ARC-LEAP User Instructions

Appalachian Regional Commission
Local Economic Assessment Package

prepared for the
Appalachian Regional Commission

prepared by
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January, 2004

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PREFACE

LEAP is a software tool that was designed and developed by Economic Development Research Group, Inc. (www.edrgroup.com) to assist practitioners in evaluating local economic development needs and opportunities. ARC-LEAP is a version of this tool developed specifically for the Appalachian Regional Commission (ARC) and it's Local Development Districts (LDDs). Development of this user guide was funded by ARC as a companion to the ARC-LEAP analysis system.

This document presents user instructions and technical documentation for ARC-LEAP. It is organized into three parts:

I. overview of the ARC-LEAP tool
II. instructions for users to obtain input information and run the analysis model
III. interpretation of output tables

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A separate Handbook document provides more detailed discussion of the economic development assessment process, including analysis of local economic performance, diagnosis of local strengths and weaknesses, and application of business opportunity information for developing an economic development strategy.

I. OVERVIEW

The ARC-LEAP model serves to three related purposes, each aimed at helping practitioners identify target industries for economic development. The first is to provide a tool for local practitioners to *assess* current economic conditions and likely future trends. The second is to provide a *diagnostic* tool to aid practitioners in targeting industries that can provide the basis for economic development. The third is to provide an *analysis* tool for assessing the effects of policy (e.g., tax) changes and new investments (e.g., transportation improvements) on the attractiveness of an area for different industries.

The *assessment* portion of the model provides baseline growth projections for 71 industries. (Industries are defined on a Standard Industrial Classification (SIC) basis.) In addition, each industry is classified according to whether there is a potential for business attraction in the local area and the magnitude of the business attraction potential for each of these industries. (The magnitude for business attraction is measured in number of jobs.) An area is classified as having a potential for business attraction if employment in an industry is lower than in a comparable area (i.e., the Comparison Area in the model) or if employment in an industry has grown more slowly than in other areas of the country.

The magnitude of the business attraction potential for each industry in the local area is assessed through a process of adding or subtracting "weights" associated with local area's relative advantages or disadvantages. Advantages and disadvantages are defined on the basis of: (1) costs of labor, materials, utilities, transportation and taxes and the sensitivity of each industry to those various cost factors; (2) size and characteristics of the local area's workforce and the sensitivity of each industry to these factors; and (3) the availability and cost of different modes of transportation (i.e., highway, air, rail, and marine) and the sensitivity of each industry to these factors. In other words, the ARC-LEAP model identifies sets of industries that are good targets for economic development by matching an area's labor and infrastructure characteristics (e.g., wage rates, education levels, airport access) with operating requirements of each industry.

The *diagnostic* portion of the model includes a complete set of area diagnostics, based on an assessment of the local area's competitiveness (relative to a comparison area chosen by the user) for each industry. In addition, more detailed diagnostics are presented for each industry for which there is a potential business attraction, as identified in the *assessment* portion of the model. This set of diagnostics identifies "critical" and "important" weaknesses that need to be addressed if the area is to fulfill some of the growth potential identified in the local area *assessment*. The diagnostics presented in ARC-LEAP are developed by looking at each industry's sensitivity to different factors and for the factors most important to an industry, the strength of the local area relative to the comparison area. Factors assessed in the *diagnostic* portion of the model include total production costs; labor costs; energy costs; tax burdens; availability of labor (i.e., "work base"); availability of skilled workers; water transportation; air transportation; rail transportation; highway transportation; and availability of Broadband Internet access.

The *policy* portion of the model allows users to *analyze* the effects of policies and investments on the business attraction potential of a local area. Users can estimate the likely business attraction impacts of changes in availability or quality of key inputs (labor and economic infrastructure), including labor force size and skill levels; Broadband access; tax policy; availability of commercial land, industrial parks, office sites; access to airports, sea ports, and rail; and improvements to highways. Estimates of these presented as estimated new jobs associated with improved business attraction potential.

II. INSTRUCTIONS FOR ARC-LEAP USERS

ARC-LEAP is a large spreadsheet workbook application. It requires a computer with Microsoft Excel software, that has sufficient internal memory to load and operate a 3.7 MB spreadsheet workbook. It contains visual basic macros that have been checked and are virus free. You must have your security level set to medium so that Excel prompts you about whether it is OK to enable the macros (you must answer "yes" to allow ARC-LEAP to work). If your security level is set to "high" then the macros will not be enabled. In that case, go to Excel's top line menu and choose "Tools," then "Options," then select the "Security" tab and click on the "Macro Security" button to set it to "medium."

ARC-LEAP is comprised of four input and four output tables. Users who wish to perform only an *assessment* of an economic area are only required to complete Input Forms 1 and 2. Users who wish to perform a *diagnostic* of an area's strengths and weaknesses must complete Input Forms 1, 2, and 3. Users wishing to perform *analysis* of the effects of *policy* changes and new investments must complete Input Forms 1, 2, 3, and 4. The locations of the required input forms and relevant output tables are presented in Table 1. (Instructions on how to interpret the output tables are presented in Section III.)

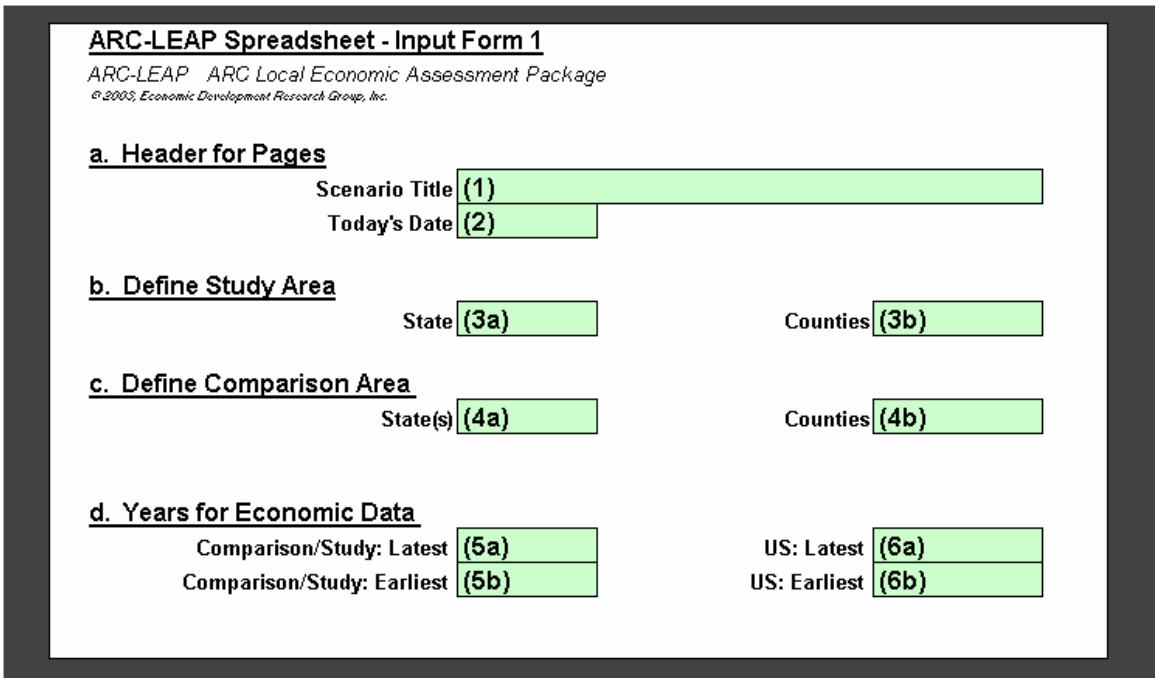
Table 1. Basic Structure of the ARC-LEAP Model

Function	Required Input Forms	Output Tables
Area Assessment	Input-1	ASSESS (columns A-E)
	Input-2	SUMMARY (columns C, E)
Area Diagnostics	Input-1	Table A1
	Input-2	Table B1
	Input-3	SUMMARY (columns D, F)
Policy Analysis	Input-1	POLICY OUT
	Input-2	
	Input-3	
	Input-4	

INPUT FORM 1

Input Form 1 must be completed in order to perform an area assessment, area diagnostics, or policy analysis. The form, which is shown in Figure 1, requires the user to input the following information: 1) scenario title; 2) date the assessment is being performed; 3) geographic definition of study area; 4) geographic definition of comparison area; 5) latest year for the economic data; and 6) earliest year for the economic data. These inputs are referred to as Inputs (1), (2), (3a), (3b), (4a), (4b), (5a), (5b), (6a), and (6b); their placement on Input Form 1 is illustrated in Figure 1. (Throughout the manual, the user can refer to the relevant Figures to match the input (or "variable") name, number, and placement in the relevant input form.

Figure 1. Input Form 1



Scenario Title (Input 1): The user has the option of naming each area assessment/policy analysis performed. This option is particularly useful when the user wants to compare the Study Area to multiple Comparison Areas or wants to run multiple policy simulations. The scenario title provided by the user Will be printed on each of the other input forms, as well as each output table. This will allow the user to save and/or print multiple sets of results, each identified by its Scenario Title.

Date (Input 2): This is automatically filled in by the model. (The user can fill in a date, but the model's ability to automatically enter the date will be lost. If this happens, the user can enter the text "=NOW()", which instructs the model to automatically fill in the current date.)

Defining Study and Comparison Areas (Inputs 3a, 3b, 4a, and 4b): The user can input both the state (Input 3a) and county or counties (Input 3b) that define the Study Area; and the state (Input 4a) and counties (Input 4b) that define the Comparator Area. Input 3b can consist of a single county, a list of multiple counties, or a designation, e.g., "Boston Metro Area" that describes the counties included in the Study or Comparison area. Because the information from Inputs 3a, 3b, 4a, and 4b will be reproduced in other tables in the model, the user should use as few characters as possible to describe the state and counties of the study area.

TIP 1 → Choosing a Comparison Area

The choice of comparison area will greatly affect the results of assessment, diagnostic, and policy analysis portions of the model. As such, the user should choose the comparison area carefully to ensure that the results are valid. An area will be a good comparison area if at least one of the following conditions is met: 1) the study and comparison areas share many of the same basic characteristics; or 2) recent transportation improvements have "linked" the areas by reducing travel time between the two areas. In case of shared characteristics, a user should choose a comparison area with: 1) similar basic characteristics, especially the mix of agriculture, services, and manufacturing, e.g., farming communities should not be compared to service-intensive suburban or urban areas; 2) roughly the same population levels and population density, i.e., the user

should compare rural areas with other rural areas and urban areas with other urban areas;[1] and 3) no major differences in structural features, such as availability of natural resources (e.g., forests, oceans, metal and ore deposits). Choosing the right comparison area is important because the existence of a *potential for business attraction* in the Study Area is determined by identifying industries that are under-represented in the Study Area relative to the Comparison Area. An industry should be considered "under-represented" only if it is feasible that the industry could locate in that area: thus, the choice of Comparison Area should eliminate differences based on features that are unlikely or impossible to change even in the long-term, such as presence of a university or proximity to forest and fishing resources. A second condition under which an area will be a good Comparison Area is if it has been recently "linked" to the Study Area because of improvements in transportation infrastructure, usually a highway project. New and improved highways can expand job opportunities (for workers) and customer markets (for businesses) by reducing travel times to/from the Study Area. This is referred to as an "accessibility improvement". Improved access to a Comparison Area can allow the Study Area to gain employment in the industries now over-represented in the Comparison Area (a kind of "spillover" effect) or achieve growth rates being achieved by those same industries elsewhere because of better and more competitive infrastructure.

Years for Economic Data (Inputs 5 and 6): Input 5 asks the user for the earliest and latest dates for the Study and Comparison Area employment data to be entered in Input Form 2. The default values for the earliest and latest years of data are 1990 and 2000. (The user should consult *TIP 2 → Choosing the Analysis Period* below for guidance on choosing the most appropriate analysis period.) The ARC-LEAP model also utilizes US employment data in its business attraction estimates. Input 6 asks the user to enter the earliest and latest dates for the US data to be used. The default US data included in the model cover the period 1990-2000. However, if a time period other than 1990-2000 is used for Study and Comparison Areas, the US data must also be changed so that the three sets of employment data (Study Area Comparison Area, and US) cover the same period.

TIP 2 → Choosing the Analysis Period: Except under special circumstances, the analysis period should cover the 1990-2000 period. (2000 is the last year for which SIC-based employment data are available.) This period is long enough to ensure that the results are not skewed by short-term changes in the economy and short enough to ensure that the data accurately reflect current economic conditions and trends. However, in some cases, the user might prefer a shorter time period, e.g., 1995-2000. Circumstances that might require a different analysis period than 1990-2000 include: 1) an area lost or added a large employer after 1990, e.g., 1994. In this case, the analysis period should begin after the opening or closing of the large employer, i.e., 1995-2000; 2) Economic conditions in the local area were much different in the second half of the 1990s than the first half in ways not mirrored in national trends. For example, an area might have experienced a change in local infrastructure—e.g., the closing of a port, the opening of an airport, the expansion of a university—that drastically changed the number and types of businesses that operate in the area. In these cases, the analysis period should be shortened to capture only the period after the changes took place. The user should note, however, that in almost all cases, the 1990-2000 period is appropriate and should be changed only there was a dramatic change in infrastructure after 1990 and before 2000; a very large local plant or firm that existed in 1990 closed; or a large plant or firm arrived after 1990. The user can also do multiple runs with different time periods (i.e., 1990-2000, as well as a shorter period that aligns with changes in local infrastructure) to assess whether changing the time period greatly affects results.

[1] cite the USDA rurality measures

INPUT FORM 2

Input Form 2 must be completed in order to perform an area assessment, area diagnostics, or policy analysis. The form, which is shown in Figure 2, requires the user to input employment, by SIC, for the Study and Comparison Areas. In addition, the user can change the default US employment information, which is based on the years 1990 and 2000.

Figure 2. Input Form 2

ARC Handbook Spreadsheet - Input Form 2 | (1),(2)

ARC-LEAP ARC Local Economic Assessment Package

Current Employment in Thousands

		Study Area		Comparison Area		United States		US Growth
		(5b)	(5a)	(5b)	(5a)	(6b)	(6a)	Forecast
SIC	LABEL	(3a),(3b)		(4a),(4b)		United States		
7	Agricultural services	(7a1)	(7a2)	(8a1)	(8a2)	(9a1)	(9a2)	(10a)
8	Forestry	(7b1)	(7b2)	(8b1)	(8b2)	(9b1)	(9b2)	(10b)
9	Fishing	(7c1)	(7c2)	(8c1)	(8c2)	(9c1)	(9c2)	(10c)
10	Metal mining	(7d1)	(7d2)	(8d1)	(8d2)	(9d1)	(9d2)	(10d)
12	Coal mining	(7e1)	(7e2)	(8e1)	(8e2)	(9e1)	(9e2)	(10e)
13	Oil and gas extraction	(7f1)	(7f2)	(8f1)	(8f2)	(9f1)	(9f2)	(10f)
14	Nonmetallic minerals, exc. fuels	(7g1)	(7g2)	(8g1)	(8g2)	(9g1)	(9g2)	(10g)
15	General contractors	(7h1)	(7h2)	(8h1)	(8h2)	(9h1)	(9h2)	(10h)
16	Heavy construction	(7i1)	(7i2)	(8i1)	(8i2)	(9i1)	(9i2)	(10i)
17	Special trade contractors	(7j1)	(7j2)	(8j1)	(8j2)	(9j1)	(9j2)	(10j)
20	Food and kindred products	(7k1)	(7k2)	(8k1)	(8k2)	(9k1)	(9k2)	(10k)
21	Tobacco products	(7l1)	(7l2)	(8l1)	(8l2)	(9l1)	(9l2)	(10l)
22	Textile mill products	(7m1)	(7m2)	(8m1)	(8m2)	(9m1)	(9m2)	(10m)

Employment Data for the Study Area (Inputs 7a1, 7a2, 7b1, 7b2, etc.): Employment data for each SIC must be entered for the Study Area for two years. (The years the data pertain to were identified in Input Form 1.) The user should choose the analysis period, i.e., the period defined by the earliest and latest years of the data based on the guidance in *Tip 2, Choosing the Analysis Period*.

There are a limited number of national sources that report employment data by SIC. One source is the US Department of Census' County Business Patterns, which can be found on-line at a number of sites, including one maintained by the Department of Census[2] and one by the University of Virginia.[3] Both sites include SIC employment data for each county and state in the US, as well as national totals. Data on the Department of Census site goes back to 1988; data on the University of Virginia site go back to 1977. On both sites, the last year for which SIC-based employment data is available is 1997. (After 1997, County Business Pattern data are reported by NAICS code.) Unfortunately, some of the individual data components, i.e., employment in a specific sector and county are suppressed in order to maintain the confidentiality of firms. In cases where data are suppressed, CBP reports a letter that specifies the range of employment. If the user is using CBP data and encounters suppressed data, the user should replace the letter with the midpoint of the range, as follows: A = 10; B = 60; C = 175; E = 375; F = 750; G = 1,750; H = 3,750; I= 7,500; J = 17,500; K = 37,500; L = 75,000; M = 100,000.

[2] http://www.census.gov/epcd/cbp/view/cbpview.html
[3] http://fisher.lib.virginia.edu/collections/stats/cbp/county.html

The Minnesota IMPLAN Group, Inc (MIG, Inc) collects employment data for 528 sectors, most of which correspond directly to an SIC code, for each county and state in the US. These data are available for years as late as 2000. The Appalachian Regional Commission (ARC) has licensed the use of employment data for each county in the ARC region for use with ARC-LEAP. ARC also has available a spreadsheet that will automatically convert IMPLAN data into SIC data. For these reasons, IMPLAN is the recommended source of employment data.
Some individual state and local agencies also compile employment data by county and SIC. State and local data should only be used if the available data sets include data for both Study and Comparison Areas. Under no circumstances should different sources be used for employment data for the Study and Comparison Areas. Mixing of data sources creates unreliable results, as the comparisons between areas will be skewed by the techniques used to gather and report data in each of the sources.
Employment Data for the Comparison Area (Inputs 8a1, 8a2, 8b1, 8b2, etc): The guidelines for "Input (7)—Employment data for the Study Area" also pertain to data for Input 8.

Employment data for the US (Inputs 9a1, 9a2, 9b1, 9b2, etc): The guidelines for "Input (7)—Employment data for the Study Area" also pertain to data for Input 8. It is important that, when possible, the US data be taken from the same source (e.g., IMPLAN, County Business Patterns) as used for the Study and Comparison Area data.

US Growth Forecast (Inputs 10a, 10b, 10c, 10d, etc.): National growth forecasts for each SIC are automatically calculated by extrapolating the data entered for the US in Input 9. The user, however, may enter other employment forecasts for particular sectors or for all sectors. Employment forecasts should be entered in annual percent change and should accord to the same time period as the US data. Examples of national employment forecasts include 10-year employment forecasts developed by the US Bureau of Labor Statistics.[4] The growth forecasts must be *employment* forecasts rather than output or value added forecasts, which are not always good predictors of likely future employment trends in an industry.

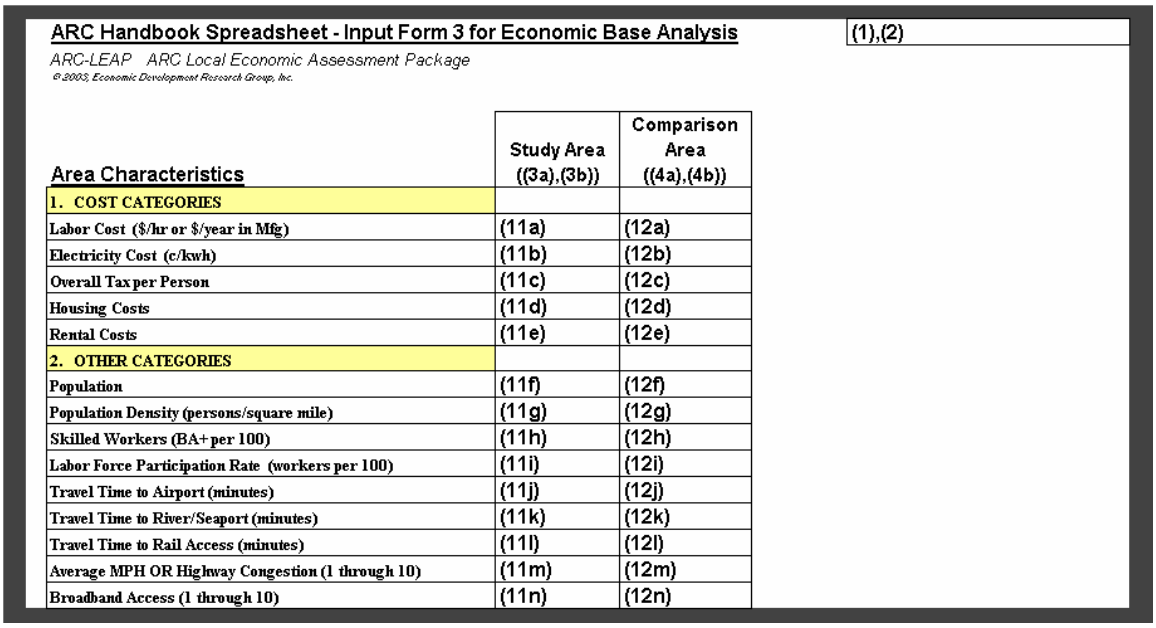
INPUT FORM 3

Input Form 3 must be completed in order to perform area diagnostics or policy analysis. The form, which is shown in Figure 3, requires the user to input information on a variety of factors in the Study and Comparison Areas, including labor costs, electricity cost, taxes, housing costs, population, skilled workers, proximity to different transportation modes, highway congestion, and Broadband access. (In some cases, users will not be able to find all the required information. In these cases, users should consult *TIP 3 → Dealing with Missing Information*.)

Labor Cost Data (Inputs 11a and 12a): Labor costs per hour (Inputs 11a and 12a) should be calculated based on average hourly or average annual wages of manufacturing workers in the Study and Comparison Areas. Although the wage data can come from a different source than the employment data entered in Input Form 2, the wage data entered for Inputs 11a and 12a must come from the same source, must be entered in consistent units, i.e., in wage costs per hour or wage costs per year, and must be for the same group of workers, i.e., all manufacturing workers or if that information is not available because of data suppression issues, all workers.

[4] These forecasts can be found at http://stats.bls.gov/news.release/ooh.t03.htm.

Figure 3. Input Form 3



ARC Handbook Spreadsheet - Input Form 3 for Economic Base Analysis (1),(2)

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Area Characteristics	Study Area ((3a),(3b))	Comparison Area ((4a),(4b))
1. COST CATEGORIES		
Labor Cost ($/hr or $/year in Mfg)	(11a)	(12a)
Electricity Cost (c/kwh)	(11b)	(12b)
Overall Tax per Person	(11c)	(12c)
Housing Costs	(11d)	(12d)
Rental Costs	(11e)	(12e)
2. OTHER CATEGORIES		
Population	(11f)	(12f)
Population Density (persons/square mile)	(11g)	(12g)
Skilled Workers (BA+ per 100)	(11h)	(12h)
Labor Force Participation Rate (workers per 100)	(11i)	(12i)
Travel Time to Airport (minutes)	(11j)	(12j)
Travel Time to River/Seaport (minutes)	(11k)	(12k)
Travel Time to Rail Access (minutes)	(11l)	(12l)
Average MPH OR Highway Congestion (1 through 10)	(11m)	(12m)
Broadband Access (1 through 10)	(11n)	(12n)

There are two primary national sources of wage data: the US Bureau of Labor Statistics (BLS) and US Department of Census' County Business Patterns (CBP). The BLS data provide information on average annual wages and average hourly wages by sector. The CBP data provide information on number of workers and total annual payroll; from these data, an average annual wage can be calculated. (Instructions are provided below.) Because they control for differences in hours worked in different areas, average hourly wages from BLS provide a more accurate measure of labor costs than the annual wages reported in CBP. However, BLS data are available only for states and metropolitan areas, while CBP data are available for states and counties. Users whose Study Area consists of a lone county or a set of counties outside the metropolitan areas covered by BLS should attempt to use the CBP data. For some areas, the CBP manufacturing data may be suppressed for confidentiality reasons. In these cases, the user should: 1) determine whether BLS metropolitan data are available and representative and if so, use BLS data; 2) choose a county close to the Study Area whose wages are likely to be similar to those in the Study Area and use CBP data; or 3) estimate county employment based on the letter used to indicate the range of employment in industrial sectors were data is suppressed. (In such cases, the user should replace the letter with the midpoint of the range, as follows: A = 10; B = 60; C = 175; E = 375; F = 750; G = 1,750; H = 3,750; I= 7,500; J = 17,500; K = 37,500; L = 75,000; M = 100,000.)

To retrieve BLS average hourly labor cost data from the Internet:

1. Go to http://www.bls.gov/data/
2. Choose "Discontinued BLS Databases", the fourth option from the top
3. Choose "Create Customized Tables (one screen)"
4. in the "Employment, Hours, and Earnings from the Current Employment Statistics survey (State and Metro Area, SIC basis)" row
5. For Input 1, select the relevant state; for Input 2, select "A 1-Digit Industry (Industry Division)"; for Input 3, select the relevant metropolitan area *or* "statewide" if the (Study or Comparison) Area covers an entire state; " State; for Input 4, select "Manufacturing"; for

Input 5, select "Average Hourly Earnings, in Dollars"; for Input 6, select "Not Seasonally Adjusted"; for Input 7, select "Get Data"

6. From the table shown, choose the annual average hourly wage from the last full year reported

To retrieve CBP data on annual wages from the US Department of Commerce Website:

1. Go to http://www.census.gov/epcd/cbp/view/cbpview.html
2. Choose "View County, State, U.S., ZIP, or MSA Database on a NAICS Basis (1998 - 2001)"
3. Select the relevant state and click on "Go" button
4. From the pull down menu, choose the relevant county/counties or the entire state and click on "Submit" button
5. From the then table shown, record the "Number of Employees for week including March 12" and "Annual Payroll" for "Manufacturing" (Industry Code 31). The data should refer to the last year available; if not, select most recent year from pull down menu in the top middle part of the page
6. Divide annual payroll by number of employees to get average annual wage

To retrieve CBP data on annual wages from the University of Virginia Website:

1. Go to http://fisher.lib.virginia.edu/collections/stats/cbp/
2. Choose "COUNTY LEVEL DATA" under 1998-2001 data (NAICS code)
3. Choose the relevant state; click on "Submit Query" button
4. In the middle of the page, the user must select a number of variables: choose relevant county/counties under the sate name; for "Industry Selection" choose "Manufacturing Division", leave second "Industry Selection" option blank; for "Variable Selection", choose "Number of Employees (Week including March 12)" and "Payroll()
5. Divide annual payroll by number of employees to get average annual wage

Energy/Electricity Cost Data (Inputs 11b and 12b): There are two types of energy cost data available nationally. The first are state data on total energy costs for industrial and commercial users from the US Department of Energy's Energy Information Agency (EIA). The second are data on electricity costs in local (i.e., sub-state) areas available from the Energy User News (EUN). The state data can be used if the Comparison and Study Areas are in different states and the user believes the state data are representative of costs on the Study and Comparison Areas. The local data, which are available only for electricity costs, should be used if the Study and Comparison Areas are in the same state or if the available state data do not reflect costs in the Study and/or Comparison Areas. Some state and local agencies also collect energy cost data—users can use local data as long as the data cover both the Study and Comparison Areas. In other words, as with information entered in Input Form 3, it is important that the same data source be used for the Study and Comparison Areas.

To retrieve energy cost data from the EIA:

1. Go to http://www.eia.doe.gov/emeu/states/_states.html
2. Click on the relevant state, then choose "Industrial" under ""Prices and Expenditures" in/of the "Total Energy" menu
3. Record the most recent year's cost in Nominal Dollars per Million Btu, the last row in the last column of Table 4 (This is the average cost of energy for industrial users.)
4. Return to relevant state's menu and choose "Commercial" under "Prices and Expenditures" in/of the "Total Energy" menu (This is the average cost of energy for commercial users.) Take the average of the two costs. (This represents the average energy cost for the state.)

To retrieve local electricity cost data from the EUN:

1. Go to www.energyusernews.com
2. Select Statistics, Trends and Energy Data
3. Open the reports from the last two months reported—one will have industrial electricity prices for each utility; the other will have commercial electricity prices for each utility.
4. Take the average of industrial and commercial electricity costs for the major utility in the county. (This represents the average electricity cost for the county.)

Note: Users can identify the major utilities that serve a particular county by accessing available state data as well as EIA's Inventory of Electric Utility Power Plants in the United States, which lists all the utilities in the U.S. and the county location of their home office, and EIA's "Form EIA-412 Database", which lists all the transmission lines and their starting and ending location for each utility in the US. These reports are available at www.eia.doe.gov/cneaf/electricity/page/pubs.html and http://www.eia.doe.gov/cneaf/electricity/page/eia412.html, respectively.

Overall Tax per Person (Inputs 11c and 12c): Users can calculate the average local, county and state tax burden per capita. To do that, the user must obtain tax revenues for the applicable city/town, county and state and then divide it by the population of the applicable area. Local and state economic development agencies, as well as local and county governments sources for this type of information. Instructions for obtaining information on county population can be found below under "Population Data (Inputs 11g, 12g, 11h, and 12h)".

Housing Cost Data (Inputs 11d and 12d):

1. Go to http://factfinder.census.gov
2. Click on "Housing"
3. Choose the relevant state and fill in the name of the relevant county
4. Choose "Value and Mortgage Status" under "Financial Characteristics"
5. Record the Median (dollars) value under "Specified Owner-Occupied Housing Units" (This is the median housing value of the county.)
6. If there is more than one county in the Comparison or Study Area, repeat for each county and record the total number of Owner-Occupied Housing Units. Take a weighted average of the total number of Owner-Occupied Housing Units and the median value in each county.

Rental Cost Data (Inputs 11fe and 12e):

1. Go to http://factfinder.census.gov
2. Click on "Housing"
3. Choose the relevant state and fill in the name of the relevant county
4. Choose "Rental Costs" under "Financial Characteristics". Scroll to the end of the table to get the median monthly rent.
5. Record the Median (dollars) Contract Rent under "Specified Renter-Occupied Housing units". (This is the median rental cost for the county.)
6. If there is more than one county in the Comparison or Study Area, repeat for each county and record the total number of Renter-Occupied Housing Units. Take a weighted average of the total number of Renter-Occupied Housing Units and the median value in each county.

Population Data (Inputs 11f, 12f, 11g, and 12g):

1. Go to http://factfinder.census.gov
2. Click on "Data Sets"

3. Choose "Census 2000 Summary File 1 (SF 1) 100-Percent Data", then click on "Geographic Comparison Tables."
4. Choose "Nation" (the default) for "Geographic Type" and "United States—County by State, and for Puerto Rico" under "Select a table format". Click "Next".
5. Select Table "GCT-PH1. Population, Housing Units, Area, and Density" , then click "Show Results".
6. Record "Population" and "Population Per Sq Mile of Land Area" for the relevant counties. (These are the population and population density figures for each county.)
7. If there is more than one county in the Comparison/Study Area, add the population figures for each to obtain an area-wide population number; and take a weighted average of population density based on the population in each county for an area-wide population density number.

Skilled Workers Data (Inputs 11h and 12h):

1. Go to http://factfinder.census.gov
2. Click on "People"
3. Choose relevant state and county
4. Choose "Educational Attainment" under "Education"
5. Under "Percent of Population 25 years and Over", record "Percent Bachelor's Degree or Higher" under "Percent of Population 25 years and Over". Use the number in the in the first column, which refers to both male and female populations. (This is a proxy for the percent of skilled workers in a county.) Note that the percent should not be added in decimal format but as the number of over-25 persons per 100 person with at least a bachelor's degree. Thus, if 24.8% of the area's over-16 population is in the labor force, the user should enter 24.8.
6. If there is more than one county in the Comparison/Study Area, use the population for each county to calculate a weighted average of skilled workers in the area.

Labor Market Participation Data (Inputs 11h and 12h):

1. Go to http://factfinder.census.gov
2. Click on "People"
3. Choose relevant state and county
4. Choose "Employment Status by Sex" under "Income and Employment"
5. Record percent "In Labor Force, Both Sexes" under "Population 16 years and over". Note that the percent should not be added in decimal format but as the number of participants per 100 person in the population. Thus, if 63.5% of the area's over-16 population is in the labor force, the user should enter 63.5.

Travel Time Data (Inputs 11j, 12j, 11k, 12k, 11l, and 12l):

The user must calculate the average time to key transportation modes: commercial airports, marine (river or sea) ports, and freight rail (truck/rail transfer) facilities. To *identify the closest facilities*, you can consult the list of intermodal connectors that is maintained by the US Department of Transportation. Go to http://www.fhwa.dot.gov/hep10/nhs/intermodalconnectors .

To *estimate travel times* to the closest airport, marine port and rail intermodal facilities, assume travel to those facilities from the middle of your study area. You can have these travel times calculated by regional or state transportation planning agencies through use of their own transportation databases or highway network models. Alternatively, you can obtain estimates of the travel times through the free online resource MapQuest or by purchasing mapping software programs provided by Rand McNally or Microsoft ("Streets and Trips"). To use MapQuest, go to http://www.mapquest.com and select "driving directions." Enter the trip origin as a community name in the middle of your study area, and

enter the trip destination as the name of the community (or actual address) in which the transportation facility is located. The mileage and travel time appear at the bottom of the driving directions.)

Relative Road Speed: MPH or Congestion Rating (Inputs 11m and 12m):
The user must estimate the average travel speed within the county or ideally, within a 60-minute radius of the center of the county. Engineers and planners at State transportation departments often collect information on speeds for individual highways and might also be able to provide an estimate of average highway travel speeds within the county. If such information is not available, the user should provide an estimate that rates relative travel speeds in the Comparison and Study Areas. The rating should be between 1 and 10, with "1" signifying very slow speeds reflecting high levels of congestion (e.g., in congested urban areas such as New York or Los Angeles) and a "10" signifying relatively higher and speeds with essentially no congestion.

For these inputs, the critical consideration is not the absolute levels of congestion or the exact average travel speed, but the percentage difference in travel times between the Study and Comparison Areas. Thus, if the user is unsure of exact speeds or congestion levels but believes that highway travel is slower in the Study Area than in the Comparison Area, the inputs should reflect that. For example, if the user believes that travel speeds in the Study Area are 10% slower than in the Comparison Area, then he or she might enter speeds such as a "36" (mph) for the Study Area and a "40" (mph) for the Comparison Area. Alternatively, the model would recognize the exact same 10% differential if figures are reported using a 1-10 rating scale, with "4.5" for the Study Area and a "5.0" for the Comparison Area.

Broadband Access (Inputs 11n and 12n):
Whether or not an area has access to high-speed and (relatively) low-cost Broadband Internet services will affect the number and types of jobs that an area will attract. Inputs 11n and 12n ask the user to assess the quality and cost of Broadband available in the Study and Comparison Areas. Unfortunately, because of rapid and on-going changes in the speed and cost of Broadband services nationally, there is no set rule for assessing the quality and cost in any one area. Instead, the user should get an estimate of the speed and cost of Broadband services in major metropolitan markets (e.g., New York, Los Angeles, Atlanta, Boston San Francisco, etc.), as well as in the Study and Comparison Areas. The user should using the speed and cost profiles for one of the major metropolitan areas as the baseline and assign it a value of "10". (Note that these calculations should done outside the model and are simply a method for assessing Broadband in the Study and Comparison Areas: the model does not require an assessment of Broadband for any other markets or for the US as a whole.) The user should then deduct three points for each technology generation that the Study and Comparison Areas lag; and one point for each 10% cost penalty paid in the Study and Comparison Areas.

Thus, in the example shown in Table 2, New York would be given a Broadband access rating of "10", the Study Area a rating of "5" and the Comparison Area a rating of "8". The Study Area rating of "5" is derived as follows: starting with a baseline rating of "10", the Study Area loses 3 points because it is one generation behind New York, i.e., T1 lines are available in New York but not the Study Area; and loses an additional 2 points because the cost of the latest technology shared with New York, i.e., Cable and DSL, is 20% higher. The Comparison Area, though, gets a rating of "8": starting with a baseline rating of "10", the Study Area loses no points in the technology generation criterion but 2 points in the cost criterion, because the cost of the latest technology shared with New York, i.e., T1 dedicated lines, is 20% higher. The user should note that the relevant cost and technology comparison is for computer networks (5 or more computers), which better capture the cost to commercial and industrial users than residential prices.

Table 2. Assessing Broadband Access (Prices for Computer Network, i.e., 5 or more computers)

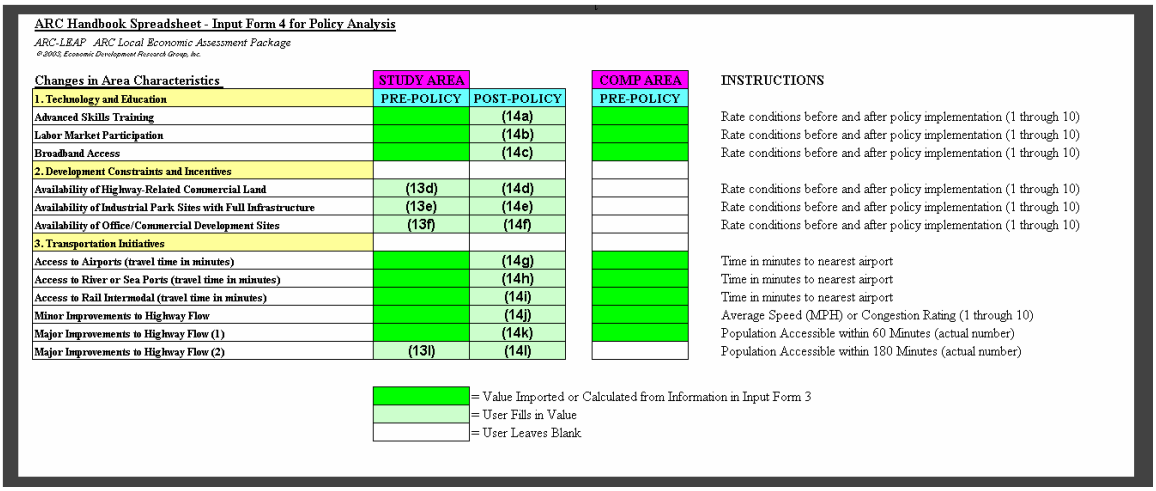
	Study Area		**Comparison Area**		**New York**	
Type Service	Speed	Monthly Cost	Speed	Monthly Cost	Speed	Monthly Cost
Dialup	20K - 53K	$33	20K - 53K	$36	20K - 53K	$30
Wireless	128K	$77	128K	$77	128K	$70
Satellite	900K	$120	900K	$120	900K	$120
DSL	256K download	$84	256K download	$85	256K download	$70
Cable	256K up	$72	256K up	$60	256K up	$60
56K dedicated line (frame relay)	56K constant	$198	56K constant	$198	56K constant	$180
T1 dedicated line (frame relay)	1.5 M burst	Not avail.	1.5 M burst	$720	1.5 M burst	$600

TIP 3 → Dealing with Missing Information Users might have problems filling out all the required fields for Input Form 3. In particular, because of incomplete coverage of local areas in the US and/or data suppression problems, there is the potential that local information will not be available on energy/electricity costs, labor costs, tax per person, travel times to transportation modes, highway travel conditions, and Broadband Access. (For the other variables, data are available for each county in the US and county values are never suppressed.) In these case, the user has two options. If the user has no information on or idea about the relative values of a variable in the Study and Comparison Area, he or she should simply enter "1"s for both the Study and Comparison Areas. If, however, the user does not have precise data but does have a sense of the relative difference between the Study and Comparison Area, he or she can enter values that reflect the relative difference. This can be done by setting the value for the Study Area to "1" and setting a value for the Comparison Area that reflects the relative difference. For example, if labor cost data are not available, but the user knows that labor costs in the Comparison Area are about 20% higher than in the Study Area, the user should enter "1" for the Study Area and "1.2" for the Comparison Area. If, on the other hand, the user knows that labor costs in the Comparison Area are about 20% *lower* than in the Study Area, the user should enter "1" for the Study Area and "0.83" for the Comparison Area. (The value of 0.83 is calculated by dividing 1 by 1.2.)

INPUT FORM 4

Input Form 4 must be completed in order to perform policy analyses. The form, which is shown in Figure 4, requires the user to assess the effects of likely future changes in the Study Area in a number of categories, including basic skills and labor market participation of local workers; Broadband access; the availability of industrial and commercial development land and sites; access to transportation modes (air, rail, port); and changes in highway conditions. In most cases, changes to these variables will be the result of policy initiatives. However, for some variables—especially Broadband access and availability of commercial and industrial development sites—private sector initiatives can be the driving force behind expected future changes.

Figure 4. Input Form 4



ARC Handbook Spreadsheet - Input Form 4 for Policy Analysis

ARC-LEAP ARC Local Economic Assessment Package

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Changes in Area Characteristics	STUDY AREA		COMP AREA	INSTRUCTIONS
1. Technology and Education	PRE-POLICY	POST-POLICY	PRE-POLICY	
Advanced Skills Training		(14a)		Rate conditions before and after policy implementation (1 through 10)
Labor Market Participation		(14b)		Rate conditions before and after policy implementation (1 through 10)
Broadband Access		(14c)		Rate conditions before and after policy implementation (1 through 10)
2. Development Constraints and Incentives				
Availability of Highway-Related Commercial Land	(13d)	(14d)		Rate conditions before and after policy implementation (1 through 10)
Availability of Industrial Park Sites with Full Infrastructure	(13e)	(14e)		Rate conditions before and after policy implementation (1 through 10)
Availability of Office/Commercial Development Sites	(13f)	(14f)		Rate conditions before and after policy implementation (1 through 10)
3. Transportation Initiatives				
Access to Airports (travel time in minutes)		(14g)		Time in minutes to nearest airport
Access to River or Sea Ports (travel time in minutes)		(14h)		Time in minutes to nearest airport
Access to Rail Intermodal (travel time in minutes)		(14i)		Time in minutes to nearest airport
Minor Improvements to Highway Flow		(14j)		Average Speed (MPH) or Congestion Rating (1 through 10)
Major Improvements to Highway Flow (1)		(14k)		Population Accessible within 60 Minutes (actual number)
Major Improvements to Highway Flow (2)	(13l)	(14l)		Population Accessible within 180 Minutes (actual number)

= Value Imported or Calculated from Information in Input Form 3

= User Fills in Value

= User Leaves Blank

In the policy assessment, two of the sets of variables—"Technology and Education" and "Development Constraints and Initiatives"—use 1-10 ranking systems to compare pre- and post-policy conditions in the Study Area. For the third set of variables ("Transportation Initiatives"), actual numbers are used. (There is one exception to this: inputs for the variable "Minor Improvements to Highway Flow" can be entered in either highway speed in average miles per hour (MPH) or using a (1-10) rating of highway congestion.) In order to help the user determine the correct rating for post-policy Technology and Education conditions, the model automatically assigns a rating to the Study and Comparison Areas based on information from Input Form 3. These variable inputs are shaded in the model to alert the user that the model will automatically calculate the values. For all variables that use a ranking system, higher numbers denote conditions more conducive to business attraction, i.e., more skilled workers, higher participation rates, better access to Broadband, and higher availability of land, industrial parks, and industrial and commercial development sites.

Labor Force Skills and Labor Market Participation (Inputs 14a, 14b, and 14c):
These variables capture improvements in labor market skills in the Study Area. "Advanced Skills Training" (Input 14a) refers to the availability of programs to offer higher-level industrial and service sector skills. Examples of such programs include targeted industrial training, certification programs, and expansion of educational opportunities. Such changes might be triggered by expansion of community college, vocational school, or university programs or even the opening of new educational facilities in the local area. (These programs and schools can be outside of the Study Area boundaries but must be accessible to people who live and/or work in the Study Area.) "Labor Market Participation" (Input 14b) refers to the growth in the number of active participants in the labor market. Such an expansion could be the result of due improvements in child care availability or access to public transportation, which can increase the number of person able to work, or greater availability of basic skills training (e.g., literacy programs, GED programs, etc.), which can increase the number of quality of labor market participants in an area.

Broadband Access (Input 14c):
The user should follow the instructions given for this variable in the Input 3 Form instructions.

Availability of Highway-Related Commercial Land, Industrial Park Sites with Full Infrastructure, and Office/Commercial Development Sites (Inputs 13d, 14d, 13e, 14e, 13f, and 14f):

An area might have an abundance of industrial parks sitting empty, just waiting for a business to walk in and instantly find vacant buildings and plots that are already hooked up with ample sewer, water, electricity, broadband communications, rail spurs and access roads. However, it is quite common, particularly in areas that have historically been economically depressed, to find that there is a significant lack of readily available industrial parks, buildings or sites that are located near the new highway and are available with full infrastructure support. Sometimes there are constraints on the availability of desirable business location sites that cannot be overcome. This may occur if the most desirable sites along the highway or nearby and accessibility to it are all already taken, or if the most desirable locations cannot be built upon because of topography or designation as wetlands, parklands or Native American reservations.

Variables 13d, 14d, 13e, 14e, 13f, and 14f ask the user to assess whether the Study Area currently has particularly advantageous or particularly limited opportunities for highway-related commercial business, industrial plants or office development (Inputs 13d, 13e, and 13f) and to assess likely future opportunities (Inputs 14d, 14e, and 14f). The current and future values for most areas are likely to be in the range of 3 to 8. A value of 1 would indicate that there are *no* attractive sites available; a value of 10 would indicate virtually unlimited availability of parks, land, and/or sites.

Access to Airports, River/ or Sea Ports, and Rail Intermodal (Inputs 14g, 14h, and 14i):

Variables 11h, 12h, 11i, 12i, 11j, and 12j capture changes in access (travel time) to airports, river or sea ports, and rail intermodal facilities. Changes in travel times are usually the result of one of two factors: 1) the opening or closing of transportation facilities including highways, airports, rail or marine transport facilities; and/or 2) changes in access time because of improvements or deterioration in highways and roads that directly access transportation facilities. The measurement of these variables is straightforward: each of the inputs should reflect the time in minutes from the center of the Study Area to the closest facility. (Methods for measuring travel times are presented in detail in the description of "Travel Time Data (Inputs 11j, 12j, 11k, 12k, 11l, and 12l)" in Input Form 3 Instructions).

Minor Improvements to Highway Flow: Region-wide (Input 14j):
Variable 14j captures minor but broad-based changes in highway flow throughout the Study Area. Such changes can be the result of region-wide programs for addressing congestion through transportation systems management techniques, traffic light management systems, introduction of automated toll systems, or other measures that permanently improve the flow of traffic within an area. These changes should be estimated as improvements in either average highway speed (MPH) or in the 10-point rating scale, as previously defined under Input Form 3. The model evaluates this change in terms of the percentage shift in values between the pre-policy and the post-policy value.

Note that this variable, "Minor Improvements to Highway Flow,"is not meant to capture major improvements in highway travel in the Study Area—such as those resulting from substantial highway investments--or improvements in highway flows between the Study Area and other economic areas. Those changes should be modeled using the "Major Improvements in Highway Flow" variables discussed below.

Major Improvements to Highway Flow (Input 14k, 13l, and 14l):
One of the major economic benefits associated with significant new or expanded highway investments is their effect on the level and predictability of economic activities. That is, better highway systems make it possible for businesses to expand their customer and labor force bases, allow workers to search for jobs over greater distances, and reduce the uncertainties associated with high (and unpredictable) levels of congestion. In some cases, highway investments are substantial enough to effectively increase the market areas for workers and firms. Such changes should be modeled using two variables: "Major Improvements to Highway Flow (1)", which captures changes in the population accessible within one hour of the Study Area, and "Major Improvements to Highway Flow (2)", which captures changes in the population or employment accessible within three hours of the Study Area.

One-Hour Access. LEAP evaluates changes in the population within a one-hour travel time as reflective of the change in area labor market base. It automatically estimates the current (pre-policy) population market within 60 minutes travel time of the Study Area center, based on previously-reported values of regional population density. This value can be over-written with a more accurate estimate, if desired. In any case, the user must estimate a value of the post-policy population accessible within 60 minutes.

The most precise measures of population accessible within a one-hour travel time (with and without roadway changes) would be obtained by using a Geographic Information System, combined with road network traffic model. Some county, regional and state planning agencies have this type of information and analysis system. However, such precision is not required. Since the model merely compares pre-policy and post-policy values to establish a percentage change, the specific values are of these variables are not critical. What is really necessary is to establish an appropriate differential that reflects the expected percentage growth in size of the population base for regional commuters and deliveries.

Three-Hour Access. LEAP evaluates changes in the population or employment within a three-hour travel time as reflective of the change in base for same-day delivery truck trips. This can encompass a very broad area that can span many communities and counties, and also cross state lines. That breadth is a barrier preventing use of most single county, single region or single state Geographic Information Systems. The recommended approach is therefore to utilize a four step process, described below. This process provides a method for calculating the change in population or employment base that is accessible within three hours, both before and after the proposed project is implemented (referred to as "pre-policy" and "post-policy" scenarios).

The simplest approach is to focus on changes in the total population of metropolitan areas accessible within three hours (before or after the proposed policy), and that is assumed in the description of the four steps shown here. However, a more refined analysis approach would be actually count total population or employment of all counties or all individual communities accessible within three hours (before or after the proposed policy change), and those options are noted in parentheses in these four steps.

1. Consult a map to identify metropolitan areas (or else all counties and communities) located within roughly 200 miles of the Study Area center. This can be done by applying map scale information with a map wheel (a manual device) or a planimeter (an electronic device) to trace distances along major highways, or else by just using a ruler (with a rough assumption that there tends to be roughly 120 roadway miles for every 100 straight air-line miles on a map).
2. Refine the list by using online mapping resources (such as www.mapquest.com) or trip/mapping software to calculate the actual highway travel times to those metropolitan areas

(or counties or communities) that appear to be within the outside fringe, e.g.., in the 130-200 mile range. (See further discussion on how to use trip/mapping online resources and software, provided earlier for Input Form 3.) This will subdivide the outside fringe group into those that currently do and do not fall within the three-hour access range.

3. For those metropolitan areas (or counties or communities) that are now within 3 hours travel time, look up their metropolitan area populations (or employment) using any of the sources listed in Table 3. Then sum those values to obtain the *pre-policy* value for metropolitan population (or total employment) within 3 hours travel time.
4. To calculate the *post-policy* value, first determine the direction(s) in which proposed new road improvements will lead to faster travel times, and then estimate the percentage increase in effective speeds for access in those directions. If, for example, there is a proposal for new or improved highway facilities that will increase speeds 30% for access to points north and south of the Study Area, then the new three hour access limit may extend to areas that are now 3.9 hours away (3 hours * 1.3). Finally, repeat steps #1, 2 and 3 with a 30% longer distance and travel time limit to identify additional metropolitan areas (or counties or communities) that would now be included. Add their populations (or employment) to get the post-policy value.

Table 3. Sources of Residential and Business Data for Areas

Data Series	***Spatial Detail***	***Update***	***Source of Data***
Sources of Population Data			
Population Estimates Program, Bureau of the Census (population)	States, counties, metro areas, places,	Every year	http://www.census.gov/population/www estimates/popest.html
Decennial Census (population, labor force)	Census tracts, towns, zip codes, counties, states, metro areas	Every 10 years	http://www.census.gov
Sources of Employment Data			
Local Area Unemployment Statistics	States, counties, large cities	Every month	Bureau of Labor Statistics (www.bls.gov) or State Labor Market Info. (LMI) agencies
Covered Employment and Wages (ES-202)	States, metro areas, labor market areas, counties, small cities and towns	Every quarter	www.bls.gov and State LMI agencies
County Business Patterns	Counties, metro areas, zip codes	Every year	www.census.gov/epcd/view/cbpview.html
IMPLAN data	Counties	Every year	ARC has purchased IMPLAN data for each county in the ARC region
Regional Economic Information System (employment, earnings)	States, metro areas, counties	Every year	http://fisher.lib.Virginia.edu/reis

III. INTERPETING ARC-LEAP OUTPUT TABLES

In this section, the ARC-LEAP output tables are discussed and sample outputs from a comparison of two areas are shown. As was summarized in Table 1, there are five output sheets in the LEAP model--"ASSESSMENT", "TABLE A1", "TABLE B1", "SUMMARY", and "POLICY OUT". The assessment ("ASSESS") and summary ("SUMMARY") tables provide the information necessary to *assess* the state of the local economy, including employment growth trends and opportunities for further growth in each sector. Tables A1, B1, and "Summary" provide *diagnostic* information for the local economy, including factors impeding business attraction in sectors with growth potential and an assessment of the extent to which shortcomings in different economic factors (e.g., skill levels, access to airports) affect the area's ability to attract certain industries. The policy output table ("POLICY OUT") provides an *analysis* of the effects of policies and investments on the business attraction potential of a local area. In the next sections, each of the output tables will be discussed in detail.

OUTPUT FORM "ASSESSMENT"

The "Assessment" output form, which is shown in Figure 6, provides six metrics to help the user *assess* the state of the local economy. The first two, found in the third and fourth columns of the table, provide information on the likely ten-year growth trends for each sector. The first of these, "10-Year Baseline Growth Range," provides high and low estimates of the next decade's growth. These estimates are based on Study Area and US growth trends in the analysis period. The second growth measure, "Average 10-Year Growth Estimate", is a simple average of the low and high growth estimates.

The next two metrics provide the user with information about the growth potential in each sector. The first of this metrics, "Additional Growth Potential", is a simple binary measure that identifies sectors with growth potential ("Yes") and those without growth potential ("No"). These determinations are based on the existing economic bases in the Study and Comparison Areas and growth trends in the Study Area and the US as a whole. The second metric, "Potential Add'l Growth (# of Jobs)" uses the same information to estimate the size of the maximum expected employment growth above baseline growth trends for each sector. These estimates are presented in number of jobs.

Figure 6. Output Form "ASSESSMENT"

SUMMARY OF PERFORMANCE FOR ALL LOCAL SECTORS

SIC	Sector	10-YEAR BASELINE GROWTH RANGE	AVERAGE 10-YEAR GROWTH ESTIMATE	ADDITIONAL GROWTH POTENTIAL	POTENTIAL ADD'L GROWTH (# OF JOBS)	INDUSTRIAL TREND RATING	POTENTIAL FOR NEW GROWTH	POTENTIAL FOR BUILDING ON RECENT GROWTH
7	Agricultural services	622 - 1,364	993	YES	91	1	STRONG	STRONG
8	Forestry	0 - 253	127	NO	0	5		STRONG
9	Fishing	NA	1	YES	0	7		STRONG
10	Metal mining	NA	0	NO	0	7		
12	Coal mining	0 - 0	0	NO	0	6		
13	Oil and gas extraction	0 - 0	0	NO	0	6		
14	Nonmetallic minerals	NA	0	NO	0	7		
15	General contractors	532 - 16,674	8,603	YES	2,612	1	STRONG	STRONG
16	Heavy construction	547 - 15,230	7,889	YES	35	1	STRONG	STRONG
17	Special trade contract	2,715 - 10,673	6,694	NO	0	1		STRONG
20	Food products	0 - 16	8	YES	507	2	STRONG	
21	Tobacco products	NA	0	NO	0	7		
22	Textile mill products	0 - 0	0	YES	90	7		
23	Apparel and other text	0 - 0	0	YES	1,277	6		
24	Lumber and wood	129 - 554	342	NO	0	1		STRONG

The last three metrics are aimed at local development personnel interested in crafting employment growth policies. The first of these metrics, "Industrial Trend Rating", is based on a comparison of the growth "trend" of industries in the Study Area with their national performance. This provides users with a means to identify the types of businesses that are particularly thriving or faltering in the local area (compared to their performance elsewhere). Specifically the model compares employment growth in the Study Area over the analysis period with employment growth in the entire US. Based on these comparisons, each sector is assigned a category from 1 to 7, where:

1 = Industry growing "faster" locally than nationally*
2 = Industry declining locally while growing nationally
3 = Industry growing locally while declining nationally
4 = Industry declining locally "slower" than nationally*
5 = Industry growing locally "slower" than nationally *
6 = Industry declining locally "faster" than nationally*
7 = Industry growing or declining locally at a rate "similar" to national trend*
(Or industry not present locally)

** Note: "Faster" denotes local growth or decline trend that is more than 20% greater than the national trend. "Slower" denotes local growth or decline trend that is more than 20% less than the national trend. "Similar rate" denotes trends that are less than 20% different.*

Economic development personnel might want to focus their attention on industries where the Study Area is lagging *and* the prospects for future employment are strong. Thus, the second of the economic development metrics, "Potential Candidates for Growth" identifies those sectors that meet two criteria: there is positive additional growth potential in the Study Area and national employment in the sector is forecast to grow over the next decade. Sectors that meet both these criteria are identified with the term "STRONG"; for those sectors that do not meet one or both of these criteria, the row is left blank.

Finally, economic development personnel can't forget to maintain reasonable support for those industries that are already doing well in the Study Area. The final metric is labeled as "Potential for Building on Existing Growth," and it reflects those sectors that are already growing locally and outperforming the national average performance. Unlike the prior metric, the performance of these sectors may not be held back by local deficiencies, but they still need to be supported to continue their strong performance into the future.

OUTPUT FORM "TABLE A1"

The "Table A1" output form, which is shown in Figure 7, provides six metrics to help the user *diagnose* the factors that are impeding growth in sectors with employment growth potential. Two types of disadvantages are identified: "critical" and "important" disadvantages. A factor is categorized as causing a "critical" disadvantage if that factor is very important to the competitiveness of a specific industry (e.g., labor costs in labor-intensive industries) and the Study Area's disadvantage is very large relative to the Comparison Area. A factor is categorized as causing a "important" disadvantage if: 1) that factor is very important to the competitiveness of a specific industry (e.g., labor costs in labor-intensive industries) and 2) the Study Area's disadvantage is significant but not huge relative to the Comparison Area; or if: 1) that factor is relatively important to the competitiveness of a specific industry (e.g., labor costs in labor-intensive industries) and 2) the Study Area's disadvantage is significant or even large relative to the Comparison Area. As shown in Figure 7, Study Area factors that are a critical disadvantage in an industry are marked with a "1", while factors causing a significant disadvantage are marked with a "2". For Study Area factors that are a strength or only a minor disadvantage—or for factors that do not strongly affect an industry's competitiveness--the relevant

row is left blank. The contribution of the following factors to each industry is diagnosed in Table A1: total production costs; labor costs; land/office costs; energy costs; taxes; worker base; skilled workers; Broadband Internet access; and availability, and/or proximity of water, air, rail, and highway transport.

Figure 7. Output Form "TABLE A1"

TABLE A1. AREA DIAGNOSTICS FOR INDUSTRIES WITH GROWTH POTENTIAL
(1 = CRITICAL DISADVANTAGE; 2 = IMPORTANT DISADVANTAGE)

				Factor Costs				Labor Market		Transportation				Other Factors
SIC	Sector	DEFICIENCY (# OF JOBS)	TOTAL PRODUCTION COSTS	LABOR COSTS	LAND COSTS	ENERGY COSTS	TAXES	WORKER BASE	SKILLED WORKERS	WATER TRANS	AIR TRANS	RAIL TRANS	HIGHWAY TRANS	BROADBAND
7	Agricultural services	91	1	1				1			1			
9	Fishing	0	2											
15	General contractors	2,612												
16	Heavy construction	35												
20	Food products	507	2			2								
22	Textile mill products	90	2			2								
23	Apparel and other textile	1,277	2								2			
25	Furniture and fixtures	192	1								2			
30	Rubber and plastics	957	1											
31	Leather products	56									1			
35	Industrial machinery	357	1						2		2			
36	Electronic/electric equipn	4,724	2						2		1			
42	Trucking & warehousing	610	1		1						1			1
45	Transportation by air	236	1	2		2		2	2		1			2
47	Transportation services	184	1	2		2		2						2

OUTPUT FORM "TABLE B1"

The "Table B1" output form, which is shown in Figure 8, provides a different way of showing the information presented in Table A1. In Table A1, (critical and important) disadvantages in economic infrastructure impeding the employment growth in each sector with growth potential are identified. In this table, area *diagnostics* are organized by production factor, e.g., labor costs, access to airports. For each production factor, industries that are critically or importantly disadvantaged by the current quality or cost of infrastructure are identified. In addition, the number of jobs that could be created if the impediment were removed, i.e., if the quality and cost of the factor were the same in the Study Area as in the Comparison Area, is estimated. (As can be seen in Figure 8, the estimated effect on employment is shown in parentheses beneath each industry identified.)

Figure 8. Output Form "TABLE B1"

TABLE B1. INDUSTRIES DISADVANTAGED BY EACH PRODUCTION FACTOR

	Factor Costs				Labor Market		Transportation				Other		Factor Costs				Labor Market		Transportation				Other
FACTOR ASSESSMENT	LABOR COSTS	LAND COSTS	ENERGY COSTS	TAXES	WORKER BASE	SKILL BASE	WATER	AIR	RAIL	HIGH-WAY	BROAD-BAND	FACTOR ASSESSMENT	LABOR COSTS	LAND COSTS	ENERGY COSTS	TAXES	WORKER BASE	SKILL BASE	WATER	AIR	RAIL	HIGH-WAY	BROAD-BAND
CRITICAL	SIC 7 (15)	SIC 42 (99)			SIC 7 (37)	SIC 49 (8)		SIC 7 (7)			SIC 42 (57)	IMPORTANT	SIC 45 (15)		SIC 20 (1)		SIC 45 (26)	SIC 35 (139)		SIC 23 (3)			SIC 45 (8)
	SIC 62 (10)	SIC 52 (22)			SIC 62 (13)	SIC 62 (20)		SIC 31 (0)			SIC 48 (29)		SIC 47 (4)		SIC 22 (3)		SIC 47 (10)	SIC 36 (238)		SIC 25 (2)			SIC 47 (4)
	SIC 64 (43)	SIC 70 (12)			SIC 64 (49)	SIC 81 (108)		SIC 36 (21)			SIC 49 (5)		SIC 50 (20)		SIC 45 (4)		SIC 50 (28)	SIC 45 (41)		SIC 35 (7)			SIC 50 (8)
	SIC 80 (711)	SIC 78 (5)			SIC 80 (1,243)			SIC 42 (27)			SIC 60 (34)		SIC 51 (83)		SIC 47 (1)		SIC 51 (161)	SIC 48 (73)					SIC 51 (59)
	SIC 82 (28)	SIC 79 (17)			SIC 82 (73)			SIC 45 (20)			SIC 62 (2)		SIC 52 (9)				SIC 52 (25)	SIC 50 (43)					SIC 64 (11)
	SIC 83 (31)	SIC 82 (46)			SIC 83 (58)			SIC 50 (2)			SIC 73 (102)		SIC 54 (62)				SIC 54 (112)	SIC 60 (0)					SIC 70 (19)
								SIC 70 (3)			SIC 87 (16)		SIC 56 (11)				SIC 56 (21)	SIC 64 (77)					SIC 78 (6)
								SIC 73 (19)					SIC 57 (17)				SIC 57 (33)	SIC 87 (91)					SIC 79 (19)
								SIC 75 (3)					SIC 59 (86)				SIC 59 (169)						SIC 82 (31)
								SIC 80 (52)					SIC 73 (136)				SIC 73 (260)						
													SIC 81 (54)				SIC 81 (69)						
													SIC 87 (45)				SIC 87 (58)						

OUTPUT FORM "SUMMARY"

The "SUMMARY" output form, which is shown in Figure 9, summarizes key information from the earlier output firms. The first two columns identify the SIC code and name of each sector with growth potential. The third and fourth columns report the size of the employment deficiency or gap in the sector (third column), as well as the amount of the gap that could be reduced if the Study and Comparison Area shared the same economic infrastructure (fourth column). The fifth column reports the 10-year baseline employment growth forecast for the sector. The last column reports the total potential growth associated with each sector, which is equal to the sum of the baseline growth and the potentially achievable employment gap reduction.

Figure 9. Output Form "SUMMARY"

SUMMARY: POTENTIAL FOR LOCAL AREA EMPLOYMENT GROWTH

Scenario

State *TN & VA*

Counties *First Tenn Dist.*

SIC	Sector	DEFICIENCY (# OF JOBS)	POTENTIALLY ACHIEVABLE GAP REDUCTION (A)	BASELINE GROWTH FOR NEXT TEN YEARS (B)	TOTAL POTENTIAL DIRECT GROWTH (A + B)
7	Agricultural services	91	91	993	1,084
9	Fishing	0	0	1	1
15	General contractors	2,612	396	8,603	8,999
16	Heavy construction	35	35	7,889	7,924
20	Food products	507	23	8	31
22	Textile mill products	90	90	0	90
23	Apparel and other textile	1,277	45	0	45
25	Furniture and fixtures	192	66	61	126
30	Rubber and plastics	957	130	1,626	1,756
31	Leather products	56	1	0	1
35	Industrial machinery	357	357	962	1,319
36	Electronic/electric equipme	4,724	623	1,418	2,040
42	Trucking & warehousing	610	417	2,867	3,284
45	Transportation by air	236	121	455	576
47	Transportation services	184	21	199	220
48	Communications	1,798	188	245	433
49	Electric, gas services	321	27	0	27

OUTPUT FORM "POLICY OUT"

The "POLICY OUT" output form, which is shown in Figure 10, estimates the employment effects of policy changes defined by the user in Input Form 4. As is shown in Figure 10, the pre- and post-policy values are imported directly from Input Form 4. The model then calculates the estimated employment effects associated with each policy change. Thus, as with the other output forms, the user is not required to enter any new information.

With POLICY OUT, the user can see the estimated employment effects of changes in the following variables: advanced skills training; labor market participation; Broadband access; availability of highway-related commercial land, industrial park sites, and office/commercial development sites; and access to airports, river or sea ports, and rail stations; and major and minor improvements in highway flow. Each of these variables was described in the section on Input Form 4.

Figure 10. Output Form "POLICY OUT"

TABLE C1. JOBS IMPACT OF PROPOSED POLICY CHANGES

ARC-LEAP ARC Local Economic Assessment Package

1. Technology and Education	PRE-POLICY	POST-POLICY	EMPLOYMENT IMPACT
Advanced Skills Training	3	4	120
Labor Market Participation	5	2	0
Broadband Access	5	6	749
2. Development Constraints and Incentives			
Availability of Highway-Related Commercial Land	3	4	319
Availability of Industrial Park Sites with Full Infrastructure	3	4	235
Availability of Office/Commercial Development Sites	3	4	348
3. Transportation Initiatives			
Access to Airports (travel time in minutes)	27	20	205
Access to River or Sea Ports (travel time in minutes)	101	80	0
Access to Rail Intermodal (travel time in minutes)	27	25	0
Minor Improvements in Highway Flow	20	36	633
Major Improvements in Highway Flow (1)	5	6	1,154
Major Improvements in Highway Flow (2)	1,000,000	1,200,000	2,532

= Value Imported or Calculated from Information in Input Form 4

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