Analyzing the Environmental Impacts from Residential Brownfield and Greenfield Developments

Amy Nagengast
Carnegie Mellon University

June 10, 2011
International Society for Industrial Ecology 2011

What is a Brownfield?

Southside Works
Pittsburgh, Pennsylvania

"Brownfields are properties with the presence (or suspected presence) of hazardous substances or contaminants"

Brownfields: Benefits & Barriers

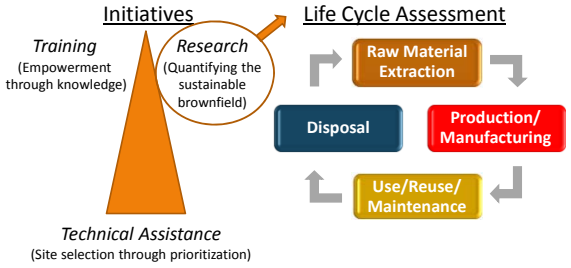
Benefits

- Location
- Existing Infrastructure
- Public Health and Safety
- Economic Growth
- Job Creation
- Local Tax Generation

Barriers

- Cleanup Costs
- Development Costs
- Liabilities
- Collaboration among Stakeholders
- Permitting
- Limited data on previous projects

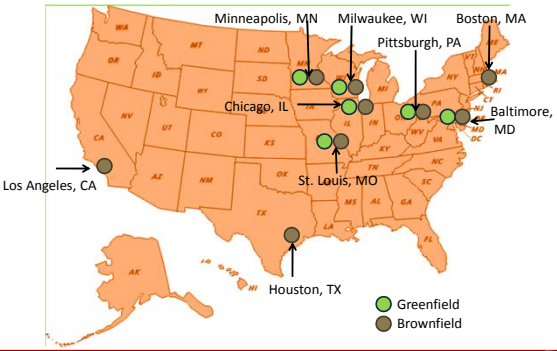
Assessing Brownfield Sustainability: Life Cycle Analysis and Carbon Footprinting



What could be different with BF and GF?

- Construction Costs-Remediation
- Travel to Work
  - Distance & Time
  - Modal Choice
- Housing Characteristics
  - Housing type (single family, multifamily)
  - Population density
- Infrastructure (roads, pipes, electricity)
- Occupant Factors
  - Income
  - Education
- Walkability-Amenities in a close proximity

Brownfield and Greenfield Locations



Brownfield Trade Offs

$580,000/acre

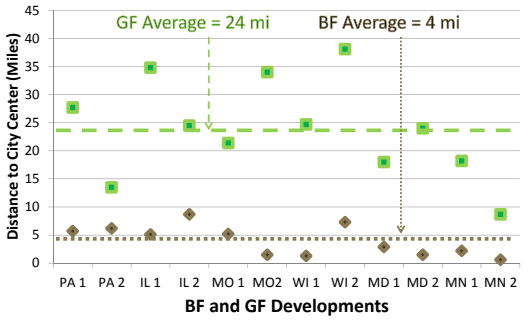
Average $190,000/acre

$22,000/acre

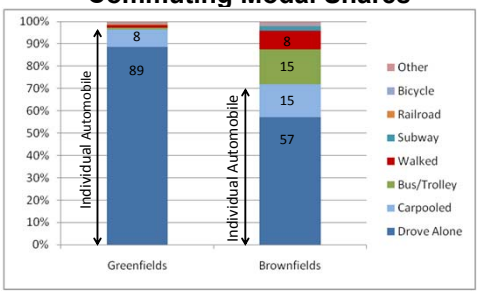
- Distance
- Time
- Fuel
- Emissions

Source: Mashayekh, Yeganeh, Chris Hendrickson, and H. Scott Matthews, (2011), The Role of Brownfield Developments in Reducing Household Vehicle Travel, ASCE J. of Urban Planning and Development (in review).

Distance to City Center

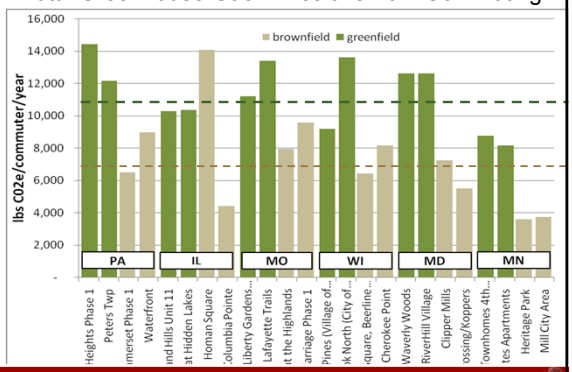


Commuting Modal Shares



Largest differences are in Individual Automobile, Public Transportation and Walking categories

Total Greenhouse Gas Emissions from Commuting



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Preliminary Results

Category	Annual Savings ($/year/person)	Annual Greenhouse Gas Emission Savings (kg CO2E/year/person)
Remediation	(250)	(60)
Building Utility Energy	10	400.
Travel Costs	200	700.
Value of Travel Time	900	-
Sum	**860**	**1,000**

Conclusions

- Remediation costs and commuting savings are important in economic and GHG calculations
- Brownfield redevelopment can be an avenue to reduce transportation congestion.
- Brownfields are of interest to multiple stakeholders.

Acknowledgements

Special Thank You to:

- Chris Hendrickson, Professor, Dept. of Civil and Environmental Engineering, Carnegie Mellon University
- Deb Lange, Executive Director, Steinbrenner Institute for Environmental Education and Research (SEER), Carnegie Mellon University
- US EPA Training, Research and Technology Assistance Grant EPA-560-F-08-290
- Western Pennsylvania Brownfields Center
- Green Design Institute

Questions?

Contact Information

Amy Nagengast

Email: anagenga@andrew.cmu.edu

Website: https://www.andrew.cmu.edu/~anagenga/