



Total Housing Units

This EnviroAtlas Smart Location map estimates the total number of housing units within each U.S. Census block group in 2010. A housing unit is any living quarters such as a house, apartment, or mobile home. Both occupied and vacant housing units are included in the housing unit inventory.

Why is the number of housing units important?

Total Housing Units is one of many measures or variables used by city planners to examine the proportions of residents, jobs, and services in urban areas and to guide development planning. Total Housing Units gives an overall view of the potential residential capacity within each block group. Housing inventories are used by local governments to justify development or transit investment and to promote land use diversity in neighborhoods.¹ Housing measures can be compared to employment measures within an area of study (e.g., a census block group) to assess the accessibility of resident working age populations to jobs. An imbalance in jobs and housing creates longer commute times, more single driver commutes, loss of job opportunities for workers without vehicles, traffic congestion, and poor air quality.²

A minimal level of residential capacity and employment opportunity is necessary to support community design strategies that make alternatives to driving more viable. At least seven homes per acre are generally considered necessary to support basic fixed-route bus service. Higher density thresholds are recommended to support light rail.³

Ideally, the types of housing should match the income levels of workers in nearby employment centers. Workers in higher income classes typically are more able to afford housing close to prominent employment centers.² Dispersion of employment to the suburbs can result in reduced accessibility by workers due to longer average trip distances, increased traffic, and lack of public transit in outlying areas. Unfortunately, the movement of jobs to the suburbs has been most pronounced in industries that offer low- and middle-skill jobs. To counter these trends, some communities have rezoned land from commercial to residential uses and set affordability mandates for new housing in an effort to diversify neighborhoods and reduce commuter vehicle miles traveled for those unable to afford housing near their workplaces.⁴



Photo: Philadelphia residential area.

Compact neighborhoods, with a diversity of housing, employment, and services offer a number of environmental benefits compared to lower density neighborhoods. Number of housing units is just one built-environment characteristic that indicates land use diversity and affects travel behavior. Research studies indicate that people who live in compact neighborhoods walk more, use transit more, and drive less than people living in lower density neighborhoods.^{1,5}

Adequate housing inventories combined with land use diversity that mixes housing, jobs, and services within neighborhoods can reduce vehicle miles traveled by making walking, biking, and transit more appealing. The National Research Council noted that doubling residential density in a metropolitan area with compact neighborhood design could reduce vehicle miles traveled by 5–12%.⁵ Other recent studies suggest that consistently reducing private auto usage through urban development design guidelines nationwide could reduce vehicle emissions by 6-10% and improve regional air quality and public health through lower [greenhouse gas emissions](#).⁶

How can I use this information?

This map, Total Housing Units, allows users to evaluate various block groups by the size of the potential resident population. Comparing Total Housing Units, both vacant and occupied, with Number of Households (occupied) can be used to assess vacancy rates or housing demand. Comparing this map with Total Employment may indicate the effectiveness of community design and road networks to link potential workers with job opportunities.

Planners may want to promote increased housing in block groups with high employment capacity and a low resident working population. They may identify neighborhoods with optimal numbers of jobs and housing that can support new or enhanced transit service. Economic development agencies in regions with limited transit service may use this map to encourage the siting of new workplaces in areas that are highly accessible to the regional workforce. Localities may also consider numbers and age classes of residents when prioritizing neighborhood improvements.

This data layer may be used with other EnviroAtlas demographic and Smart Location data layers to compare the proportions of residents, jobs, and services among community block groups. The aerial-image base map (seen by increasing the transparency of the map layers) can be used to show the spatial distribution of the built environment within the census block groups. For select communities, users can overlay EnviroAtlas community land cover maps that show impervious surfaces, street trees, and other common land covers at 1-meter resolution.

How were the data for this map created?

The [2010 Census](#) provided a count of housing units per census block group. Both occupied and vacant housing units are included in the housing unit inventory. For more information, please see variable CountHU in the [Smart Location Database User Guide](#).

What are the limitations of these data?

Summarizing and estimating various metrics across block groups may create misleading results. It is important to remember that jobs or residences are not distributed evenly throughout the area of a block-group. Census block groups may include both developed and undeveloped areas. A large block group may be diverse, but jobs, housing and services may be widely distributed with low accessibility (e.g., little or no public transit). In urban centers, block groups may be quite small and rather uniform in land use even though they

may be very close to another more diverse block group. This indicator is most useful for drawing attention to regional patterns or specific neighborhoods that would benefit from further study. The aerial-image base map gives an indication of the proportions of developed and undeveloped land in each census block group.

How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. This data layer is incorporated into a larger EPA data product called the [Smart Location Database](#). The Smart Location Database is a nationwide geographic data resource for measuring location efficiency. Most attributes are available for every census block group in the United States.

Where can I get more information?

A selection of resources on the relationships among city planning, development densities, and environmental quality is listed below. More details about this metric are available in the [Smart Location Database User Guide](#). In addition, EPA's [Smart Growth Program](#) provides tools, resources, and technical assistance to communities seeking to pursue compact, mixed-use, walkable, and transit-oriented development strategies to protect public health and the environment. For additional information on the data creation process, access the metadata for the data layer from the drop down menu on the interactive map table of contents and click again on metadata at the bottom of the metadata summary page for more details. To ask specific questions about this data layer, please contact the [EnviroAtlas Team](#).

Acknowledgments

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Selected Publications

1. Florida Department of Transportation. 2009. [Transit-oriented development design guidelines](#). Accessed July 2014.
2. Zhou, J., Y. Wang, and L. Schweitzer. 2012. [Jobs-housing balance and employer-based travel demand management program returns to scale: Evidence from Los Angeles](#). *Transport Policy* 20: 22–35.
3. Cervero, R., and E. Guerra. 2011. [Urban densities and transit: A multi-dimensional perspective](#). Working Paper UCB-ITS-WWP-2011-6, Institute of Transportation Studies, University of California, Berkeley.
4. Cervero, R., and M. Duncan. 2006. [Which reduces vehicle travel more: Jobs-housing balance or retail-housing mixing?](#) *Journal of the American Planning Association* 72(4):475–490.
5. National Research Council. 2009. [Driving and the built environment: The effects of compact development on motorized travel, energy use, and CO₂ emissions](#). Special Report 298, The National Academies Press, Washington, D.C. 240 p.
6. Kramer, M. 2013. [Our built and natural environments: A technical review of the interactions among land use, transportation, and environmental quality, Second edition](#). Environmental Protection Agency, Washington, D.C.