Sylvatica

Solutions & Software for Industry and the Environment: LCA, DfE, P2, and Industrial Ecology

Guide to Using the EPP Assistant

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Guide to Using the EPP Assistant

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Table of Contents

	Page
Chapter 1: Overview	1
Chapter 2: Getting Started	3
Chapter 3: Using the EPP Assistant	5
Chapter 4: Reference and Case Study	19

CHAPTER 1: OVERVIEW

An introduction to the EPP Assistant, the structure of this guide, and how to get help using the tool

Introduction to the EPP Assistant

Environmentally preferable purchasing (EPP) is an activity of increasing importance for organizations large and small, in the U.S. and abroad. There is dramatic growth in the number of products that are touted as being environmentally preferable, and in the volume of information being provided about such products.

With this growth in options and available information, along with limits on available time and resources to devote sifting through all this information as it continues to change, comes the need to prioritize. Among all of your organization's purchases, which ones are having the greatest environmental impacts? And given the environmental goals of your organization and the nature of its operations, which environmental impacts should you select as your top priorities for reducing through EPP?

The EPP Assistant is designed to enable you to get your bearings and set priorities for EPP. You enter data on your annual purchasing, using your own purchasing categories. The tool enables you to match your purchasing categories to those in its database for which life cycle assessment (LCA) data are available. It then enables you to calculate and graphically visualize how much impact is associated with each of your purchasing categories, for a given category of environmental impact.

In this tool, EPP prioritization is based on environmental impact prioritization. The EPP Assistant helps you by giving an objective assessment of the degree to which your organization's purchases are having an environmental impact.

Thus, the EPP Assistant enables you to:

a) Enter data on your specific annual purchases, and on this basis to:

b) Prioritize environmental impact categories; and on this basis to:

c) Prioritize purchasing categories for EPP action.

There is one more thing that the EPP Assistant is designed to help you do. That is to estimate and report progress and benefits from your ongoing EPP efforts. You can enter and compare purchasing data for different scenarios, and for different years, in terms of the environmental impacts the purchases entail. Use this feature to compare alternative purchasing strategies. As you reduce your use of high-polluting inputs to your operations, you can then calculate the resulting environmental benefits and report them to stakeholders.

The EPP Assistant is an "open source" software tool, meaning that it is transparently designed and is not proprietary, but rather has been developed as the starting point for a collaborative effort among its users. It can and should be enhanced and improved by a community of

interested users. We hope you will benefit from using the tool, that the environment will benefit as well, and that you will consider the invitation to participate in a community of people around the world to make the tool more powerful and effective for all of us.

Organization of This Guide

Chapter 2 gets you up and running with the EPP Assistant, specifies requirements for your computer system, leads you through software installation, and suggests an approach to learning the software by using this guide.

Chapter 3 leads you through the use of the EPP Assistant, emphasizing how you move through the tool and obtain results.

Chapter 4 is a reference section, providing background information about the calculations and data sources employed within the EPP Assistant.

Note to anyone who wishes to provide comments: Please submit all questions and comments about the tool via email. To reach the tool developer (Greg Norris) directly, you may send email to gnorris@sylvatica.com. A user forum for the tool is located at www.earthster.org .

CHAPTER 2: GETTING STARTED

System requirements, installing your software, and learning how to use the EPP Assistant

System Requirements

In order to use the EPP Assistant, you need a copy of the free Analytica Player software, which is produced by Lumina Decision Systems. You can also use a purchased copy of the Analytica software, if preferred. Analytica runs under the Microsoft Windows operating environment. The system requirements are:

• Personal computer, at least a 486-66Mhz (Pentium 90 MHz or faster recommended), running Windows 98 or more recent.

• A hard drive with at least 5 megabytes of free disk space.

• At least 8 megabytes of RAM (16Mb or greater recommended).

• 8-bit color display (16-bit color depth recommended).

To ensure user-friendly viewing of the tools' screens:

- Right-click on your desktop and select Properties
- Click on the Settings tab
- Make sure the Screen area is set at a minimum of 1024 by 768.
- If it is not, adjust it so that it is and then click on Apply

Software Installation

You first install the Analytica Player software from http://www.lumina.com/ana/player.htm. If you have a paid version of Analytica installed on your system, do not install the player version.

Next, create a folder on your hard drive named "EPP Assistant." Download the EPP Assistant software from either of the following websites, www.earthster.org or www.zerowastenetwork.org, and double-click the self-extracting file, saving it into the EPP Assistant folder on your hard drive.

Learning and Using the EPP Assistant

The best way to learn to use the EPP Assistant software is to have it open on your computer and follow the instructions provided in Chapter 3 of this guide.

Learning and Using Analytica

The EPP Assistant was developed using the Analytica model development environment and programming language.

Basic and intermediate users of the EPP Assistant can learn how to do all the EPP prioritization modeling and analysis they need, using just this guide. Advanced users, including those who wish to add new capabilities to the model, will benefit from learning how to use Analytica to customize the EPP Assistant.

CHAPTER 3: USING THE EPP ASSISTANT

How to put the EPP Assistant to work for your organization, to prioritize and evaluate your environmentally preferable purchasing activities

Open the Assistant

If Analytica is not yet open: Within the Windows Explorer software, double-click on the file named "EPP Assistant," or (if you can view file extensions) "EPP Assistant.ana." Note that the extension ".ana" tells Windows to use Analytica to open this document. Analytica will start, and the EPP Assistant will be opened for use.

If Analytica is already open: If you have already started the Analytica software, for example by choosing Programs…Analytica from the Start menu, then you open the EPP Assistant from within Analytica as follows:

1) Close any currently open model by choosing Close from the File menu.

2) Open the EPP Assistant by choosing Open Model from the File menu, and navigating with the file finder until you locate the file "EPP Assistant."

The Two Basic Operations within the EPP Assistant

When you work with the EPP Assistant, you generally go back and forth between two operations:

1) Entering data about your purchasing categories: This entails entering how much you spent (or are planning to spend) on commodities in each purchasing category; possibly adding new purchasing scenarios; and (if the tool doesn't already feature your purchasing code system) matching your purchasing categories to the underlying life cycle assessment (LCA) data;

2) Viewing results of simultaneous life-cycle assessment evaluations of the environmental implications of your purchases: this can be done using a variety of environmental impact categories, and moving back and forth between interactive tables and graphs of results.

The first screen of the EPP Assistant provides access to both of these operations, as shown in Figure 1.

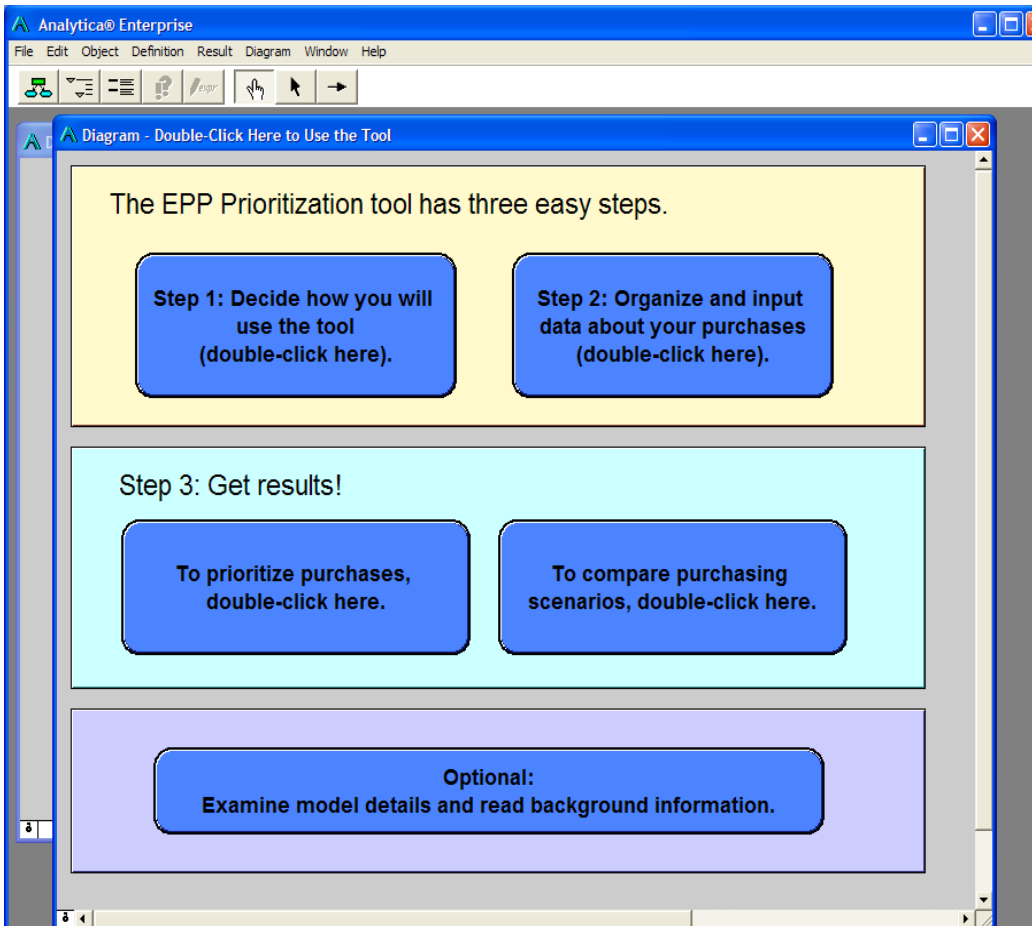


Figure 1: The top-level view of the EPP Assistant, showing the options available for entering data and viewing results. The figure also shows the optional gateway for viewing model details.

Providing Data Inputs

There are two necessary steps in data entry.

1) Determining how you will use the tool. Many organizations will want to use the tool to determine which purchases have the greatest environmental impact. If you choose this option, you will be working exclusively with the "base case" scenario. If you choose instead to compare two alternative purchasing scenarios, you can change the names of these scenarios. To change the names, first double-click on the button labeled "Step 1." Then click on the button labeled "List." Type over the text labeled "Baseline" and "Option 1" with the names of your two purchasing scenarios. Click on the black "x" in the top right hand corner of the screen to close the window and enter your changes into the model.

2) Entering your list of purchasing categories, or commodities, and entering the data. Your list of commodities may come from your purchasing software. The EPP Assistant may already have your organization's commodity list. The EPP Assistant comes with the ability to store and work with three different commodity lists. These are the BEA[1] standard list of commodities, the NIGP[2] standard list of commodities, and a third list that allows you to link your organization's commodity list to the BEA list. To edit and work with the lists of commodities, double-click on the button labeled "Step 2" near the top of the main window. You will see the window displayed in Figure 2.

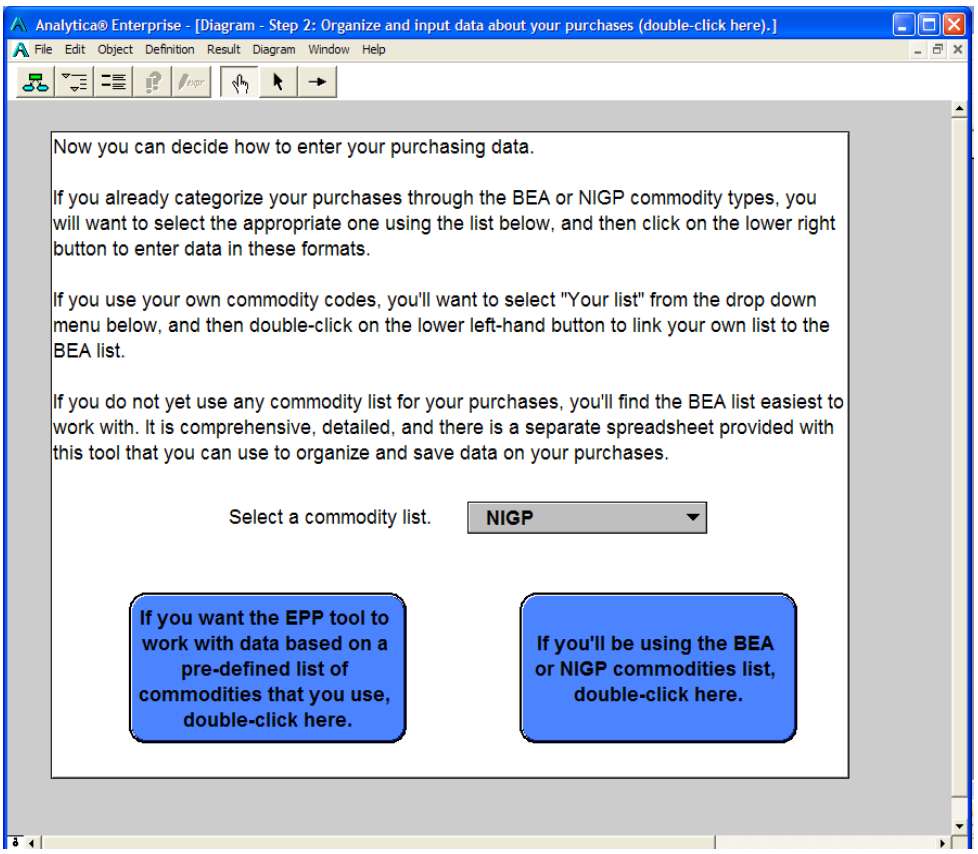


Figure 2: This screen is a gateway to use your own commodities list (left button) or the NIGP or BEA list (right button).

Note: Each window you open remains open until you close it. To go back to a previous window, close the current window. Alternatively, use the menu item "Window" and select "move to front" to pick the window you wish to view. Lists are saved when you click the black "x" to close the window. Please note that unless you are using a paid version of Analytica, the tool cannot save your changes for a later session.

[1] Bureau of Economic Analysis
[2] National Institute of Governmental Purchasing

You will enter your data depending upon which commodity list you choose to use.

Using the BEA commodity list: Double-click on the button labeled "If you'll be using the BEA or NIGP commodities list..." This will bring up the screen in Figure 3.

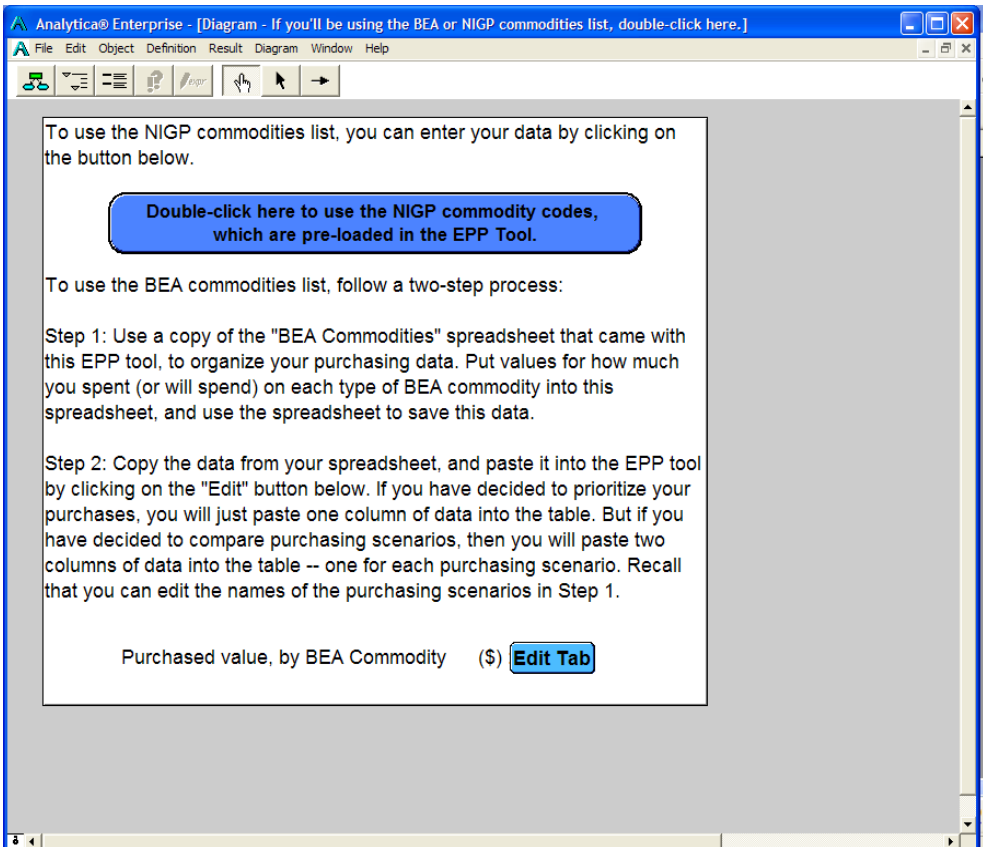
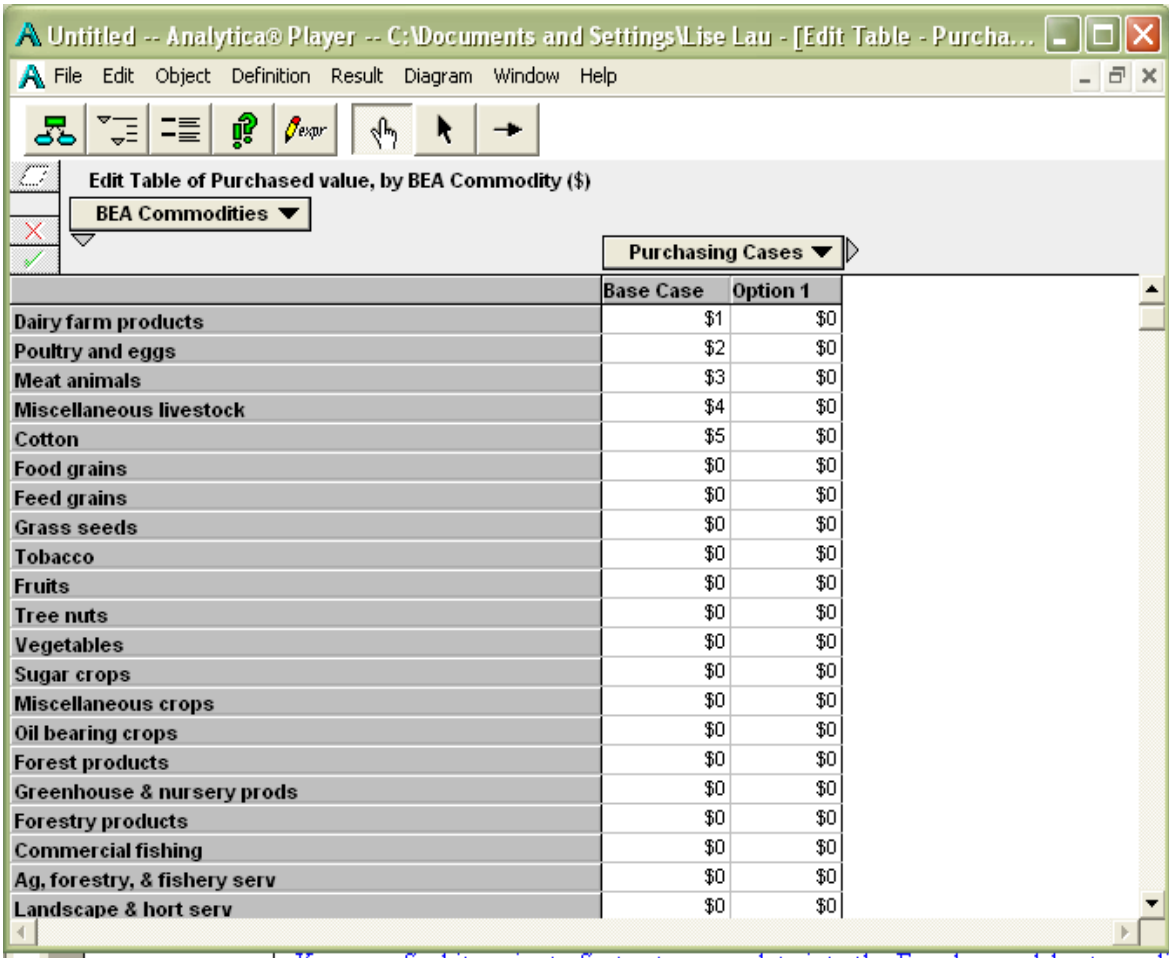


Figure 3: Follow the instructions on this screen to use the BEA commodities list.

You may find it easier to first enter your data into the Excel spreadsheet supplied with the tool ("BEA Commodities Spreadsheet.xls"). This will allow you to search the spreadsheet for specific words in the commodity name, using the Excel "find" function. To enter the data, click on the button "Edit Tab." This will bring up the screen in Figure 4.

Note: some of the screen-shots in the following pages contain data in the tables and results in the output graphics. This is done to illustrate how the tables and graphs appear when there are non-zero results. Your copy of the EPP Assistant, downloaded from the web, is set to be empty of user-input data, so the tables and graphs will not show values until you enter them.



	Base Case	Option 1
Dairy farm products	$1	$0
Poultry and eggs	$2	$0
Meat animals	$3	$0
Miscellaneous livestock	$4	$0
Cotton	$5	$0
Food grains	$0	$0
Feed grains	$0	$0
Grass seeds	$0	$0
Tobacco	$0	$0
Fruits	$0	$0
Tree nuts	$0	$0
Vegetables	$0	$0
Sugar crops	$0	$0
Miscellaneous crops	$0	$0
Oil bearing crops	$0	$0
Forest products	$0	$0
Greenhouse & nursery prods	$0	$0
Forestry products	$0	$0
Commercial fishing	$0	$0
Ag, forestry, & fishery serv	$0	$0
Landscape & hort serv	$0	$0

Figure 4: Enter the data from your purchasing scenario(s) directly into the spreadsheet in the EPP Assistant or by pasting from an Excel spreadsheet.

If you are evaluating your purchases for the highest environmental impact, you only need to enter data into the "Base Case" column. Incorporate your data into the model by clicking the green check mark at the top left of the spreadsheet.

2) Using the NIGP list: To use the NIGP list, double-click on the button labeled "Double-click here to use the NIGP commodity codes" which appears at the top of the window shown in Figure 3. You will see a window as shown in Figure 3-5.

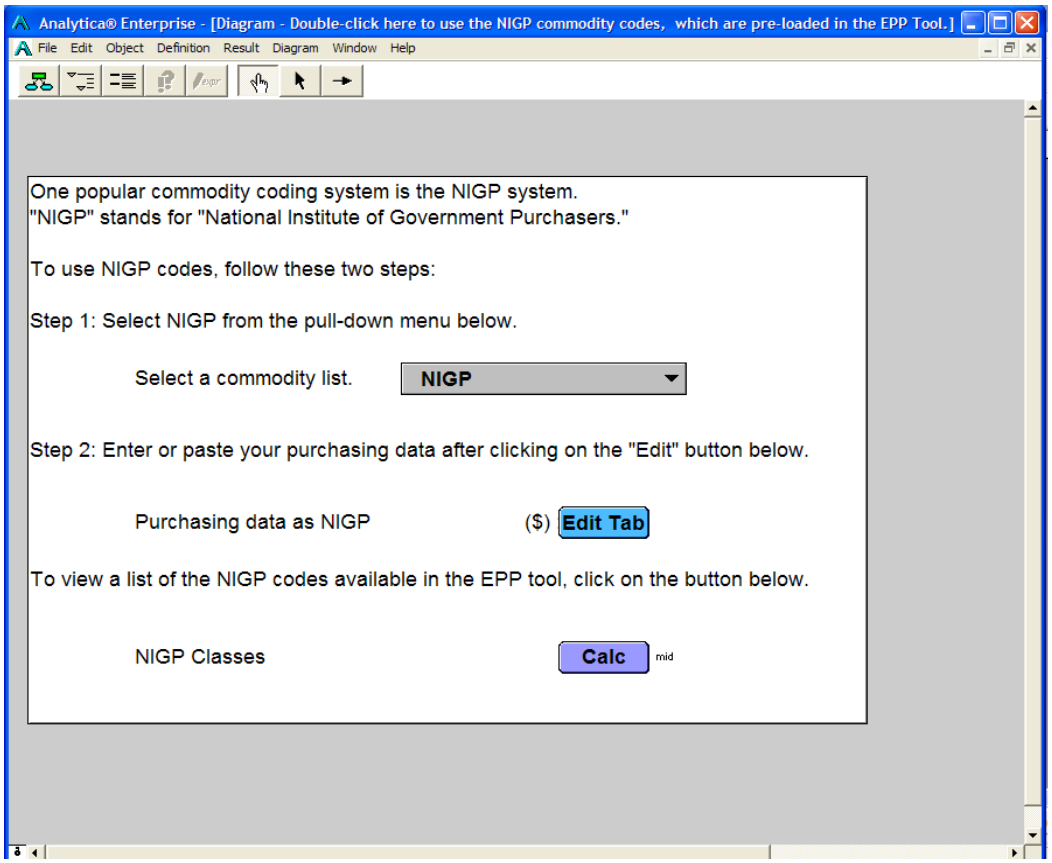


Figure 5: To use the NIGP list, first ensure "NIGP" is selected from the pull-down commodity list menu. Then select "Edit Tab" to enter your purchasing data.

Ensure that "NIGP" is selected from the pull-down menu "Select a Commodity List." Then click on "Edit Tab" to enter your data. You will see a screen similar to Figure 4, but with NIGP commodity names. Enter your data directly into the spreadsheet in the tool, or copy and paste from an Excel spreadsheet. If you are analyzing your purchases for areas of high environmental impact, you only need to enter data into the Base Case. Click on the green checkmark at the top left of the spreadsheet to enter this data in the model.

Use the button to the right of "NIGP Classes" to see just a listing of the codes.

3) Using your own commodity list. To use your own commodity list, you must first link it to the BEA list. Start by double-clicking on the button labeled, "If you want the EPP . . ." (see Figure 2). You will see a screen as shown in Figure 3-6. Select the "List" button labeled "Your list." Figure 7 shows the list that will appear. Paste your commodity list into this list.

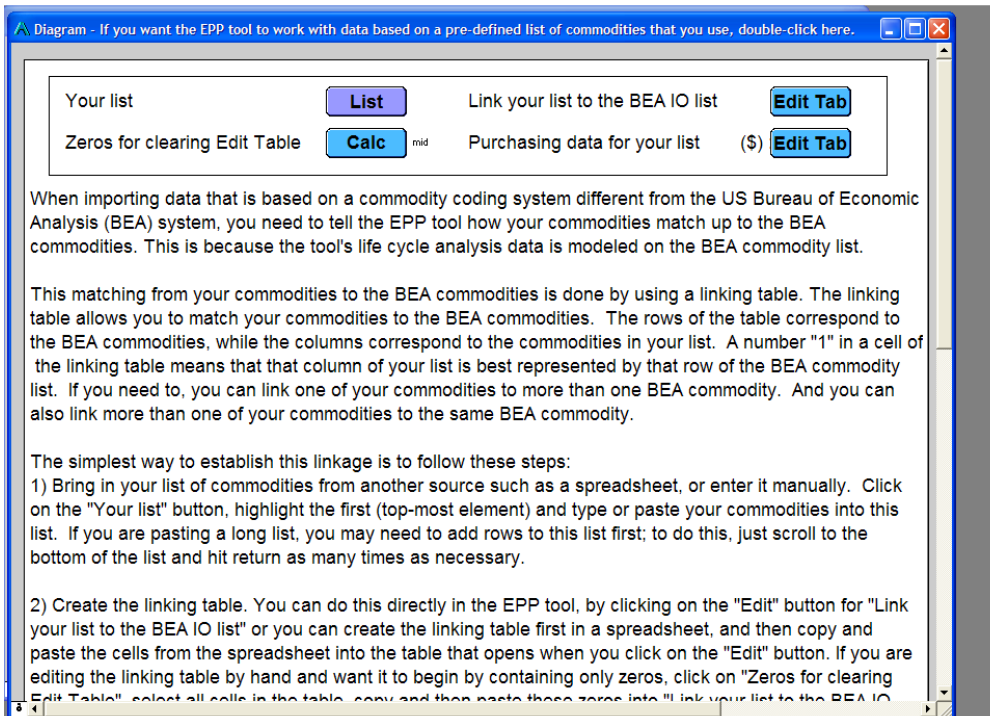


Figure 6: To use your own commodity list, you begin by entering your list.

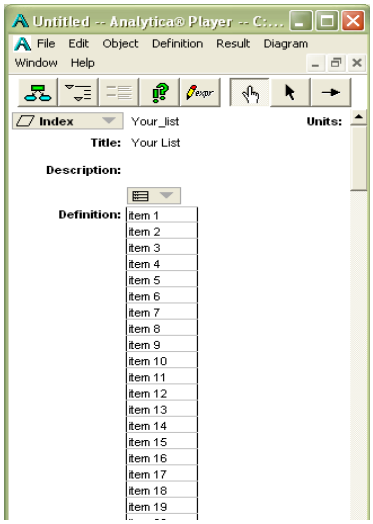
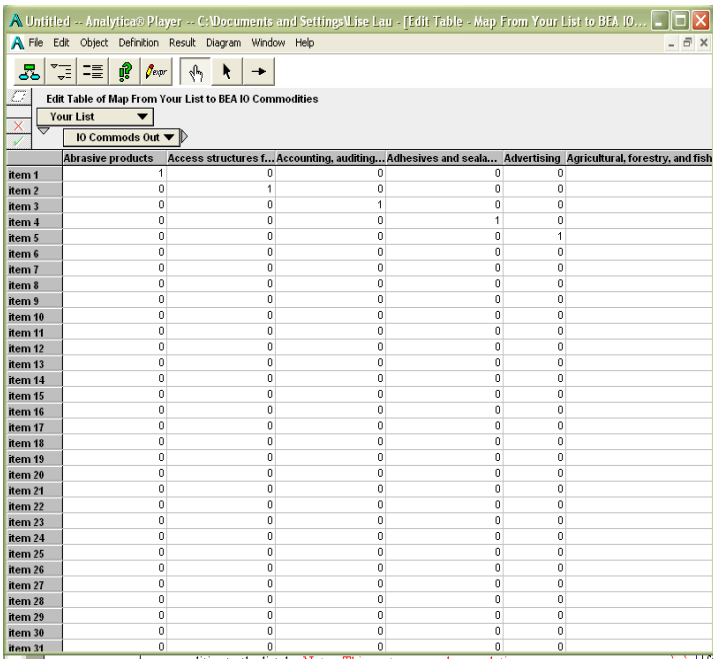


Figure 7: Paste your commodities list into this list. You will match them to the BEA commodities in the next step.

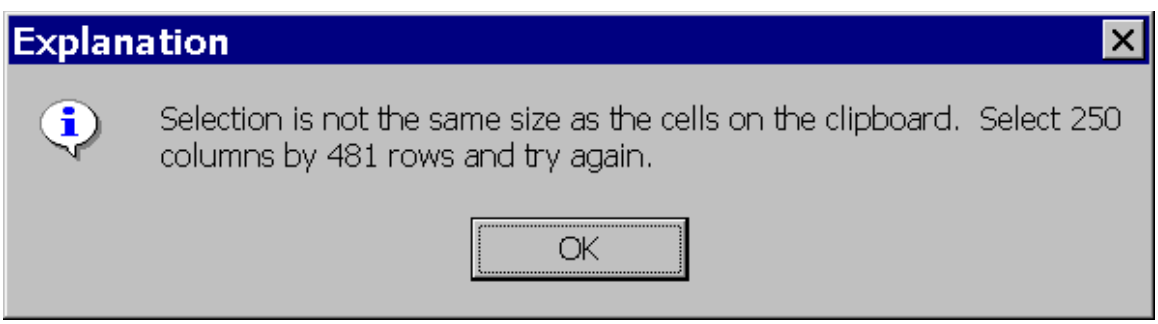
To enter your list in the model for this session, click the black "x" to close the window. To link your list to the BEA list, click on "Edit Tab" next to the text labeled "Link your list . . ." You will see a screen similar to Figure 8, but with your commodity names on the left hand side.



	Abrasive products	Access structures f...	Accounting, auditing...	Adhesives and seala...	Advertising	Agricultural, forestry, and fish
item 1	1	0	0	0	0	
item 2	0	1	0	0	0	
item 3	0	0	1	0	0	
item 4	0	0	0	1	0	
item 5	0	0	0	0	1	
item 6	0	0	0	0	0	
item 7	0	0	0	0	0	
item 8	0	0	0	0	0	
item 9	0	0	0	0	0	
item 10	0	0	0	0	0	
item 11	0	0	0	0	0	
item 12	0	0	0	0	0	
item 13	0	0	0	0	0	
item 14	0	0	0	0	0	
item 15	0	0	0	0	0	
item 16	0	0	0	0	0	
item 17	0	0	0	0	0	
item 18	0	0	0	0	0	
item 19	0	0	0	0	0	
item 20	0	0	0	0	0	
item 21	0	0	0	0	0	
item 22	0	0	0	0	0	
item 23	0	0	0	0	0	
item 24	0	0	0	0	0	
item 25	0	0	0	0	0	
item 26	0	0	0	0	0	
item 27	0	0	0	0	0	
item 28	0	0	0	0	0	
item 29	0	0	0	0	0	
item 30	0	0	0	0	0	
item 31	0	0	0	0	0	

Figure 8: In this example, Item 1 is linked to "Abrasive products," Item 2 is linked to "Access structures," etc.

To link your commodities to the BEA commodities, you first need to delete all of the number ones that are in the Edit Table. To do this, click on the "Zeros for clearing Edit Table" button. Then copy the entire table. Then, close that table, click on the "Link your list to BEA list" button, and paste after clicking on the cell in the top left corner. If you get the following dialog box,



change your columns so that they're your rows and visa versa.

Now, to link your commodities to the BEA's, place ones (i.e. the digit, "1") in the cells that best match your commodities' rows to the BEA's columns. All other cells in that row and column should be set to "0," which they will be if you have correctly pasted in the zeros from the zeros table. Click on the green check mark at the upper left to save the links you have established for this session (session = the period between having opened the tool and closing out of it).

To enter your purchasing data, click on the "Edit Table" button next to the text labeled "Purchasing data for your list." You will see a window similar to Figure 4 with your

commodities listed. Enter your data directly into the spreadsheet or copy and paste from Excel. If you are analyzing your purchases to prioritize them based on environmental impacts, you only need to enter data into the "Base Case" column. Click on the green check mark in the top left corner of the spreadsheet to save the data you have entered for this session.

Note: Unless you have a purchased version of Analytica, when you close out of Analytica, the data you have entered will not be saved. To save time in future analysis, right click on this table and select "copy table." Paste the spreadsheet into an Excel workbook and save the workbook. You will later be able to copy and paste your commodities list from column A in the workbook into the commodities list shown in Figure 7, and the matches from the rest of the workbook into the BEA linking table (Figure 8). IMPORTANT: Per session, be sure to complete all copy and paste procedures from Excel before doing any from within the model. If you first copy and paste data from within the EPP model (e.g. the zeros from the Zeros Table into the Edit Table), you will no longer be able to copy and paste from Excel in that session.

Viewing Results Outputs

There are two main categories of results within the EPP Assistant, corresponding to its two main purposes:

- Purchasing Prioritization: Use the EPP Assistant to determine which of your purchased commodities contributes how much to which categories of environmental impact. For example, if your organization wants to reduce its global warming impacts, use the EPP Assistant to calculate your organization's "global warming footprint," and to identify which types of purchases are making the largest contributions to that footprint.

- Benefits Assessment: Use the EPP Assistant to calculate "before and after" environmental impacts of your organization's purchasing. This is done by comparing purchasing scenarios. You can also use the Assistant to calculate the net environmental benefits of switching from one purchasing scenario to another.

Compare and Prioritize Purchases within a Scenario

In the "Step 3: Get Results!" section of the main window, double-click on "To Prioritize Purchases . . ." and you will be presented with the window shown in Figure 9.

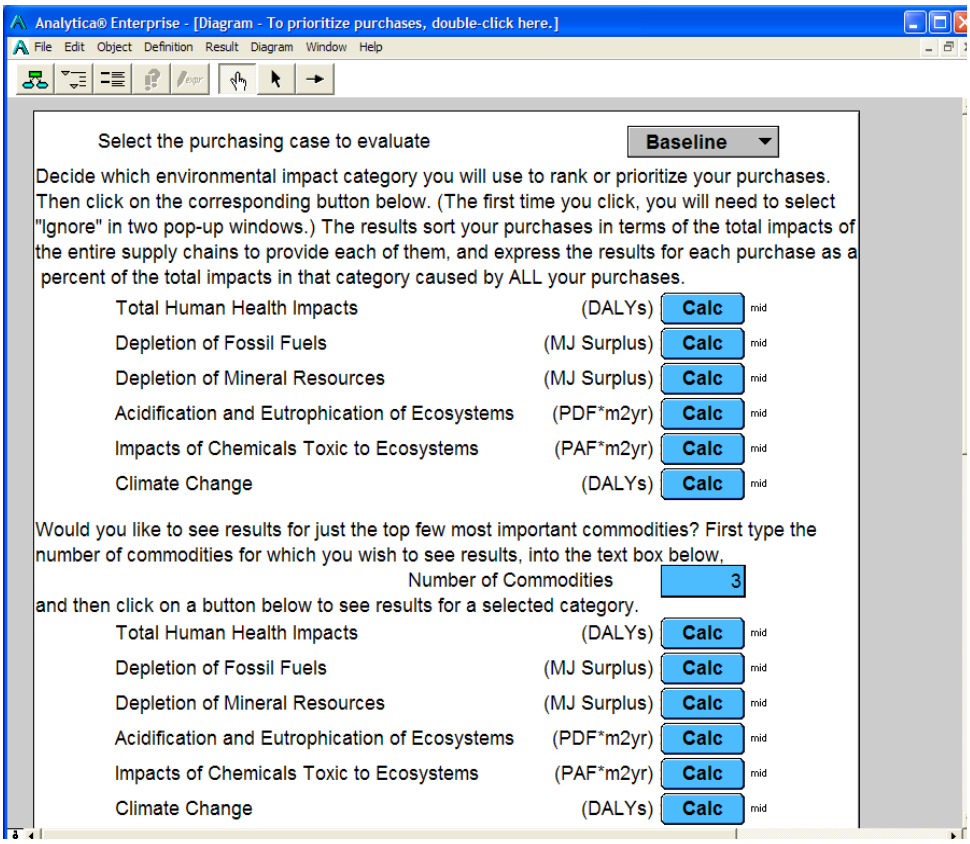


Figure 9: You can choose which impacts to prioritize and see the impacts of your purchases or choose results for only the top few.

Select the impact category you wish to use to rank your purchases. When you click the "Calc" button next to the impact category, you'll get two Question messages that look like Figure 10. Select "Ignore" each time the message appears.

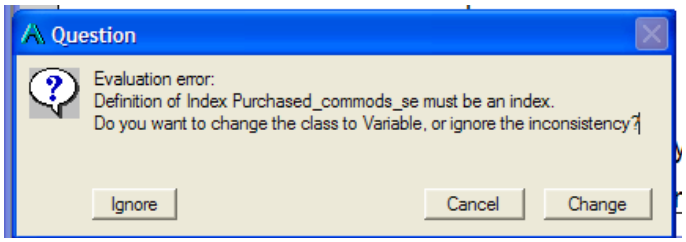
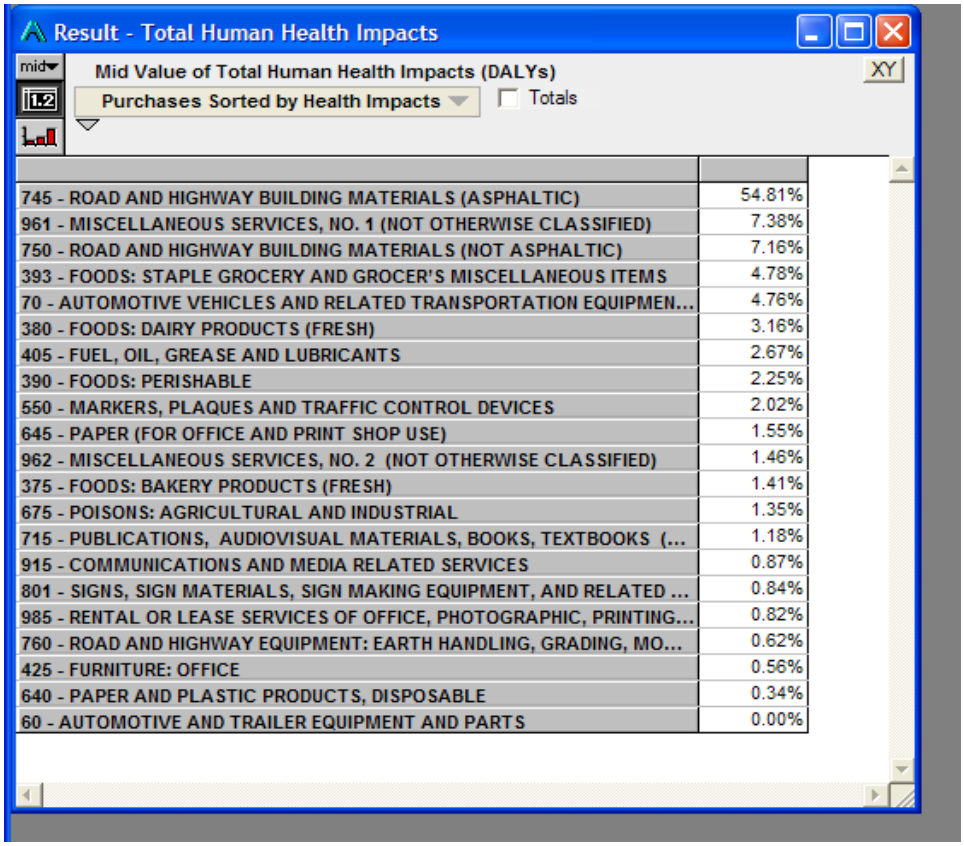


Figure 10: The first time you click on any "Calc" button, you get two Question screens. Simply click "Ignore" and keep working.

After ignoring the two Questions, you will see the results as shown in Figure 11. To move back and forth between a bar-chart and table format, click the small bar chart icon and the "1.2" icon on the upper, left-hand side of the window.



745 - ROAD AND HIGHWAY BUILDING MATERIALS (ASPHALTIC)	54.81%
961 - MISCELLANEOUS SERVICES, NO. 1 (NOT OTHERWISE CLASSIFIED)	7.38%
750 - ROAD AND HIGHWAY BUILDING MATERIALS (NOT ASPHALTIC)	7.16%
393 - FOODS: STAPLE GROCERY AND GROCER'S MISCELLANEOUS ITEMS	4.78%
70 - AUTOMOTIVE VEHICLES AND RELATED TRANSPORTATION EQUIPMEN...	4.76%
380 - FOODS: DAIRY PRODUCTS (FRESH)	3.16%
405 - FUEL, OIL, GREASE AND LUBRICANTS	2.67%
390 - FOODS: PERISHABLE	2.25%
550 - MARKERS, PLAQUES AND TRAFFIC CONTROL DEVICES	2.02%
645 - PAPER (FOR OFFICE AND PRINT SHOP USE)	1.55%
962 - MISCELLANEOUS SERVICES, NO. 2 (NOT OTHERWISE CLASSIFIED)	1.46%
375 - FOODS: BAKERY PRODUCTS (FRESH)	1.41%
675 - POISONS: AGRICULTURAL AND INDUSTRIAL	1.35%
715 - PUBLICATIONS, AUDIOVISUAL MATERIALS, BOOKS, TEXTBOOKS (...	1.18%
915 - COMMUNICATIONS AND MEDIA RELATED SERVICES	0.87%
801 - SIGNS, SIGN MATERIALS, SIGN MAKING EQUIPMENT, AND RELATED ...	0.84%
985 - RENTAL OR LEASE SERVICES OF OFFICE, PHOTOGRAPHIC, PRINTING...	0.82%
760 - ROAD AND HIGHWAY EQUIPMENT: EARTH HANDLING, GRADING, MO...	0.62%
425 - FURNITURE: OFFICE	0.56%
640 - PAPER AND PLASTIC PRODUCTS, DISPOSABLE	0.34%
60 - AUTOMOTIVE AND TRAILER EQUIPMENT AND PARTS	0.00%

Figure 11: Result from having clicked on a "Calc" button (or "Results" button, after the calculation has been done once). Choose the small bar chart icon to display the results as a bar chart. Click on the button labeled "1.2" to return to the table format.

If you only wish to see the top contributors to an impact category, close the result window and on the screen that appears, select the number of commodities to display and then click on the appropriate "Calc" button.

Note: Once a calculation has been done for the data that has been entered into the model, the "Calc" button will change to "Result." Changing the data in the model will cause the button to revert back to "Calc."

You can access descriptions of the units for each impact category on the Purchasing prioritization screen (one level back from the results charts/tables) by clicking on the key at the bottom left of the window.

Compare Scenarios, Calculate Benefits

In the "Step 3: Get Results!" section of the main window, double-click on "To compare purchasing cases . . ." and you will be presented with the window shown in Figure 3-12.

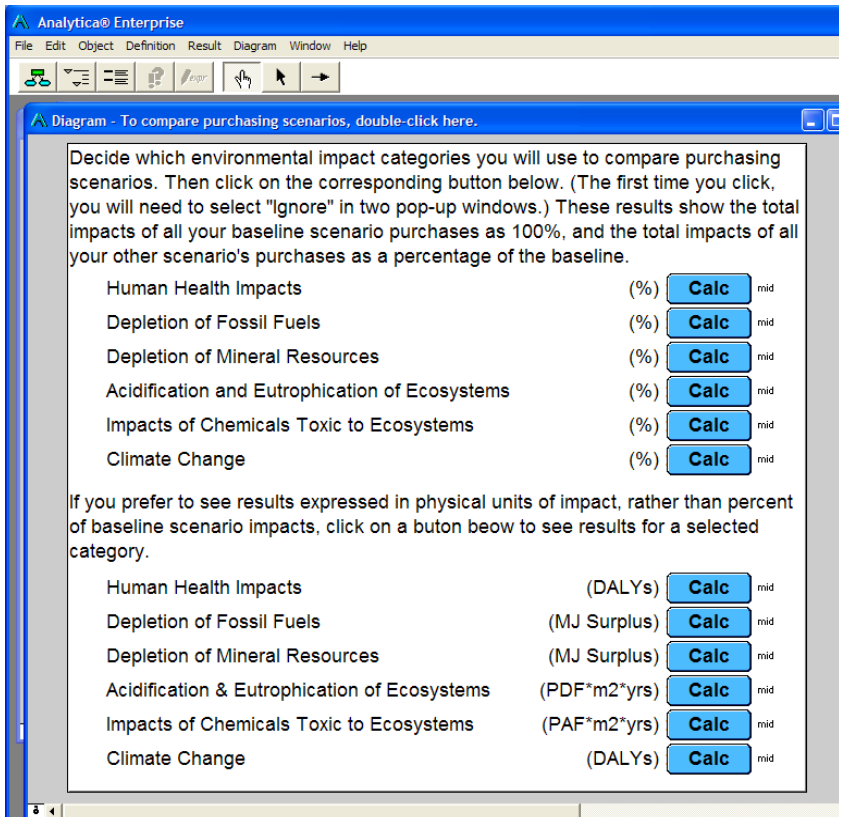


Figure 12: When comparing purchases, all purchases in each case are summed. The impacts for the first case are defined as 100% and the second case is displayed as a percentage of the first case.

Clicking on any of the "Calc" buttons will pop up two Question windows like the one in Figure 10. Simply click "Ignore" to both questions. You will be presented with either a chart of results, as shown in Figure 13, or a table of results. Toggle between the bar chart and the table by clicking on the "1.2" and bar-chart icons in the upper-left part of the screen.

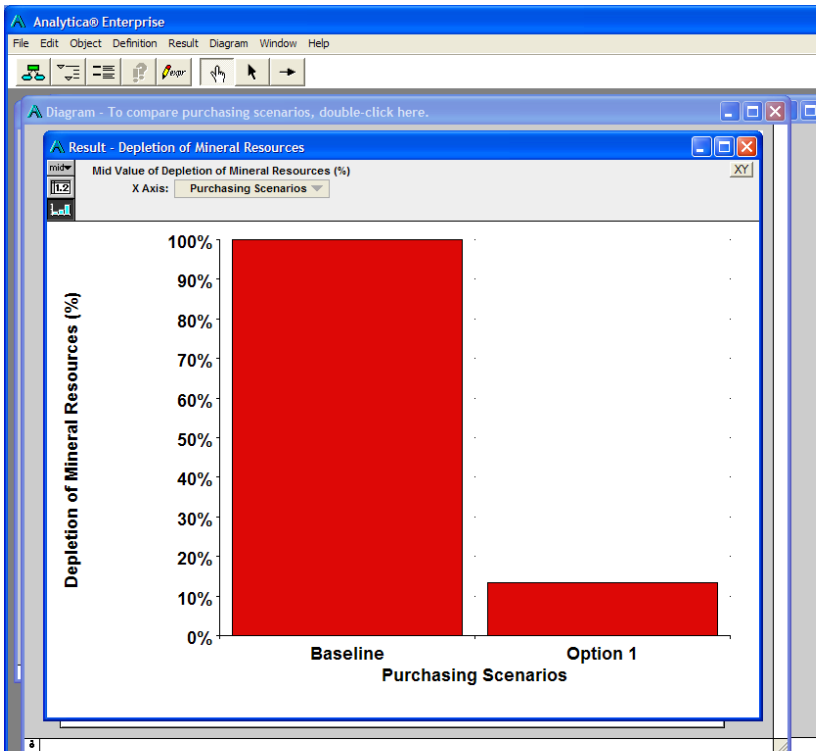


Figure 13: Clicking on a "Calc" button from the comparison screen and then clicking on the bar-chart icon will result in a chart showing Option 1's impacts as a percentage of the Base Case's.

You can also look at the results expressed in physical units by clicking on the "calc" buttons at the bottom of the window. The units for absolute impacts[3] are as follows:

• **Human health impacts** are measured in "disability-adjusted life years" (DALYs), which is an estimate of the total loss of life years in the population due to total releases of pollution that are caused by the purchase and its full supply chain. This is also the unit of measurement for the impacts of releases of greenhouse gases that can lead to **climate change**.

• **Depletion of fossil fuels and of mineral resources** is measured in "Mega-Joules of surplus energy" which is an estimate of the extra energy required to be used to extract the next increment of mineral resources or fossil fuel resources, due to the consumption of these resources occurring in the supply chain of the studied purchases.

[3] For detailed documentation on the impact assessment methods used in the EPP Assistant, consult the report on the EcoIndicator 99 methodology, available for download from www.pre.nl.

• Impacts of **acidification and eutrophication of ecosystems** are measured in "potentially-affected fraction of species times square meter years" (PAF * m2yr). This measure is based on an estimate of the fraction of impacted species in the impacted regions, times the area impacted, times the duration of the impact in years. **Impacts of chemicals toxic to ecosystems** are based on an estimate of the potentially *disappeared* fraction of species in the impacted region, times the area impacted, times the duration of the impact.

CHAPTER 4: REFERENCE AND CASE STUDY

Methods and databases underlying the EPP Assistant, and a worked case study example

Methods

The EPP Assistant uses the methods of life-cycle assessment (LCA), as described in such reference documents as the Standards for LCA from the International Standards Organization (ISO). You can prioritize your purchasing, and assess benefits, in terms of Life-Cycle Inventory results and Life-Cycle Impact Assessment results. Each of these is explained below.

- Life-Cycle Inventory results: These are a full tabulation of all the flows of natural resources consumed from the environment, and all the pollutant flows released to the environment, by the full chain of processes required to provide a final commodity to your organization. The life cycle inventory results within the EPP Assistant tend to contain approximately one thousand inventory flows for each commodity.

- Life-Cycle Impact Assessment results: These are the result of using "characterization factors" which estimate the relative contribution of each inventory flow to one or more environmental impacts of concern. They are more useful for decision-making than the inventory data.

All the calculations necessary for the model to do its work are transparently visible within the model.

To view the details of the model, on the first page, click on the button labeled "Optional: Examine model details . . ." and then just double-click on one of the blue rounded rectangles that are displayed.

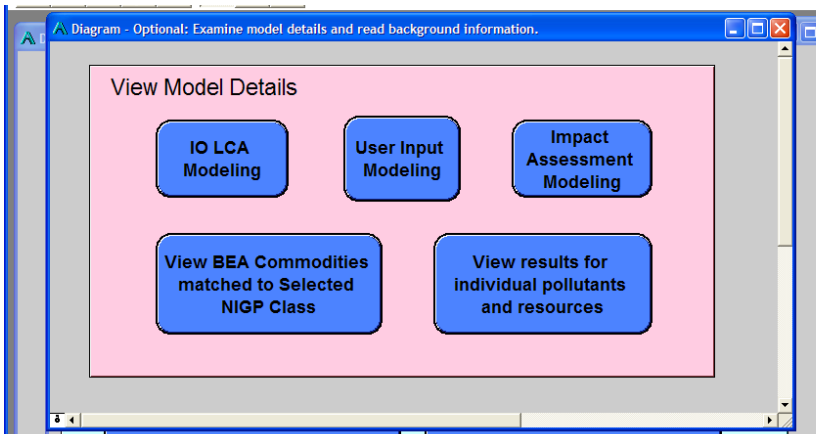


Figure 14: All of the model calculations are available for any user to examine. Simply click on a button of interest to dig down.

Figure 4-14 shows the results of double-clicking on the "IO LCA Modeling" block. In this figure, we see a flow diagram with a separate block for each of the logical calculation steps that are contained within the model. Also in Figure 4-15, the user has clicked once on the details "key" in the bottom-left corner of the window. Once you have clicked this key, you can read the equation for any one of the steps, by just clicking once on the block, and seeing the corresponding equation in the details pane shown at the base of the window. Select "Definition" from this menu to view equations. If "Definition" is not listed as an option, you first need to highlight (click on) a node in the diagram, and then select "Definition." In the example displayed in Figure 15, we read that the equation for the variable called "Embodied Raw Materials by Purchased Input" is defined as "Sum(Raw_matl_results, Purchased_bea_io_com)." Now, the "Raw_matl_results" are the results of estimating the impacts of the purchasing scenarios on the depletion of raw materials. The variable named "Purchased_bea_io_com" means the purchases in the different scenarios, expressed as commodities in the BEA input/output table. And the equation means to add up (to sum) the raw materials impacts for each of the different BEA input/output commodities.

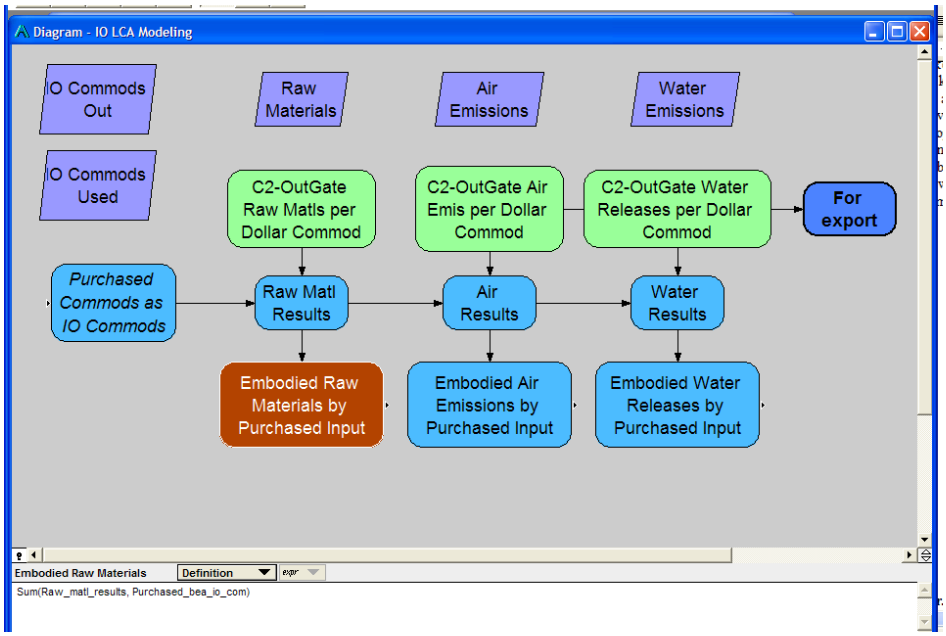


Figure 15: All the details of the model can be viewed by the user. The details for IO LCA Modeling are shown here.

Databases

The EPP Assistant uses the latest and most complete database on the embodied environmental impacts of all categories of purchased commodities within the United States. This database was originally prepared by Sangwon Suh at the University of Leiden, in the Netherlands. It is contained within the professional SimaPro software for LCA. The data were exported and used to compute results that can be distributed in an open source tool such as the EPP Assistant. Further documentation for the database is available from PRé consultants, at www.pre.nl.

Case Study Example

This final section illustrates the use of the EPP Assistant in a hypothetical case study.

Let's say we are a small, independent, environmental consulting firm that wants to "walk the talk" -- in addition to developing tools and reports and analyses for environmental management by other firms and agencies, we also want to examine and then improve the environmental impacts of our *own* operations. Our time is limited, so we would like to focus our "greening" efforts on those purchasing categories that are having the greatest impact on the environmental and health impacts that we are concerned about. This year we are particularly interested to address our impacts on climate change, fossil fuel use, and overall impacts on human health.

We begin by gathering together our expense summary report from last year, prepared as part of our routine accounting. For this simple example, to get started, we'll ignore purchases in categories that total less than $100. Next year we might examine *all* our purchases, but this year we begin with the hunch that our minor purchases are not likely to be the larger areas of our firm's environmental impact.

In reviewing our major purchases, we see that we spent $1500 on a new laptop computer last year. We realize that we don't (hope to) have to buy a new laptop every year; rather, we estimate that we might buy a new one every 3 years. So we decide to estimate annual purchases on computers as $500. We do the same for computer peripheral equipment, estimating an additional $150 every year.

We arrive at the summary table for our major business expenses as shown on the next page. This table shows that our major expense category by far is our subcontracting to other consultants; the total amount subcontracted last year was $15,000. Our next highest expense category is for communications (telephone, cell phone, and Internet). Our first inclination is to leave out the subcontracting from this analysis... but then we get curious. Perhaps one of the important things that we can do is to recommend to our subcontractors that they, too, consider "greening" their operations? Or perhaps most of the money we pay to them goes to their salary rather than paying for polluting inputs. For example, perhaps our plane flights last year, which cost only $1000, still caused more pollution than our subcontracts of $15,000? We decide to leave the subcontracted services in the analysis for now, to get a handle on these and similar questions.

We decide to relate our purchasing categories to the BEA commodity list. For this purpose, we use the spreadsheet file, "BEA Commodities Spreadsheet", to help us find the BEA commodity that corresponds to each of our purchasing categories. We also enter the data for our annual purchases into this spreadsheet, to save our data for later. We will copy our purchasing data from this spreadsheet and paste it directly into the EPP Assistant tool during the example analysis.

Table 4-1: Purchasing data for our case example

Spending Category	Corresponding BEA Commodity	Annual Amount
Printing and office paper	24.0705: Stationary, tablets, and related products	$500
Periodicals	26.0200: Periodicals	$500
Commercial printing	26.0501: Commercial printing	$500
New laptop	51.0103: Electronic computers	$500
New peripheral equipment	51.0104: Computer peripheral equipment	$150
Air transportation	65.0500: Air transportation	$1000
Telephones and Internet	66.0000: Communications, except radio and TV	$1200
Electricity	68.0100: Electric services (utilities)	$800
Natural gas	68.0200: Gas production and distribution (utilities)	$400
Hotels (business travel)	72.0100: Hotels and lodging places	$1000
Meals (business travel)	74.0000: Eating and drinking places	$500
Legal and accounting services	73.0301: Legal services	$300
Subcontractors	73.0105: Management and consulting services, testing & research labs	$15,000

We enter the purchasing data as shown in the table above into the spreadsheet, as illustrated in the next figure. Using the spreadsheet makes it easier to find BEA commodities, because the spreadsheet includes commodity categories, and also because we can use the “find” feature in our spreadsheet software to search for keywords, like “electric” or “gas” or “legal”, etc.

	A	B	C	D	E	F
151		_24_ Paper and allied products, except containers	24.0100	Pulp mills		
152			24.0400	Envelopes		
153			24.0500	Sanitary paper products		
154			24.0701	Paper coating and glazing		
155			24.0702	Bags, except textile		
156			24.0703	Die-cut paper and paperboard and cardboard		
157			24.0705	Stationery, tablets, and related products	500	
158			24.0706	Converted paper products, n.e.c.		
159			24.0800	Paper and paperboard mills		
160		_25_ Paperboard containers and boxes	25.0000	Paperboard containers and boxes		
161		_26A_ Newspapers and periodicals	26.0100	Newspapers		
162			26.0200	Periodicals	500	
163		_26B_ Other printing and publishing	26.0301	Book publishing		
164			26.0302	Book printing		
165			26.0400	Miscellaneous publishing		
166			26.0501	Commercial printing	500	
167			26.0601	Manifold business forms		
168			26.0602	Blankbooks, looseleaf binders and devices		
169			26.0700	Greeting cards		
170			26.0802	Bookbinding and related work		
171			26.0803	Typesetting		
172			26.0806	Platemaking and related services		
173		_27A_ Industrial and				

BEA Commods

Figure 16: Using the spreadsheet to organize our purchasing data

Next, we turn to the EPP Assistant tool.

Step 1: Decide how we will use the tool. Answer: to prioritize our existing purchases.

Step 2: Organize and input data about our purchases.

We discussed this in the preceding pages. We are using the BEA IO commodity list. So we double-click on the "Step 2" button in the main window of the tool, and select "BEA Commodities" from the "Select a commodity list" menu, as shown in the next figure.

Next we double-click on the button that reads "If you'll be using the BEA or NIGP commodities list, double-click here." Within the window that opens up, we click on the "Edit Table" button for "Purchased value, by BEA Commodity." The table that opens up is where we will enter or paste the data that describe our annual purchases. You can copy from the spreadsheet in the figure above (select and copy cells E5 through E479) and then click on the top cell in the Edit Table within the EPP Assistant, and paste the purchasing data into the EPP Assistant.

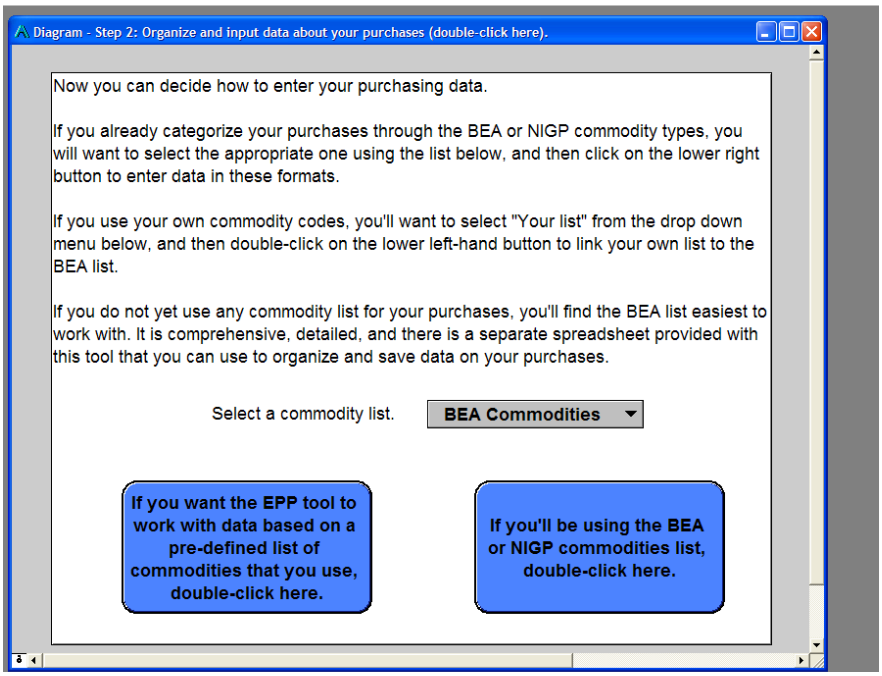


Figure 17: Selecting the BEA commodities list

Step 3: Get Results!

We double-click on the button labeled "To prioritize purchases, double-click here." This opens up a large window full of "Calc" buttons from which we can generate and view results.

Recall that our interest this year is to address our impacts on climate change, fossil fuel use, and overall impacts on human health. Let's begin by clicking the "Calc" button at the top of the window, for "Total Human Health Impacts." (We have to click "Ignore" twice, and then we are done with that nuisance message for the remainder of this usage session.) A window of results will open. It will be either a table of numbers, or a graph. Both views are shown in the figures below; to switch between them, just click in the "1.2" or bar-graph icons near the top left corner of the results window.

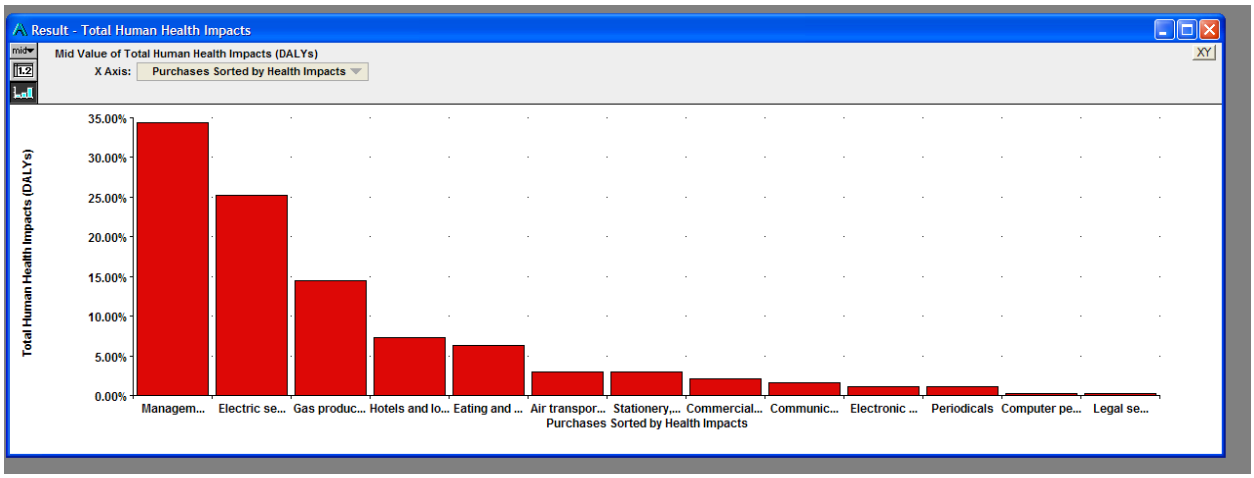
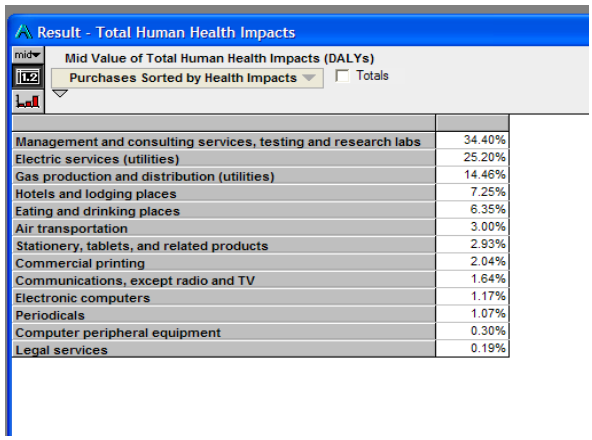


Figure 18: Human health results, in graphical format



Result - Total Human Health Impacts

Mid Value of Total Human Health Impacts (DALYs)

Purchases Sorted by Health Impacts | Totals

Management and consulting services, testing and research labs	34.40%
Electric services (utilities)	25.20%
Gas production and distribution (utilities)	14.46%
Hotels and lodging places	7.25%
Eating and drinking places	6.35%
Air transportation	3.00%
Stationery, tablets, and related products	2.93%
Commercial printing	2.04%
Communications, except radio and TV	1.64%
Electronic computers	1.17%
Periodicals	1.07%
Computer peripheral equipment	0.30%
Legal services	0.19%

Figure 19: Human health results in table format

What do these initial results tell us? Lots of things!

First, recall that we spend $15,000 per year on subcontractors. We spend $800 per year on electricity. Yet, purchases of electricity are not far behind purchases of management and consulting services in terms of total embodied human health impacts of pollution releases.

Perhaps there is not an "either-or" situation here. If we can purchase electricity from renewable or non-polluting sources, *and* encourage our subcontractors to do the same, then we will be addressing a large share of our total purchases' human health impacts.

We see that natural gas production and distribution is in third place – and this is without including the impacts of the emissions from combustion of the natural gas! Thus, a third thing we can do is make sure our office is well-insulated and uses a set-back thermostat, to minimize

our use of natural gas. Interestingly, air transportation, paper and printing, and even the production of our computer and printer, are not responsible for nearly as large an impact on human health.

Let's close the results window for human health impacts.

What about climate change, which is another one of our big priorities this year? Click on the "Calc" button for "Climate Change" impacts to see the results shown below.

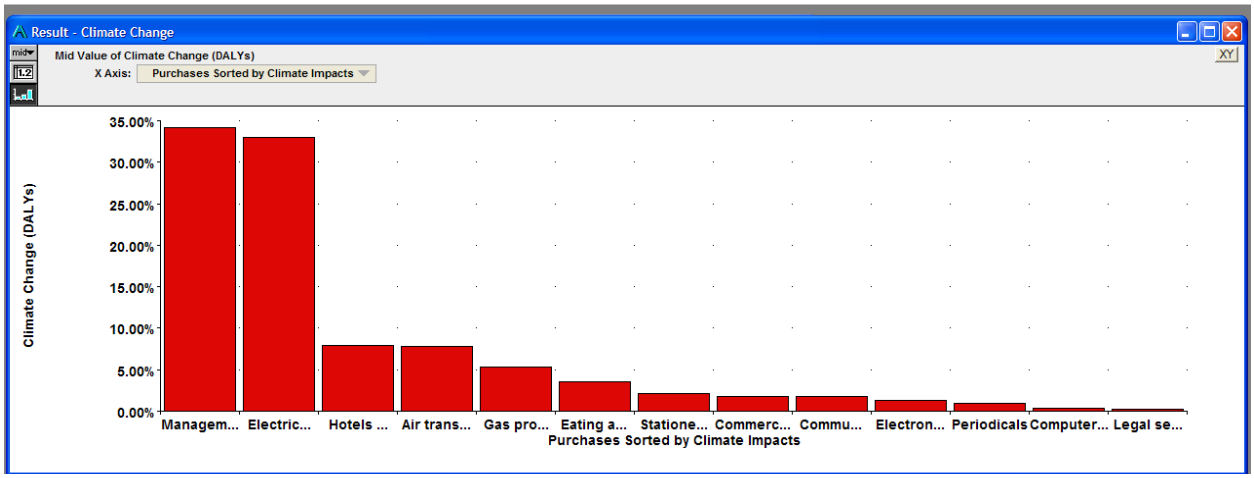


Figure 20: Results for climate change impacts

These results show us that our purchases of $800 of electricity have as much impact on climate change as our purchases of $15,000 of management consulting services! We also see that while air transportation is important, so are our stays in hotels! After all, hotels are heated and cooled, lit, and consume energy for washing and cleaning. Again, these results tell us that by focusing on the top 4-5 purchase categories, we can address the bulk of our impacts.

Finally, recall that we were also concerned about fossil fuel depletion. Click on the "Calc" button for "Depletion of fossil fuels" to see that, for this impact category, *it is all about our use of natural gas.* This is an interesting result – the uses of electricity and of air travel are having a large impact on climate change because these purchases include the combustion of the fuels. Our natural gas purchases include production, distribution, transportation, and so-on, but not the final combustion of the natural gas in our furnace or boiler. But when we look at the results in terms of fossil fuel depletion impacts, we see just how important our office heating truly is! Might be time to invest in more insulation, or more thermally insulated windows, and make sure we use that set-back thermostat in evenings and weekends.

What about driving one's car to/from work? For simplicity, we've assumed that the consultant in the case study works out of a home office, but still, there is driving to/from the airport, the computer store, and so-on. While employees' driving to work does not show up in the expenses of a large company, it can indeed show up as very important in the impacts of all service sector companies, large and small. This should be borne in mind when you do your studies! Also, future versions of this open source tool should gain the ability to include "on-site" emissions associated with purchases such as natural gas for heating, and gasoline for automobiles.