



Climate Change & Land Use

Smart Growth Recommendations from New Jersey Future

October 2008

Connecting Climate Change and Land Use

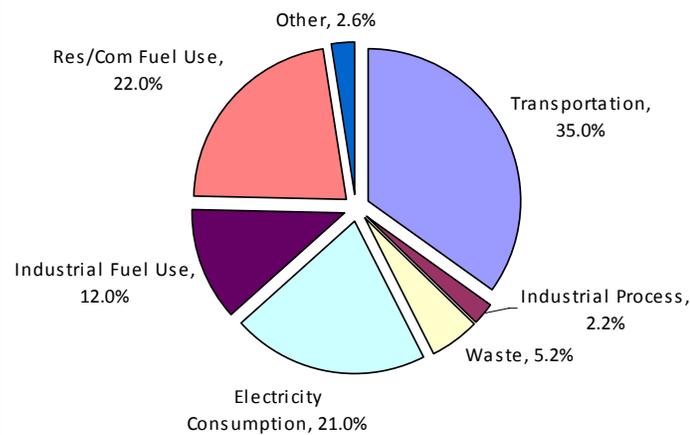
There is growing recognition, in New Jersey and across the world, that global warming is a serious problem that will require action in the coming years and decades. Add to that the recent spike in fuel prices, and more and more people are talking seriously about hybrid cars, renewable energy, green building technology and other ways to reduce greenhouse gases and save on energy costs. There is one crucial piece of the puzzle, however, that is often omitted from this conversation: the role of land use in influencing carbon emissions.

Land use—the decisions we make about where and how to develop—has a profound and lasting effect on our greenhouse gas emissions. And unlike cars or appliances, which can be replaced every few years if a newer, more efficient model comes along, the decisions we make about how to develop, and the impacts those decisions have on our carbon footprint, will be with us for generations. Poor land-use decisions not only lead to higher emissions today, but they also limit our ability to reduce those emissions well into the future.

Figure 1.

NJ Gross Greenhouse Gas Emissions by Sector, 2000

The transportation sector contributes more than one-third of New Jersey's greenhouse gas emissions and is its fastest-growing source.



Source: NJ Department of Environmental Protection, *Draft Greenhouse Gas Inventory and Reference Case Projections 1990-2000*, February 2008

Recommendations in Brief

- 1) Establish a statewide target for reduction in vehicle miles traveled (VMT).
- 2) Develop state and local land-use strategies to reach stated target.
- 3) Align state rules, regulations and infrastructure investments in accordance with the land-use strategies, including prioritized investments in the transit system.
- 4) Call on local governments to create plans and zoning regulations that foster development in areas appropriate for growth and discourage sprawling development patterns.
- 5) Provide local governments with financial incentives to change their land-use plans and zoning ordinances to support walkable, mixed-use development where appropriate.
- 6) Design places that are friendly to multiple modes of transportation, including biking, walking, transit and automobiles.

Transportation Sector is Dominant Source of Carbon Emissions in New Jersey

Land use plays a critically important role in climate change because it directly affects emissions from the transportation sector. In New Jersey, transportation accounts for the largest single sector of our carbon footprint, representing 35 percent of emissions (See **Figure 1**), compared with 26 percent for the nation as a whole. It is also projected to be the fastest-growing sector for the foreseeable future. The vast majority, 78 percent, of emissions from the transportation sector are attributable to gasoline burned in private automobiles.

Three main factors determine the emissions rate from the transportation sector:

- 1) Vehicle miles traveled (VMT), or the amount each person drives;
- 2) Fuel efficiency, or how many miles per gallon (MPG) a car gets; and
- 3) The carbon content of gasoline, calculated as emissions per gallon, which influences how much carbon dioxide is released for each gallon of gasoline burned.

Regulatory strategies, both at the state and federal levels, have tended to focus on the second and third factors, while not addressing the first: vehicle miles traveled. The federal government, for example, has recently increased corporate average fuel economy (CAFE) standards to achieve a fleet-wide vehicle efficiency rate of 35 miles per gallon by 2020. Meanwhile, California recently passed a low-carbon fuel standard to reduce the carbon intensity of vehicle fuels 10 percent by 2020.¹ While these steps are important, studies² have shown that emissions reductions achieved through increasing fuel economy and regulating the carbon content of fuels will be wiped out by projected increases in VMT. Overall CO₂ emissions from the transportation sector will rise if nothing is done to curb the rise in VMT, which in New Jersey has been growing by an average of 2 percent per year since 1965.

Spread-Out Development Underlies Increased Driving

Land-use decisions have a major impact on the number of miles we drive. Historically, cities in New Jersey were designed with walking or transit in mind. They were built with a mix of uses—residential, commercial and recreational—all close to one another. After World War II, New Jersey turned away from its downtowns and main streets

$$\text{Emissions rate from transportation sector} = \text{VMT} \div \text{MPG} \times \text{emissions per gallon}$$

decreased and, as a result, walking became impractical or impossible.

The effect of this development pattern on our driving habits has been enormous. Between 1970 and 2005, VMT grew 40 percent faster than the number of registered drivers and 64 percent faster than the number of residents in the state (See Figure 2). The resulting loss of open space over this period has been equally dramatic. Between 1985 and 2002 (the broadest range for which data are available), population increased by 13 percent while the amount of undeveloped land decreased by 20 percent. If this trend continues, researchers estimate the state will be the first in the nation to reach build-out sometime in the next few decades.³

Density Matters

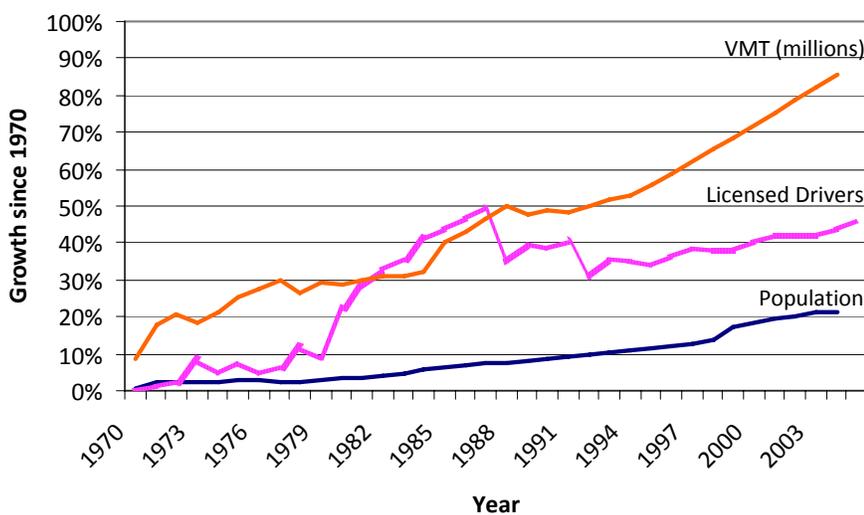
Any discussion about the role of land-use decisions in influencing VMT is incomplete without recognizing the influence of density. Population density, generally defined in terms of residents per square mile, can have a major impact on the number of miles people drive in a region. The general rule of thumb is that the higher the population density of a region, the lower the per-capita VMT of that region. Higher density allows people to take some trips by walking or biking. It also makes providing mass transit more feasible—as activities are concentrated, more people can share a ride to destinations. And by having more goods and services available in close proximity, higher-density areas can reduce the number of miles traveled for those trips that are still taken by car.

Nationwide, studies have shown that residents of the 10 most compact urban areas drive, on average, 28 percent fewer miles than their counterparts in the 10 most sprawling metropolitan

Figure 2.

Vehicle Miles Traveled (VMT) Growth in New Jersey

VMT growth has outstripped increases in population and registered drivers since 1970.



Sources: Federal Highway Administration, Highway Statistics 2005; US Census Bureau, 2005 Census

and adopted an approach to land use in favor of an automobile-oriented growth pattern. Development was segregated by uses and connected by a road network characterized by poor local connections and over-dependence on major arterial highways. Density also

¹ <http://gov.ca.gov/index.php?fact-sheet/5155/>

² Ewing, Bartholomew, Winkleman, Walters and Chen, *Growing Cooler: Evidence on Urban Development and Climate Change*, ULI, 2007.

³ Hasse & Lathrop, *Tracking NJ's Dynamic Landscape: Urban Growth and Open Space Loss 1986-1995-2002*, CRSSA and Rowan Univ., 2008

areas.⁴ This relationship also appears to hold true on an individual project basis. In a study of a mixed-use urban infill project in Atlanta, researchers found that the project would result in about 35 percent fewer miles driven than had the same amount of housing units and commercial space been built at prevailing, suburban densities in the region.⁵

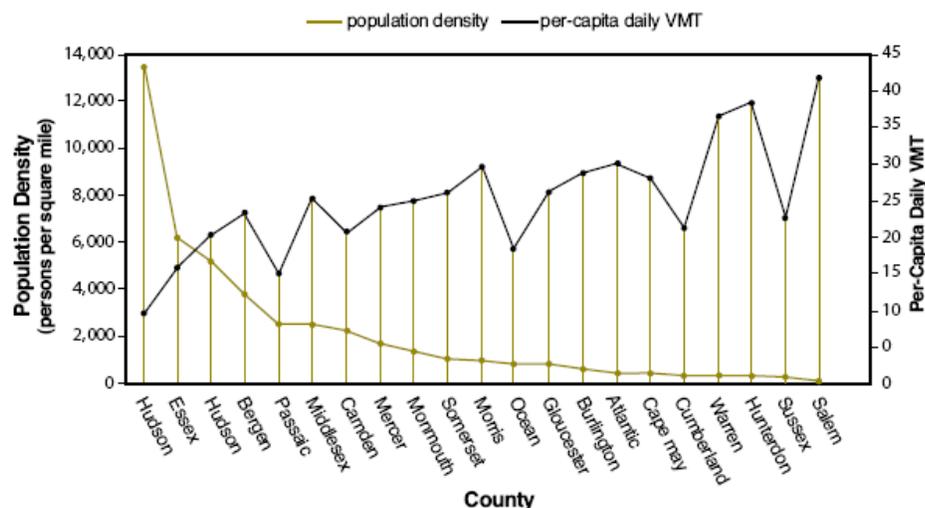
As a state with many relatively high-density areas, New Jersey, on the whole, benefits from this relationship between density and VMT. As of 2005, New Jersey had the sixth lowest per-capita VMT in the nation. Part of this is attributable to New Jersey’s relatively high transit ridership; about 10 percent of the state’s residents commute to work using transit, roughly twice the national average. This level of transit ridership would not be feasible without the corresponding density to support it. Even within New Jersey, the relationship between density and VMT is clear. Looking at the state’s 21 counties, those with the highest population density invariably have the lowest per-capita VMT, and vice versa (See Figure 3).

SB 375: California Uses Smart Growth to Address Climate Change

On September 30, 2008, Gov. Arnold Schwarzenegger of California signed into law Senate Bill 375, a first-of-its-kind law designed to fight global warming by curbing sprawl. The law, which is intended to complement a larger effort in the state to reduce greenhouse gas emissions to 1990 levels by 2020, operates on three fronts: transportation planning, housing policy and regulatory relief.

On the transportation side, the law requires the state’s metropolitan planning organizations (MPOs) to develop sustainable community strategies aimed at reducing greenhouse gas emissions from the transportation sector in their region, and to link their transportation funding plans to those strategies. On housing policy, the law requires the MPOs to apportion regional housing obligations among municipalities based on the sustainable community strategies. The intent is for more affordable housing to be built in places where growth makes sense, near jobs and transit, while still requiring all municipalities to meet their “fair share” of the state’s affordable-housing need. Finally, the law establishes a process whereby some development pro-

Figure 3.
Population Density vs. Per-Capita Daily Vehicle Miles Traveled (VMT), 2002
Residents in compact areas drive less, thanks to good transportation alternatives.



Sources: NJ Department of Transportation (VMT); US Census Bureau (population)

jects can be designated as “transit priority projects,” exempting them from certain regulatory aspects of the California Environmental Quality Act review.

Like New Jersey, California is a home rule state, where municipalities control local land-use decisions through planning and zoning within their borders. Rather than attempt to alter this control, SB 375 instead uses the powers held by the state—transportation funding, affordable housing and environmental regulation—to try to reduce sprawl and the greenhouse gas emissions associated with it.

Land use and home energy use

In addition to influencing the amount of greenhouse gas emitted from the transportation sector, land-use decisions affect residential energy use. Specifically, both the type of housing, whether single-family or multi-family, and the density at which that housing is built, significantly affect energy use, and therefore greenhouse gas emissions. In general, the smaller the house, the less energy it uses. Attached houses typically require less energy because their shared walls make them more efficient to heat and cool.

On average, families living in single-family detached houses consume 54 percent more energy for space heating and 26 percent more energy for space cooling than similar families in multi-family housing. Density also affects household energy use. One study found that CO₂ emissions from homes at four units per acre were 25 percent greater than homes built at 20 units per acre.

⁴ Ewing, Bartholomew, Winkleman, Walters and Chen, *Growing Cooler: Evidence on Urban Development and Climate Change*, ULI, 2007.

⁵ Ibid.

Recommendations for Reducing Carbon Emissions through Land Use

New Jersey's Global Warming Response Act has set ambitious targets for the reduction of greenhouse gas emissions—a 20 percent reduction by 2020 and an 80 percent reduction by 2050—and has tasked the Department of Environmental Protection with creating a plan to reach them. Achieving these targets will require a significant reduction in emissions generated by the transportation sector, which in turn will require changes in land-use patterns in order to make getting around easier without relying exclusively on the automobile.

We must foster compact development in locations that are appropriate for growth—places that are near existing infrastructure such as transit, roads, water and sewer—and discourage it in less developed locations where new growth would destroy prime farmland and significant natural resources. New Jersey Future recommends the following course of action:

1) Establish a statewide target for reduction in vehicle miles traveled (VMT). This would provide a measurable framework for state actions aimed at addressing the land-use side of emissions reduction. The target would need to be developed jointly by each of the state agencies, in particular the Departments of Transportation and Environmental Protection, and coordinated by the State Planning Commission (SPC), in order to arrive at a rate that is meaningful as well as feasible.

2) Develop state and local land-use strategies to reach the stated targets. One approach would be to empower the State Planning Commission to apportion VMT goals at the regional level and to work with counties and municipalities within these regions to develop and implement a suitable land-use framework to achieve the goals. The implementation strategy would be informed by the State Development and Redevelopment Plan currently in place. Strengthening the State Planning Act would help ensure successful implementation of the land-use strategies.

3) Align state rules, regulations and infrastructure investments in accordance with the land-use strategies, including prioritized investments in the transit system. Beyond improvements needed for public health and safety, ensure that funds flow primarily to areas slated for growth that will contribute to emissions reductions. Condition these investments on local government cooperation with the SPC's implementation plan to ensure that new developments will provide tangible VMT reduction results. Prioritize funding for rail, bus and ferry systems to provide more accessibility and offer more comfortable,

frequent and reliable service. Increase funding for both transit capital improvements and ongoing operations. Focus interagency efforts on overcoming other obstacles to growth in appropriate places.

4) Call on local governments to adopt plans and zoning regulations that foster compact development in areas appropriate for growth and discourage spread-out and sprawling development patterns. Municipal governments, through the state's strong home rule tradition, hold the key to development decisions. Without sound local land-use plans and ordinances to support the VMT target, the state will not achieve its greenhouse gas reduction goals.

5) Provide local governments with financial incentives to change their land-use plans and zoning ordinances to support walkable, mixed-use development. While many towns see the inherent benefits of this type of zoning, others have difficulty overcoming the financial or political barriers to change. Creating financial incentives for municipalities that plan and zone for compact mixed-income, mixed-use housing in appropriate locations will speed acceptance and implementation. The state should also help prime development areas near transit stops by strengthening the existing Transit Village program's work with qualified towns, as well as assisting eligible communities under the Urban Transit Hub Tax Credit Act to plan for investment.

6) Design places that are friendly to multiple modes of transportation, including biking, walking, transit and automobiles. New Jersey residents need more convenient, less auto-dependent ways to get around. One way to achieve this is to adopt a statewide "Complete Streets" policy that requires transportation agencies to plan for the needs of all users when building or improving roads.

Setting a Target. A VMT reduction target could come in the form of an absolute target (e.g., a 20 percent reduction from 2005 levels), or in the form of a per-capita reduction over time. The latter would be preferable from an economic development perspective, as it would not be seen as a "penalty" for population growth. Because the state's overall greenhouse gas reduction goals are set in terms of absolute reductions, however, a per-capita VMT reduction target may not be compatible with these larger goals. Also relevant to is the concept of "green" VMT, or trips taken by carbon-neutral means such as electric cars. As this technology advances, the adopted VMT target may need to be amended to account for these types of trips. These are issues that would need to be addressed as part of formulating a VMT reduction target.