

## Sustainable Design in the Retail Market

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## Presentation Topics

- LEED credits for Bed Bath & Beyond / Christmas Tree Shops
- Case Study: People's Food
- Breadth 1 - Window Re-Design
- Breadth 2 - Plumbing Fixture Re-Design

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Previous experience in the retail market brought me to this project and my research topics



- Employment with Schimenti Construction Company  
May 2006 - August 2006
- Schimenti specializes in retail construction and I worked on a variety of different retail projects
- Despite a variety of well educated and experienced professionals within the company there was little to no experience or knowledge of LEED projects

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## Bed Bath & Beyond: A Growing Retail Company



- They've progressed as a company from \$216 million in sales in 1992 to \$5.81 billion in 2005
- They are building between 70-100 new buildings each year throughout the United States
- Purchased Christmas Tree Shops, a popular company in the Massachusetts region in 2003

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## Retail owners have many concerns about building green

- Initial cost premiums
- Increased project schedule
- Unfamiliarity with LEED projects (both the owners and contractors)
- Very little documented life-cycle cost information for retail projects
- Aesthetic quality

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## Bed Bath & Beyond / Christmas Tree Shops Paramus, New Jersey



- Initially scheduled for a 15 month construction duration
- \$25.5 million total project cost
- There were last minute design and construction alterations
- The general contractor was replaced mid-construction

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## Project Photos



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## LEED in Retail Today: Better late than never!



- Pilot projects starting August 2005
- LEED Retail version 1 - New Construction (released April 2006)
- LEED Retail version 2- New Construction (released February 2007)
- Significantly less participation then other portions construction markets to date

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## Attainable LEED Credits: Bed Bath & Beyond / Christmas Tree Shops Paramus, New Jersey

- The analysis includes 36 LEED points I have deemed most attainable, all prerequisite credits, the requirements to achieve the points, and strategies that can be used to attain them for the Bed Bath & Beyond / Christmas Tree Shops
- Many points are completed without even considering LEED points in the design
- Other points are easily and inexpensively completed
- The nature of many retail projects lends itself to LEED points

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## Easily Attainable Credit Examples

- EA Credit 5: Measurement & Verification
- MR Credit 5.1: Regional Materials: 10% Extracted, Processed & Manufactured Regionally
- EQ Credit 7.2: Thermal Comfort: Employee Verification
- ID Credit 2: LEED Accredited Professional

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## EA Credit 5: Measurement and Verification (1 Point)

- This credit is not difficult to achieve for the Bed Bath & Beyond project or many other retail projects. NOVAR control system consists of automated controls and a monitoring system that is capable of measuring actual energy use throughout the building. Without any further effort the NOVAR system can be used to track the energy use and confirm that the building meets all the desired energy requirements from design

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## MR Credit 5.1-5.2: Regional Materials: 10-20% (Up to 2 Points)

*Requirements:* Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10% (based on cost) of the total materials value. 20% of total cost gives an additional point

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## MR Credit 5.1-5.2: Regional Materials: 10-20% Continued



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## EQ Credit 7.2: Thermal Comfort: Employee Verification (1 Point)

- *Requirements:* Agree to implement a thermal comfort survey of building employees within a period of 6 to 18 months after occupancy. This survey should collect anonymous responses about thermal comfort in the building including an assessment of overall satisfaction with thermal performance and identification of thermal comfort-related problems

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## ID Credit 2: LEED Accredited Professional (1 Point)

- Consistent with all the other LEED guides, 1 point is rewarded for having a LEED AP involved in the project. For a LEED certified project to be successful it is important to have a LEED AP involved regardless of this credit

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## Case Study: People's Food Market

- 5,400 SF
- Design-Build project
- 55% new construction, 45% renovation
- 2 Story building grocery store
- Total project cost: \$900,000
- Variety of rooms including offices, conference rooms, retail space, restrooms
- Winner of BEST (Businesses for an Environmentally Sustainable Tomorrow) in 2003 and Southeast Portland Uplift Community Award in 2003

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## Case Study: People's Food Market

- People's Food consumes 16% less energy than mandated by Oregon Energy Code and saves roughly \$1,700 each year in energy costs
- Many of the efforts to build sustainably were responded to with government and private organization grants and support. (\$10,000 for an emerging technology grant. \$9,100 from Oregon State Government)
- The integrated design-build process allowed for a variety of professionals working together to produce a well-designed and executed project
- Premium initial costs are very quickly offset by annual cost savings

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## Case Study: People's Food Market



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## Breadth 1 – Window Re-Design

- Analysis done to determine the effects of exchanging standard, double glazed windows to a variety of other window types including low emissivity, high reflectance, and single glazed
- EQuest program use to simulate building performance. The program asks for project specific information to give the most realistic possible results

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## Analysis Sample Results

Electric Consumption (kwh x1000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	0.5	5.3	23.2	42.5	53.4	79.4	70.2	32.3	9.8	-	325.7
Heat Pump	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Lighting	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Ventilation	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	-	-	-	-
Unlabeled	8.9	7.2	9.1	8.2	8.8	8.9	9.4	9.3	8.2	8.8	8.2	8.9	100.2
Process & Misc	0.3	0.3	0.1	0.2	0.2	-	-	-	0.2	0.2	0.2	0.1	0.4
Electric Usage	41.2	37.0	42.9	40.9	42.4	42.0	41.3	47.0	38.7	42.4	28.7	41.3	485.8
Peak Demand	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	4.8
Peak Load	87.0	81.6	75.1	80.0	88.0	88.4	87.0	72.1	84.4	89.0	84.4	87.0	812.0
EMax	187.0	207.9	178.7	150.0	144.0	143.3	174.0	104.8	140.2	122.4	112.2	117.2	1,880.0

Simulation 1  
Double clear 1/8" air



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## Window Re-Design Results

### Summary:

- In comparison to the baseline (Simulation 1) the following 4 simulations had a difference in (thousands of kwh, millions of BTUs) (% of baseline kwh, % of baseline BTUs):
- Simulation 2 - (+3.6, -71.4) (+0.2%, -3.8%) Double low-emissivity 1/4" glass, 1/4" air
- Simulation 3 - (-10.7, +56.0) (-0.7%, +3.0%) Double reflectance 1/4" glass, 1/4" air
- Simulation 4 - (+6.5, +53.8) (+0.3%, +2.9%) Single clear 1/8" glass
- Simulation 5 - (-6.6, -22.4) (-0.4%, -1.2%) Triple low-emissivity film 1/4" glass, 1/4" air
- The results proved Bed Bath & Beyond was not an ideal candidate for this particular project alteration

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## Breadth 2 – Plumbing Fixture Re-Design

- Using the current plumbing fixtures for Bed Bath & Beyond/ Christmas Tree Shops and their employee count, I analyzed the water reducing benefits of using water efficient or waterless fixtures
- I evaluated the cost premium for changing the fixtures in comparison with the annual savings for using less water

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## Plumbing Fixture Re-Design Results

	HR DESIGN	1/8" AIRBASE	LEED BASELINE
Year estimated water use <sup>1</sup>			
Gallons per day	374	954	765
Gallons per month	11,370	28,927	23,877
Gallons per year	115,043	294,819	243,350
% Reduction, Average	61		
% Reduction, LEED Baseline	62		
Water reduction:			
Over the 310 day occupancy per year the reduction in water is:			
(294,819 - 115,043) gallons = 179,876 gallons			
Cost reduction:			
(179,876 gallons/year) x (\$0.004/gallon) = \$715.48/year			
Payoff period:			
(Initial Premium) / (savings/year) = payoff period			
(\$2428.00) / (\$715.48) = 3 years, 5 months			

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## Plumbing Fixture Re-Design Results

- The re-design saves \$715.48 per year for only an initial premium of \$2428.00. The pay-off period is less than 3.5 years
- 61% reduction in water use in comparison to current fixtures in place
- Provides a win-win situation. The design is environmentally responsible and economically beneficial

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## Research Summary

- It has taken some additional time for the retail market to follow the sustainable design trend of many other markets but, it appears their participation is right around the corner
- Efforts have been set in motion by the United States Green Building Council and a LEED certification guide is on its way
- As the retail market continues to get involved in sustainable projects the many benefits of green building will become increasingly more visible to owners
- Substantial reduction of life-cycle costs take some careful planning and design, as well as an experienced project team, but are extremely attainable if the effort is made

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## Questions Please!



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