

Sustainable Communities Indicators

Overview of the Transportation and Climate Initiative's Sustainable Communities Scoping Papers

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Background

The Transportation and Climate Initiative (TCI) is a regional collaboration of the energy, environment, and transportation agencies from 11 northeast states and the District of Columbia that work together to reduce greenhouse gas emissions in the transportation sector. One of TCI's areas of focus is developing state-level tools and policies that promote sustainable communities. Over the past several years, TCI's Sustainable Communities Workgroup has worked in support of that goal.

One area of the workgroup's focus has been development of a common set of indicators for sustainable communities policies within the TCI Region. Through two TCI workshops, as well as additional dialogues, the 12 TCI jurisdictions worked with Georgetown Climate Center and Rutgers University's Bloustein School of Planning and Public Policy to identify appropriate metrics of success. Following the workshops, the Bloustein School of Planning and Public Policy developed a preliminary report, "TCI Metrics Research Project: Working Toward a Common Set of Indicators."¹ The report recommended eleven indicators as best suited to monitoring the effectiveness of TCI jurisdictions' sustainable communities policies and demonstrating the benefits of such policies. The indicators are as follows:

1. *Transportation-related greenhouse gas emissions*
2. *Energy consumption in the transportation sector*
3. *Travel mode share (drive-alone, transit, walking, biking, etc.)*
4. *Transportation investments by mode (i.e., highway, pedestrian or bicycle, transit, freight) and type (i.e., operations/maintenance, state-of-good repair, safety, capacity expansion)*
5. *Return on investment from transportation projects*
6. *Combined housing & transportation cost as a proportion of area median income*
7. *Proportion of development (jobs, housing) occurring inside or outside developed areas or designated growth areas*
8. *Acres of agricultural or natural lands developed annually per new resident*
9. *Proximity to amenities (shopping, health care, fresh food, recreation, etc.)*
10. *Proportion of jobs or housing near transit*
11. *Health impacts of transportation emissions*

Rutgers has conducted an extensive review of the available literature and developed a set of detailed technical "scoping papers" to explore opportunities to use indicators within the TCI Region and whether there are major impediments to their adoption.² The scoping papers reveal that certain indicators would

¹ Carnegie, Jon A. *TCI Metric Research Project: Working Toward a Common Set of Indicators*. Edward J. Bloustein School of Planning and Public Policy, Rutgers, The State University of New Jersey. May 2012.

² The Scoping Papers are available on the Transportation and Climate Initiative's website at www.transportationandclimate.org

be easier to calculate than others, due to availability of the data, ease of data collection, and the extent to which data are already being used to inform existing state policies. Below is a summary of the findings of these scoping papers, including the indicators that were identified, the potential to use each to evaluate TCI states' progress on sustainable communities policies and programs, potential strategies each indicator could support, and TCI state programs that already make use of the indicators.

Most promising indicators

Each of the indicators is relevant for the TCI region; however, several stand out as easily calculable and immediately relevant at the state level. The indicators that fall into this category are:

1. *Transportation-related greenhouse emissions*
2. *Energy consumption in the transportation sector*
3. *Travel mode share*

1, 2. Transportation-related greenhouse gas emissions and energy consumption in the transportation sector

The transportation sector accounts for almost one third of greenhouse gas (GHG) emission the U.S.,³ and reducing GHG emissions is one of TCI's primary objectives, so the indicator provides a direct measure of progress. GHG emissions are relatively easy to calculate using energy use data. Energy consumption in the transportation sector is often a proxy for emissions, and could be calculated using state-level fuel sales (a "top-down" approach), vehicle miles traveled (VMT) and vehicle efficiency information (a "bottom-up" approach), or a combination of the two. Using fuel sales alone may not be an appropriate indicator, since a large portion of fuel sold in some states is consumed outside of the state's borders. Conversely, calculations based on passenger vehicle miles fail to capture GHG emissions generated from rail or bus, which can be significant. In addition, while some states have comprehensive Travel Demand Models (TDMs) that provide reliable VMT data, a VMT approach may be constrained by limitations in vehicle fuel efficiency data and VMT data. Relying on VMT calculations also means that states will not capture GHG emissions reductions resulting from changes in other factors such as lowered carbon content in fuels or reduced congestion. One alternative to these approaches is to use the Motor Vehicle Emissions Simulator "MOVES." MOVES is a model developed by the U.S. Environmental Protection Agency that is already used nationwide to estimate emissions of other pollutants from transportation sources.

These indicators could support a number of potential strategies including:

- *Complete streets policies*
- *Comprehensive transportation plans*
- *Land conservation policies*
- *Smart growth policies*
- *GHG targets*

³ U.S. Environmental Protection Agency, *Sources of Greenhouse Gas Emissions*.
<http://www.epa.gov/climatechange/ghgemissions/sources/transportation.html>

These indicators have already been used in TCI jurisdictions including:

- *Massachusetts' implementation of its Global Warming Solutions Act*
- *Vermont's Comprehensive Energy Plan: Measurable objectives*
- *New York's Strategies for a New Age: New York State's Transportation Master Plan for 2030*

3. Travel Mode Share

Travel mode share (TMS) describes the proportion of trips taken by various means and can help gauge the extent to which viable transportation alternatives exist. This indicator can reflect options at the local or state level, or in between. TMS can be calculated by using readily available survey data (e.g., from the U.S. Census Bureau's American Community Survey). It can also be customized using travel surveys or Geographic Information System (GIS) and GPS techniques to get more accurate and detailed data about travel behavior.

This indicator could support a number of potential strategies including:

- *Complete streets*
- *Funding prioritization policies*
- *Transit development or enhancement policies*
- *Transit-oriented development policies or funding programs*
- *Smart growth policies*

The indicator has already been used in TCI jurisdictions including:

- *Maryland DOT's Annual Attainment Report on Transportation System Performance*
- *New Jersey's Transit Village Program*
- *New Hampshire's DOT Balanced Scorecard*
- *Massachusetts' GreenDOT Policy and Plan*

Indicators requiring substantial data modification or processing

4. *Proportion of development occurring inside (or outside) developed or designated growth areas*
5. *Acres of agricultural or natural lands developed annually per new resident*
6. *Proximity to amenities*
7. *Proportion of jobs or housing near transit*
8. *Investment by mode*

4, 5. Proportion of development occurring inside (or outside) developed or designated growth areas and acres of agricultural or natural lands developed annually per new resident

These two indicators allow states to assess whether growth is happening in ways that are conducive to “smart growth” or in ways that are likely to increase per-capita VMT and GHG emissions. Because the indicators are calculated using similar methodologies, they are discussed together.

States will likely have different approaches to making these calculations. Different legal structures surrounding land use, designated growth areas, and protected land areas as well as varied data collection methods will lead states to define inputs to these calculations differently. The National Land Cover Database can be used as a starting point; however, many states have more recent and higher resolution land cover data that may provide a more accurate picture within the state. GIS tools are well equipped to do such calculations but in the absence of GIS software or skilled GIS users, the American Community Survey and Census Factfinder can be used to determine how many new residences have been constructed in a given area.

These indicators could support a number of potential strategies including:

- *Designated growth area policies (place-based land-use policies)*
- *Protected land policies*
- *Statewide indicators tracking efforts*
- *Infrastructure planning*
- *Transportation funding policies*

These indicators have already been used in TCI jurisdictions including:

- *Maryland's PlanMaryland, 12 Visions*
- *New Jersey Department of Environmental Protection's Environmental Trends Tracking*

6, 7. Proximity to amenities and proportion of jobs or housing near transit

Proximity to amenities (shopping, health care, fresh food, recreation, etc.) and proportion of jobs or housing near transit can be used to measure how likely people within a given area will be to take advantage of alternative transportation options. These are important indicators for a number of reasons. A population's proximity to amenities and transit can provide a wealth of information about social equity and general well-being, yet these calculations are complicated because the availability of data relating the location of amenities, types of amenities, etc., varies significantly across the TCI region. Moreover, data sometimes fails to capture the presence of physical or social barriers that prevent easy access to amenities. A popular example of this problem is the number of shopping centers surrounded by large parking lots and adjacent to major highways. In such instances, close proximity does not necessarily translate into increased availability of walking, bicycling, or public transportation as viable alternatives to personal vehicles. More sophisticated approaches can provide a more meaningful picture of accessibility; however, these approaches are more resource-intensive.

These indicators could support a number of potential strategies including:

- *Transit-oriented development policies*
- *Smart growth planning grants and incentive programs*
- *Health and well-being tracking programs*
- *Designated growth area policies*
- *Statewide planning initiatives*

These indicators have already been used in some of the TCI jurisdictions including:

- *Maryland's PlanMaryland, 12 Visions*
- *New Jersey's State Strategic Plan*

8. Investment by mode

An increase in investment in transit and active transportation modes (such as biking or walking) can indicate progress on strategies to reduce per capita VMT and associated GHG emissions. While investment by mode is an important indicator for these reasons, it will be calculated differently in various jurisdictions depending on how the state collects and updates investment data. States report that the nature of these data can be an important indicator of their efforts but that care should be given to ensuring that meaningful methods are developed; this may be an area of collaboration for the TCI states.

This indicator could support a number of potential strategies including:

- *Fix it first (funding policy)*
- *Transit-oriented development programs*

The indicator has already been used in some of the TCI jurisdictions including:

- *New Jersey's "Fix It First" policy*

Indicators needing refinement or additional information

9. *Combined housing and transportation cost as a proportion of area median income*
10. *Return on investment*
11. *Health benefits*

9. Combined housing and transportation cost as a proportion of area median income

Transportation is the second largest expense for most households after housing, and households living in automobile-dependent locations spend 25 percent or more of their income on transportation.⁴ Housing that is located closer to employment centers and other amenities can reduce household transportation costs to just 9 percent of household income and provide environmental benefits. Calculating housing and transportation cost is relatively simple, thanks to the existence of the Housing and Transportation Affordability Index, developed by the Center for Neighborhood Technology.⁵ The TCI region may want to explore ways to use this indicator at the state level, although important local variations may be lost if the index is used above the neighborhood level.

⁴ U.S. Department of Transportation, Federal Highway Administration, *Transportation and Housing Costs*. https://www.fhwa.dot.gov/livability/fact_sheets/transandhousing.cfm

⁵ Housing and Transportation Affordability Index. <http://htaindex.cnt.org/>

This indicator could support a number of potential strategies including:

- *Affordable housing policies*
- *Infrastructure investment decisions*
- *Transit-oriented development programs*
- *Health and well-being tracking programs*
- *Transportation planning*
- *Ride-share program development*

The indicator has already been used in some of the TCI jurisdictions including:

- *Mercer County, NJ, used housing and transportation affordability as a long-range indicator of economic sustainability in the 2010 update of its Master Plan.*

10. Return on Investment

Calculating return on investment (ROI) for sustainable communities policies and projects can help states gauge what policies are likely to be successful in the future. However, calculating ROI can be quite complicated. Historically, ROI calculations for transportation projects have not included social or environmental benefits and, in some instances, may have relied on assumptions that ultimately undervalued the outcome of sustainable communities investments. In many instances federal policies, such as the guidance provided for calculating benefit cost relationships for TIGER grants, determine how ROI must be calculated for major transportation investments, meaning that states are constrained in their ability to use newer methodologies to quantify the returns on transportation investments. Nonetheless, significant research has been done in this area. Some of these federal policies are under review to facilitate states' abilities to influence how ROI is calculated on major transportation projects. For instance, the Federal Transit Administration issued a Notice of Proposed Rule Making for their Small Starts program to receive feedback on FTA's methods for calculating ROI for transit projects.⁶ Transportation projects funded by the federal American Recovery and Reinvestment Act (ARRA) are also reaching completion and may provide an opportunity to explore the social and environmental returns on investment from transit projects in comparison to highway projects.

This particular indicator holds significant potential for the TCI region—given the wide array of sustainable communities policies and projects in place in the TCI region, and the number of ARRA-funded projects nearing completion in the northeast, return on investment may be an area in which TCI could use its collective resources to promote more research and encourage the federal government to make it easier to consider social and environmental returns as part of ROI.

This indicator could support a number of potential strategies including:

- *Funding policies*
- *Transit-oriented development programs*
- *Statewide planning efforts*
- *Regional planning efforts*

⁶ Federal Register, Department of Transportation. Docket No. FTA-2010-0009. January 9, 2013. <http://www.regulations.gov/#!documentDetail;D=FTA-2010-0009-0323>

11. Health Benefits

Sustainable communities policies and programs can improve the health of a community by improving air quality and offering active transportation options. Significant work is being done at research institutions to develop models that can help states determine how various state transportation policies may affect health. Among these are the University of Cambridge’s Integrated Transport and Health Impact Modeling Tool (ITHIM)⁷ and the U.S. EPA’s BenMAP.⁸ As is the case with most sophisticated models, the use of ITHIM requires an upfront investment in both the modeling programs and staff to have the skills necessary to use it. BenMAP is a flexible tool that can be used by a range of users with varying levels of experience using models. While these tools are not designed retrospectively to examine the health impact of state policies, they can be used to assess the way that various policies will ultimately affect travel behavior and health. As such, use of these tools could address TCI jurisdictions’ desire to link health impacts with sustainable transportation policies.

Measuring particular health conditions may not serve as a meaningful indicator of community sustainability due to the numerous exogenous factors that influence health outcomes. However, combining this indicator with measures of environmental conditions that are known antecedents of health conditions may be useful. For example, measures of active transportation rates may indicate the extent to which individuals in a particular community are able to walk or bike, two activities that are known to improve and maintain good health.⁹ Other community indicators may also serve as good proxy indicators of health. Number of trees, green roofs, or other “green infrastructure” is also strongly correlated with health and may serve as meaningful indicators.

This indicator could support a number of potential strategies including:

- *Complete streets*
- *Concentrated growth*
- *Health and well-being tracking programs*
- *Walk and bike to school initiatives*
- *Emissions reductions targets*
- *Employer travel incentive or well-being incentive programs*

Conclusion

The above indicators can help the TCI jurisdictions and states measure the success of sustainable communities policies and programs. Several of these indicators are easily calculable and immediately relevant to the TCI states, while others would require modification or further refinement. States may wish to use one or more of the above indicators when evaluating sustainable communities policies and deciding on future program investments. Moreover, region-wide agreement on preferred indicators could provide consistency that allows individual state program accomplishments to be aggregated toward shared goals.

⁷ University of Cambridge, Centre for Diet and Activity Research, *Integrated Transport and Health Impact Modelling Tool*. <http://www.cedar.iph.cam.ac.uk/research/modelling/ithim/>

⁸ U.S. Environmental Protection Agency, *Environmental Benefits Mapping and Analysis Program (BenMAP)*. <http://www.epa.gov/air/benmap/>

⁹ Activity-based travel models can help to capture active transportation rates better than most travel demand models and may serve to assess rates of active transportation.

Funding for the Transportation and Climate Initiative's Sustainable Communities work is provided by the Rockefeller Brothers Fund, Barr Foundation, Surdna Foundation and Oak Foundation. The Georgetown Climate Center is grateful for their support and the support from all of the funders who make our work possible: <http://www.georgetownclimate.org/support>.

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