

# Materials Are Green Only in Context – Are We Looking at Green Building Programs in the Wrong Way?

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SWST Annual Meeting - Boise, Idaho

June 2009

# It's Not Easy Being Green!

- \* Ask Kermit! Or...
- \* Anyone Else that has tried to decide what's good and what's bad for the environment!



# Outline

1. Role of Green Building in Aiding Green Choices
2. Which Products are Green?
3. Green Fundamentals
4. New Green Building Approach



# **#1 Role of Green Building**

# **National Scope Green Building Programs**

- Green Globes**
- NAHB**
- LEED**

# The LEED Program

- LEED-H (Homes)
- LEED-NC (New Construction)
- LEED-CI (Commercial Interiors)
- LEED-CS (Core and Shell)
- LEED-R (Retail)
- LEED-HC (Health Care)
- LEED-EB (Existing Buildings)

There are currently at least  
83 green building  
programs operating in the  
United States, and 2 more  
in Canada.


# Green Building Programs in the United States





## **Green Building Standards Focus On:**

- ✓ Energy efficiency
- ✓ Materials efficiency
- ✓ Water efficiency
- ✓ Occupant safety and health
- ✓ Site impacts

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**One Goal of The Green  
Building Movement is to Solve  
The Material Choice Dilemma**

**Within the category of materials efficiency, most green building programs identify “environmentally preferable materials.”**

## Point Distribution within LEED-H, Version 2.0

Category	Maximum Points and Prerequisites in Each Category	Minimum Points Needed Within Each Category for LEED Silver
	22 pts, 2 pr	5 pts, 2pr
Water efficiency	15 pts	3 pts
Energy and atmosphere	38 pts, 2 pr	0 pts, 2pr
Materials and resources	16 pts, 3 pr	2 pts, 3pr
Indoor air quality	21 pts, 7 pr	6 pts, 7pr
Innov. and design process	11 pts, 3 pr	0 pts, 3pr
Location and linkages	10 pts	0 pts
Homeowner awareness	3 pts, 1 pr	0 pts, 1pr
<b>TOTAL</b>	<b>136 pts, 18 pr</b>	<b>16 pts, 18 pr</b>

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## LEED for New Construction v 2.2 Registered Project Checklist

Yes	?	No		
			<b>Materials &amp; Resources</b>	<b>13 Points</b>
Yes			Prereq 1	Storage & Collection of Recyclables <b>Required</b>
			Credit 1.1	Building Reuse, Maintain 75% of Existing Walls, Floors & Roof <b>1</b>
			Credit 1.2	Building Reuse, Maintain 95% of Existing Walls, Floors & Roof <b>1</b>
			Credit 1.3	Building Reuse, Maintain 50% of Interior Non-Structural Elements <b>1</b>
			Credit 2.1	Construction Waste Management, Divert 50% from Disposal <b>1</b>
			Credit 2.2	Construction Waste Management, Divert 75% from Disposal <b>1</b>
			Credit 3.1	Materials Reuse, 5% <b>1</b>
			Credit 3.2	Materials Reuse, 10% <b>1</b>
			Credit 4.1	Recycled Content, 10% (post-consumer + 1/2 pre-consumer) <b>1</b>
			Credit 4.2	Recycled Content, 20% (post-consumer + 1/2 pre-consumer) <b>1</b>
			Credit 5.1	Regional Materials, 10% Extracted, Processed & Manufactured <b>1</b>
			Credit 5.2	Regional Materials, 20% Extracted, Processed & Manufactured <b>1</b>
			Credit 6	Rapidly Renewable Materials <b>1</b>
			Credit 7	Certified Wood <b>1</b>

Yes	?	No		
			<b>Indoor Environmental Quality</b>	<b>15 Points</b>
Yes			Prereq 1	Minimum IAQ Performance <b>Required</b>
Yes			Prereq 2	Environmental Tobacco Smoke (ETS) Control <b>Required</b>
			Credit 1	Outdoor Air Delivery Monitoring <b>1</b>
			Credit 2	Increased Ventilation <b>1</b>
			Credit 3.1	Construction IAQ Management Plan, During Construction <b>1</b>
			Credit 3.2	Construction IAQ Management Plan, Before Occupancy <b>1</b>
			Credit 4.1	Low-Emitting Materials, Adhesives & Sealants <b>1</b>
			Credit 4.2	Low-Emitting Materials, Paints & Coatings <b>1</b>
			Credit 4.3	Low-Emitting Materials, Carpet Systems <b>1</b>
			Credit 4.4	Low-Emitting Materials, Composite Wood & Agnifiber Products <b>1</b>
			Credit 5	Indoor Chemical & Pollutant Source Control <b>1</b>
			Credit 6.1	Controllability of Systems, Lighting <b>1</b>
			Credit 6.2	Controllability of Systems, Thermal Comfort <b>1</b>
			Credit 7.1	Thermal Comfort, Design <b>1</b>
			Credit 7.2	Thermal Comfort, Verification <b>1</b>
			Credit 8.1	Daylight & Views, Daylight 75% of Spaces <b>1</b>
			Credit 8.2	Daylight & Views, Views for 90% of Spaces <b>1</b>

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## #2: Which Products Are Green?

# Which of the Following are “Green”?

- \* New car that gets 100 mpg?
- \* Bamboo flooring?
- \* Compact fluorescent bulbs?
- \* Recyclable plastic bottles?
- \* Energy Star house?





**Depends!!!**



For the 100 mpg car

It depends on how much you  
drive: E.g. More? Less? Same?

Also.....



# Is it Just Me Or...

Did you ever wonder what happens to the approximately 100 MILLION CUBIC FEET of “rubber” that wears off of tires in the US every year??




# Are Bamboo Products Green?

Depends on the source of the bamboo, and the impacts of bamboo manufacturing!

# Concerns with CFL's:

- \* Need to “leave them on”
- \* Don't work well in cold, dimmers, or with timers
- \* Contain mercury! (don't break them!!)



**Better Option!**  
Sunlight? Or  
Light Emitting Diodes!  
(LED)

# Recyclable Plastic Bottles?



\* Well... consider these facts!

## Since 1997...

- \* Recycling of Water Bottles has increased from about 1.1 Billion bottles per year to between 6 and 7 Billion bottles per year!!
- \* Unfortunately....



## Since 1997...

- \* The number of water bottles in the waste stream has grown from 2.5 billion bottles per year to approximately 38 billion bottles per year!!



# Energy Efficient Houses?



# Since the 1970's Energy Crisis...

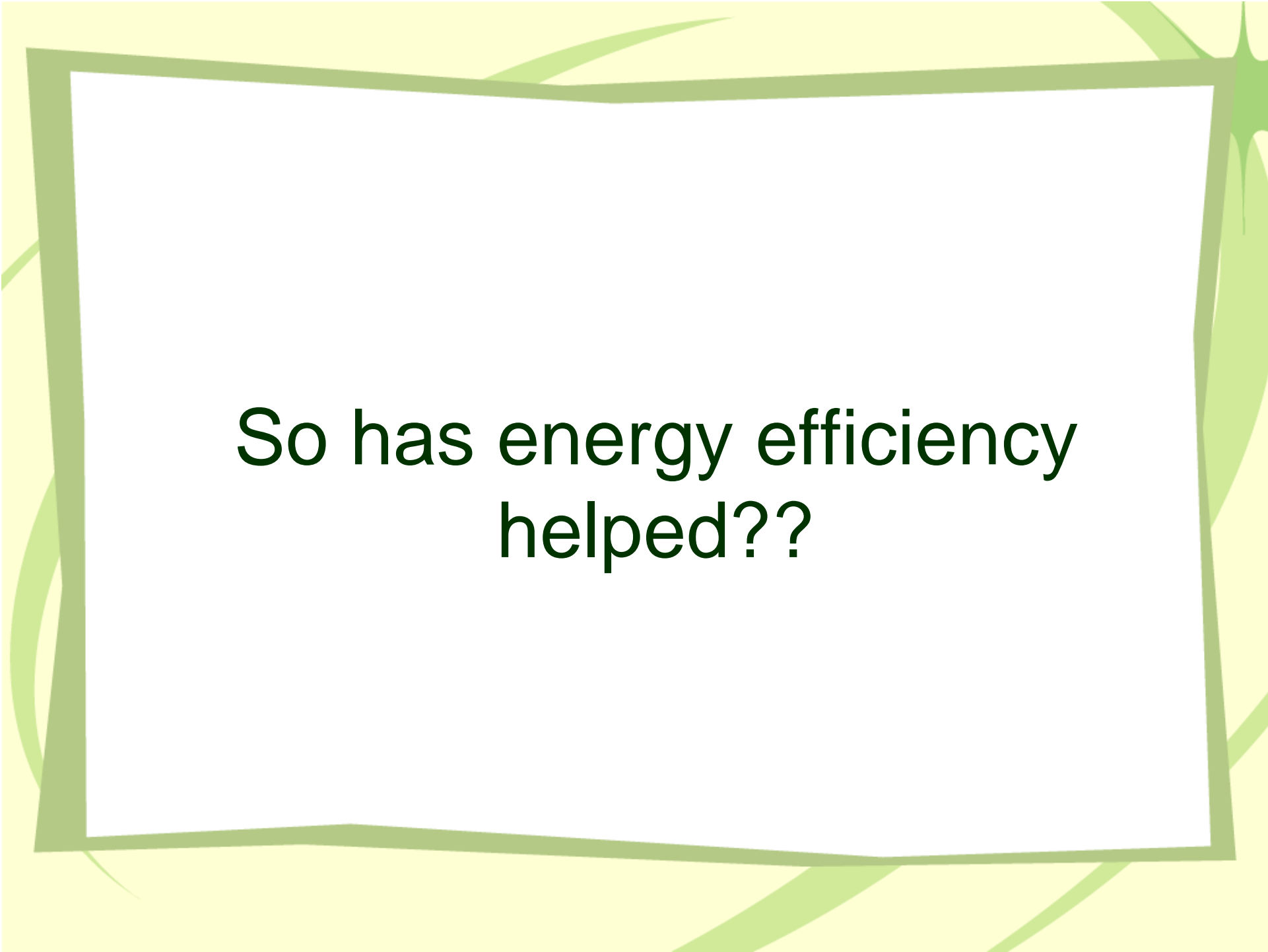
Per person Electrical use is UP 50%

House size is UP 50%, and

Floor area per person is UP 50%

(use of coal, wood as energy sources are  
also up)

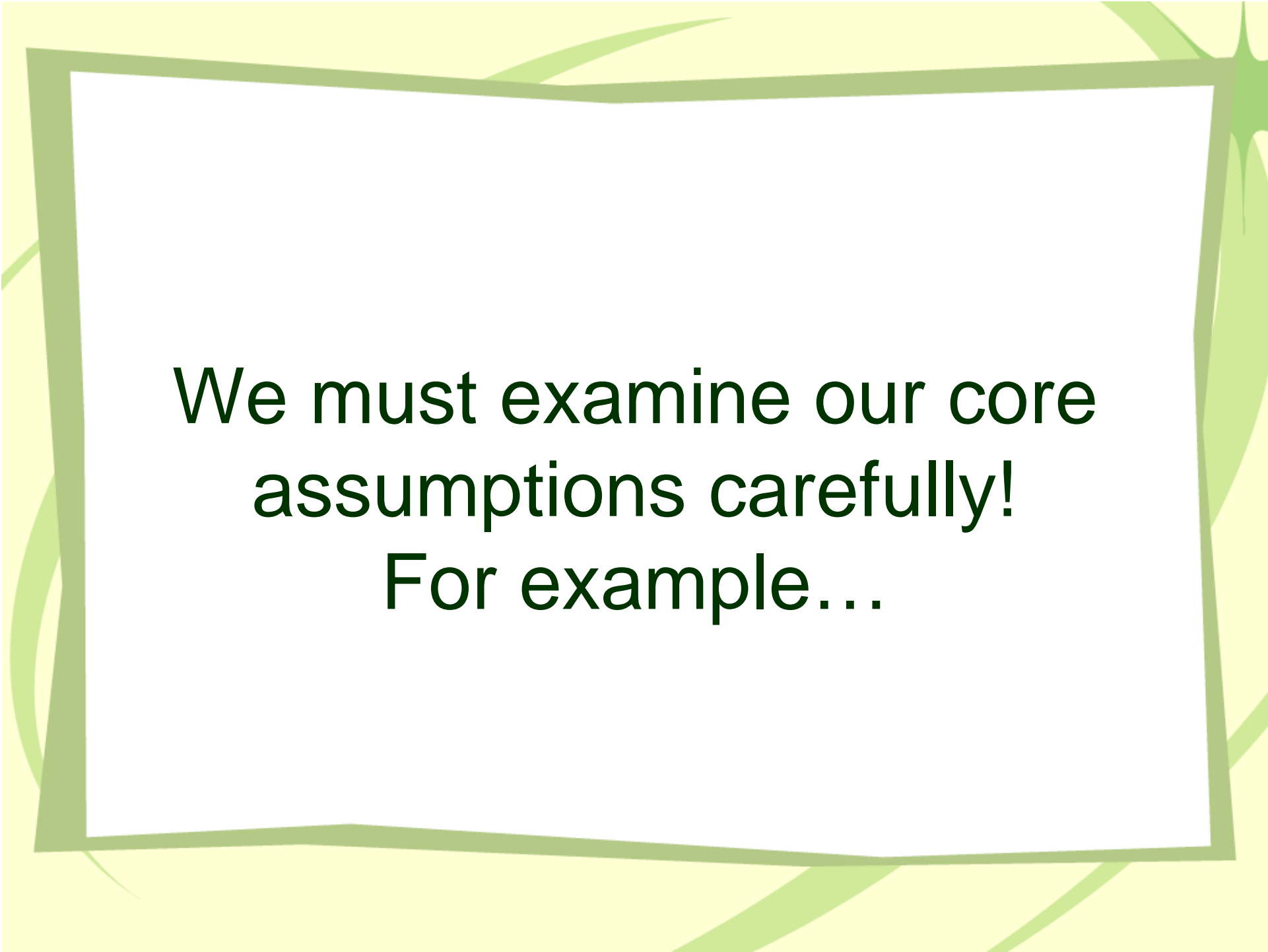
Total Oil usage is up 50%



So has energy efficiency  
helped??



So what do we do??



We must examine our core  
assumptions carefully!  
For example...




# What material is...

- \* Produced in an automatic mfg facility,
- \* Utilizes waste products such as CO<sub>2</sub>,
- \* Factory runs almost exclusively on solar power, and
- \* Is 100% recyclable?



Wood




So it would be reasonable to  
consider “wood” green!

But does this mean wood  
products are green?



# Not Necessarily!

It depends.....on a lot of other factors involved in the manufacture of the final product.



**So How Do We Decide  
Whether a Product  
is Green or Not?**

Key Point to Understand:

**NO PRODUCT IS GREEN...**

.. green exists only in a context,  
or in relation to another product  
that serves a given function.

# Life Cycle Assessment

- \* IS Comprehensive...but it is also:
  - Complex
  - Specific to an exact series of processes
  - May Assume Post-consumption Behaviors

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**So What Do We Do?**



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# #3: Green Fundamentals

# Well...

- \* Buy less crap!
- \* Buy the most durable goods possible
- \* Buy “organic”
- \* Buy other “certified”

What does “Crap” mean?

Anything with a short lifespan





**What about Durable Goods?**

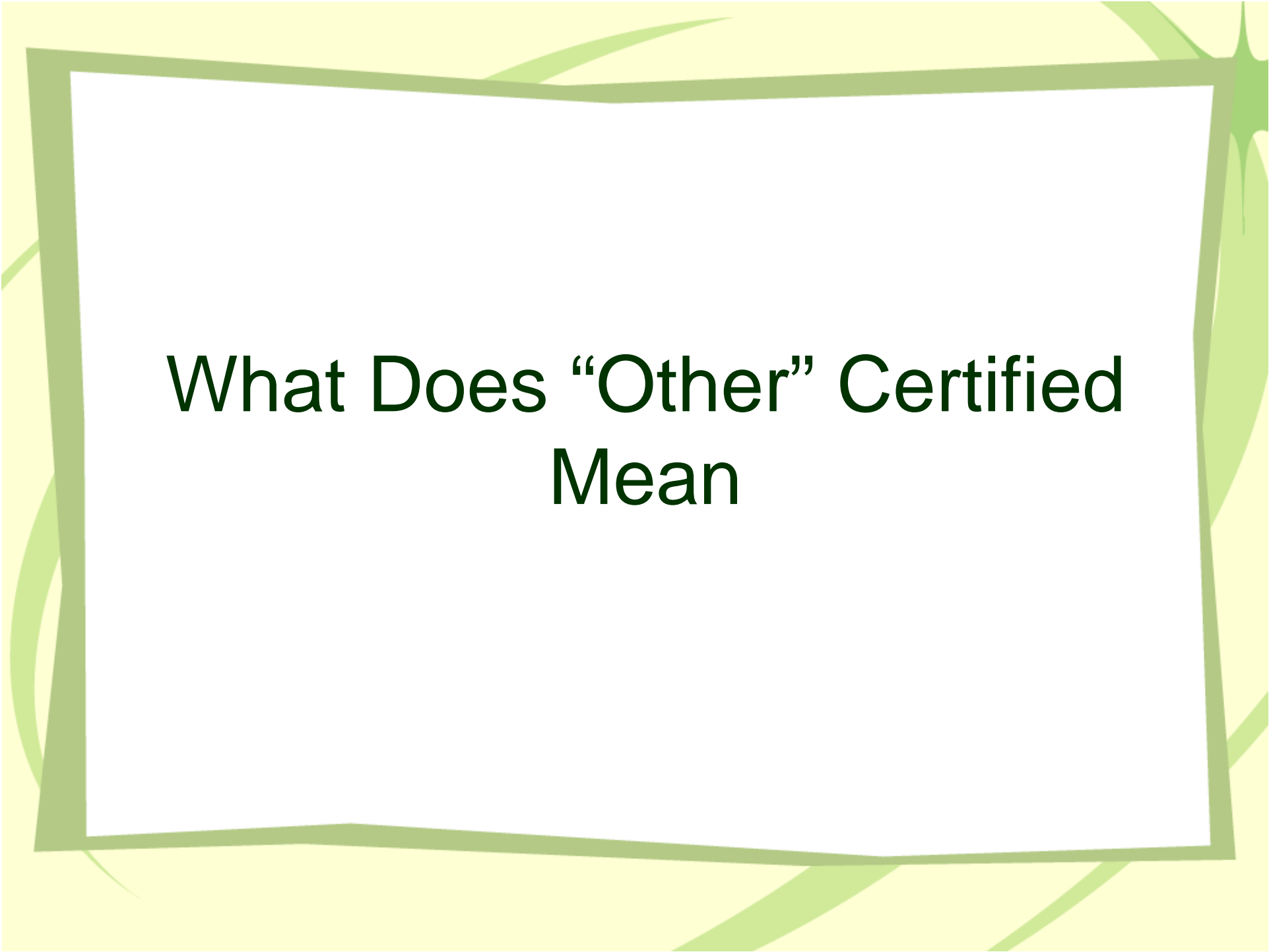




**Certified Organic**







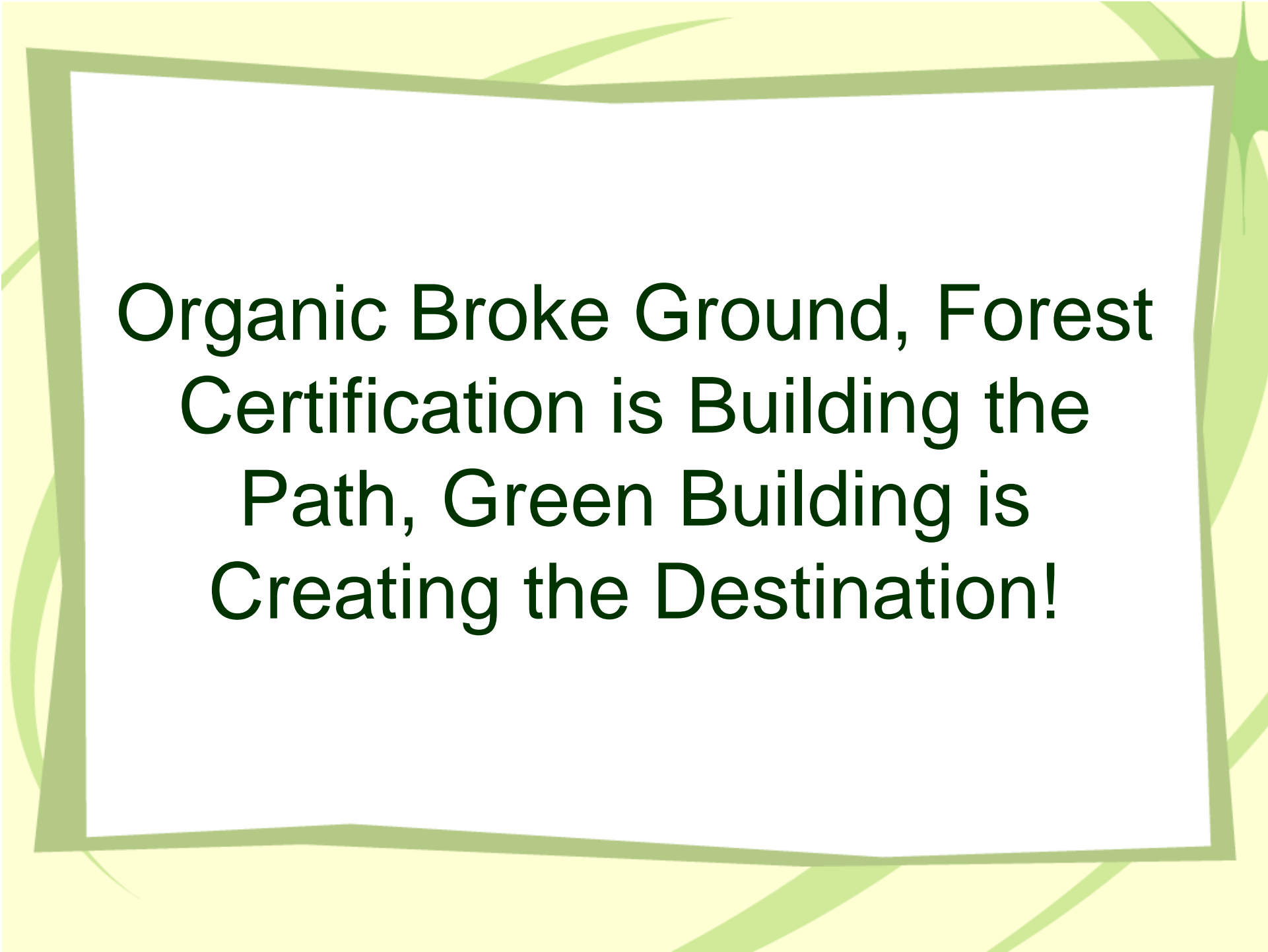
# What Does “Other” Certified Mean

# Other Certification Systems

- \* Forest Stewardship Council
- \* Marine Stewardship Council
- \* GreenGuard




Green Cross



**Organic Broke Ground, Forest  
Certification is Building the  
Path, Green Building is  
Creating the Destination!**

# So if we are trying to build a Green Building:

- \* Life Cycle Assessment can be a valuable tool
- \* Selecting materials that have been independently certified as sustainable can help also . . .
- \* But .....

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Perhaps this is the wrong  
discussion anyway?

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## **#4: New Green Building Approach**

## Possible **Performance** Based Characteristics

- \* House size
- \* Number of bathrooms
- \* Energy consumed
- \* Water consumed
- \* Air quality
- \* Site impacts
- \* Materials used



# House Size

- \* Measure of the total volume of materials consumed
- \* Reflects total impact on environment regardless of source
- \* Impacts nearly ALL consumption factors

# Number of Bathrooms

- \* Potentially impacts water use
- \* Plumbing and fixtures are all high impact items

# Energy Consumed

- \* Easily Measured
- \* Compare Globally
- \* Encourages positive behaviors

# Water Consumed

- \* Easily Measured
- \* Compare Globally
- \* Spurs Creativity
- \* Encourages Positive Behaviors

# Measured Air Quality

- \* Easy to measure
- \* Compare to exterior... or some norm
- \* Important health characteristic

# Materials Use

- \* Minimize
- \* Reuse
- \* Recycle
- \* Use Renewable
- \* Seek Certified

# A Performance-Based System

- \* Would be relatively simple to implement.
- \* Could be self or third party administered.
- \* Could apply to existing, remodeled or new construction.
- \* Could be based on local, regional, national or international measures.



# Performance Based Systems Impact on Wood?

What other System in the World  
Already has a Third Party  
Evaluation System in Place???



# Questions?

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