>



http://wiffradio.org/gallery/MakingWaves/Suburban_Sprawl_in_Chester_Co_PA_Image_82655



<http://twochatelainesfarm.com/default.aspx>

Transportation Costs



Analysis of Data Shows That...

Transportation costs vary by place, depending on:

- Access to services
- Walkable destinations
- Extent and frequency of transit
- Access to jobs
- Housing Density



Places with these qualities:

- Own less autos per household
- Drive less miles annually
- Use public transit more

→ Lower Transportation Costs



Model Costs of Transportation

6 Neighborhood Variables

Residential Density

Gross Density

Average Block Size in Acres

Transit Connectivity Index

Job Density

Average Time Journey to Work

3 Household Variables

Household Income

Household Size

Commuters per Household



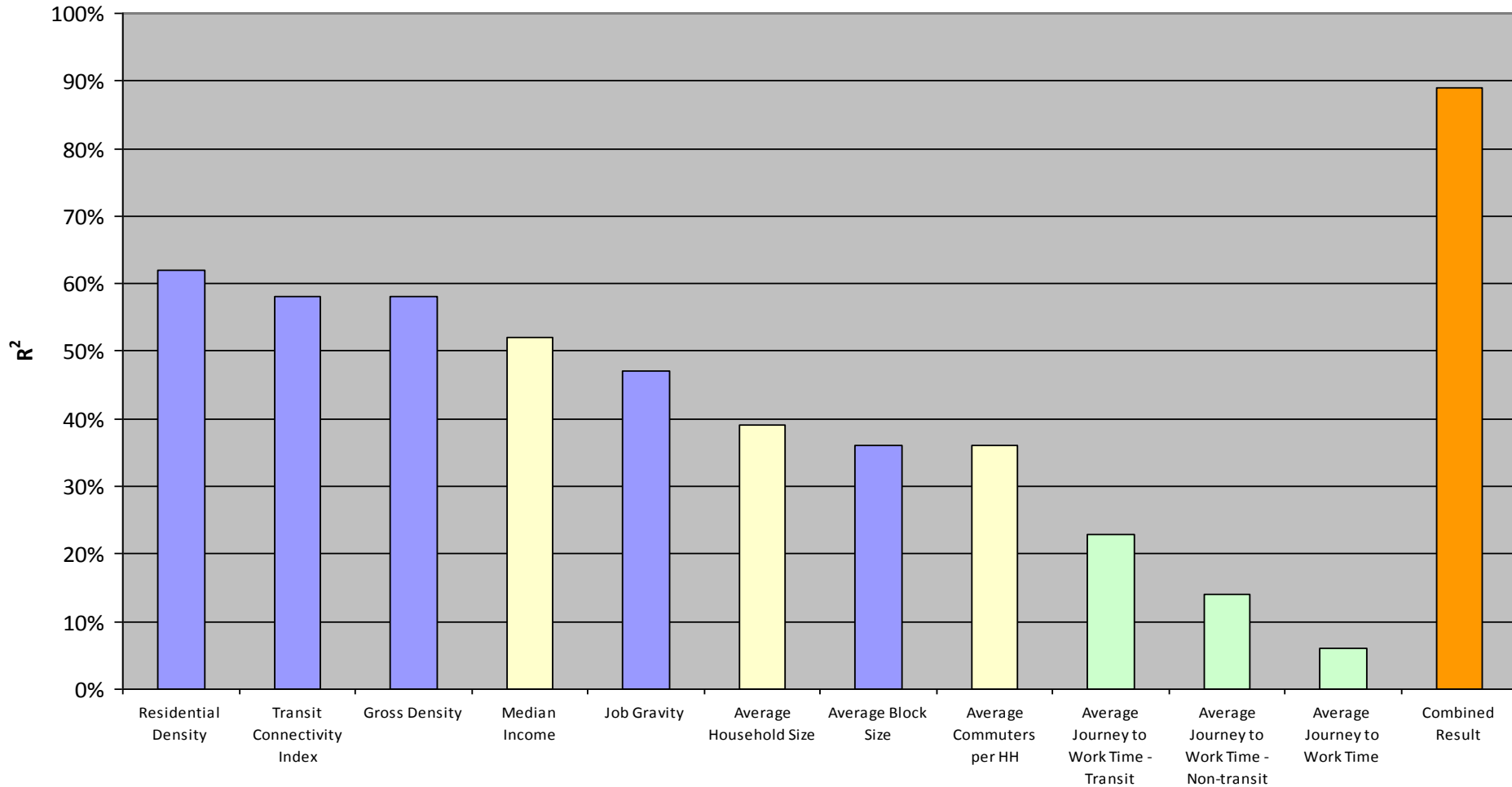
Car Ownership
+
Car Usage
+
Public Transit Usage



**TOTAL
TRANSPORTATION
COSTS**

Independent Variable Significance

Auto per Household Fit



Fitting Washington DC area only

H+T Index: Rethinking Housing Affordability

boston.com



- What about transportation expenditures?
 - Second largest after housing
 - Costs are largely unknown
 - Leads to inefficient development patterns
- H+T Affordability Index gives a more complete picture of affordability

Factoring Transportation into the Affordability Equation

- Transportation costs are typically 18% of household budget
- H+T Affordability Index calculates costs at the neighborhood level
- 30% housing + 15% transportation = 45% H+T affordability benchmark

$$\text{Affordability} = \frac{\text{Housing Costs} + \text{Transportation Costs}}{\text{Income}}$$

Why an Index?

Index

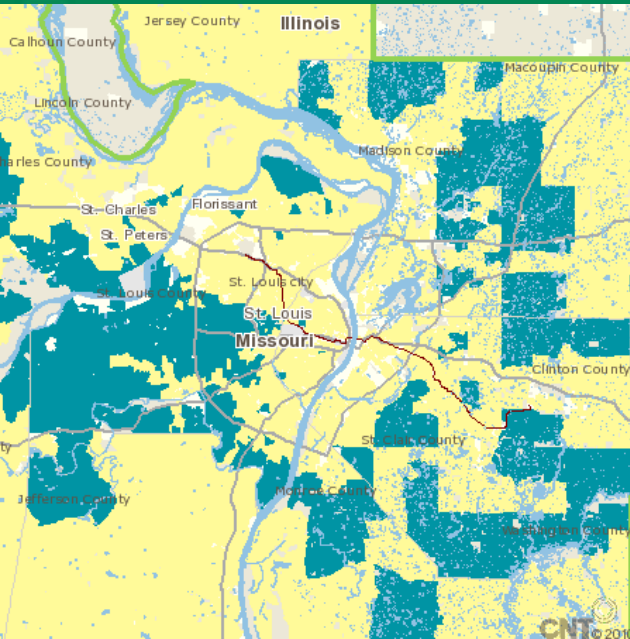
“...is a number that indicates the location of something in a list, scale, or array of numbers or prices; indexes are also primarily employed because their simplicity allows for ease of comparisons.”*



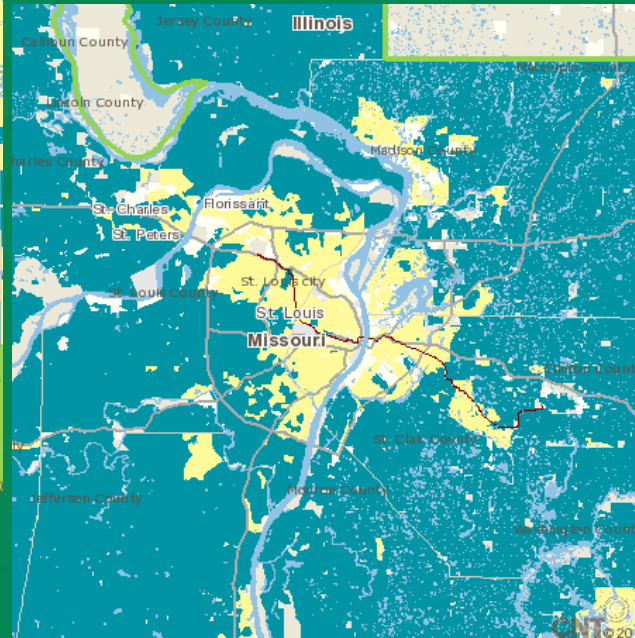
Allows Users to:

- Control for socio-economic variables.
- Therefore focuses on how urban form drives affordability.
- Allowing for comparison of affordability of a single representative household.

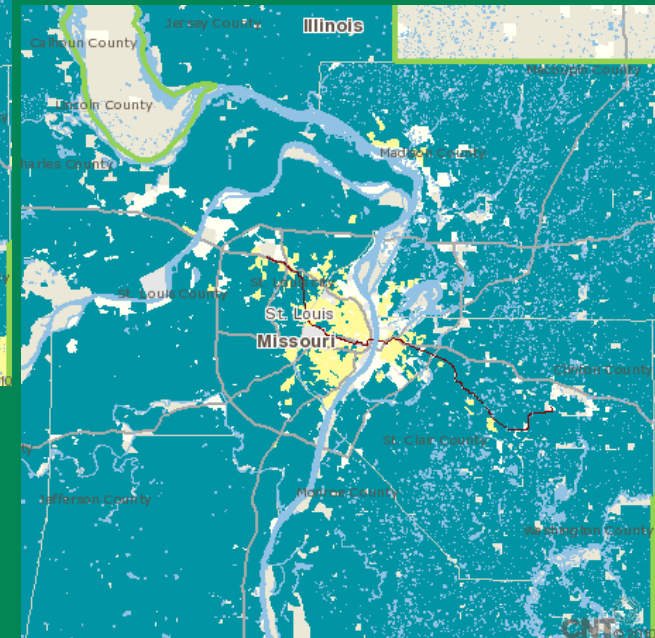
Shrinking Affordability



Housing at 30%



H+T at 45%



Moderate Household :
80% of RMI: **\$35,550**
Size: **2.5 People**
Commuters: **1.2 Workers**

H+T at 45%
for Moderate Household

Typical Household:
Regional Median Income (RMI): **\$44,437**
Size: **2.5 People**
Commuters: **1.2 Workers**

Region: Madison, WI

▼ Region

Focus: **Map Area** ▼

Typical Household: Regional Median Income: \$49,223 Size: 2.4 People Commuters: 1.1 Workers

Display: Neighborhood Statistics **▼ Change**

Housing Costs - % Income

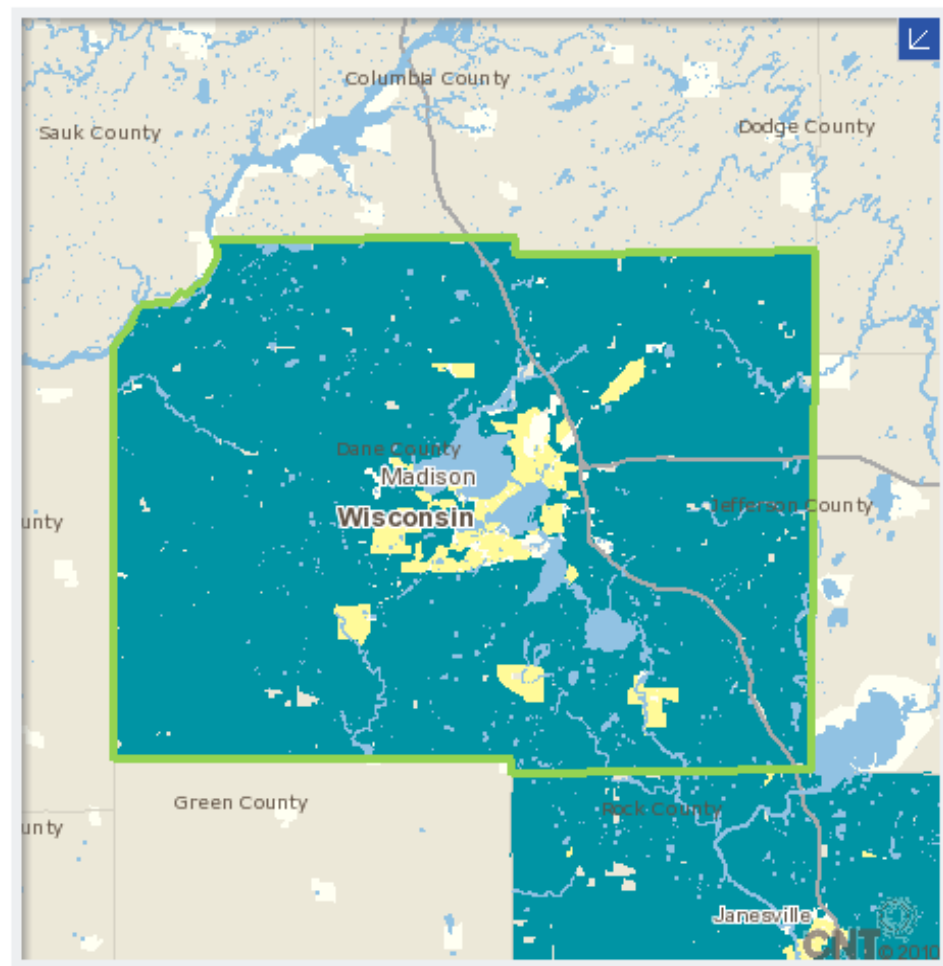
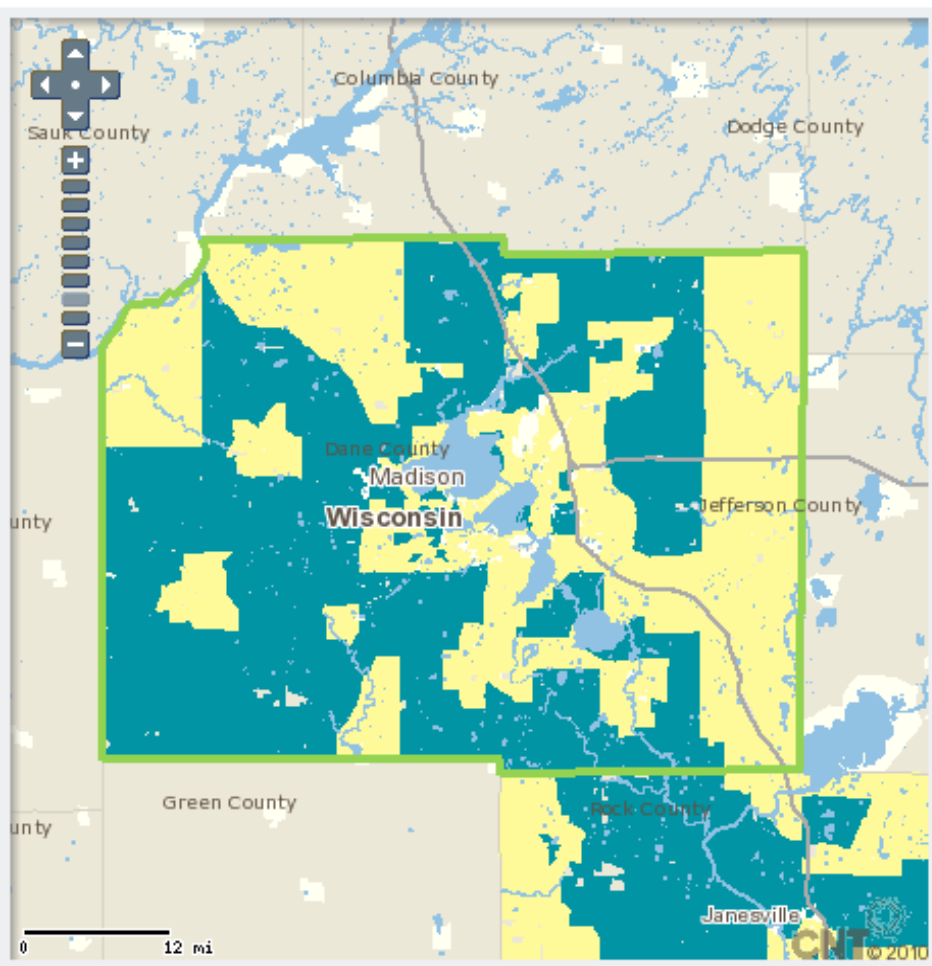
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Criteria	Neighborhoods	Percent of Neighborhoods
No Data Available	1	0.3%
Less than 30%	226	72.9%
30% and Greater	83	26.8%
Map Total	310	100%

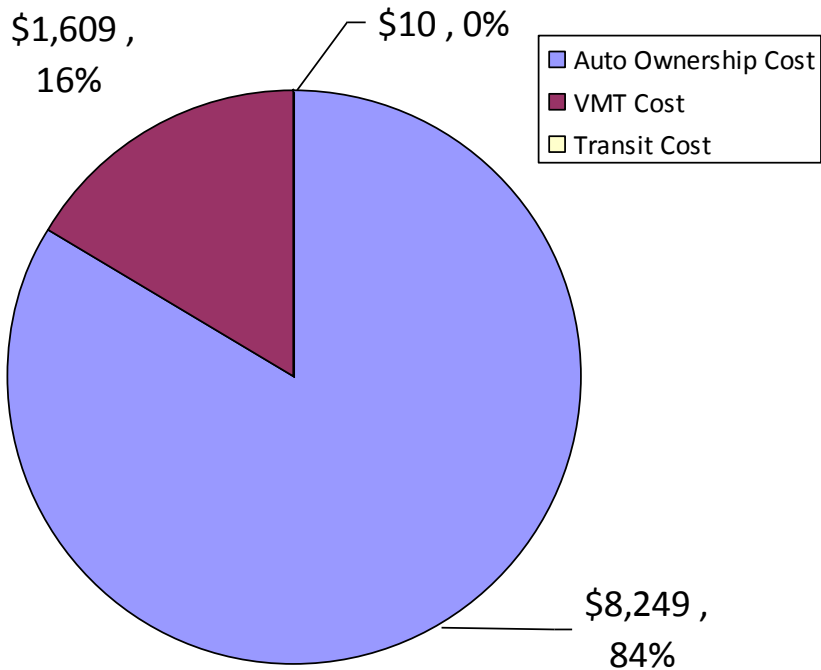
Housing and Transportation Costs - % Income

▼ Change

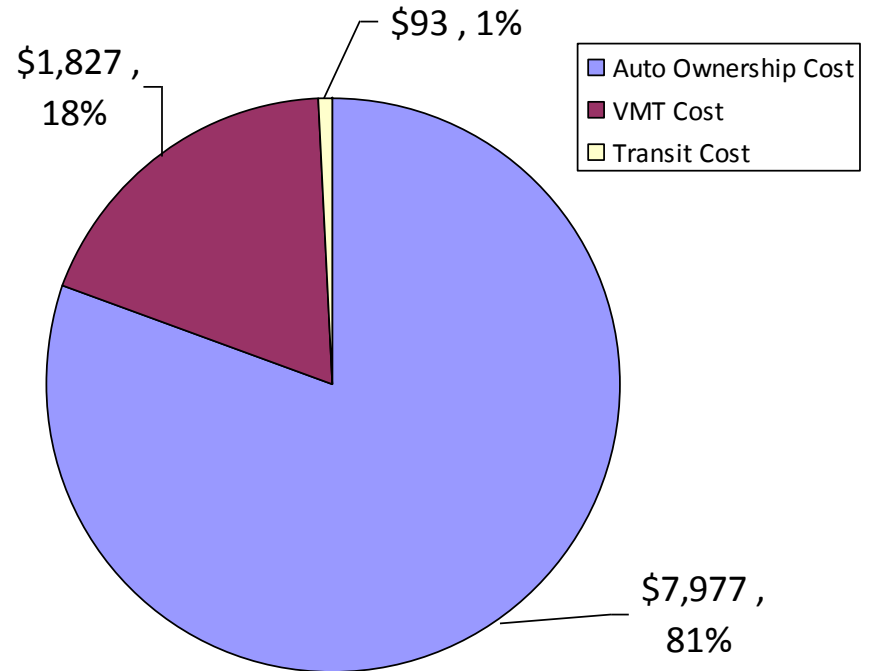
Criteria	Neighborhoods	Percent of Neighborhoods
No Data Available	1	0.3%
Less than 45%	121	39%
45% and Greater	188	60.6%
Map Total	310	100%



Cost Breakout by Transportation Component



Cost Breakout Lincoln NE Metro



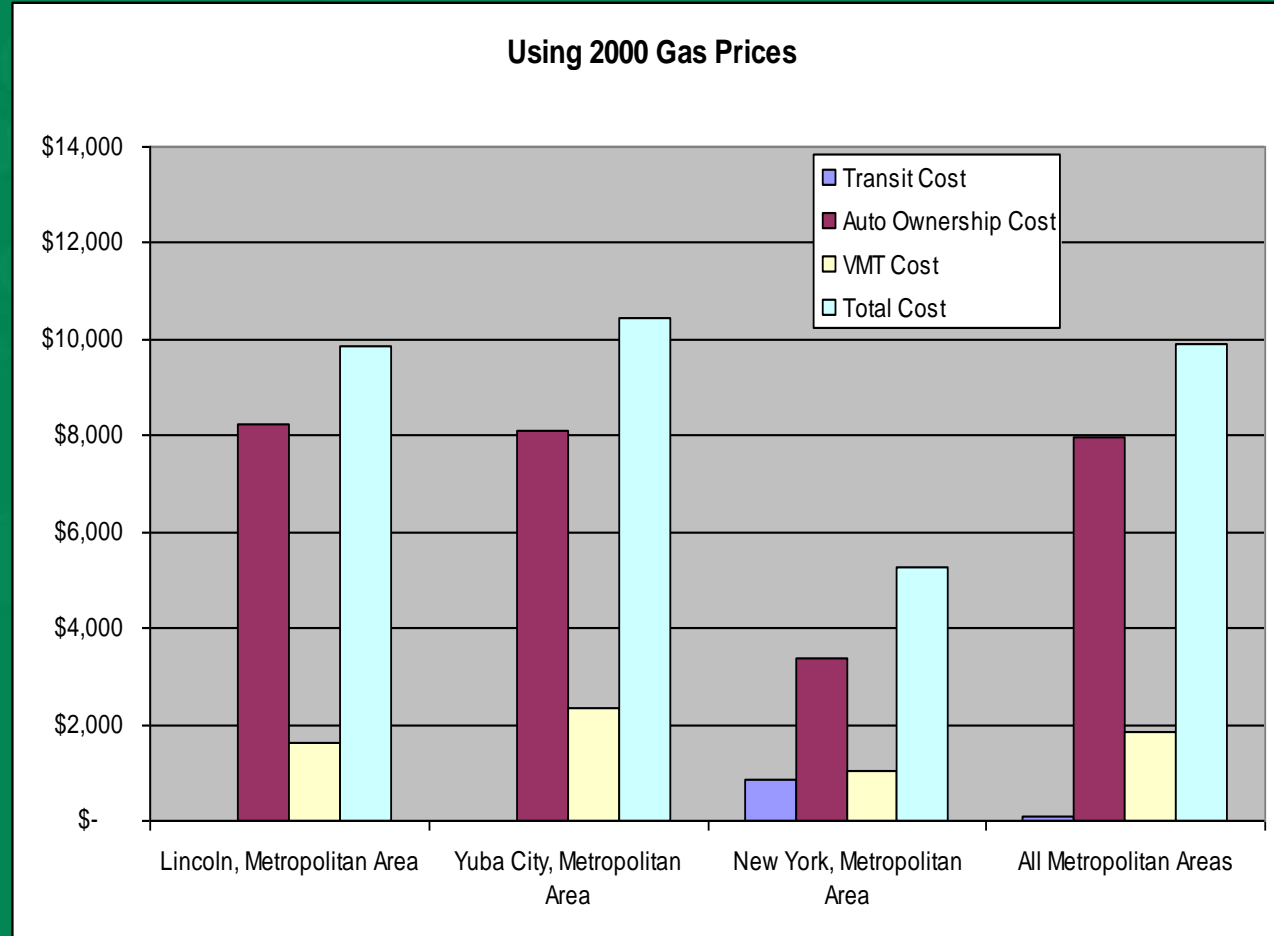
Cost Breakout All Metro Areas in US

- All Metro Areas
- New York Metro – largest percent transit
- Yuba City CA Metro – largest percent VMT
- Lincoln NE Metro – largest percent auto ownership

Cost Breakout

by Transportation Component

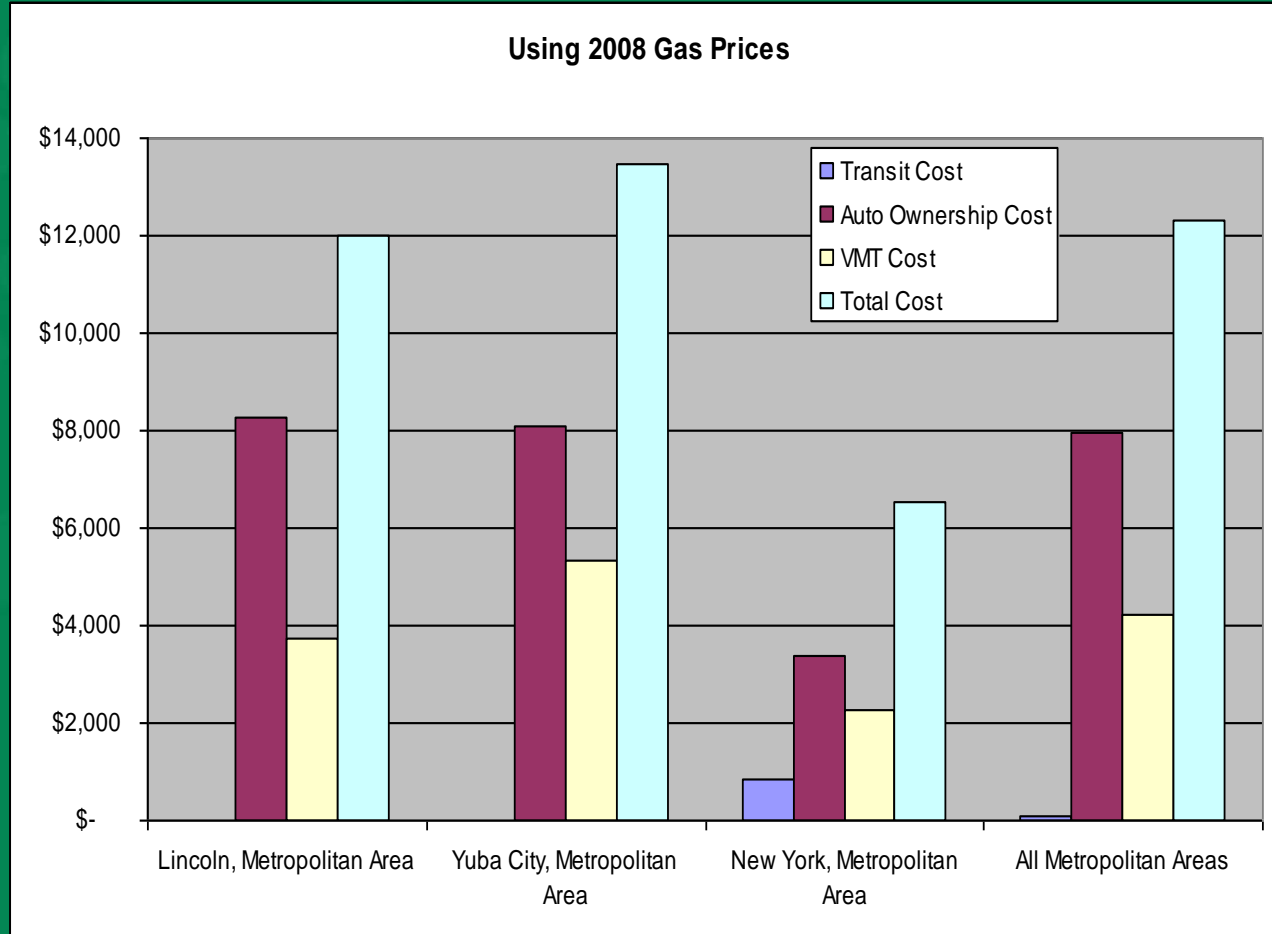
- The mix varies as well as the overall cost
 - All – \$9,897
 - NYC – \$5,285
 - Yuba City – \$10,449
 - Lincoln – \$9,868



Cost Breakout

by Transportation Component

- The mix varies as well as the overall cost
 - All – \$9,897
 - NYC – \$5,285
 - Yuba City – \$10,449
 - Lincoln – \$9,868
- The exposure to volatile gas prices
 - All – \$12,305 (24% increase)
 - NYC – \$6,526 (23%)
 - Yuba City – \$13,471 (29%)
 - Lincoln – \$12,001 (22%)



(Using peak 2008 gas price)

Apps and Updates

- <http://htaindex.cnt.org>
- New websites with updated data
 - Expand coverage to 940 Metropolitan and Micropolitan Statistical Areas (2008 OMB definition excluding PR)
 - Use 2009 ACS 5 year estimates (2005-2009) at block group level to recalibrate
 - Develop new national transit data and develop more ubiquitous and comparable transit access indicator
- Explore more detailed costing model for auto ownership

The collage features several key web applications:

- H+T Affordability Index:** A map of the United States with color-coded regions. Text: "True Affordability and Location Efficiency H+T Affordability Index".
- Abogo:** A map showing transportation routes and costs. Text: "Abogo transportation costs made transparent".
- Walk Score:** A search interface showing a score of 52 for "Somewhat Walkable".
- Housing + Transportation Calculator:** A detailed interface with a map and various input fields. Text: "Housing + Transportation Calculator".

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Thank you!

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For more information, visit:

<http://www.cnt.org>

<http://htaindex.cnt.org>

<http://abogo.cnt.org>

H+T Newsletter: <http://htaindex.cnt.org/subscribe.php>