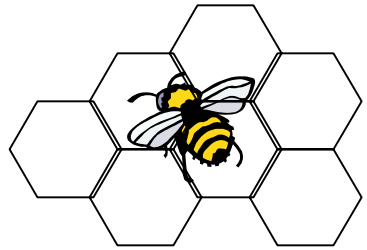
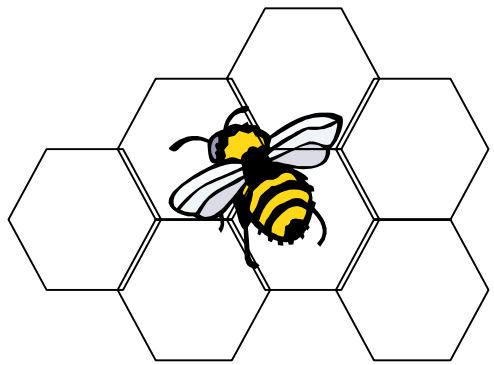
"The Four Toos"



- *Too Much Information*
- *Too Many Criteria*
- *Too Many Choices*
- *Too Little Time*

Building for Environmental and Economic Sustainability (BEES™)

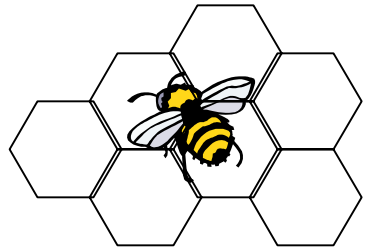


Barbara Lippiatt

U.S. Department of Commerce

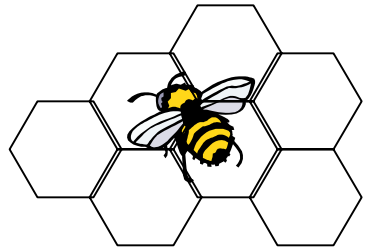
National Institute of Standards and Technology

BEES Sponsors



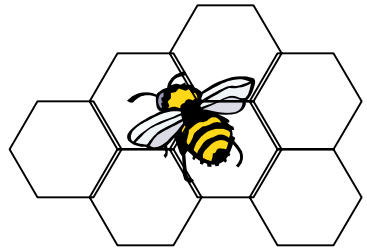
- *NIST Building & Fire Research Laboratory*
- *U.S. EPA Environmentally Preferable Purchasing Program*
- *White House (PATH)*
- *U.S. Department of Agriculture*

BEES Contractors



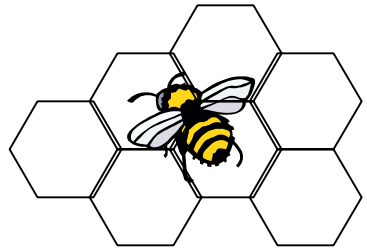
- PriceWaterhouse Coopers/Ecobalance
- Southface Energy Institute
- University of Michigan
- Institute for Environmental Research and Education

BEES 2.0 Users



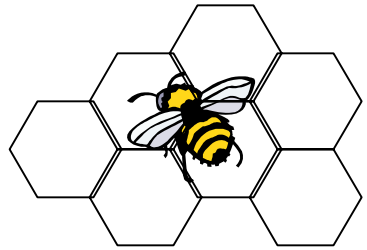
- 4500+ users from 60 countries
  - Designers 23%
  - Builders 16%
  - Government 14%
  - Consultants 12%
  - Educators 11%
  - Other 11%
    - Researchers 9%
    - Manufacturers 6%

How Does BEES Work?



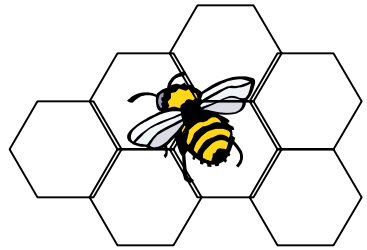
- Model
- Data
- Software

BEES Model



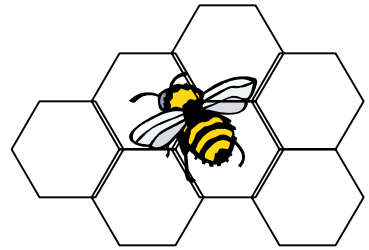
- ***Takes Life-Cycle Approach***
- ***Based on Consensus Standards***
  - *Life-Cycle Costing (ASTM E917)*
  - *Building Element Classification (ASTM E1557)*
  - *Environmental Life-Cycle Assessment (ISO 14040)*
  - *Multi-Attribute Decision Analysis (ASTM E1765)*

BEES Model: Environmental Impacts



- Global Warming
- Acid Rain
- Eutrophification
- Resource Depletion
- Indoor Air Quality
- Solid Waste
- Smog
- Ozone Depletion
- Ecological Toxicity
- Human Toxicity

Analysis Parameters



☐ No Weighting

Environmental vs. Economic Performance Weights

Environmental Performance (%): 50 vs. Economic Performance (%): 50

Environmental Impact Category Weights

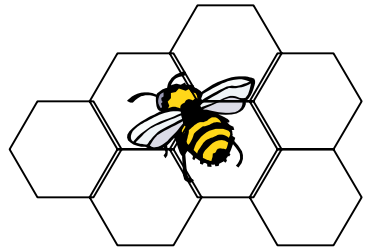
- ○ User-Defined
- ○ EPA Scientific Advisory Board
- ○ Harvard University
- ◉ Equal Weights

View Weights

Discount Rate (%): (Excluding Inflation) 4.2

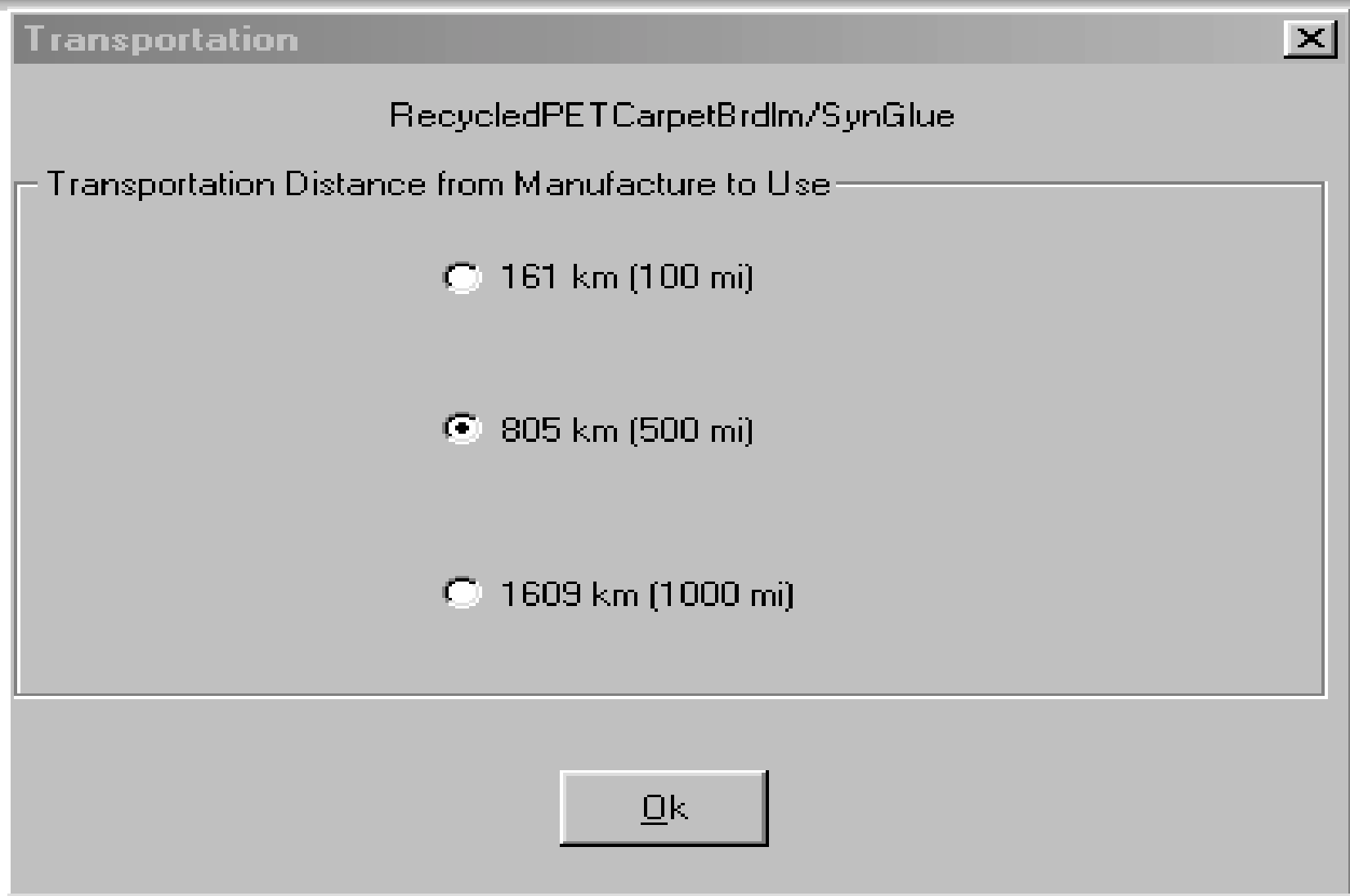
Ok Cancel Help

BEES Parameters: Environmental Weights

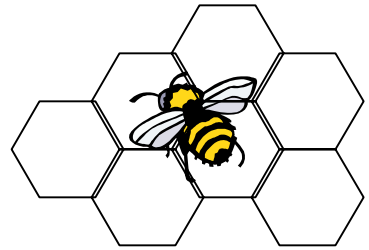


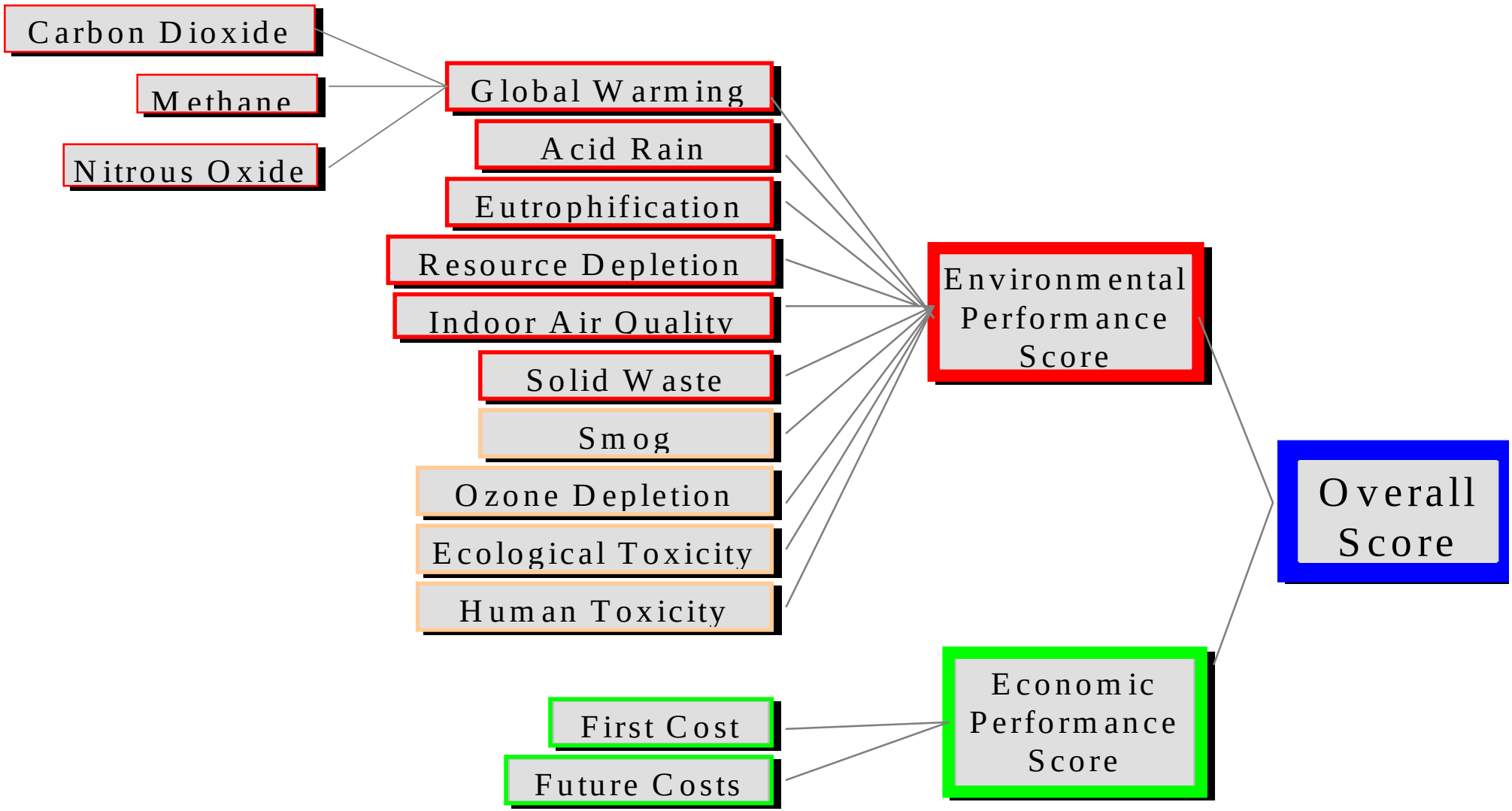
	EPA	Harvard
Global Warming	27	28
Acid Rain	13	17
Eutrophication	13	18
Resource Depl'n	13	15
Indoor Air	27	12
Solid Waste	7	10
	100%	100%

BEES Model: Parameters

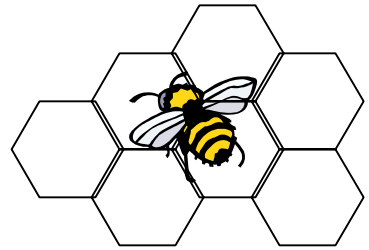


BEES 2.0 Model



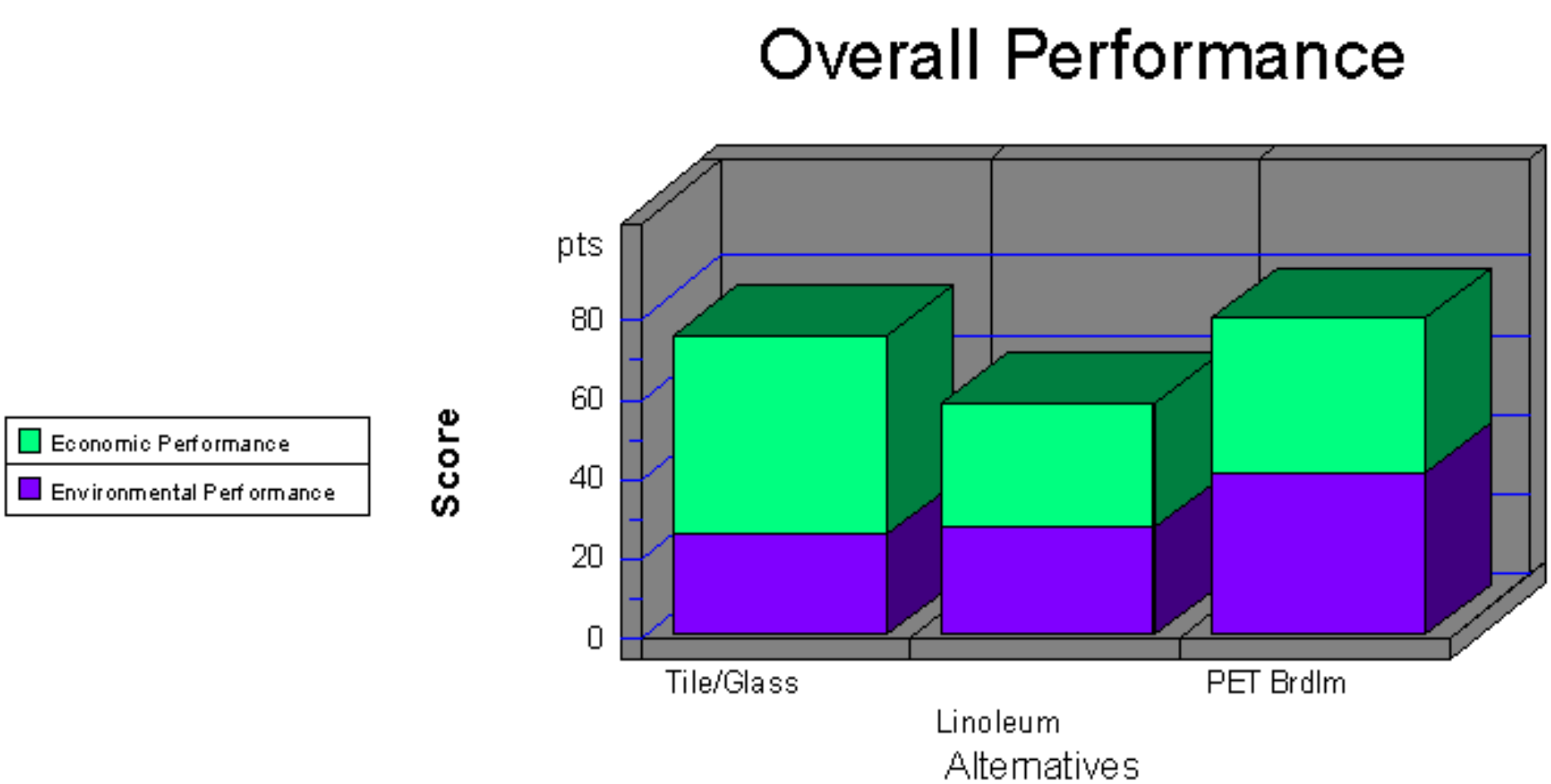


BEES Data



- **U.S. Industry Average**
- **Fifteen Building Elements**

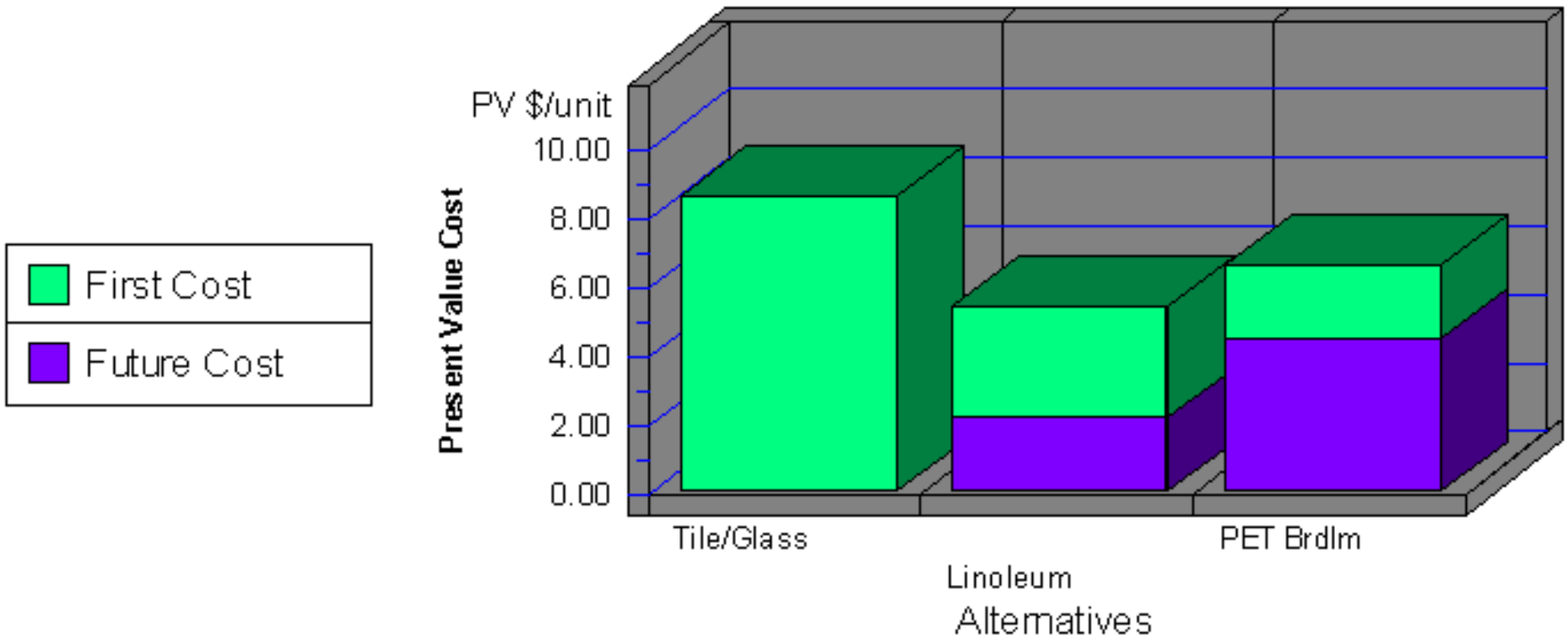
- *Framing*
- *Exterior Wall Finishes*
- *Wall Sheathing*
- *Wall Insulation*
- *Roof Coverings*
- *Roof Sheathing*
- *Ceiling Insulation*
- *Interior Wall Finishes*
- *Floor Coverings*
- *Slab on Grade*
- *Basement Walls*
- *Beams*
- *Columns*
- *Parking Lot Paving*
- *Driveways/Sidewalks*



Note: Lower values are better

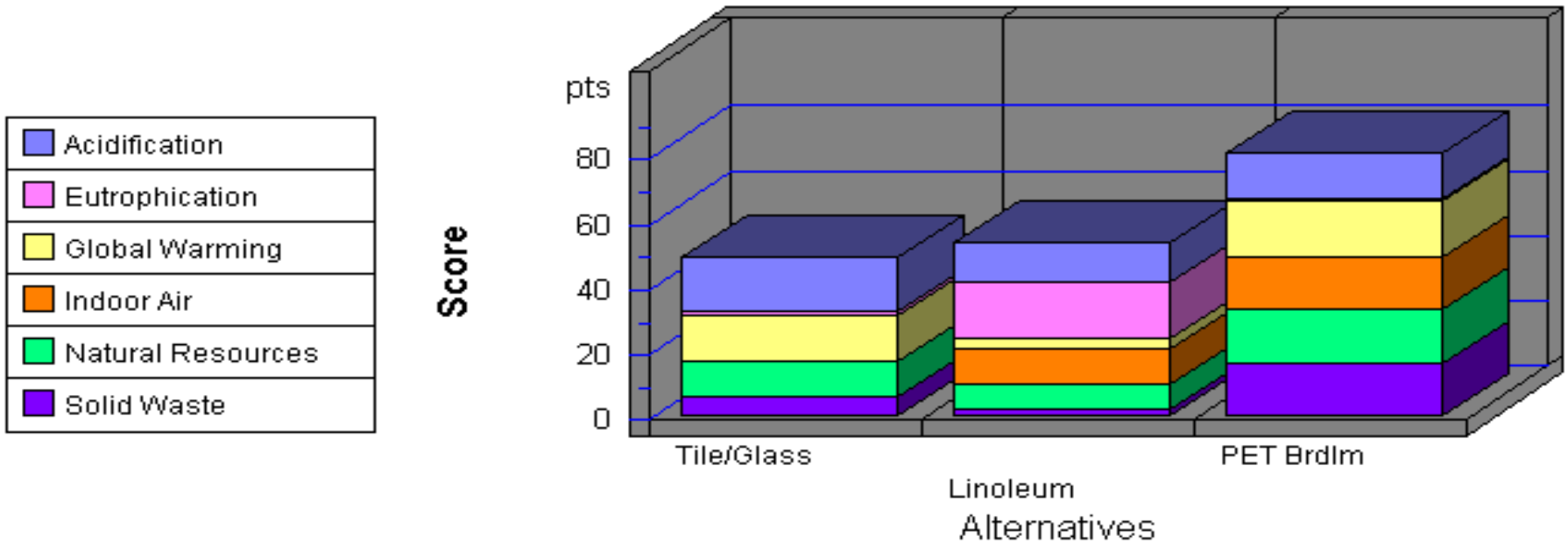
Category	Tile/Glass	Linoleum	PET Brdlm
Economic Perform.–50%	50	31	39
Environ. Perform.–50%	25	27	41
Sum	75	58	80

Economic Performance



Category	Tile/Glass	Linoleum	PET Brdlm
First Cost	8.53	3.18	2.11
Future Cost– 4.2%	0.00	2.15	4.46
Sum	8.53	5.33	6.57

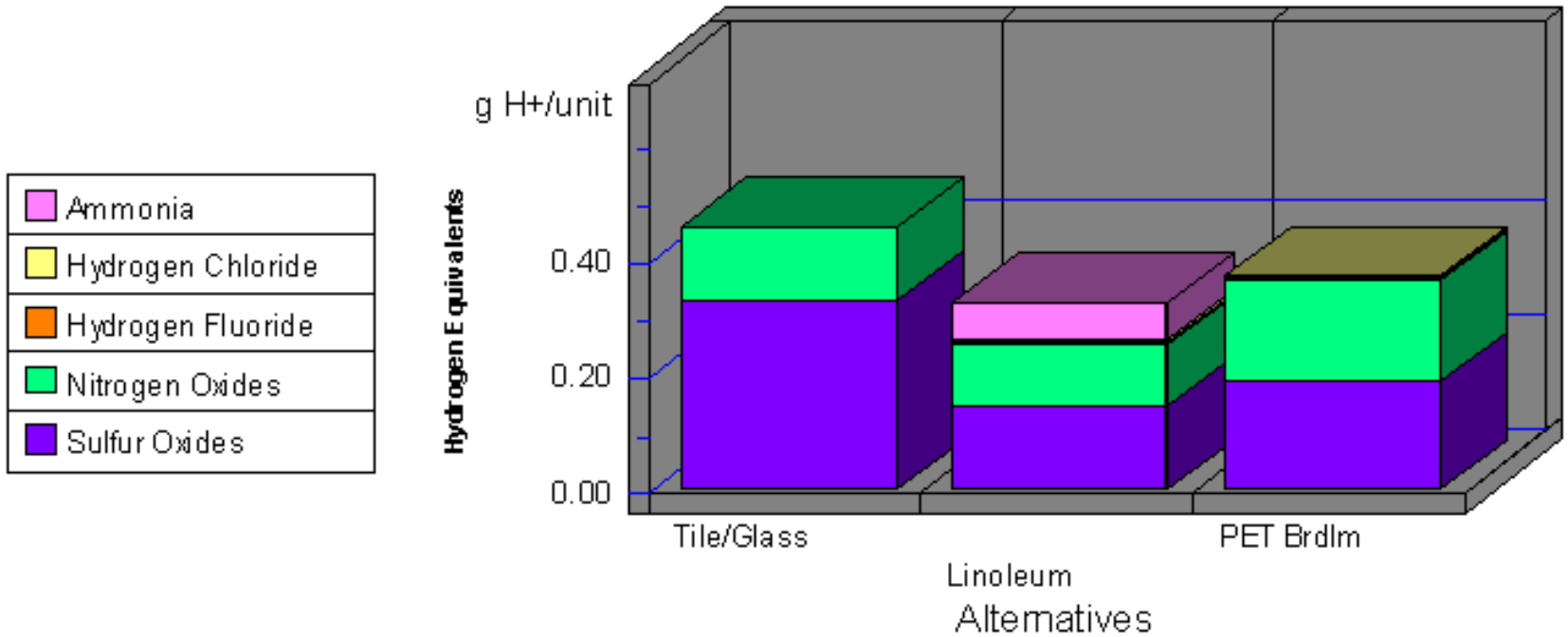
Environmental Performance



Note: Lower values are better

Category	Tile/Glass	Linoleum	PET Brdlm
Acidification--17%	17	12	14
Eutrophication--17%	1	17	1
Global Warming--17%	14	3	17
Indoor Air--16%	0	11	16
Natural Resources--17%	11	8	17
Solid Waste--16%	6	2	16
Sum	49	53	81

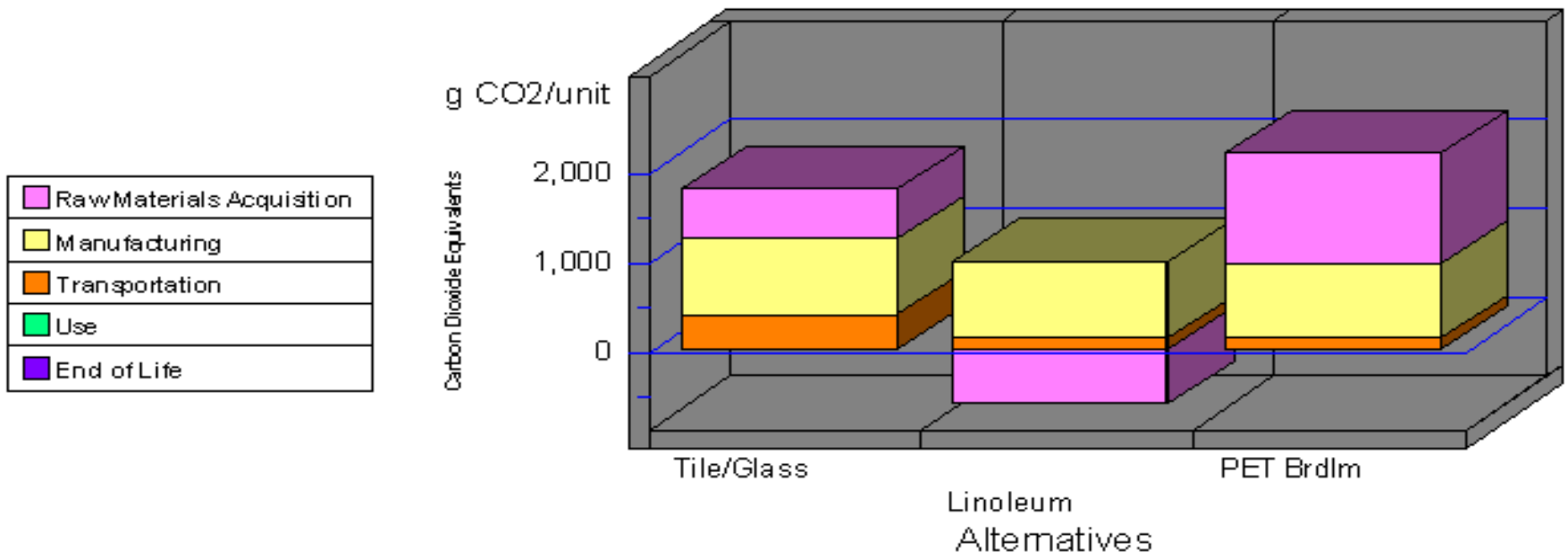
Acidification by Flow



Note: Lower values are better

Category	Tile/Glass	Linoleum	PET Brdlm
Ammonia	0.0001	0.0644	0.0006
Hydrogen Chloride	0.0019	0.0039	0.0052
Hydrogen Fluoride	0.0001	0.0008	0.0011
Nitrogen Oxides	0.1251	0.1098	0.1767
Sulfur Oxides	0.3318	0.1454	0.1886
Sum	0.4590	0.3243	0.3722

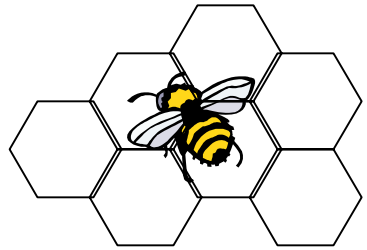
Global Warming by Life-Cycle Stage



Note: Lower values are better

Category	Tile/Glass	Linoleum	PET Brdlm
1. Raw Materials	550	-624	1229
2. Manufacturing	860	867	843
3. Transportation	373	117	116
4. Use	0	0	0
5. End of Life	0	0	0
Sum	1783	360	2188

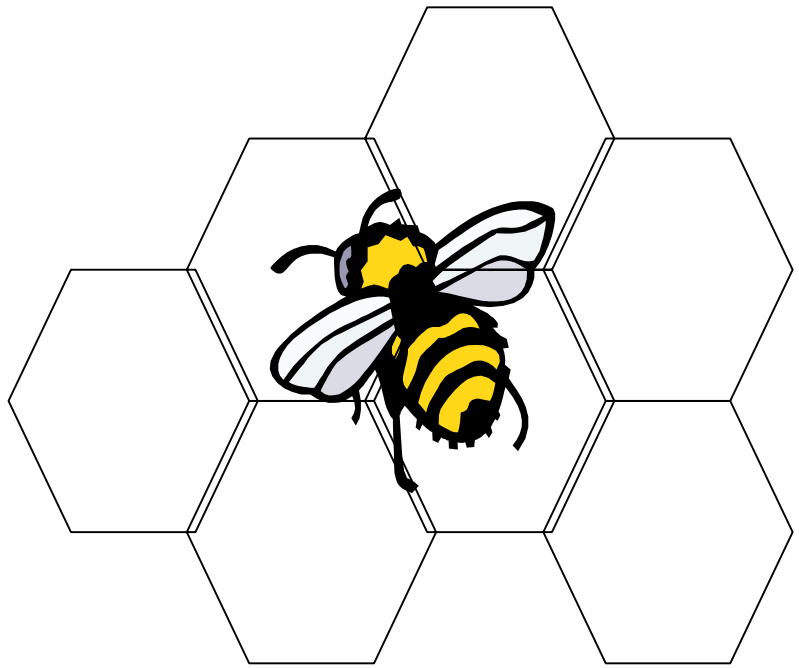
What's Next?



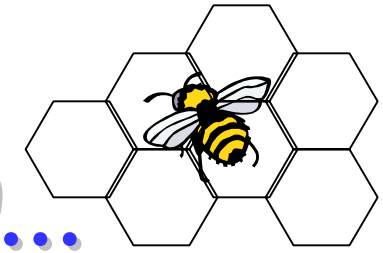
- *"BEES Please:" Collect brand-specific data*
- *Respond to BEES 2.0 Critical Review*
  - *habitat alteration impact*
  - *absolute measurement*
- *Compare BEES vs. LEED results*
- *Publish BEES 3.0 Winter 2002*

BEES Tool

- *Practical*
- *Consistent*
- *Transparent*
- *Flexible*



For a Free Copy of BEES 2.0...



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