

Walk-through for CMU's EIO-LCA Model



What is this?

ANS: This is an input-output model which you can use to gage the environmental impact of goods and services produced in the economy. It provides a great quick approximation for a full LCA.

For a another example – please visit the tutorial:

http://www.eiolca.net/tutorial/tut_1.html

- 1) Once at <http://www.eiolca.net/use.html>, either search for the product you are looking for or browse a category. We first are going to look at plastic bottles.

The screenshot shows the eiolca.net website interface. At the top, there is a header with the eiolca.net logo on the left and the Carnegie Green Design Institute logo on the right. Below the header is a navigation bar with three tabs: "About the Model", "Use the Model", and "Teach the Model". The "Use the Model" tab is active, showing three sub-tabs: "Simple", "Advanced", and "Custom". The "Advanced" sub-tab is selected. The main content area displays the text: "You may either find a sector via a keyword search, or browse through the sector list for US Dept of Commerce EIO model from 1997 (491 x 491) contributed by Green Design Inst". Below this text is a search form with a text input field containing "plastic bottles", a "Search" button, and a note: "Note: Feature in development - use with caution." Below the search form is a "Categories" section with a dropdown menu showing "Plastic, Rubber and Nonmetallic Mineral products" and a "Browse" button.

Search for plastics bottles or browse plastic, rubber and nonmetallic products.

2a) Select "Plastic bottle manufacturing either from the search results or by browsing the category (here I browsed)

Sectors for Plastic, Rubber and Nonmetallic Mineral products:

Select one of the following sectors for analysis.

Plastics bottle manufacturing

which of the following data sources would you like to display?

- Economic Activity
- Conventional Air Pollutants
- Greenhouse Gases
- Energy
- Toxic Releases

2b) Select one or more output categories you are interested in

2c) Select dollar amount (units x price per unit). In this case I assumed 10 million bottles at a price of \$0.25/each (in 1992)

For what level of increased economic activity in the selected sector? Note, this refers to producer price.

2.5 Million Dollars

How many sectors would you like displayed? Top 25

2d) Select how many related sectors are portrayed

Display Data for selected sector(s)

Note: How to find prices?

- In this times of e-commerce, you can find the price of a unit just by using GOOGLE.
- The tricky part comes that since this model works 1992 commodity/commodity input-output (IO) matrix of the US economy, you need to transform your price to a 1992 equivalent. There 2 ways:

1) Find NAUICS code

2) Then find data for the appropriate yr:

$$\text{Price / unit} = \frac{\text{Total Econ Activity}}{\text{Total Units}}$$

$$P(1997) = P(2005) \times \frac{CPI(1997)}{CPI(2005)}$$

Where P(x) = price in year x

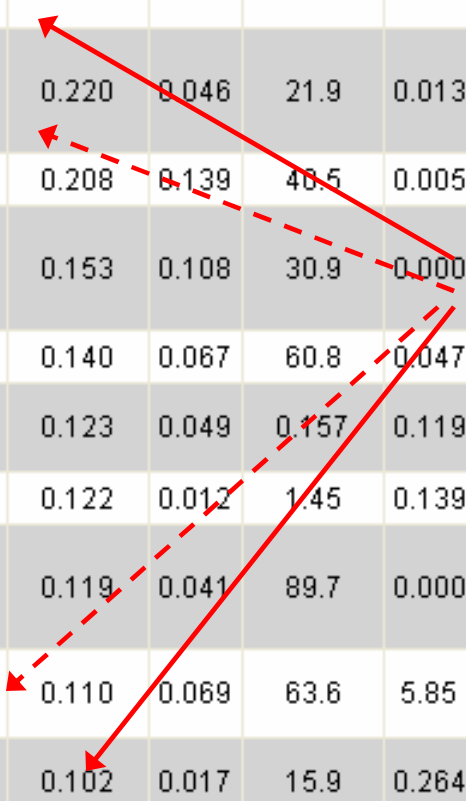
CPI (x) = the value of the consumer price index in year x. For this please refer to:

<http://www.census.gov/prod/2001pubs/statab/sec15.pdf>

Output

	Sector	Total Economic \$mill	Value Added \$mill	Direct Economic %	SO2 mt	CO mt	NOx mt	VOC mt	Lead mt	PM10 mt	GWP MTCO2E	CO2 MTCO2E	CH4 MTCO2E	N2O MTCO2E	CFCs MTCO2E
		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Total for all sectors	6.09	2.47	66.7	7.12	21.9	5.93	5.35	0.001	0.756	2860	2280	234.	272.	72.2
326160	Plastics bottle manufacturing	2.51	0.929	99.9	0.082	0.000	0.011	0.199	0	0.005	94.5	92.0	0.276	2.22	0
325211	Plastics material and resin manufacturing	0.634	0.145	86.1	0.013	0.038	0.026	1.52	0	0.051	279.	217.	0.146	32.1	29.9
325190	Other basic organic chemical manufacturing	0.220	0.046	21.9	0.013	0.112	0.047	0.252	0	0.014	85.6	74.4	0.042	4.08	7.06
420000	Wholesale trade	0.208	0.139	40.5	0.005	1.38	0.124	0.104	0	0.003	64.7	6.11	0.044	58.6	0
550000	Management of companies and enterprises	0.153	0.108	30.9	0.000	0.000	0.000	0.000	0	0	6.69	1.64	0.011	5.04	0
484000	Truck transportation	0.140	0.067	60.8	0.047	15.3	1.10	1.14	0.000	0.027	54.3	47.0	0.149	7.14	0
211000	Oil and gas extraction	0.123	0.049	157	0.119	0.203	0.089	0.137	0	0.004	130	20.9	107.	1.26	1.42
324110	Petroleum refineries	0.122	0.012	1.45	0.139	0.080	0.031	0.111	0	0.014	169.	83.6	18.5	66.9	0.019
326110	Plastics packaging materials, film and sheet	0.119	0.041	89.7	0.000	0.000	0.000	0.080	0	0.000	6.94	5.74	0.013	1.05	0.135
221100	Power generation and supply	0.110	0.069	63.6	5.85	0.289	2.65	0.026	0.000	0.124	1090	1070	0.214	7.05	13.0
325110	Petrochemical manufacturing	0.102	0.017	15.9	0.264	0.085	0.198	0.626	0	0.015	101.	79.1	0.047	16.9	5.11

Inputs



Total TJ	Elec MKWh	Coal TJ	NatGas TJ	LNG TJ	LPG TJ	MotGas TJ	Diesel TJ	Kero TJ	AvFuel TJ	JetFuel TJ	LFO TJ	HFO TJ
34.4	1.80	10.3	14.7	0.011	1.83	1.41	0.253	0.002	0.021	0.441	1.52	1.86
2.71	0.833	0	1.12	0	0.207	0.448	0	0	0	0	0	0
4.78	0.276	0.266	3.89	0	0.226	0.057	0	0	0	0	0.016	0.030

IFO TJ	Non-Point Air kg	Point Air kg	Tot Air Releases kg	Water Releases kg	Land Releases kg	U'ground Releases kg	Total Releases kg	POTW Transfers kg	Offsite Transfers kg	Total Rel/Trans kg
.86	174.	641.	814.	112.	746.	334.	2010	355.	166.	2530
0	0.018	1.30	1.32	0	0	0	1.32	0	0.044	1.37
030	75.3	163.	238.	17.8	0.962	87.0	344.	142.	20.9	507.

Notes:

- \$mil = million dollars
- Total economic = complete economic supply chain of purchases needed to produce the outputs at the level you specify.
- Value Added = difference between output and supply chain purchases.
- Direct Economic % = purchases made by the industry analyzed / total supply chain effect.
- MTCO₂E = metric tones of CO₂ equivalent.
- GWP = global warming potential.

For the rest of you questions on the headers of the output table just place the cursor above and an explanation will appear!!!

I recommend you read the following FAQs. It makes it easier to understand.

- <http://www.eiolca.net/methods.html>

Cool Application 1:

- Most LCI databases have just LCI's for products. With this you can create an approximate LCI for say a performing arts company. Try it out (under “Arts, entertainment, recreation, hotels and food services” category)

Cool Application 2:

- Easy to obtain approximate LCIs for a product comparison