

# Buildings

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A photograph of a city skyline at dusk or dawn, with buildings silhouetted against a dark sky. The title 'Building & Site Design Issues' is overlaid in white text with a blue outline.

# Building & Site Design Issues

- Increased energy consumption
- Materials & building design
- Quality, function & context of buildings within our neighborhoods
- Financial implications of green building

A photograph of a city skyline at dusk or dawn, with various buildings and a bridge visible against a dark sky. The title 'Buildings Introduction' is overlaid on this image.

# Buildings Introduction

## Energy Consumption

- In 2004, residential and commercial buildings in the US accounted for more than 38% of our total annual energy consumption
  - 21% residential
  - 17% commercial
- This percentage is growing and is projected to surpass 50% in less than 20 years
- Only one-half of one percent of our these buildings' energy consumption comes from renewable sources
- These figures indicate the urgent need for sustainable design as our communities grow

A background image showing a city skyline with various buildings and a bridge, overlaid with a semi-transparent dark blue layer.

# Buildings

## Sustainable Design & Materials

What is Sustainable (Good) Design?  
Functional + Comfortable + Energy Efficient  
+ Healthy + Durable  
= Environmentally Responsible

- LEED (Leadership in Energy & Environmental Design) Criteria:
  - LEED-H for homes
  - LEED-NC for new construction
  - LEED-ND for neighborhood developments

A background image showing a city skyline at sunset or sunrise, with buildings and a bridge visible against a warm, orange and yellow sky. The title 'Life Cycle Awareness' is overlaid in white text with a blue shadow effect.

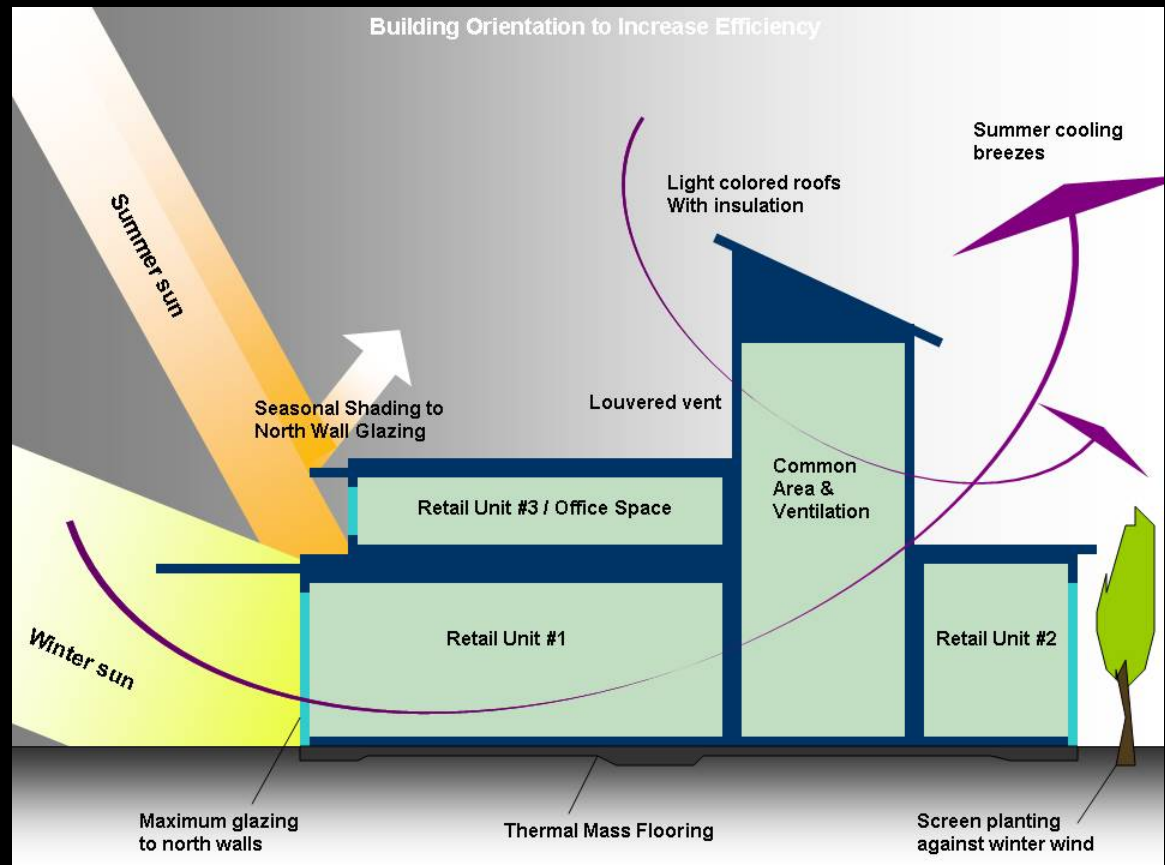
# Life Cycle Awareness

We must consider the following about materials to make wise material selection & design choices:

- Quarrying & refining
- Production of raw materials
- Manufacturing of raw materials
- Manufacturing of components
- On-site construction
- Building use
- Afterlife: demolition, reuse, disposal

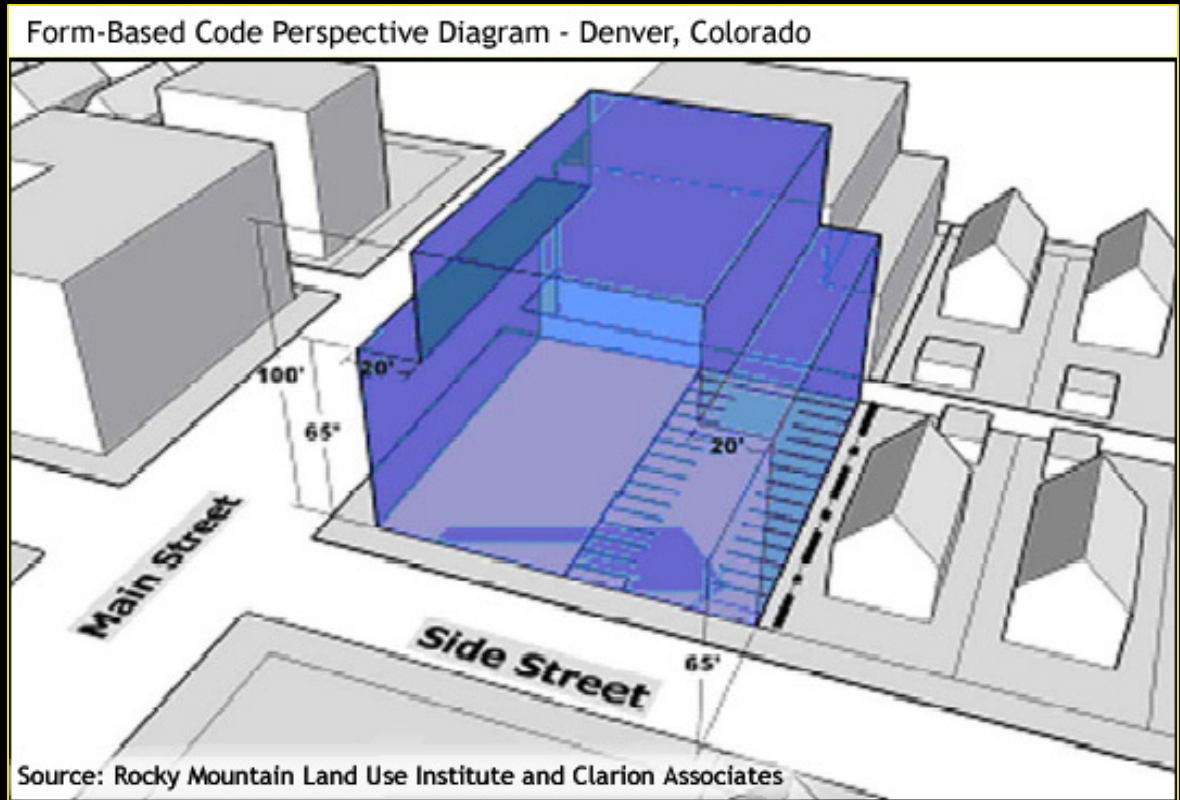
# Land Use Strategies

- Use of Police Power
- Comprehensive Planning & Community Goal Setting
- Aesthetics
- Size Caps
- Energy Efficient Design



# Land Use Strategies

- SmartCode
- Form-Based Code →
- Traditional Neighborhood Development
- Transit Oriented Development





A background image showing a city skyline with several skyscrapers and a large bridge in the distance, likely the Cleveland skyline. The text is overlaid on this image.

# Promoting Retail Development in the Right Places

**How do we promote sustainable retail development in core/old cities?**

- Historic preservation easements
- Historic tax credits
- Smart growth tax credits
- Enhancement of the Storefront Program, Restore Cleveland and Main Street Initiatives
- Cluster development in retail nodes in City of Cleveland
- Thinning out obsolete retail in other areas





# Other Potential Strategies for Cleveland

- Impact fees
- Incentives for meeting sustainable design criteria
- LEED Inspections
- Regional impact analysis & review
- Use of local and regional comprehensive planning to establish goals and land use regulations to enforce them

# Where is the Market?

## First Cost Premiums

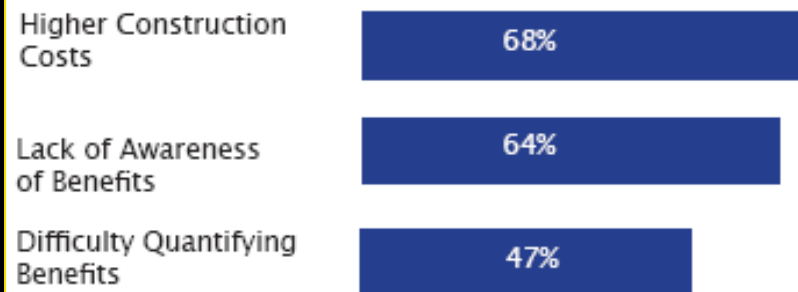
- Many green techniques employed at little or no additional cost, if used early
- Economies of Scale

## Quantifying Benefits

- Does green building pay off in the long run?
- How do you calculate this?

Figure A: Factors Discouraging the Construction of Green Buildings

Percent of Executives Rating Factor as Very or Extremely Significant in Discouraging Green Construction



Source: Turner Construction Company 2005 Survey of Green Buildings

# Mechanisms for Determining the Real Value of Green Building

## Kats Approach: Net Present Value (NPV)

Category	20 Yr NPV	
Energy Savings	\$5.80	per sq ft
Emissions Savings	\$1.20	per sq ft
Water Savings	\$0.50	per sq ft
Operations and Maintenance Savings	\$8.50	per sq ft
Productivity and Health Value	\$36.50 to \$55.30	per sq ft
Subtotal	\$52.90 to \$71.30	per sq ft
Average Extra Cost of Building Green	(-\$3.00 to -\$5.00)	per sq ft
<b>Total 20-Year Net Benefit</b>	<b>\$50 to \$65</b>	<b>per sq ft</b>

Source: Capital E

## Pivo & McNamara Approach: Annual Savings and Capitalization Rate

	Investment per sf	Rate of Energy Savings	Annual Savings per sf	Savings per 100,000 SF Office Building	Asset Value Increase at a 10% Cap Rate	Simple Payback
Janitorial Services	\$0.01	5%	\$0.14	\$13,500	\$135,000	IMMEDIATE
Operations & Maintenance	\$0.05	9%	\$0.20	\$19,800	\$198,000	4 MONTHS
Lighting	\$1.04	16%	\$0.36	\$36,000	\$360,000	3 YEARS
Heating, Cooling & Ventilation	\$1.21	9%	\$0.21	\$20,700	\$207,000	6 YEARS
All Combined	\$2.30	40%	\$0.90	\$90,000	\$900,000	2.5 YEARS

Source: Dr. Gary Pivo and Dr. Paul McNamara