

Mapping Wisconsin's Economy

A spatial perspective on economic trends and conditions

Issue 1 – May/June 2004

By Matt Kures

The Impact of Rising Gas Costs on Wisconsin Commuters

During the first part of 2004, Wisconsin drivers have experienced a steady increase in gasoline costs. At the end of May, average gasoline prices in the State are approximately \$0.50 more per gallon than prices in May of 2003¹. While rising gas prices impact all households, the costs are particularly noticeable to commuters who drive. Although commuting only accounts for 14.8% of all trip generation, this activity is responsible for 28.4% of miles traveled². Commuters can reduce their personal costs through the use of public transit, alternate modes of transportation and ride sharing. However, these options are often either unavailable to workers, or commuters are reluctant to make these changes. Accordingly, this issue of *Mapping Wisconsin's Economy* examines some potential impacts of rising gas costs on Wisconsin's commuters and communities.

Measuring the Impact of Rising Gas Costs on Commuters

Within Wisconsin, 89.4% of all workers drive to work. Included in this figure are 88.9% of workers who drive alone and 11.1% that use some sort of carpooling³. Understanding the impact of rising gas prices on these commuters requires knowing something about how far each of these employees drives to work. While the 2000 U.S. Decennial Census reports commuting times for workers, travel time does not necessarily correlate to driving distance. Traffic congestion and highway access can positively or negatively impact driving times without respect to the overall distance traveled. Subsequently, using driving times as a proxy for distance traveled can be misleading. In overcoming this problem, a data set known as the Census Transportation Planning Package (CTPP) can be used to estimate the actual distance between where an individual lives and works.

Released in April 2004, Part III of CTPP is a detailed data set that tracks worker travel between every census tract, county, place, and MCD in the United States. The CTPP also contains comprehensive

information on workers' occupations, incomes, transportation modes and other labor force information. The CTPP has a wide range of applications and more information is available at: <http://www.fhwa.dot.gov/ctpp/>

To measure commuting distances, the census tract information contained in the CTPP was analyzed using GIS. Simply put, commuting distances were estimated by calculating the distance between the centers (centroids) of the census tracts containing a worker's residence and place of employment. For workers that live and work in the same census tract, a measure of average distance from a tract's center to the tract's edges is used (known as spread). Note that these distances were only calculated for commuters that drive. Average driving distances for each census tract were also calculated by averaging the total distance traveled for each worker living in a census tract. Additional information on this methodology is available at <http://www.uwex.edu/ces/cced/mwe/ctpp.html>

Knowing the estimated driving distance for individual commuters and the average driving distance for every census tract allows the impact of gasoline price increases to be evaluated:

$$\text{Additional Annual Gasoline Costs} = d_{ij} * f * p * c_{per} * n \quad (1)$$

Where:

- d_{ij} = Driving distance from a residence to work (round trip)
- f = U.S. average vehicle fuel efficiency (21.9 miles per gallon in 2000)⁴
- p = Annual price increase per gallon
- n = Number of trips to work per year (typically 250 for full time workers)
- c_{per} = Adjustment for carpool size (i.e. two person carpool = 0.5)

While this equation makes a number of assumptions, it provides a good estimate of the impact of increased gas prices on the average commuter.



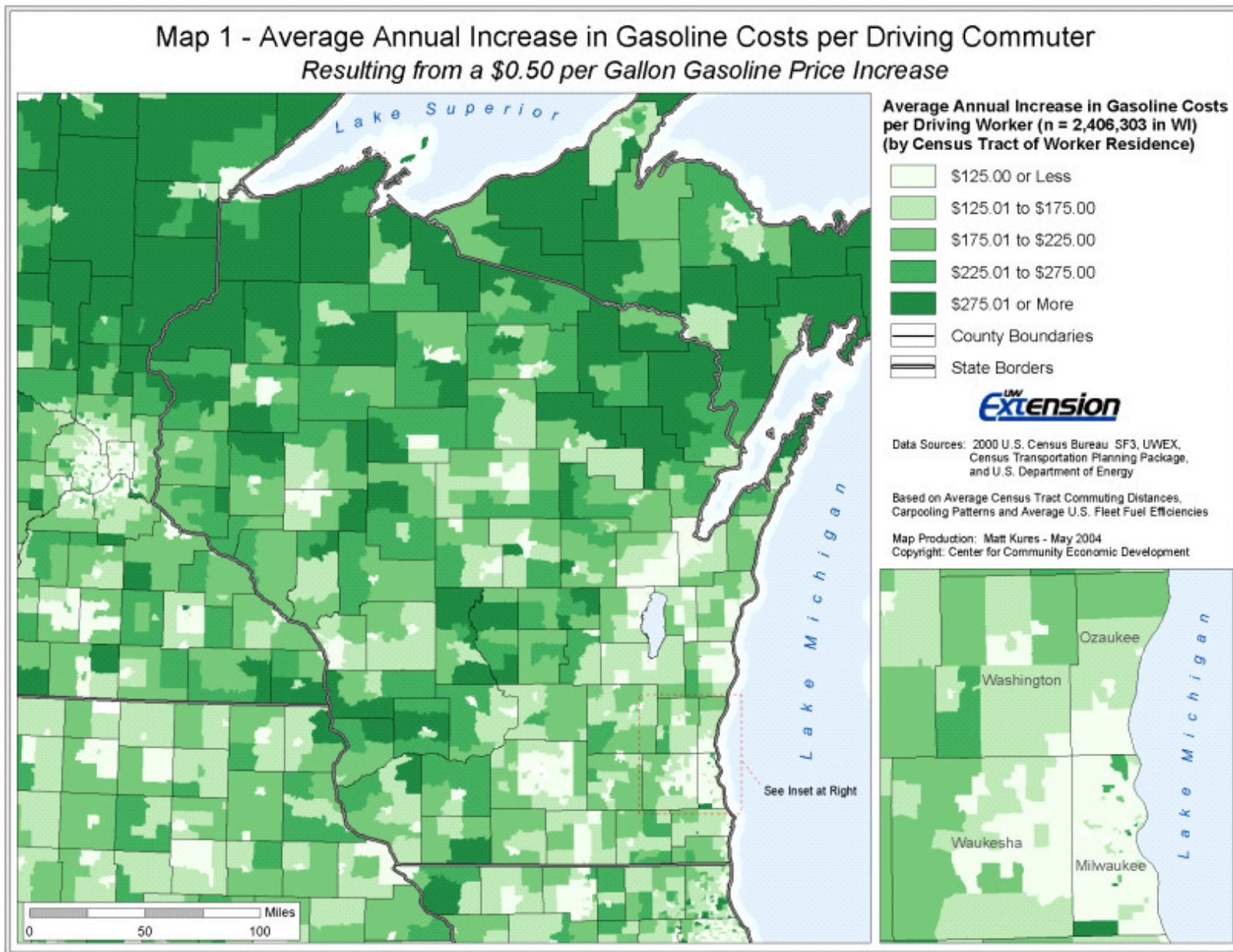
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To show how Equation 1 can be used, the following map (Map 1) uses a sustained \$0.50 per gallon price increase to examine the average annual impacts on driving commuters. A full size PDF or JPEG version of this map can be downloaded at: <http://www.uwex.edu/ces/cced/mwe/>



Some Implications of Increased Gasoline Prices – The Leakage of Local Dollars

Clearly, Map 1 shows that the impact of higher gas prices will vary by individual commuters and geographic areas. However, the total statewide impact of an annual \$0.50 increase is approximately \$316 million. Despite this figure, a number of surveys suggest that gas prices have not yet reached a level that will change most drivers' habits⁵. Nonetheless, communities should be concerned as the extra dollars spent on gasoline represent dollars that might normally be spent on other expenditures in the local economy. Ultimately, this \$316 million represents dollars leaking out of the local economy and the State of Wisconsin. To demonstrate the impact on a given community, Table 1 shows the estimated additional expenditures on gasoline for commuters residing in 20 selected communities. An Excel spreadsheet with all Wisconsin cities and villages is available for download at <http://www.uwex.edu/ces/cced/mwel/>.

Table 1 - Annual impact of \$0.50 per gallon increase on driving commuters in selected Wisconsin communities

Community Name	Average Round Trip Distance (in miles)	Avg. Increase in Gasoline Costs per Commuter	Total Annual Impact of \$0.50 Increase
Milwaukee	17.3	\$91.5	\$18,822,451
Madison	16.7	\$90.0	\$8,116,492
Kenosha	23.5	\$126.4	\$4,956,678
Green Bay	14.8	\$81.0	\$3,924,149
Appleton	18.1	\$100.1	\$3,336,780
Racine	19.0	\$102.3	\$3,273,494
River Falls	31.0	\$167.8	\$1,075,311
Whitewater	33.9	\$185.8	\$1,024,594
Chippewa Falls	18.6	\$102.1	\$578,683
Baraboo	18.0	\$96.7	\$481,546
Sparta	20.1	\$109.7	\$422,064
Ripon	20.6	\$113.4	\$341,700
Osceola	52.5	\$276.6	\$314,177
Prescott	27.1	\$147.4	\$279,660
Richland Center	21.2	\$112.3	\$222,761
Muscoda	67.2	\$349.6	\$211,515
Park Falls	29.0	\$156.2	\$163,497
Chilton	17.8	\$95.4	\$157,796
Black River Falls	11.0	\$59.0	\$84,709
Wyocena	53.5	\$288.7	\$68,131

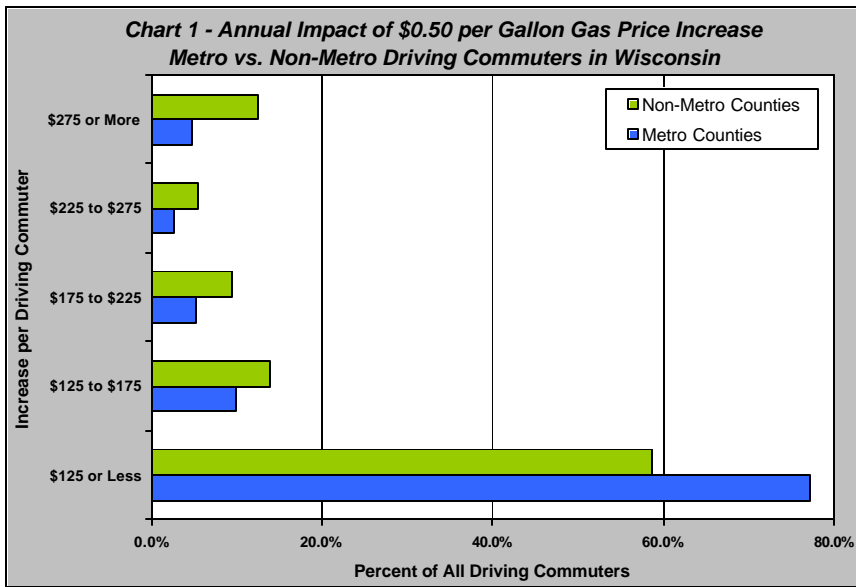
Table 1 shows that even small communities (such as Chilton) can face a significant impact. Although local economies experience leakage in a variety of ways, increasing gas costs are particularly important as most of these dollars flow out of the State and the United States. For instance, when communities experience sales leakage in retail expenditures, the sales may be going to a neighboring community or county. These dollars remain somewhat local as sales taxes generated by these expenditures remain in the state (with the exception of dollars flowing across state lines).

In examining gasoline expenditures, the primary reason for the recent price increases is rising oil costs. While these rising costs represent increased revenues for those areas producing oil, more than 62% of the United States' oil comes from foreign production⁶. Furthermore, the ~38% of oil produced domestically is extracted from areas outside of Wisconsin. While Wisconsin receives revenue through a state gas tax, this tax is indexed on an annual schedule and set at a fixed amount per gallon (currently 32.1¢). This tax rate differs from the retail sales tax that is based on the percentage of the purchase price. Accordingly, as gas prices rise, Wisconsin's gas tax remains the same. (For more information on gas prices and community impacts, see the current edition of *Community Indicators* at <http://www.uwex.edu/ces/cced/indicate.html>)

Some Implications of Increased Gasoline Prices – Differences between Metro and Non-Metro Counties

While all communities will experience some amount of leakage, both Table 1 and Map 1 suggest that the impact of rising gasoline prices varies throughout the state. Specifically, the map suggests a number of differences between metro and non-metro areas. In general, metro areas tend to show smaller impacts per commuter than non-metro areas. This trend is particularly noticeable for commuters living in the Milwaukee, Madison and Green Bay areas. Chart 1 verifies this trend as it shows that commuters living in non-metro counties tend to pay more than their metro counterparts^a.

^aThis analysis defines metro counties according to the 1999 OMB definitions of metropolitan statistical areas (MSAs). Metro counties include: Brown, Calumet, Chippewa, Dane, Douglas, Eau Claire, Kenosha, La Crosse, Marathon, Milwaukee, Outagamie, Ozaukee, Pierce, Racine, Rock, Sheboygan, St. Croix, Washington, Waukesha, Winnebago.

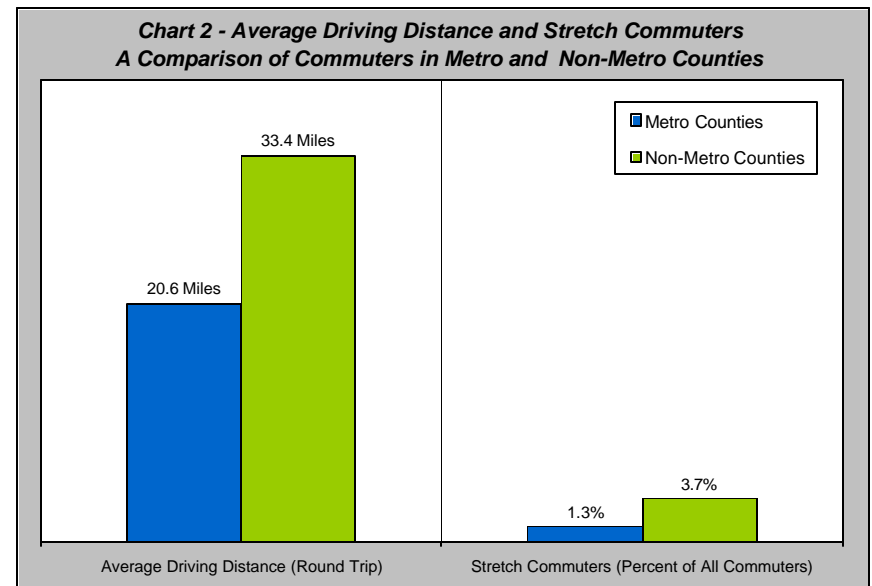


One potential reason behind this metro/non-metro difference is a greater percentage of carpooling commuters in urban areas. However, the U.S. Census Bureau reports that non-metro counties actually have a larger percentage of driving commuters who carpool (12.3%) than metro counties (10.6%).

Another possible reason for the difference between metro and non-metro counties is a longer average commuting distance for workers residing in rural areas. In exploring this potential difference, Chart 2 shows the average driving distance for workers living in either metro or non-metro areas. Chart 2 shows that commuters living in non-metro counties have an average round trip drive of 33.4 miles compared to 20.6 miles for workers in metro counties. Given the lower density of rural areas, and the longer distances between residences and potential places of work, the greater average distance traveled by workers residing in non-metro counties is not surprising.

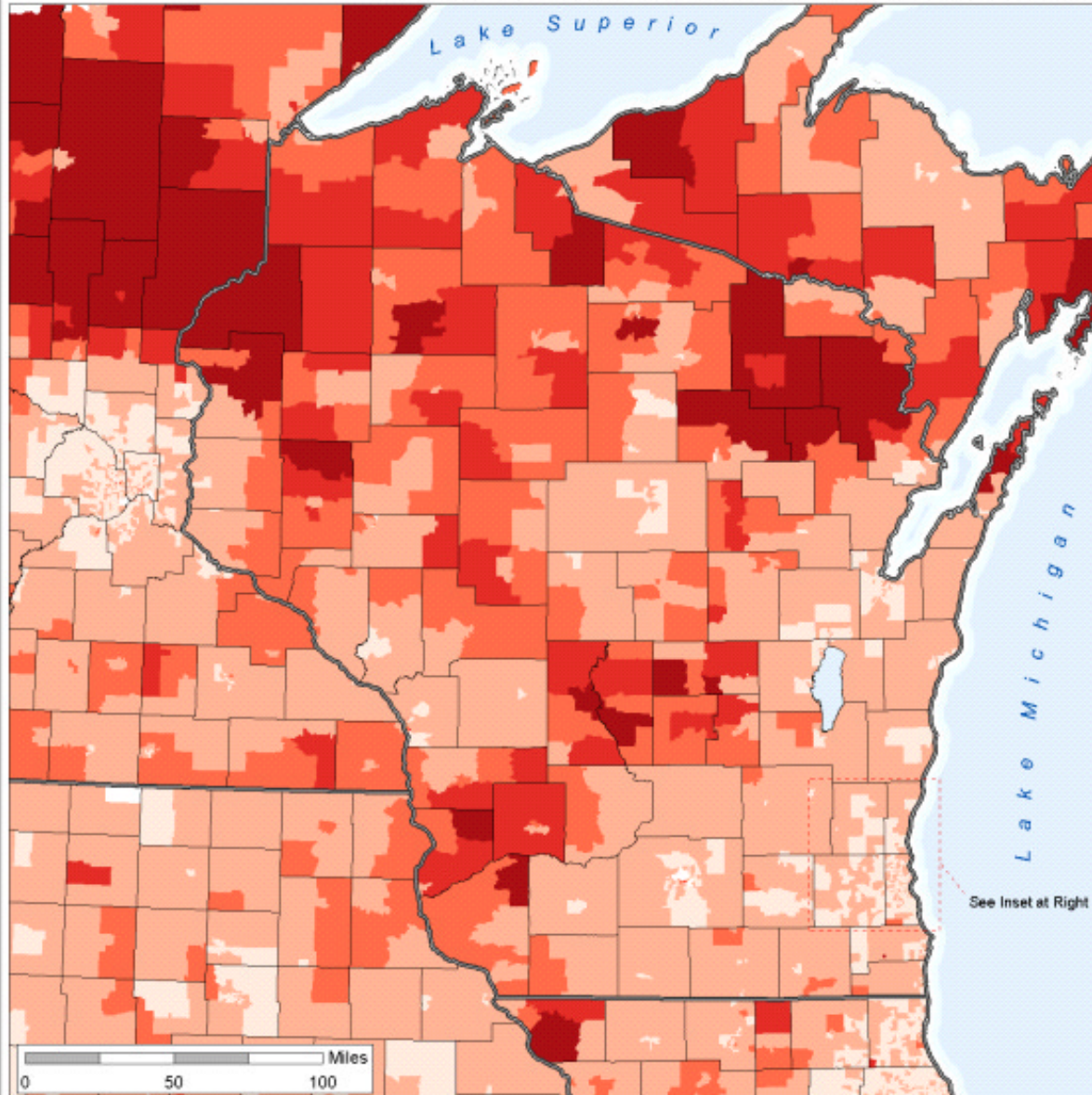
An interesting trend that contributes to longer commuting distances is due to the number of “stretch commuters” found in non-metro areas. Stretch commuters are defined by the U.S. Census Bureau as workers

traveling more than 50 miles each way to work. In Wisconsin, there are an estimated 50,292 workers driving to work that could be classified as stretch commuters. While this value only represents 2.1% of all commuters driving to work, Chart 2 again shows the disparity between metro and non-metro counties. While only 3.7% of commuters living in non-metro areas are classified as stretch commuters, this figure is almost three times the percentage found in urban areas. Furthermore, while only 32% of all Wisconsin commuters live in non-metro counties, these rural areas account for 56% of all stretch commuter residences in the State.



To help depict the distribution of these long distance commuters, Map 2 on the following page shows the percentage of stretch commuters by census tract. The distribution furthers the idea that many rural areas (especially in the northern, southwest and central parts of Wisconsin) tend to have a higher proportion of stretch commuters than other areas of the State. As with Map 1, a full size PDF or JPEG version of this map can be downloaded at: <http://www.uwex.edu/ces/cced/mwe/>.

Map 2 - Stretch Commuters by Census Tract of Residence
Percent of Commuters Driving 50 Miles or More Each Way



Percent of Commuters Driving 50+ Miles to Work (each way) in each Census Tract (2.1% of all WI Commuters)

- 1.0% or Less
- 1.1% to 4.0%
- 4.1% to 7.0%
- 7.1% to 10.0%
- 10.1% or More

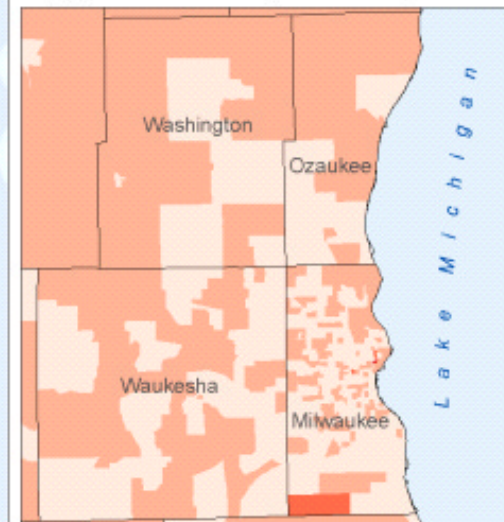
- County Boundaries
- State Borders



Data Sources: UWEX and Census Transportation Planning Package

"Stretch Commuters" are defined by the U.S. Census Bureau as commuters traveling 50 or more miles to work each way. For this analysis, only commuters who drive were used.

Map Production: Matt Kures - May 2004
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See Inset at Right



Conclusions

Increasing gas prices are felt by all consumers, but have a particular impact on Wisconsin's commuters who drive. While this issue of *Mapping Wisconsin's Economy* is only a brief examination of the impacts and issues surrounding gas prices, it does raise some interesting points. Should gas prices remain at their current level, Wisconsin's driving commuters will spend an estimated additional \$316 million on gasoline costs than they did in the previous year. This amount represents potential expenditures leaving both local communities and the State of Wisconsin.

Furthermore, the analysis points to a number of differences between metro and non-metro counties. In particular, we see a considerable difference in the distances that commuters in these different areas drive and the greater impact that increasing gas prices have on the average commuter living in a non-metro area. These conclusions suggest that if gasoline prices continue to increase, we will be faced with making decisions about how to travel, develop future economic development strategies and build our communities. The nature of these decisions will be greatly impacted by the geographic location of each community.

Next Issue of Mapping Wisconsin's Economy: Per Capita Income in Wisconsin.

Sources

1. AAA Fuel Gauge Report for Wisconsin (May 28, 2004). <http://www.fuelgagereport.com/WIavg.asp>
2. National Household Transportation Survey (2001) <http://nhts.ornl.gov/2001/index.shtml>
3. 2000 U.S. Census Summary File 3, Table 35.
4. *Average Fleet Fuel Efficiency Statistics*- U.S. Department of Transportation Bureau of Transportation Statistics: http://www.bts.gov/publications/national_transportation_statistics/2003/html/table_04_11.html
5. CNW Marketing Research – <http://www.msnbc.msn.com/id/4954349/>
6. American Petroleum Institute - <http://api-ec.api.org/>

Additional Information Sources

Community Indicators - Community Indicators is a series of online templates that provide practical, thought provoking information and stimulate discussion at the community level. The templates are designed to provide easy access to a variety of data about your community and other communities throughout the United States. <http://www.uwex.edu/ces/cced/indicate.html>

Census Transportation Planning Package

- <http://www.fhwa.dot.gov/ctpp/> - Additional information
- <http://www.transtats.bts.gov/> - Data downloads

2003 Wisconsin Energy Consumption – Wisconsin DOA

http://www.doa.state.wi.us/docs_view2.asp?docid=1593

WisStat- Applied Population Laboratory's on-line demographic information server for Wisconsin <http://www.wisstat.wisc.edu/>

U.S. Census Bureau American Factfinder – The American Factfinder is the gateway to current and historical Census Bureau information: <http://factfinder.census.gov>

Stretch Commuting

- Stretch Commuting Quick Facts http://www.bts.gov/publications/national_household_travel_survey/quick_sheets/stretch_commute.html
- Press Release from the U.S. DOT's Office of Public Affairs <http://www.dot.gov/affairs/bts1004.htm>