The H+T Toolkit

Using the H+T Index to Improve Location Efficiency
The Housing + Transportation (H+T®) Affordability Index was conceived to investigate the relationship between how communities are built and the cost for residents to live in them. The Center for Neighborhood Technology (CNT) began this research in 2006, when very little was known about the variation across different communities in the costs associated with household transportation choices. Housing and transportation costs represent the largest expenses in most household budgets, and are driven in large part by location and community characteristics. However, in the absence of good information, conventional measures of affordability have ignored transportation costs.

The standard measure of affordability begins and ends with the cost of housing. If a household spends 30 percent or less of its income on a home, the cost is typically considered affordable. This encourages a “drive ’til you qualify” mentality, where home-hunters pass over city neighborhoods or inner-ring suburbs, choosing instead to live in outer-ring communities where housing is often cheaper, but transportation is more expensive. In the end, the net effect of this tradeoff is that households may unknowingly pay a greater combined cost. In a time of rising energy costs and widespread foreclosures, the H+T Index helps fill a long-standing gap in our understanding of the connection between costs and development patterns. By making transportation costs more transparent—for families choosing a new home and for policymakers deciding where to make public investments—the Index improves on one-dimensional views of regional growth and affordability.

CNT goes a step further by proposing a new affordability standard of 45 percent of income for combined housing and transportation costs. The H+T Index and the new affordability standard challenge conventional wisdom and demonstrate that the combined cost of housing and transportation places a majority of communities in this country beyond the reach of regional median income households. Three out of four communities (76 percent) are considered affordable under the traditional “housing-only” standard. This figure shrinks, however, to just three out of 10 (28 percent) when both housing and transportation costs are considered and a 45 percent affordability benchmark is applied—a difference of 86,000 American neighborhoods. Mapping this shift shows that as we have grown our communities in ways that help keep housing affordable, we have often chosen development patterns that can make it difficult to avoid a large transportation burden.

But this tradeoff is not universally necessary. Nearly 30 percent of existing communities are built in a way that offers everyday families a reasonable cost of living, allowing them to balance both their housing and transportation expenses. These communities differ from each other, but tend to have a few things in common: relatively compact building patterns, pedestrian-friendly streets, a mix of land uses within neighborhoods, and multiple modes of readily available transportation. These places prove that we can plan our growth more effectively.

_How+To_ offers communities a path to improving their affordability by using H+T data in planning, policy, and performance measurement. We hope that the explanations and many examples in this guide make it easier for your community to achieve its goals by joining the dozens to date that are actively using the information contained in the H+T Affordability Index.

Scott Bernstein
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How+To:
The H+T® Toolkit
Using the Index to Improve Location Efficiency

PREPARED BY
THE CENTER FOR NEIGHBORHOOD TECHNOLOGY
AUGUST 2012
Executive Summary

“How+T is such a powerful concept that I’d say it now plays a leading role in regional policy development . . . it presents an intuitive metric that almost everyone grapples with in life whether they realize it or not. As planners trying to communicate with a broad range of people, it helps us to have a metric you can look at all the way from the household level, up to the neighborhood, city, county, or regional level. We feel like it tells us something meaningful about how we’re doing as a region, and relates how we are doing overall to people’s everyday decisions, big and small. We expect to be using this metric for a long time to come, as it’s started a dialogue in this region that people are very eager to continue.”

Jennifer Yeamans, Transportation Planner, Metropolitan Transportation Commission

**How+To** is a reference guide for policymakers, planners, researchers, housing advocates, activists, developers, and others interested in applying the Housing + Transportation (H+T) Affordability Index to their work. Data and images from the Index can generate insights that support efforts to enhance regional affordability and livability, and can be implemented by a wide range of government and community organizations from the local to the federal level. Primary users to date include metropolitan planning organizations (MPOs), university researchers, housing advocates, municipal governments, professional planners, experts on climate change, and federal and state agencies.

**How+To** is organized into three sections that group the tool’s uses into public education and outreach; planning and performance measurement; and integration of H+T Index data into policies and programs. Each section provides numerous examples of people and organizations that are using the Index for various purposes in cities and regions across the country.

The first section, **What does H+T mean for me and my community?**, shows how the Index can help clients and constituents make informed decisions by raising awareness of transportation costs and how they vary.

The second section, **How do we know if we are getting where we want to go?**, describes how to use the H+T Index for performance measurement, goal setting, and planning. These applications range from very simple uses, such as tracking affordability levels in a municipality using data available on the H+T Index website, to more involved custom analyses that combine H+T data with local data, produce a locally-specific typology of places, or investigate impacts on specific populations of interest.

The third section, **How can we best meet our housing and transportation needs?**, discusses how H+T Index data can be integrated into public policy to promote more location-efficient development and lower housing and transportation costs. It explains how to use the H+T Index to optimize the distribution of development resources, including strategies to improve project selection and encourage transit-supportive private development.

In **How+To**, the Center for Neighborhood Technology (CNT) has compiled a representative set of applications of the H+T Index from the past several years and provided guidance for replicating them. Please let us know how you and your organization are using the Index. Also feel free to contact CNT at info@cnt.org to seek further guidance on using H+T for your research, planning, or policy projects.
The Housing + Transportation (H+T) Affordability Index is an innovative tool that provides a more comprehensive measure of the affordability of housing by calculating the transportation costs associated with a home’s location. The H+T Index was originally developed by the Center for Neighborhood Technology (CNT) as a project of the Brookings Institution’s Urban Markets Initiative, and was expanded to cover 337 metro areas in 2010. As of 2012, the Index offers data for 877 metropolitan and micropolitan regions, covering 89 percent of the U.S. population.

The transportation costs estimated in the H+T Index are more than the costs of commuting to and from work. They also include all other travel that is part of the household daily routine. The household transportation model is based on a multidimensional regression analysis, in which a formula describes the relationship between three dependent variables (auto ownership, auto use, and transit use) and six main independent household and neighborhood variables.

The methods for the cost model are drawn from peer-reviewed research findings on the factors that drive household transportation costs. The model assumptions, calculations, and methods have been reviewed by practitioners at the Metropolitan Council in Minneapolis–St. Paul, fellows with the Brookings Institution, and academics from the University of Minnesota, Virginia Polytechnic, Temple University, the University of Pennsylvania, and elsewhere, specializing in transportation modeling, household travel behavior, and community indicators. Detailed documentation of the methods used to generate H+T data is posted to the H+T website at: http://htaindex.cnt.org/downloads/HTMethods.2011.pdf.
What Does H+T Mean for Me and My Community?

Supporting Individual Decision-making and Educating the Public

Cost is often the most important consideration for households when they are looking for a new home. While nothing beats rental and sales listings for a sense of home prices and rents, and online calculators provide information on the regional cost of living, these sources typically don’t include transportation costs, the second largest expense in the average household’s budget. They also fail to show how living costs, and transportation costs in particular, vary between neighborhoods.

Currently the H+T Index is the only tool that enables an in-depth examination of both housing and transportation costs across neighborhoods in a given region, allowing home seekers to identify places that can optimize their combined housing and transportation budget. H+T maps and information can also help educate the public more broadly about regional development, and about the connections between how communities are built, the options we have when choosing where we live and how we get around, and our cost of living. The H+T Index website also provides information about the factors used to estimate transportation costs, such as car ownership rates and miles traveled by the regional typical household, on a neighborhood-by-neighborhood basis.

FIGURE 2
Location-efficient development patterns (top) tend to offer walkable areas, while location-inefficient development patterns (bottom) tend to be heavily focused on accommodating private vehicles.
(Sources: Flickr users Michigan Municipal League and Steven Vance)
Add a Data Feed to a Website

To make transportation cost data more accessible to people looking for a new house or apartment or to developers looking to site new projects in affordable locations, CNT has introduced a free, user-friendly online tool called Abogo™ (http://abogo.cnt.org/). Users simply type in an address and Abogo shows the average transportation costs for a typical regional household in that neighborhood compared with the entire region. To show environmental impacts, Abogo also estimates average household CO₂ emissions from transportation in that neighborhood. Linking to the Abogo website is a good way for municipal governments, public housing agencies, or other organizations involved with social services and housing to connect constituents to this resource.

Tapping into existing networks, such as a multiple listing service (MLS), is another way to introduce location efficiency into the local housing market. The National Association of Realtors (NAR) has published guidance for its members on transportation costs that includes a discussion of combined housing and transportation affordability,¹ and has established a Green REsource Council with the intent of making “the knowledge of green real estate practices available to everyone.” The Green REsource Council introduced the Green MLS Tool Kit, a resource for real estate brokers and developers who are interested in adding green qualifications to their local listing database.² A “green MLS” would allow brokers and developers to search for properties based on green qualifications, which can include carbon emission estimates from the H+T Index.

Through an application programming interface (API), any website can display average transportation cost and carbon emissions data, powered by Abogo. Providing access to these data on an MLS or through other web resources for home seekers can educate users on how their transportation costs compare to those in other parts of the region and spread awareness of how these costs impact affordability.

To see an example of how H+T data can appear on a website, check WalkScore.com, which currently provides CNT’s estimate of the average transportation cost and transportation-related carbon emissions for the address selected. The data are available under the “Your Commute” tab, and the user can adjust the income, transportation cost, and housing cost fields to see what portion of income these expenses consume.

² See http://greenthemls.org/.
FIGURE 4: CNT’s Average Transportation Cost and Carbon Impact API on Walkscore.com.

Abogo shows average transportation costs for a given region.
Use H+T Data in Financial Counseling and Homebuyer-Training Materials

Public-housing agencies, nonprofits, and other organizations are often involved in education and outreach to households that are seeking affordable housing. These organizations can productively include H+T Index data in their efforts to assist renters and first-time homebuyers, as well as homeowners facing foreclosure and other community groups that work with these populations. Anyone in a relatively vulnerable financial position can benefit from understanding how transportation costs impact affordability, as illustrated by the H+T Index, and Abogo can further help people optimize their housing and transportation costs on an address-by-address basis. Abogo also has a “gas slider” application that allows users to see how rising gas prices affect transportation costs and increase households’ vulnerability to price spikes.

Organizations involved in housing counseling may find it useful to reference Abogo, rather than the H+T Index website, due to Abogo’s consumer orientation. Printed guidance materials for clients could simply include a short explanation of what Abogo does, a few instructions for how to use it, and a link to the Abogo website. For example, CNT developed materials to train housing counseling staff at the Housing Trust of Santa Fe and the City of El Paso on how to educate their clients about housing and transportation affordability. These materials include a briefing guide for housing counselors, slides and talking points for PowerPoint presentations, and a handout for individual counseling sessions. Organizations and other regions can modify these templates to customize them for their own market. Please feel free to contact CNT at info@cnt.org about obtaining and adapting these materials. CNT also encourages municipalities and local nonprofits to use H+T information in classes or webinars for housing developers, real estate agents, and landlords.
Create a Personalized H+T Cost Calculator for a Region

Some users prefer to enter more personalized information to support individual decision-making. In theory, a calculator could allow users to enter their own values for all of the factors that the H+T Index takes into consideration to produce individualized H+T costs. This would allow a user to compare costs between their own neighborhood and other locations assuming, for example, that his or her current transportation choices and habits do not change. However, the H+T Index and Abogo were designed to take into account the fact that typical transportation behaviors can vary widely depending on the physical characteristics of a location. For this reason it is important when constructing a calculator to be clear about its purpose and work to ensure that the tool is designed to provide the desired information.

CNT has worked with partners in several regions to develop customized individual H+T cost calculators that allow users to adjust household characteristics such as household size, income, and number of commuters. Users can also customize specific transportation parameters and habits—such as number of trips taken by transit, number of cars owned, vehicle fuel economy, and annual miles driven—and enter costs for parking and tolls, which are not considered in the H+T Index model. In partnership with the Terwilliger Center for Workforce Housing at the Urban Land Institute and the Center for Housing Policy, CNT has developed calculators for Washington, DC, Boston, and the Bay Area of California. The calculator can be easily integrated into an organization or agency’s website. The Minnesota Urban Land Institute and CNT, through the support of the Family Housing Fund, just released a similar H+T cost calculator for the Twin Cities.

![Housing + Transportation Calculator](image)

**FIGURE 6**
The Terwilliger cost calculator for Washington, DC.

“Transportation can even be an aid to home ownership if it reduces transportation costs and frees up more income for putting together a down payment and sustaining a monthly mortgage payment.”


Engage and Educate the Public

Governmental and nonprofit organizations use the H+T Index to enhance their public outreach and engagement activities. In addition to the H+T Index and Abogo, H+T maps and graphics can be juxtaposed with other data to show how public policy and planning relate to affordability, quality of life, mobility, public health, and other regional issues.

For example, H+T data can be used to illustrate the number and location of neighborhoods that are affordable to a region’s typical households, both when housing costs alone are considered and when transportation costs are added in. This kind of comparison can help build support for investments in transit-supportive land-use planning, demonstrate the need for assisted housing or transit investments in particular areas, or simply raise awareness of a region’s housing and transportation challenges.

Public health practitioners can use the underlying data on built-environment factors (such as residential density and walkability), which are likewise available on the H+T website, to illustrate the linkage between car dependence and health outcomes. Because the built environment directly impacts the way people get around and the extent to which they can walk or bike, it can have a significant impact on the health of a community.

H+T Index data can also support public awareness of the needs of an aging population. For example, a municipality might use H+T data to support a decision to locate a proposed retirement community in a walkable area closer to local businesses. Low combined housing and transportation costs might also be a selling point for the developer, as such locations offer residents more mobility and independence.

The H+T Index supports public education and engagement in smaller communities, too. Many small towns within rural regions have a central core that historically served their region’s commercial, logistical, and communications needs. Users of H+T data in these regions may have fewer “neighborhoods,” and therefore find that there are fewer neighborhood-specific datapoints to compare. However, as with large metropolitan areas, maps of H+T data in small regions illuminate the costs of different development patterns and help people understand the value of location efficiency.

Below are other ways that H+T data and Abogo can be used to educate the public about the cost of living and about public policies that help maintain affordable costs:

- Use H+T data or maps in public outreach efforts to advocate for better land-use planning that lowers the cost of living.
- Create infographics that promote awareness of the financial benefits of switching to public transit.
- Combine H+T cost data with information on local property taxes and fees to show the competitive advantage of a neighborhood or town relative to adjacent areas.
- Use H+T estimates of vehicle miles traveled and car ownership rates in particular neighborhoods as part of a budgeting exercise for personal financial management.
- Use Abogo transportation costs to show the benefits of living in location-efficient neighborhoods.
- Use the Abogo gas slider to show how rising gas prices affect the cost of transportation and increase households’ vulnerability to price spikes.
- Combine regional H+T cost data with regional data on household income growth to show the change in remaining disposable income after rising housing and transportation costs are deducted.
FIGURE 7
A walkable built environment (top) supports the needs of seniors in Northville, Michigan, while the residential community below (bottom) was built for car dependence.
(Sources: Flickr users Michigan Municipal League and Phil Dowsing)
How Do We Know if We are Getting Where We Want to Go?

Setting Goals, Measuring Performance, and Informing Urban and Regional Planning

Regional and local planning organizations, nonprofits, and others are using the H+T Index to measure regional affordability and sustainability over time, identify areas for improvement, and track progress toward goals. The more comprehensive picture of affordability produced by the Index reveals otherwise hidden costs and highlights the relationship between the built environment and the way people get around. Linking regional infrastructure and land-use patterns to mobility, affordability, and environmental issues can also inform planning at the local level.

This section provides an overview of indicators available from the H+T Index dataset, and describes a number of ways the data can be used for performance measurement and goal setting. In the future, as its source data are updated, the H+T Index will also be able to track long-term housing and transportation affordability trends. Some organizations may find that they need more than the data and tools available online. Organizations with independent geographical information system (GIS) and data analysis capabilities can contact CNT to obtain a regional H+T dataset to produce customized maps and dig deeper into relationships between H+T metrics and other regional datasets. For specific populations or target areas within a region, CNT can provide customized data and communications. This can be useful for supporting equity considerations in planning, and to support small-area planning such as in corridors or station areas.
The Washington, DC Council of Governments has set a goal that by 2020 housing and transportation costs in Regional Activity Centers will not exceed 45 percent of area median income (see http://www.regionforward.org/).

By 2020, the housing and transportation costs in Regional Activity Centers will not exceed 45 percent of area median income.

Policies and initiatives in Asheville, North Carolina, encourage development in many areas that are relatively location-efficient. The orange and blue areas in the map above incorporate H+T Index data to show opportunities to align policies and initiatives more closely with existing location efficiency: blue indicates areas targeted for development that are relatively location-inefficient, while orange indicates areas that are relatively location-efficient but are not targeted for development.

(Source: Center for Neighborhood Technology)
Measure Performance and Set Goals

Many useful indicators can be generated directly from the H+T Index website. For example, all of the underlying variables that the Index uses to estimate transportation costs can be obtained directly from the drop-down menus. Please see Appendix I for detailed instructions on using the website. Multiple indicators may be needed to build a meaningful metric. For more examples of useful indicators that can be constructed, see Appendix II.

OVERVIEW OF INDICATORS ON THE H+T INDEX WEBSITE

Affordability and Cost of Living

The Index has been used in a number of regions to illustrate the impact of development patterns on the cost of living for average or working families. Because the Index takes into account the two largest items in the household budget, it strikes a useful balance between broad cost-of-living measures, which provide information at a regional level, and housing-only price indices, which ignore the fact that housing costs are sometimes low by virtue of a remote location in which car-dependence drives up transportation costs.

The H+T website offers affordability data for typical regional households earning the area median income (AMI), moderate-income households (defined as those earning 80 percent of AMI), and those earning the national median income. The following are examples of indicators available from the website:

- the number and percentage of block groups in a neighborhood or region with affordable (less than 45 percent of household income) H+T costs
- the number and percentage of dwelling units located in areas that are affordable to households earning 80% of the AMI
- average H+T costs as a percentage of income, for the typical household earning 80% of the AMI
- average transportation cost burden, as a percentage of income for households earning the AMI (see fig. 12)

Automobile Cost and Usage

For a variety of purposes, it may be helpful to track automobile ownership and usage rates for the typical regional household across communities. Both can also be expressed in terms of gasoline and other transportation costs that siphon spending from the local economy. Comparing sub-regional areas against each other allows planners and consumers alike to identify communities that are more location-efficient. Indicators include:

- estimated household vehicle miles traveled (VMT) for the regional typical family
- percentage of total households (or of population) residing in block groups where estimated VMT for the typical regional household is below a target per-household threshold
- annual household gasoline costs for the typical regional household in a given regional or sub-regional area (VMT multiplied by a cost factor for gasoline)

Public and Active Transportation

Increasingly, sustainability is linked to transportation options that encourage health and wellness. Several components of the H+T Index describe the accessibility of public transportation and the walkability of a neighborhood. These components can themselves be used as indicators:

- transit connectivity index (TCI)—the frequency of transit service within a given neighborhood
- transit access shed—the area accessible within 30 minutes by public transportation from any block group, scaled by the frequency of service
- average block size and intersection density—measures of pedestrian friendliness and walkability (see fig. 13)

FIGURE 11
Many underlying variables can be easily looked up on the H+T Index website.
(Source: Center for Neighborhood Technology 2009 H+T Index)
FIGURE 12
Transportation costs as a percentage of income for the Boston, Massachusetts, area (Source: Center for Neighborhood Technology 2009 H+T Index)

FIGURE 13
Average block size for the Boston, Massachusetts, area (Source: Center for Neighborhood Technology 2009 H+T Index)
Environmental Impact/Emissions
The Index offers insight into the link between the built environment and climate change by estimating carbon dioxide (CO$_2$) emissions from household driving. The H+T transportation model calculates CO$_2$ emissions by applying a carbon factor to estimated VMT, revealing the climate impacts of regional travel, neighborhood by neighborhood.

Emissions can be usefully illustrated using the metric of average CO$_2$ emissions per household from auto use. Densely populated areas are conventionally seen as producing more pollution; while the Index shows that these areas have higher transportation-related CO$_2$ emissions per acre, maps such as the one above reveal much lower CO$_2$ emissions per household in higher density areas.

Other Considerations for Performance Indicators
H+T data can be updated only as often as the underlying source data are available, and never more often than once per year. As a result, H+T cost performance cannot be tracked over shorter intervals. Indeed, it may take a few years to register significant changes, depending on how fast the underlying built environment in changing.

On the H+T website, data are displayed in side-by-side maps. A drop-down menu allows users to examine components of transportation behavior, such as vehicle miles traveled or automobiles per household, next to maps of the underlying characteristics that produce location efficiency (such as residential density, transit connectivity, and intersection density). This same information can be viewed in the form of summary tables that organize the information in terms of people, households, or neighborhoods. Metrics expressed in these terms may be more meaningful to stakeholders as performance measures and thereby support more effective engagement.

As with any data or indicator, exercise care in interpreting these tables. For example, figure 14 below shows that 94.8 percent of the population of northwestern Indiana resided in block groups where the regional typical household would find average housing costs affordable. It would be incorrect to interpret this figure as saying 94.8 percent of northwest Indiana households in 2009 could afford their home while 5.2 percent could not.

Caution should also be exercised when comparing two different regions, whether with side-by-side maps or in the form of rankings for a given indicator or metric. Since H+T Index data is generated for a region’s reference household, such comparisons require changing the reference household to “nationally typical.” Please see the User Guide in the Appendix.

**FIGURE 14**
Nearly 95% percent of the 2009 population of northwestern Indiana resided in a block group where the regional typical household would find housing costs affordable, using the conventional affordability standard.
(Source: Center for Neighborhood Technology 2009 H+T Index)
FIGURE 15
Estimated per-acre greenhouse gas emissions from transportation in the Austin, Texas area
(Source: Center for Neighborhood Technology 2009 H+T Index)

FIGURE 16
Estimated per-household greenhouse gas emissions from transportation in the Austin, Texas area
(Source: Center for Neighborhood Technology 2009 H+T Index)
GEOGRAPHIC SCALE

The H+T Index gives users the ability to analyze neighborhood-level data aggregated to different geographies, such as the region, county, or municipality. The choice of geography depends on the particular needs of an organization. An organization might choose to focus on the geography where it has the most influence or can most effectively enact change (e.g., a local government may wish to use H+T data for neighborhoods in the municipality, while an MPO is more likely to use data for the whole region). But keep in mind that awareness of the broader context can also be valuable; for example, using data for all block groups in the region can help municipalities see how they fit into the larger picture.

For H+T data aggregated to geographic units that are not available directly on the website, such as a transit corridor or a watershed, please see the discussion of custom geographies in the “Locally Defined Geographies” section on the next page.

SETTING GOALS

While tracking trends over time can be useful, indicators are far more powerful if they track progress toward a defined performance goal. For example, several regions have used the Index to define a goal focused on reducing the H+T cost burden on working families from a current baseline to a target value by a future date. Any of the indicators described above can be accompanied by a performance goal. Some performance goals are likely to be synergistic, for example, increasing the share of public transportation usage for all trips by 10 percent from a defined baseline may also reduce per capita CO₂ emissions from transportation.

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4. Note that the H+T dataset uses Census block groups to represent neighborhoods because it is the smallest geographic unit for which the Census Bureau tabulates sample data. A block group is a subdivision of a Census tract and can consist of anywhere between 600 and 3,000 people, but ideally consists of 1,500 people.
Create Custom Maps and Analyses

Long-range transportation plans and comprehensive plans both provide opportunities to use H+T indicators over an extended period. Since both types of plans are generally implemented in stages or phases, they lend themselves to consistent updates on progress. H+T data will be updated with some frequency, and before-and-after maps can be a powerful way to communicate progress. Although planners can use data and graphics from the H+T website, acquiring the source data can produce enhanced results.

With access to the data underlying the H+T Index, organizations can use H+T metrics for modeling and to create custom maps and analyses. The dataset includes CNT’s transportation cost estimates for households earning the AMI and 80 percent of AMI. CNT also provides modeled car ownership, VMT, transit use, and CO₂ emissions for these income levels. Some of the independent neighborhood and household variables that are used in the H+T model are available upon request. These data may be used to enhance planning efforts, research projects, and regional analyses, or to develop a custom in-house analysis focused on regional affordability.

To acquire a dataset, organizations should identify the geographic extent of its focus area (pricing depends on the number of block groups) and complete CNT’s H+T Data Request Form, included in this document as Appendix III. In addition to filling out this form, organizations will be asked to sign a standard Data Sharing Agreement (Appendix IV).

A data request is for the dataset itself. CNT can perform a range of customized analyses described below under contract in collaboration with organization staff.

Perform H+T Analysis on Locally Defined Geographies

H+T data at the block group level can be aggregated to a variety of geographic boundaries using standard weighting calculations. In this way, H+T data can be generated for a wide range of geographies of interest, such as transit corridors, ZIP codes, aldermanic or council wards, municipalities, counties, zoning classifications, school districts, watersheds, state legislative districts, incentive districts (tax increment financing districts, Empowerment or Enterprise Zones), and traffic analysis zones.

Customizing the area of focus can provide valuable insight into how policies and resources should be targeted at the sub-regional level. As noted above, the current H+T website allows for customization at the sub-regional level to specific areas such as MPO boundaries and federal congressional districts. Data at the block group level reveal general trends, but looking at how costs vary across boundaries that have political importance can make it easier to convince decision-makers to develop programs and policies to address affordability issues. Likewise, locally-defined geographies that best reflect a particular environmental challenge, economic unit, or proposed project changes the viewer’s focus and carries a different message that may be more suitable for some purposes.
Target Specific Populations by Customizing H+T Inputs

In its standard form, the Index models data for households of average size for the region, with the average number of commuters for a household in the region, and with income that reflects the region’s household median. It also provides information for those same “regionally typical” households but at a lower income level (80 percent of AMI), and for a “nationally typical” household. To highlight how H+T costs vary according to other household characteristics, CNT can produce custom datasets that focus on populations of interest or show how different household types fare across a region.

For example, an organization may want to determine which neighborhoods in a region offer affordable living to low-income families earning 60 percent of AMI with four members and two workers, or how VMT and car ownership rates vary according to income, household size, or both. With customized data, organizations can develop their own parameters and find answers for these kinds of focused questions. Inputs that may be customized include:

- income levels from 60 percent to 140 percent of AMI
- number of people per household
- number of commuters per household
- cost factors that are applied to the modeled car ownership and usage rates to produce estimated transportation costs (e.g., price of gasoline per gallon)

CNT provided a custom dataset for Grand Valley University’s work with the Grand Rapids Area Coalition to End Homelessness to produce the report Housing & Transportation: Affordability in Grand Rapids and Kent County. For consistent comparisons the report focused primarily on the regional affordability outlook for a household size of three and with an income of 50 percent of AMI. It also included an examination of how household size would impact transportation affordability, illustrating the severe strain transportation costs can have on low-income households (see fig. 19).

Juxtapose H+T Affordability Data with Other Datasets

Combining H+T Index data with demographic or socioeconomic indicators that the Index does not currently include can further illuminate how affordability varies across communities and regions. For example, a project to assess housing quality and the cost of living among low-income homeowners could show estimated housing and transportation costs for households earning 50 percent of AMI, overlaid with local data on the condition of housing stock in low-income neighborhoods. H+T data can be mapped and analyzed in conjunction with a wide range of other variables, such as location of jobs (by sector, income, age of worker, etc.), underutilized land parcels, poverty status, age, ethnicity, and more.

CNT’s analysis of affordable housing developments financed by the Illinois Housing Development Authority (IHDA), Illinois’ housing finance agency, illustrates how H+T Index data can be added as a map layer to existing local data. CNT identified and geocoded eight years worth of affordable housing projects approved by IHDA’s Board in the Chicago region, then mapped the project locations against transportation costs, transit access, and other H+T metrics, including employment access, VMT, and car ownership. The analysis revealed how transportation costs impact the affordability of subsidized housing in the region and evaluates the effectiveness of efforts to connect affordable housing to jobs and transit. This is a straightforward kind of analysis because housing and transportation affordability is simply mapped in relation to any identified set of location points that are of interest. Unlike a customized dataset with local sources that serve as an input to the model itself (which is discussed later in this document), the analysis is performed with the standard H+T Index dataset. The standard model outputs are juxtaposed against a set of points or geographic areas identified within the region.

FIGURE 19
An analysis of combined housing and transportation costs in a largely rural county estimated costs for several household types and income levels (Source: Grand Rapids Area Coalition to End Homelessness, see http://www.roofstoroots.org/housing-study).

FIGURE 20
Many affordable housing investments in the Chicago region offer residents location efficiency, but the results are uneven (see http://www.cnt.org/repository/SDA.pdf).
FIGURE 21
The Transit Oriented Development Database ("TOD Database") provides detailed demographic and economic information, including H+T data, for thousands of station areas around the country.
(Source: Center for Transit-Oriented Development)

FIGURE 22
An example of performance-based place types
(Source: Center for Transit-Oriented Development)
The Transit Oriented Development Database (TOD Database, at http://toddata.cnt.org/) is a more complex example of how a tremendous range of available data can be presented in one place with interesting synergies. The database, funded by the Federal Transit Administration and produced by CNT and its partners in the Center for Transit-Oriented Development (CTOD), provides a large amount of demographic and economic data for thousands of station areas across the country. The database, accessible through a free website, includes fields from the H+T Index, 2000 and 2010 Decennial Census, the 2005–09 American Community Survey 5-Year Estimates, the 2000 Census Transportation Planning Package, and the 2002–09 Local Employment Dynamics dataset.

Create a Set of Development Types that Guide Policies and Standards

Just as H+T Index data allow for evaluation of existing neighborhoods, the dataset can also be used to construct a neighborhood development typology that associates performance outcomes with the physical features of desired or anticipated neighborhood development patterns. The H+T Index supplies the statistical attributes of many potential development types that communities may wish to consider, which can be associated with visual illustrations of what those development types look like. Stakeholders can simultaneously evaluate visual illustrations of how the community could develop along with the relative degrees of car dependence with which each development type tends to be associated. Helping stakeholders understand how built form is linked to the transportation decisions they make every day can be a powerful way to engage them in developing a long-range vision for the region. This kind of engagement helps set the stage for context-sensitive design and building codes that likewise support compact, transit-friendly development, and provides a framework to set goals for better performance.

CTOD, of which CNT is a partner, published a guidebook to TOD place types that integrates performance measures in this manner. The Performance-Based Transit-Oriented Development Typology Guidebook is a hands-on tool for identifying different conditions that exist around transit stations and determining how those conditions influence performance on a range of metrics. The Guidebook uses data on existing conditions, including estimated vehicle miles traveled from the H+T Index, to help planners compare station areas to aspirational outcomes. The CTOD performance-based TOD typology is designed to help communities assess the outcomes they might expect from investments in transit and TOD, and to identify the factors that differentiate transit-oriented development from “transit-adjacent” development.

Incorporate Local Data into the H+T Model

Adding locally available data to the H+T model can produce more precise estimates of local transportation costs at a neighborhood and regional level. Organizations interested in using the Index extensively for planning or other program work will benefit from this refined view. CNT can supplement the Index with datasets provided by a local partner to create customized H+T reports. CNT has already worked with several regions to develop such custom models and reports.

In Chicago, for example, the Chicago Metropolitan Agency for Planning (CMAP), the regional land-use and transportation planning organization, provided CNT with land-use data and a measure of walkability they call the “pedestrian environment factor.” With these added inputs, CNT developed a model that estimated transportation costs in the region with more precision than the standard version of the H+T Index. Indicators from the Index were subsequently used in the development of the 2010 long-range regional comprehensive plan.

CNT has found that incorporating local land-use data generally produces the greatest improvement in H+T modeling accuracy, but other sources, such as automobile odometer readings from emissions testing centers, can also produce more precise results.

Build a Development Scenario Impact Tool

CNT can develop scenario evaluation tools that project the impacts of alternative development decisions on affordability. Changes in residential and job density, transit connectivity, and land-use patterns can impact H+T affordability. A development scenario impact tool can reveal how different patterns of growth will influence average auto ownership, VMT, transit use, carbon emissions, and transportation costs for the typical regional household. The modeled effects of changing neighborhood characteristics can then be used as one factor in making zoning, land-use, and investment decisions. For example, the development scenario impact tool can show the decreases in household transportation costs from proposed increases in transit connectivity and resulting increased density, which can in turn help justify transportation investments that improve regional affordability and sustainability.

In addition to modeling regional trends, the scenario evaluation tool can clarify the impacts of development patterns at a local level. For example, the tool can be used to estimate the affordability consequences of a new job center. It can also be useful in areas with low density and little or no transit to illustrate how incremental changes can improve affordability and livability.
Creating Policies that Use H+T Directly to Define Needs and Target Resources

Target Resources Based on H+T Characteristics

Identifying location-efficient and -inefficient areas in a community can help individuals and policymakers determine, along with other criteria, where and how to invest new resources for the most positive impact. Municipal and county governments, MPOs, and regional quasi-governmental organizations all have responsibilities to allocate resources over geographic areas with widely varying assets and needs. The concept of location efficiency can help decision-makers identify the parts of their jurisdiction that meet, or fail to meet, goals for housing and transportation costs.

By looking closely at the underlying H+T variables, decision-makers can further discern the reasons for a neighborhood’s location efficiency, and in turn how to improve location inefficient areas. In general, location-efficient areas have a mix of residential and commercial land uses, smaller block sizes, better job access, transit availability, more frequent transit, etc. Depending on the community’s goals and challenges, location-efficient areas can be candidates for infill development, redevelopment, or inclusive housing policies that ensure some proportion of units remain affordable to lower-income families. Location-inefficient areas may be candidates for improving the mix of land uses, walkability, or transit service.

The Metropolitan Planning Council of Chicago conducted an analysis of potential alignments for bus rapid transit (BRT) service, with the goal of supporting full-scale BRT while balancing community goals of increased livability, reduced travel time, and lower environmental impacts. The analysis applied 14 selection criteria to score and rank the most viable corridors in the city. The average household transportation cost burden from the H+T Index served as one of two criteria related to the federal “livability principle” of promoting equitable, affordable housing. Street segments

“CNT’s H+T Index makes relevant financial and transportation information visible to designers and policy makers. Like so much of CNT’s work, it provides a broad view of regional issues with local impact. Ultimately, tools like this one enable the creation of affordable, sustainable cities.”

Jeanne Gang, Principal, Studio Gang Architects and 2011 MacArthur Fellow
with the highest average transportation costs as a percentage of household income received preference in the scoring criteria in order to target public investments to the areas of greatest need. The project resulted in the selection of 10 corridors that support full-scale BRT while balancing multiple important community goals.

CNT frequently fields questions about the policy implications of H+T data. CNT’s view is that the Index encourages regions to think about affordability in new ways, but the data do not dictate a specific set of policy actions that apply to all situations. In areas with high levels of transit access, investment in more housing and commercial development may be desirable and an increase in transit service may yield substantial increases in ridership or economic development. Conversely, H+T data can be used to advocate for retrofitting lower-density communities and increasing transit options in location-inefficient areas, allowing a suburban area to become relatively more affordable. Neither solution is right or wrong, but in a context of scarce resources, H+T data can help to optimize the allocation of funds.
Plan Transportation Investments with Community Benefits

H+T Index data can help attract foundation and government grants by helping applicants frame housing equity issues in a new way, illustrate the need for public transportation dollars, or describe the environmental impacts of car-dependence via greenhouse gas emissions. The H+T Index also can be used effectively to show areas that might be underserved in terms of transportation availability, and the role of the built environment in keeping a community affordable.

Tucson, Arizona, recently received a TIGER grant for the construction of a streetcar line connecting the University with other downtown areas. To support its proposal, an H+T analysis provided information about the connection between transit and combined lowered housing and transportation costs. This highlighted the city’s commitment to providing transit service across income levels, as well as its desire to ensure that residents of affordable units were not pushed out due to lack of transit access.

Cincinnati, Ohio, received an Urban Circulator Grant for a streetcar to connect two of its major job centers, supported in part by a CNT analysis using H+T Index data. The circulator will connect downtown Cincinnati to the Uptown neighborhood, home to the University of Cincinnati, University Hospital, Cincinnati Hospital, and the Over-the-Rhine neighborhood. CNT’s analysis helped make the case that the project will reduce the jobs/housing mismatch while keeping transportation costs low. The project, which recently broke ground, will also promote mixed-use development and investment across a variety of place types.

Since 2009 the Metropolitan Transportation Commission’s (MTC) in the San Francisco Bay Area has used H+T as a metric to track regional progress. The Long Range Transportation Plan includes a goal to reduce the share of low-income and lower-middle income residents’ household income consumed by transportation and housing by 10% percent by 2035. The H+T Index is part of the screening process for transportation projects, and the $50 million Bay Area Transit- Oriented Affordable Housing (TOAH) Fund helps finance the development of affordable housing near transit lines throughout the Bay Area.
**Promote Development in Location-Efficient Areas**

The H+T Index enables planners and policymakers to distinguish between location-efficient and -inefficient areas, which in turn can be used to target investments, incentivize development that will be more sustainable over the long term, and discourage less sustainable development. In addition to the other methods described in this section, decision makers could:

- Expedite permitting and approvals for new construction on vacant lots in the most location-efficient areas.
- Permit denser, mixed-use development “by right” in more location-efficient areas, along with creating supportive design standards, such as form-based codes.
- Streamline environmental reviews, or permit certain exceptions to those reviews, in location-efficient areas. Similarly, location efficiency could serve as a selection criterion for projects that require lower environmental impacts.
- In high-growth areas, target location-efficient zones for the creation and preservation of rental units, e.g., through inclusionary zoning.
- Charge development impact fees or environmental impact fees for new development in location-inefficient areas, with lower or no fees for multi-family housing, transit-oriented housing, mixed-use development, etc.
- In areas with a large number of tax delinquent properties, develop a land bank and prioritize the acquisition of properties in location-efficient areas.

**Use location efficiency to determine optimal placement of additional non-car infrastructure, e.g., bike racks.**

**Give points for location efficiency in competitive financing programs.** The Qualified Allocation Plans that guide the selection of projects for Low-Income Housing Tax Credits and other sources of competitive financing for affordable housing often give points for amenities such as proximity to transit or environmentally friendly design. Using location efficiency as defined by the H+T Index is a more robust standard and has direct bearing on a major issue for the target population: transportation costs.

**Create standard underwriting criteria for TODs.** An obstacle to increasing the location efficiency of cities with public transit is that current underwriting criteria for residential development projects encourage only a limited range of housing types and limit the percentage of the development that is not residential. TODs need a broad range of housing types at various price points as part of mixed-use developments and districts.

**Support location efficient mortgages (LEMs).** On the consumer side, giving LEMs parity with other home loan instruments under federally defined financial services incentives would allow LEMs to become a universal feature of any federally-approved automated underwriting system.
Target Grants to the Reduction of Combined Housing and Transportation Costs

Foundations and government agencies offer competitive grant programs for program design, planning activities, public awareness campaigns, and other efforts to support sustainable communities. To the extent that such efforts deal with housing, transportation, planning, or development, H+T concepts and data can improve applicants’ quality of analysis and promote more holistic approaches. Grant programs can also explicitly reward applications for projects that are designed to reduce combined H+T costs.

Include Transportation Costs in the Definition of Affordability

The definition of affordability has a direct effect on families and communities, from defining the size of a home loan to establishing the magnitude of the need for subsidized housing in a given market. Where “affordability” has bearing on an outcome, the definition can be expanded to include transportation costs. There are five ways that definitions of “affordability” affect our lives:

- Analysis of trends and comparison across household types
- Defining housing needs for public policy purposes
- Encouraging coordination of housing and transportation policies
- Predicting the ability of a household to pay rent or mortgage
- Estimating the level of poverty

A policy can be enacted at any level of government to redefine affordability for a particular purpose. El Paso, Texas, adopted a policy direction in July 2010 that redefines affordability for the purposes of city funding and policy decisions as housing and transportation costs of no more than 50 percent of household income, and requires the city manager to use the Index as a tool to benchmark the costs of housing and transportation. And in South Carolina, before enacting a development fee for new construction, the government of Richmond County solicited a study of the impact of the fee on the availability of affordable housing. The county’s definition of affordability for the purposes of the study was “the combined cost of housing and transportation is less than 45 percent of household income” for low- to moderate-income households.

With the passage of the Housing + Transportation Affordability Index Act in April 2010, the Illinois General Assembly made the state the first to officially adopt the Index as a policy and planning tool. Under the new law, five state agencies are to consider H+T costs when making public investments and siting facilities in urbanized areas. The law also directs the State Housing Task Force to include the Index in the creation of a “State affordability definition and process.”
Let Us Hear From You!

The H+T Affordability Index offers many applications for a diverse group of practitioners. The Index is helping stakeholders across the country understand that affordability goes beyond just the cost of housing, and that location efficiency is a valuable asset. H+T data reveals that while our development patterns have been focused on creating residential choices, we have largely ignored the importance of transportation choices. By highlighting the places where policies and plans have balanced these needs, the Index gives planners the opportunity to identify development patterns worth emulating, equips consumers with useful information in making a location choice, and helps the public better understand how plans and policies affect the cost of living.

CNT produced this Toolkit to help more communities learn how they, too, can use H+T data and maps to educate and engage with the public, define performance measures and planning activities, and effectively target resources to fulfill particular public policy goals. We welcome your feedback on this publication, and look forward to learning how your community is using this tool to become more livable and sustainable. Please let us know how you and your organization are using the Index by emailing us at info@cnt.org. Also feel free to contact us to seek further guidance on using H+T data for your research, planning, or policy projects. To keep up to date on new releases and new applications of the data by users around the country, please sign up to receive our periodic newsletter at http://htaindex.cnt.org/news.php.
Appendix I:
H+T Website User Guide

Navigating the Map
To view the H+T Index, click on View the Index in the upper left hand corner of the website or on the Use the H+T Index box.

This User Guide to the H+T Index website is presented here for reader convenience and is current as of the date of this publication. For first-time users, CNT recommends printing this User Guide and following it sequentially with the H+T Index website on a monitor. To view the methods used to generate H+T data, please see the documentation located on the H+T website here: http://htaindex.cnt.org/downloads/HTMethods.2011.pdf. Any updates to the User Guide and methods documentation will be available online at http://www.htaindex.org.
Clicking on either link will take you to a map of the United States where you can either zoom in to a desired area or use the *Find* search bar at the top of the page. Locations that appear in green text are regions, those that appear in blue are Census defined places. This search bar will remain above the maps and can be used to change regions or find a specific location within a region.

You can pan around the map using the zoom bar and navigation tool shown at right. Clicking on the map will bring up a dialog box with data for the selected block group, as well as aggregate data pertaining to the region, county and municipality in which the block group is located.

After a location has been chosen, the default map view presents side-by-side comparisons of housing costs as a percentage of area median income and housing + transportation costs as a percentage of area median income.

The *Map View* tool above the right hand map allows you to view one map at a time, which results in an expanded map and legend as seen at the bottom of this page.
Custom Map Comparisons

The default map view after a location has been selected is side-by-side comparisons of housing costs as a percentage of area median income and housing + transportation costs as a percentage of area median income.

In addition to the preset map comparison, there are a wide range of other variables that can be viewed. To bring up the complete list of variables available on the H+T Index, click on the name of the variable currently displayed on the map.

Clicking on the name of the currently displayed variable will produce a drop-down menu of other variables available for comparison.

Both inputs and outputs from the transportation cost model are included on the list of variables which is organized into the following categories (see example below):

- Two Views of Affordability
- Affordability Indices
- Household Model Outputs
- Greenhouse Gas from Household Auto Use
- Model Inputs—Environment Variables
- Model Inputs—Household Variables
- Housing Costs

After a variable has been selected, the dialog box will close and the map will update. If you choose not to change the variable being viewed on the map, click on the X in the upper-right-hand corner to close the box.
In addition to assessing relationships among variables, the two-map view can be used to compare different geographies within a region or different regions. Normally when you type a location into the Find bar, both maps will zoom to the selected geography. However, clicking on the lock symbol will bring up another Find bar.

This allows you to select geographies for each map separately. For example, transportation costs are shown below as a percentage of income in the Chicago and Los Angeles metro regions. Locations can be compared within the same region and at different scales as well.

When you want the geographies to update simultaneously, click on the grey open lock symbol and the second Find bar will be removed.

**Household Income Variables**

When a region is selected, the default display is data modeled for the Regional Typical Household.

The Regional Typical Household assumes a household earning the median income for the region, with the average household size for the region, and the average number of commuters per household for the region. An important aspect of the H+T Index is that transportation costs are modeled for the “typical” household in a region, or the household represented by these three values.

By fixing income, household size, and commuters, the model controls for the impact of these variables on transportation costs. Differences in transportation costs are therefore a result of neighborhood characteristics and variation in the built environment. When variables are shown as a percentage of income, this median income value is used. Therefore, the variable can be interpreted as the cost impact of a given location on the average household in the region.

CNT has modeled and reported data for three typical households, each with a different income level. To change the household income variable, click on the name of the variable currently displayed on the map. This brings up a complete list of variables available on the H+T Index. The three household variables are listed at the top of the variable box.

The first is the **Regional Typical Household**, with its assumptions described above. Second is the **Regional Moderate Household**, which assumes a household income of 80 percent of the regional median, the regional average household size, and the regional average commuters per household. Third, the **National Typical Household** assumes a household income of $51,425 (the national median household income), the national average household size of 2.6, and the national average number of commuters per household of 1.15 (values current as of the date of this publication).
Legends

Several different legends are available to help users interpret the data presented on the maps. The default legend is a key illustrating the value ranges represented by the colors on the map. In the two-map view, additional legends can be viewed by clicking on the arrow to the right of the key (in the one-map view all the legends are displayed at once).

This brings up a drop-down menu of the legends that are available.

**Graphical Legend** shows the count of block groups in each color/variable range.

**Histogram Legend** shows a bar chart representing the frequency distribution of the count of block groups for each value of the given variable, with the range showing the 5th to 95th percentiles.

**Population Statistics** shows the count and percentage of the population within each of the variable ranges.

**Household Statistics** and **Neighborhood Statistics** have the same functionality as **Population Statistics**, but show counts and percentages for households and neighborhoods (block groups), respectively.
### Appendix II: Examples of Data Types and Uses

| Ten Examples of Useful Data Types / Metrics / Comparisons from the H+T Dataset | Viewable on H+T website? | Public Outreach | Reg’l / Local Planning | Reg’l / Local Goal Setting | Consumer Education | Program Evaluation | Site / Project Selection | TOD Policy & | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 Number/percentage/location of block groups in a region/city/county where average housing costs and estimated transportation costs together would be affordable to a median-income household | Y | • | • | • | • | • | • | • | Can be compared to “housing costs only” to illustrate importance of transportation costs |
| 2 Number/percentage of regional / city / county population (or households) living in block groups where average housing and transportation would be affordable to a median-income household | Y | • | • | • | • | • | • | • |
| 3 Average expenditure by the typical regional household on transportation, in dollars per year, by block group, compared to the same value for the municipality, county, and/or region | Y | • | • | • | • | • | • | • | Calculate monthly or weekly values; also see Abogo.cnt.org |
| 4 Average number of miles driven by the typical regional household per year, by block group, compared to the same value for the municipality, county, or region | Y | • | • | • | • | • | • | • | Items 3, 4 and 5 are inter-related; recommend using all together |
| 5 Average number of cars owned by the typical regional household, by block group, compared to the same value for the municipality, county, or region | Y | • | • | • | • | • | • | • |
| 6 Average value, by block group, of residential density, block size, intersection density, transit connectivity, transit access shed, and employment access | Y | • | • | • | • | • | • | • | See descriptions of variables and source data at htaindex.cnt.org/downloads/HTMethods.2011.pdf |
| 7 Any of the values above, calculated for proposed or existing corridors or station areas | N | • | • | • | • | • | • | • | Block group data must be weighted for area of interest |
| 8 Use 3 above to evaluate the location efficiency of block groups where public place-based investments have been made, are being considered, or for which funding is sought | N | • | • | • | • | • | • | • | Requires layering H+T data with local data |
| 9 Change from 2000 to 2009 for items 1-5 above, for the national typical household, by block group, municipality, county, region, corridor, or station area | N | • | • | • | • | • | • | • | Contact CNT about comparison datasets and guidance on appropriate usage |
| 10 Change from 2000 to 2009 for item 1 above, for the national typical household, compared to change in wages, overall cost of living, consumer price index, or other familiar measure over the same period | N | • | • | • | • | • | • | • |
Appendix III:
CNT Data Request Form

Request for Housing and Transportation Affordability Data

Date __________________

<table>
<thead>
<tr>
<th>Contact</th>
<th>Organization</th>
<th>Address</th>
<th>Phone #</th>
<th>Email</th>
</tr>
</thead>
</table>

Please state the specific use of the data you are requesting:

For what specific geographic area(s) would you like data:

At what geographic level would you like the data reported:

- ☐ Census block group
- ☐ Other, please specify:

Which dataset are you requesting:

- ☐ 2009 H+T Index values (data description in Attachment A)
- ☐ 2000 and 2009 comparison dataset (data description available upon request)
- ☐ Both
Attachment A: **Product Description** *(data will be provided as a text file)*

<table>
<thead>
<tr>
<th>Field Heading</th>
<th>Variable Name</th>
<th>Further Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>fips</td>
<td>FIPS Code</td>
<td>Geographic Identifier</td>
<td>TIGER/Line</td>
</tr>
<tr>
<td>region</td>
<td>Region</td>
<td>CBSA</td>
<td>2005-2009 American Community Survey</td>
</tr>
<tr>
<td>ami</td>
<td>Area Median Income</td>
<td>Median Income for the CBSA</td>
<td>2005-2009 American Community Survey</td>
</tr>
<tr>
<td>area_hh_size</td>
<td>Area Average Household Size</td>
<td>Average Household Size for the CBSA</td>
<td>2005-2009 American Community Survey</td>
</tr>
<tr>
<td>area_commuters</td>
<td>Area Average Commuters per Household</td>
<td>Average Commuters per Household for the CBSA</td>
<td>2005-2009 American Community Survey</td>
</tr>
<tr>
<td>total_hhs</td>
<td>Total Number of Households</td>
<td></td>
<td>2005-2009 American Community Survey</td>
</tr>
<tr>
<td>ami_autos_per_hh</td>
<td>Autos per Household</td>
<td>As modeled for the AMI, area average household size, and area average commuters per household</td>
<td>Modeled from independent household and local environmental variables</td>
</tr>
<tr>
<td>ami_pct_transit</td>
<td>Percent of Journeys to Work by Transit</td>
<td>As modeled for the AMI, area average household size, and area average commuters per household</td>
<td>Modeled from independent household and local environmental variables</td>
</tr>
<tr>
<td>ami_vmt_per_hh</td>
<td>Vehicle Miles Traveled per Household per year</td>
<td>As modeled for the AMI, area average household size, and area average commuters per household</td>
<td>Modeled from independent household and local environmental variables</td>
</tr>
<tr>
<td>t_cost_ami</td>
<td>Average Monthly Transportation Costs</td>
<td>As modeled for the AMI, area average household size, and area average commuters per household</td>
<td>Modeled from independent household and local environmental variables</td>
</tr>
<tr>
<td>t_ami</td>
<td>Transportation Costs as Percent of AMI</td>
<td>As modeled for the AMI, area average household size, and area average commuters per household</td>
<td>Modeled from independent household and local environmental variables</td>
</tr>
<tr>
<td>h_cost</td>
<td>Average Median Monthly Housing Costs</td>
<td>Calculated from Median Selected Monthly Owner Costs and Median Gross Rent from the ACS</td>
<td></td>
</tr>
<tr>
<td>h_ami</td>
<td>Housing Costs as Percent of AMI</td>
<td>Calculated from Median Selected Monthly Owner Costs and Median Gross Rent from the ACS</td>
<td></td>
</tr>
<tr>
<td>ht_ami</td>
<td>Housing + Transportation Costs as Percent of AMI</td>
<td>As modeled for the AMI, area average household size, and area average commuters per household</td>
<td>Modeled from independent household and local environmental variables</td>
</tr>
</tbody>
</table>

CNT can provide customized data as well; if you are interested in customized data please indicate the data you are requesting:

We will respond with a quote within three business days of finalizing the data request.
DATA LICENSE AGREEMENT
Between
CENTER FOR NEIGHBORHOOD TECHNOLOGY
And

THIS AGREEMENT is entered into as of this ___ day of ___ , 20 __ , between the Center for Neighborhood Technology, with an address of 2125 W North Ave, Chicago, IL 60647, (“CNT”), and ___________________________ with an address of ___________________________ , (“Licensee”).

NOW, THEREFORE, IN CONSIDERATION of the mutual promises and obligations contained herein, the parties agree as follows:

1. CNT owns data on housing and transportation affordability (“Data”), including certain Data for which, subject to the terms and conditions of this Agreement, CNT will provide to Licensee in the format, and for the purposes, set forth in Attachment A, which is hereby incorporated into this Agreement as if fully set forth herein.

2. CNT shall solely and exclusively own all right, title, and interest in and to the Data, and any and all models, source code, object code, information, materials, and products provided to Licensee, together with any modifications, improvements, and derivative works of any of the foregoing, whether made by either party or by a third party, including all copies thereof and intellectual property (including trademarks, copyright, and patents) therein or thereto. Licensee agrees to assign and transfer and hereby does irrevocably assign and transfer to CNT any right, title or interest Licensee may have, if any, in and to the Data and any and all of the foregoing.

3. CNT hereby grants to Licensee a limited, revocable, non-exclusive, non-transferrable, royalty-free license to use Data provided by CNT to Licensee for the specific purpose described on Attachment A, subject to the terms and conditions of this Agreement; provided however that the foregoing grant is expressly conditioned on Licensee using the Data solely for non-commercial, non-profit, non-revenue-based purposes.

4. The Licensee represents and warrants that the Data shall be used only by Licensee's staff, and that Licensee shall not allow any third party to use the Data or sell or otherwise transfer Data to any third party, in whole or in part, without the prior express written approval of CNT. In the event of any breach of the foregoing representations and warranties, the license granted to Licensee under this Agreement shall automatically terminate.

5. DISCLAIMER OF WARRANTIES. CNT DOES NOT WARRANT THAT THE DATA ARE ACCURATE OR COMPLETE. THE DATA ARE PROVIDED “AS IS” TO THE FULLEST EXTENT PERMISSIBLE BY LAW, AND CNT AND ITS SUBSIDIARIES AND AFFILIATES DISCLAIM ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.
6. LIMITATIONS OF LIABILITY. NOTWITHSTANDING ANYTHING TO THE CONTRARY HEREIN, CNT SHALL NOT BE LIABLE TO LICENSEE FOR ANY DAMAGES WHATSOEVER INCLUDING WITHOUT LIMITATION AMOUNTS REPRESENTING DIRECT, INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL, EXEMPLARY, OR PUNITIVE DAMAGES, LOSS OF PROFITS, LOSS OF BUSINESS, HOWEVER CAUSED, ON ANY THEORY OF LIABILITY, INCLUDING CONTRACT OR TORT (INCLUDING NEGLIGENCE OR PROFESSIONAL ERRORS AND OMISSIONS) AND NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE. IN THE EVENT THAT APPLICABLE LAW DOES NOT PERMIT THE FOREGOING EXCLUSION OF LIABILITY AND DAMAGES, CNT’S LIABILITY SHALL BE LIMITED TO THE GREATER OF $100 OR THE LOWEST AMOUNT ALLOWED BY LAW.

7. Indemnification. Licensee shall defend, or have a third-party defend, at its expense, indemnify, and hold harmless CNT, its subsidiaries and affiliates, and its and their directors, officers, employees, and agents, and their respective successors, heirs and assigns from and against any and all claims, allegations, demands, suits, and proceedings (collectively, “Claims”), and from and against any liability, judgments, awards, damages, settlements, fees and costs (including attorney’s fees) incurred in connection with any such Claim, brought or asserted by any third party in connection with this Agreement, the Data, or Licensee’s use of the Data.

8. To assist CNT in the maintenance of the Data, the Licensee agrees to provide CNT, at the address shown below, with any information concerning errors or discrepancies found in the Data.

   CNT
   Attn: Linda Young
   Research Director
   2125 W North Ave.
   Chicago, IL 60647

9. Payment in the amount of ( ) shall be made by Licensee to CNT within thirty (30) days of receipt of invoice.

10. Licensee agrees to cite CNT as the source of information whenever Data is used in reports, papers, publications, maps and other products. Citations will be directly on tables, charts, and maps using the Data. In instances where Licensee makes further calculations using Data, Licensee will cite that further calculations were made using source data provided by CNT.

IN WITNESS WHEREOF, the Agreement has been executed by the parties hereto as of the day and year first written above.

CENTER FOR NEIGHBORHOOD TECHNOLOGY

______________________________
Kathryn Tholin, Chief Executive Officer
Acknowledgements

CNT is grateful for the generosity of the Rockefeller Foundation and the Ford Foundation, whose support has enabled the development and expansion of the H+T Index and the production of How+To: The H+T Toolkit. CNT would also like to thank the organizations and foundations who supported and continue to support CNT’s work in many of the research and policy applications of the H+T Index that are described in this guide: The Brookings Urban Markets Initiative, Center for Housing Policy of the National Housing Conference, Nathan Cummings Foundation, The Energy Foundation, Field Foundation of Illinois, The Ford Foundation, Lloyd A. Fry Foundation, Grand Victoria Foundation, The Joyce Foundation, John D. and Catherine T. MacArthur Foundation, McKnight Foundation, Rockefeller Foundation, Searle Funds at the Chicago Community Trust, Surdna Foundation, U.S. Department of Housing and Urban Development, U.S. Department of Transportation, and Wallace Global Fund.

Finally CNT would like to thank the many partners we have found in government agencies, nonprofit organizations, and for-profit firms whose interest in using the Index spawned so many projects over the years, as well as those that have kept us informed of their own independent uses of the tool. Among them are the ones presented in this Toolkit: Center for Housing Policy, Center for Transit Oriented Development, Central Corridor Funders’ Collaborative, Chicago Metropolitan Agency for Planning, City of Asheville, City of El Paso, City of Cincinnati, City of Tucson, County of Richland (South Carolina), Family Housing Fund, Grand Rapids Area Coalition to End Homelessness, Grand Valley University, Illinois Housing Development Authority, Metropolitan Planning Commission, Metropolitan Planning Council, Metropolitan Washington Council of Governments, National Association of Realtors, Reconnecting America, Strategic Economics, the Sustainable Communities Partnership, The Housing Trust, Urban Land Institute, Urban Land Institute-Minnesota, Walkscore, and the Washington D.C. Office of Planning.

How+To was authored by Stefanie Shull, Matthew Sussman, and Laura Pepper, with project management from Stefanie Shull and additional oversight from María Choca Urban. Rik Adamski contributed background research and helped develop an initial structure, and Hazel Levine inspired the title. Thanks to Nicole Gotthelf, Martha Koch, Paul Mack, Colin Murphy, Kathrine Nichols, and Annette Stahelin for getting it over the finish line. Other CNT staff who provided valuable input include Sofia Becker, Scott Bernstein, Jacky Grimshaw, Adam Mays, Stephanie Morse, Steve Perkins, Emily Robinson, Kathy Tholin, and Linda Young.
ABOUT THE CENTER FOR NEIGHBORHOOD TECHNOLOGY

The Center for Neighborhood Technology (CNT) is an award-winning innovations laboratory for urban sustainability. Since 1978, CNT has been working to show urban communities in Chicago and across the country how to develop more sustainably. CNT promotes the better and more efficient use of the undervalued resources and inherent advantages of the built and natural systems that comprise the urban environment.

As a creative think-and-do tank, we research, promote, and implement innovative solutions to improve the economy and the environment; make good use of existing resources and community assets; restore the health of natural systems and increase the wealth and well-being of people—now and in the future. CNT’s unique approach combines cutting edge research and analysis, public policy advocacy, the creation of web-based information tools for transparency and accountability, and the advancement of economic development social ventures to address those problems in innovative ways.

CNT works in four areas: transportation and community development, water, energy and climate. CNT has two affiliates, IGO™ CarSharing and CNT Energy.

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