

## Brownfields, Infill, and Energy

---

Evans Paull  
Northeast-Midwest Institute  
[www.nemw.org](http://www.nemw.org)  
epaull@nemw.org

---

---

---

---

---

---

---

---

## Brownfields, Infill, and Energy Summary

---

- **Transportation Aspects:**
  - Brownfields/In-fill connection to lower VMT's
    - Shorter work and shopping trips
    - Higher non-auto mode split
- **Building-Related Aspects:**
  - Density and Brownfields
  - Green Buildings and Brownfields;
- **Site related Aspects**

---

---

---

---

---

---

---

---

## Energy Demands by Sector

---

Energy demands by Sector

Sector	Percentage
Buildings	43%
Transportation	32%
Industry	25%

---

---

---

---

---

---

---

---

**Transportation/VMT's  
ULI Report – “Growing Cooler”**

- VMT's are increasing faster than fuel efficiency
- Compact growth - people *do* drive less
- “The rise in vehicle emissions can be curbed simply by growing in a way that makes it easier for Americans to drive less”

---

---

---

---

---

---

---

---

**Transportation/VMT's  
ULI Report – “Growing Cooler”**

25% Less daily VMT/HH with Compact Development

Area Type	Daily VMT/HH
10 Most Sprawling Metropolitan Areas	27
10 Most Compact Metropolitan Areas	21

Source: Ewing, Pendall, and Chen 2002, p. 18.

---

---

---

---

---

---

---

---

**Transportation/VMT's  
ULI Report – “Growing Cooler”**

- 20% – 40% VMT reduction due to “compact in-fill” development.
- Factors affecting the range, in rank order:
  - Location near city center
  - Density
  - Mixing of uses/internal design
  - Degree of connectedness to the existing grid
  - Access to transit

---

---

---

---

---

---

---

---

**Transportation/VMT's  
ULI Report – “Growing Cooler”**

- Growth scenario: if 60% of new development by 2050 is “compact:”
  - Reduces total transportation-related CO<sub>2</sub> from expected trends by 7% to 12%.
  - Benefits are permanent and will grow over time

---

---

---

---

---

---

---

---

**Transportation/VMT's  
Atlanta – “Walkable Neighborhoods” study**

- “Walkable” = density, mixed land uses, and the interconnectedness of the street patterns;
- “Most Walkable Neighborhoods” saved 20% - 30% VMT's compared to “Least Walkable Neighborhoods”

---

---

---

---

---

---

---

---

**Transportation/VMT's  
King Co – “Interconnected Neighborhoods”**

- Urban “Interconnected Neighborhoods” = Density, frequency of intersections, grid pattern
- Reduced VMT's by 26%

---

---

---

---

---

---

---

---

**Transportation/VMT's**  
 Center for Clean Air Policy – Residential Densities

- Suburban 4 units per acre vs. Urban 20 units per acre
- Projected 25% reduction in VMT's for Urban

---

---

---

---

---

---

---

---

**Transportation/VMT's**  
 Brownfields and Compact Development

- Can Brownfields Projects claim the VMT reductions attributed to dense/compact development?

---

---

---

---


---

---

---

---

**Transportation/VMT's –**  
 Brownfields/infill and VMT's



- Clean Air-Brownfields Project:
  - Dallas and Baltimore case studies: Brownfields vs greenfields, saves:
    - 22% - 55% VMT's
    - 40% - 87% - NOX
    - 36% - 73% - VOC's
- Atlantic Station EPA Analysis
  - Atlantic Steel (vs. 3 alternate suburban sites) saves:
    - 14% - 52% VMT's
    - 37% - 81% - NOX
    - 37% - 81% - VOC's

---

---

---

---



---

---

---

---

### Transportation/VMT's Atlantic Steel to Atlantic Station

- 6 mil sq ft office
- 5,000 DU's
- 2 mil sq ft retail
- 1,000 hotel rms
- 11 acres open space

---

---

---

---

---

---

---

---

### Going beyond VMT's – Building Factors

- Buildings account for 43% of energy demand
- Ways to reduce GHG's attributable to Buildings:
  - Green/energy efficient buildings
  - Efficiencies in heating and air conditioning higher density structures (fewer exposed walls)

---

---

---

---

---

---

---

---

### Building Factors – Green Buildings

- Green Buildings and Brownfields
  - 25% of LEED-ND applicants applied for brownfields points;
  - Cherokee Investments – all projects will be green;
  - Consultants – market forces favor large-scale mixed use urban/brownfields projects going green;
  - **ALL** four large-scale TIF projects cited in a recent NEMW report are going green

---

---

---

---

---

---

---

---

## Building Factors – Green Buildings Mega-Brownfields Projects – Going Green



Atlantic Station, Atlanta



Gates Rubber, Denver



Gateway South, Baltimore



Cleveland Flats East Bank, Cleveland

---

---

---

---

---

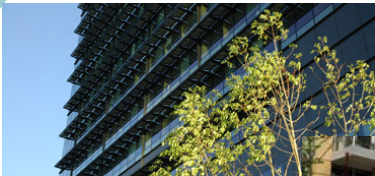
---

---

---

## Building Factors – Green Buildings Mega-Brownfields Projects – Going Green

Portland –  
South Waterfront



---

---

---

---

---

---

---

---

## Going beyond VMT's – Building Factors - Density

- Efficiencies in heating and air conditioning more dense structures (fewer exposed walls)
  - Multi-family housing averages ½ the electricity use of single-family housing;
  - ULI report – 20% differential when control for socioeconomic factors and DU size

---

---

---

---

---

---

---

---

## Going beyond VMT's – Building Factors - Density

- GWU Density analysis of brownfields vs. greenfields
  - One acre/Brownfields saves 4.5 acres greenfields;
- LEED analysis (NEMW)
  - Brownfields projects - more than twice as likely to also qualify for LEED density points

*Can brownfields claim the density benefits - VMT and buildings?*

*CONCLUSION: YES, but...*

---

---

---

---

---

---

---

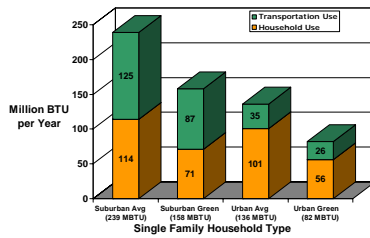
---

---

---

## Adding up the Transport and Building Benefits

- Average In-Town House Outperforms Even the Greenest Sprawl House w/Hybrid Cars (Source: Smart Growth America)




---

---

---

---

---

---

---

---

---

---

## Going beyond VMT's – Site Factors

- Infrastructure-related energy demands
  - Cost differential –
    - \$55,000/DU/Suburban vs.
    - \$7,500/DU/brownfields
  - Infill 25% lower than greenfields (EESI)
- Greater efficiency (lower “line-loss”) in transmitting energy???
- Distributed Energy
  - Waste-to-energy plants serve many urban core areas

---

---

---

---

---

---

---

---

---

---

## Going beyond VMT's – Site Factors – Distributed Energy

### o Waste-to-Energy plants

- 89 waste-to-energy plants operating in 27 states;
- Generate 2,500 megawatts electricity to 2.3 million homes;
- 1500-ton/day facility saves **270,000 tons** CO<sub>2</sub> annually



Baltimore's waste to energy plant – BRESCO – serves Baltimore's core/Downtown

---

---

---

---

---

---

---

---

## Summary – What we know and what we need to analyze in more depth

### o Known:

- Relationship between VMT's and urban/compact development;
- Green buildings and energy;
- Density is a key:
  - o VMT
  - o Building HVAC energy demands

### o Needs analysis:

- Brownfields and density
- Brownfields and green buildings
- Brownfields and TOD
- Brownfields and distributed energy
- Brownfields and efficiencies in transmitting energy (line-loss)

---

---

---

---

---

---

---

---

## Brownfields, Infill, and Energy

Evans Paull  
Northeast-Midwest Institute  
[www.nemw.org](http://www.nemw.org)  
epaull@nemw.org

---

---

---

---

---

---

---

---