



## Industrial Job Density

This map estimates the number of industrial jobs per unprotected acre within each census block group in 2010.

### Why is industrial job density important?

Industrial job density 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 for efficient city design and transit networks. Besides indicating the number of jobs per unprotected acre within a census block group, the metric also suggests a level of economic activity in the block group. Job densities in particular job classes may be compared with overall employment density to highlight job distributions within and among block groups.

The industry employment classification includes jobs in agriculture, forestry, mining, oil and gas, construction, manufacturing, wholesale, transport, and warehousing. The wages within the class range from entry-level wages to managerial salaries. Since 2009, construction, wholesale trade, manufacturing, transportation, and warehousing have shown good job growth during the post-recession recovery. However, employment in all of these categories remains far below pre-recession levels except for transportation and warehousing.<sup>1</sup> Though manufacturing has experienced at least two decades of offshoring, 12 million workers, or 9% of the workforce, are still employed in the sector, and it is seeing modest post-recession gains.<sup>2</sup> The oil shale boom has fueled the increase in oil and gas jobs that led the industrial sector since 2007, particularly in states with large shale reserves like North Dakota and Pennsylvania.<sup>3</sup> However, the boom may be cooling as more than 50,000 oil and gas jobs were lost in early 2015.<sup>4</sup> Industrial jobs traditionally have been a source of middle wage jobs. Deregulation, consolidation, and the offshoring of jobs have all contributed to the insecurity of the middle wage worker.<sup>5</sup>

In spite of a trend toward land use diversity, industrial job densities still tend to be concentrated in zoned industrial parks. Just as with the location of office or retail centers in metropolitan areas, industrial zones tend to be distributed near central downtown core areas as well as in outlying suburban subcenters, generally along major highways or railways. Knowing the distribution of various job densities is prerequisite to planning for transportation networks and affordable housing centers that are accessible to jobs of all wage classes. The occurrence of affordable housing with



Photo: Strip mine, Wikimedia Commons

easy access to industrial work locations gives workers the ability to save on transportation costs.

Smart Growth planning programs promote the development of a diversity of residences, employment opportunities, and services within compact neighborhoods. Planning strategies promote housing in job-rich areas and new employment centers in dense residential zones. Residential proximity to clean industries or warehouse districts is consistent with mixed use planning.<sup>6</sup> In addition, the redevelopment of industrial [brownfields](#) can revitalize neighborhoods by transforming blight, producing jobs, and preserving greenspace through infill development.<sup>7</sup> Resident workers with easy accessibility to a diversity of job types in various wage classes can reduce not only vehicle miles traveled (VMT) but fuel consumption and [greenhouse gas emissions](#) (GHGs) associated with employee commuting trips.<sup>8</sup>

### How can I use this information?

This map, Industrial Job Density, allows users to evaluate various block groups by the number of industrial jobs per unprotected acre relative to other characteristics. Using this map to identify the number of industrial jobs by census block group within an area of study can be useful in a number of urban planning contexts. Comparing this map to areas of relatively high-, low- and middle-wage worker residential density may indicate the effectiveness of community design and road networks to link potential workers with job opportunities.

Planners may want to promote increased affordable housing in block groups with high industrial employment density and

a low resident working population. They may identify neighborhoods with optimal densities 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 industrial employment centers in areas that are highly accessible to the regional workforce.

### How were the data for this map created?

The 2010 [Census LEHD](#) (Longitudinal Employer-Household Dynamics) database gave the total number of industrial jobs (NAICS sectors 11, 21–23, 31–33, 42, 48, and 49) by U.S. Census block group. EPA then isolated areas of the block group that were not protected from development. NAVTEQ data (2011) provided the location of federal, state, and local parks, zoos, cemeteries, public beaches, and water bodies. The Protected Area Database (PAD-US v1.3) provided the locations of parks and protected natural areas as well as privately-owned land area with restrictions on development (such as conservation easements). The relevant portions of each protected area dataset were intersected and dissolved into a single polygon layer that represented all areas in which development was restricted. The resulting protected areas layer was then integrated with the block group areas in GIS. EPA used this block group unprotected acreage as the denominator to calculate industrial employment density. The metric, listed as D1c8\_Ind10, may be found in the [Smart Location Database User Guide](#).

### What are the limitations of these data?

Industrial job density, when representing mining in remote locations, may be zero when the Number of Jobs metric shows a significant number of industrial jobs because the denominator (unprotected or developed acreage) may be zero or close to zero. It is also important to remember that jobs or residences are not distributed evenly throughout the

### Selected Publications

1. Evangelist, M. 2014. [The low wage recovery: Industry employment and wages four years into the recovery](#). National Employment Law Project Data Brief, accessed May, 2015.
2. Bureau of Labor Statistics. 2016. [Manufacturing: Employment, hours, and earnings](#). Accessed August 2016.
3. Greenstone, M., and A. Looney. 2012. [The role of oil and gas in driving job growth](#). Brookings on Job Growth, June 1, 2012. Accessed May, 2015.
4. Backmon, M. 2015. [The oil bust is starting to take a hold on American jobs](#). Quartz, accessed May, 2015.
5. Autor, D.H., L.F. Katz, and M.S. Kearney. 2006. [Measuring and interpreting trends in economic inequality: The polarization of the U.S. labor market](#). AEA Papers and Proceedings 96(2):189–194.
6. Qureshi, M., and R. King. 2015. [Three ways land-use planning and zoning can increase urban density](#). World Resources Institute. Accessed August, 2016.
7. Environmental Protection Agency (EPA). 2014. [The EPA brownfields programs produce widespread environmental and economic benefits](#). Overview, accessed May 2015.
8. National Research Council. 2009. [Driving and the built environment: The effects of compact development on motorized travel, energy use, and CO<sub>2</sub> emissions](#). Special Report 298, The National Academies Press, Washington, D.C. 240 p.

area of a block-group. A diversity of land uses or activities may be sparsely distributed in large census block groups. On the other hand, a small block group may be uniform and low in diversity, but it may be located within easy access to a more diverse block group. Using the aerial-image base map will give an indication of the proportions of developed and undeveloped land in each census block group. The U.S. Census Bureau maintains a website on methodology and [reliability of data](#).

### How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. Data from the [2010 U.S. Census](#) may be viewed and downloaded from the census website.

### Where can I get more information?

A selection of resources on the relationships among industrial jobs, city planning, and environmental quality is listed below. EPA's [Smart Growth Program](#) provides tools, resources, and technical assistance to communities seeking to pursue compact 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](#).

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