

Sketch Planning Tool: Estimating Benefits of Livable Centers in the Houston-Galveston Region

Introduction

The purpose of the sketch planning tool is to illustrate the potential benefits, as measured by mode shift, which could occur from the presence of centers in a region. The tool is not meant to be a precise measurement of benefits, but rather as a means of quantifying their potential magnitude. The tool also demonstrates how changes in data and assumptions impact the resulting outputs.

The tool is designed to be interactive and transparent so that the user is able to clearly view the data and assumptions that are being used. The user can change these factors to explore how different assumptions will affect outcomes or modify the tool for use in a different region or hypothetical growth scenario. Only input areas colored in red should be modified. The inputs in red are linked to calculations in cells that are colored yellow. These yellow cells should not be modified.

The Inputs

The user should begin by clicking on the tab labeled 'Input 1'. This spreadsheet displays the major inputs utilized throughout the tool. The user will see displayed at the top of this spreadsheet the four types of centers and the characteristics used to define them. The assumption driving this delineation of center types is that not all centers are equal in size or density and that these differences will impact the distribution of benefits. For each of these center types (neighborhood center, town center, regional center and urban core) the user will see the assumed size, density, population and employment levels, and other characteristics.

Again, the user may alter any of the inputs in this section that are coded in red. For example, the user may wish to see the impact on benefits that would occur if the assumed density level in neighborhood centers is changed from 9 dwelling units per acre to 4 dwelling units per acre. The user would simply click on that cell and replace the number with their desired input. A major input used to determine the level of benefits is line 22, which is the number of centers of each center type. Changing the inputs in line 22 allows the user to see the impact of various combinations of center types on the outputs.

Another important input is the total number of workers. The tool assumes a workforce of 2 million, which is the current level in the Houston-Galveston region. This input may be found in cell I-27, coded in red. This input may be changed to either reflect the number of workers that exist in a different region, or to reflect a future number of anticipated workers (for example in the year 2035). The number of workers is used as the driving factor rather than the total population because it is assumed that workers are the main generators of trips. Note that if the number of centers entered in line 22 will generate a population in centers that exceeds the total in cell I-27, either the number of centers should be reduced or the number of workers in cell I-27 should be increased.

The Assumptions

The spreadsheets labeled 'Assumptions_1' and 'Assumptions_2' provide the user additional information on how the results are calculated. Again the inputs in red may be changed by the user. The inputs on the 'Assumptions_1' spreadsheet cover information regarding trip generation information by center type. These assumptions cover everything from residents per dwelling unit to the number of trips per day to the attractiveness factor of centers. Inputs are based on data sources such as the U.S. Census where such information existed. These sources are cited by asterisks that appear next to each input. Other inputs are assumptions based on logical inference that are open to evaluation. Such assumptions were made due to the lack of literature or data. One of the purposes of this process is to make the assumptions as transparent as possible to increase the validity of the results.

The 'Assumptions_2' spreadsheet shows the distribution of population and trips with and without centers by center type. This spreadsheet also shows the distribution of trips among the center types, in terms of origins and destinations for work and non-work trips. This is displayed in both percentages and absolute terms. For example, the table shows that it is estimated that 3% of trips will be from a neighborhood center to a town center. These inputs, coded in red, may be changed. The absolute numbers displayed in the table below will change accordingly.

The Results

To view the resulting outputs from any changed inputs, the user should toggle to the 'results' tab. The results spreadsheet is a summary sheet that shows the percent change in trip mode that will occur if the number of centers with the given characteristics on the input spreadsheet are created. The first table provides a summary of the increase or decrease in trips for work, non-work, and all trips by mode. The second table breaks down the distribution by single-occupancy vehicle trips (SOV) and carpool trips.

The results are further broken down by work trips, non-work trips, and all trips on the two tabs immediately following the results spreadsheet. The work trip and non-work trip spreadsheets provide further detail regarding the breakdown of mode split based on the origin and destination among center types. This is displayed both in percentages and in absolute number of trips. Again, these inputs are linked with those on the input spreadsheet so any changes to the inputs will be carried through to these pages.

Applying the Tool to Your Region

Some users may desire to apply the tool to the circumstances found in their region. The first step is to determine what kind of centers exist, or that the user would like to see exist, in their region. For example, for some regions there may not be regional centers or neighborhood centers may exist at only a much smaller size. These inputs can be specified in the 'Input 1' spreadsheet. To determine the size and types of centers to be used in the tool for the Houston-Galveston region a GIS grid map was created showing current levels of population and employment densities. Existing centers of each type were then identified with their corresponding density levels. Use of such a GIS mapping exercise is not a pre-requisite for the application of the tool to the user's region.

Next the user should input the total number of workers in their region in cell I-27 on the 'Input 1' spreadsheet. As previously discussed, this can either be the current number of workers or the number of workers projected for a future year. The user can utilize Census, American Community Survey, and National Household Transportation Survey data to fill in the following cells in the 'Assumptions_1' spreadsheet (see lines 6-44): residents per dwelling unit, workers per dwelling unit, dependents (non-working) per worker, the share of auto in all work trips, the share of transit in all work trips, the share of walking/biking in all work trips, the share of telecommuting in all work trips, the percent of commuter person trips accounted for by SOV and the average number of people per carpool. All other data on this sheet is either derived from these inputs or is a logical inference, open to the user's interpretation.

Contact

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