

MATERIALS TRANSPARENCY & LEED

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About Nadav Malin



- President & CEO, BuildingGreen, Inc.
- LEED Fellow
- Founding Chair, LEED Materials & Resources Technical Advisory Group
- Consultant
- Facilitator
- Author

Learning Objectives

Participants will be able to:

1. Describe the documentation needed for products to meet the MRc Building Product Disclosure and Optimization: EPDs credit, Option 1 in the LEED v4 BD+C and ID+C rating systems.
2. Determine whether or not a particular Health Product Declaration meets the MRc Building Product Disclosure and Optimization: Material Ingredients credit, Option 1 in the LEED v4 BD+C and ID+C rating systems.
3. Explain why carbon emitted soon, in the process of constructing a building, is more damaging than the same amount of carbon emitted later, during building operations.
4. Explain the difference between how the transparency options and the optimization options in the three MRc Building Product Disclosure and Optimization in the LEED v4 BD+C and ID+C rating systems credits are structured.

We Have a Crisis

climate
ecosystems
habitat

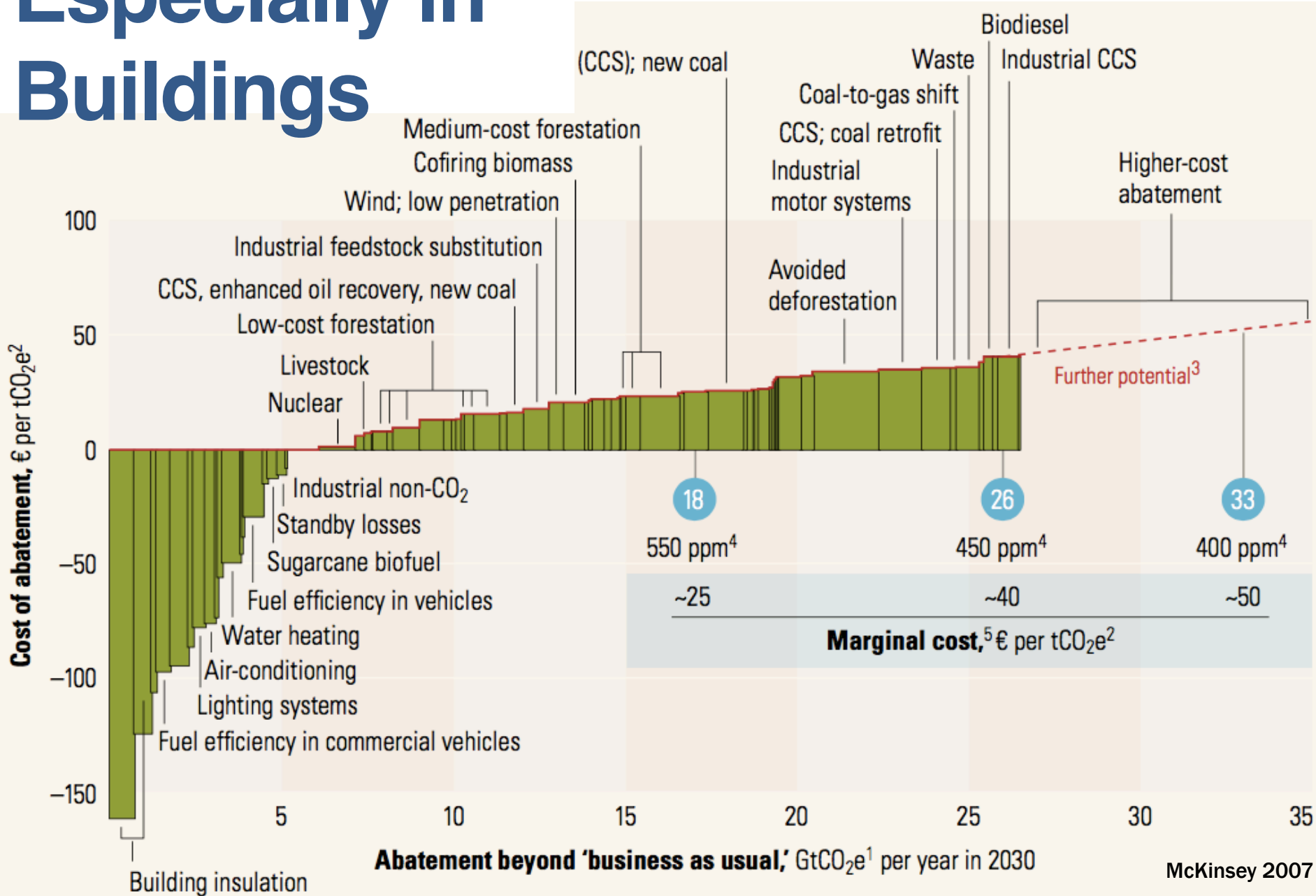
water
hazardous substances
social upheaval



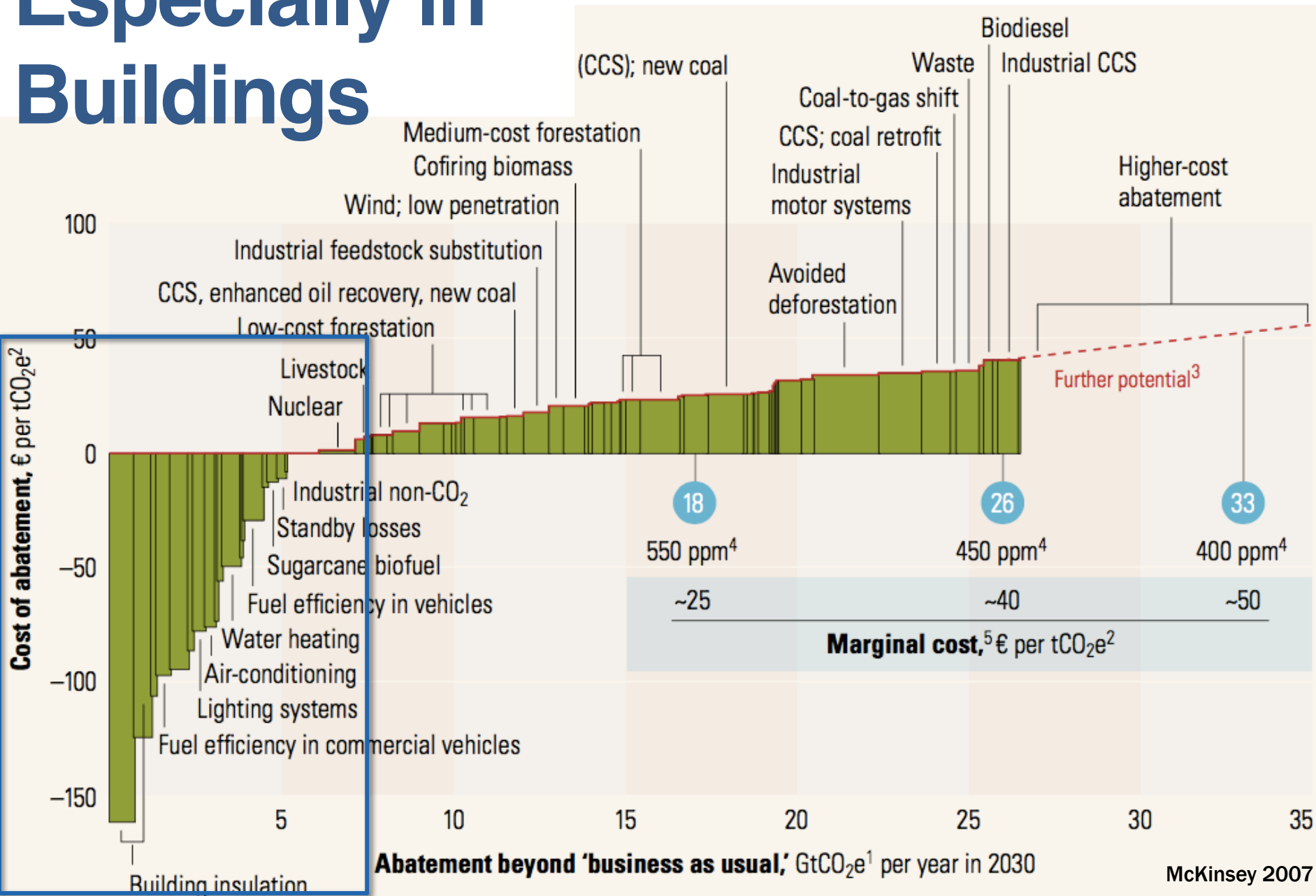
We Have Solutions



Especially in Buildings



Especially in Buildings



Solutions in building operations are direct

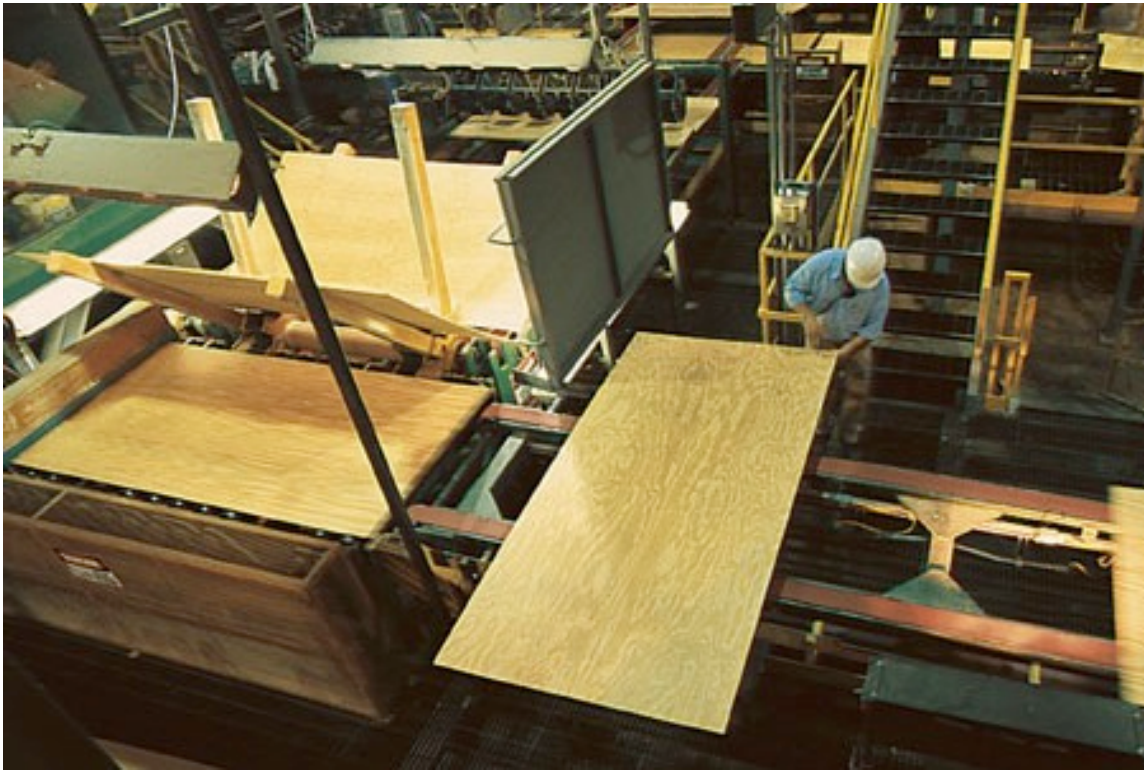
Owners see energy, water bills



Occupants feel health,
productivity impacts



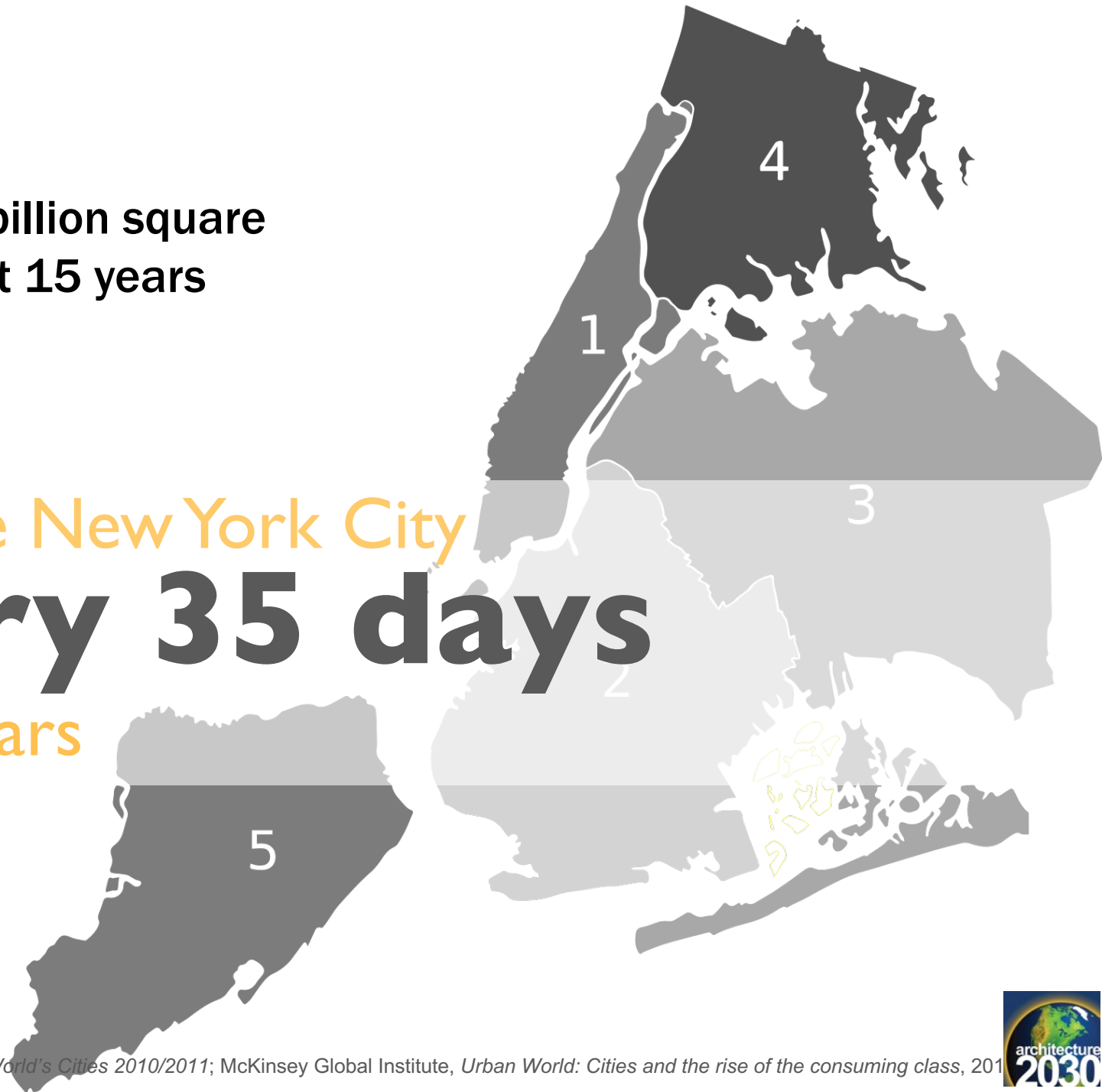
Solutions in the materials we use are indirect



- A product's chemical ingredients are hidden
- Environmental footprints are not visible
- Environmental costs are externalized

Adding 900 billion square feet over next 15 years

An entire New York City
every 35 days
for 15 years

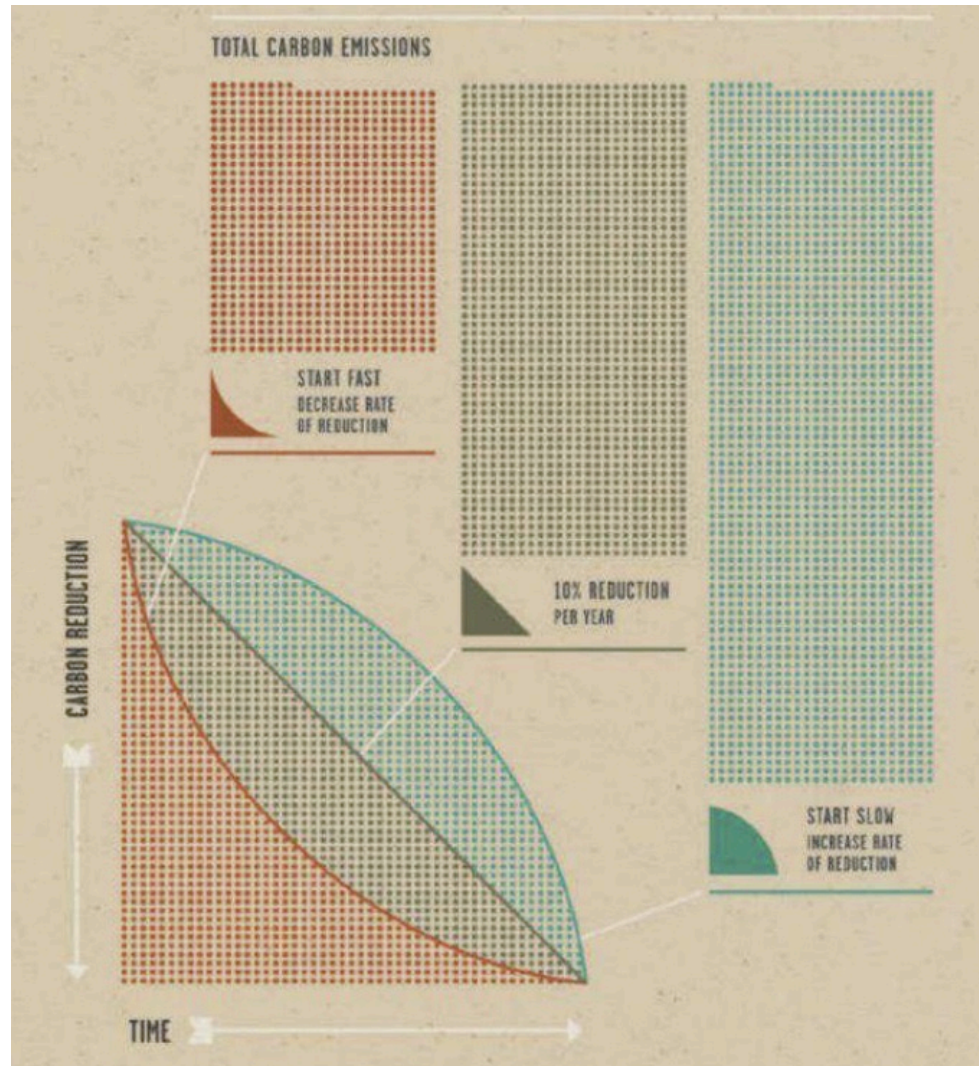


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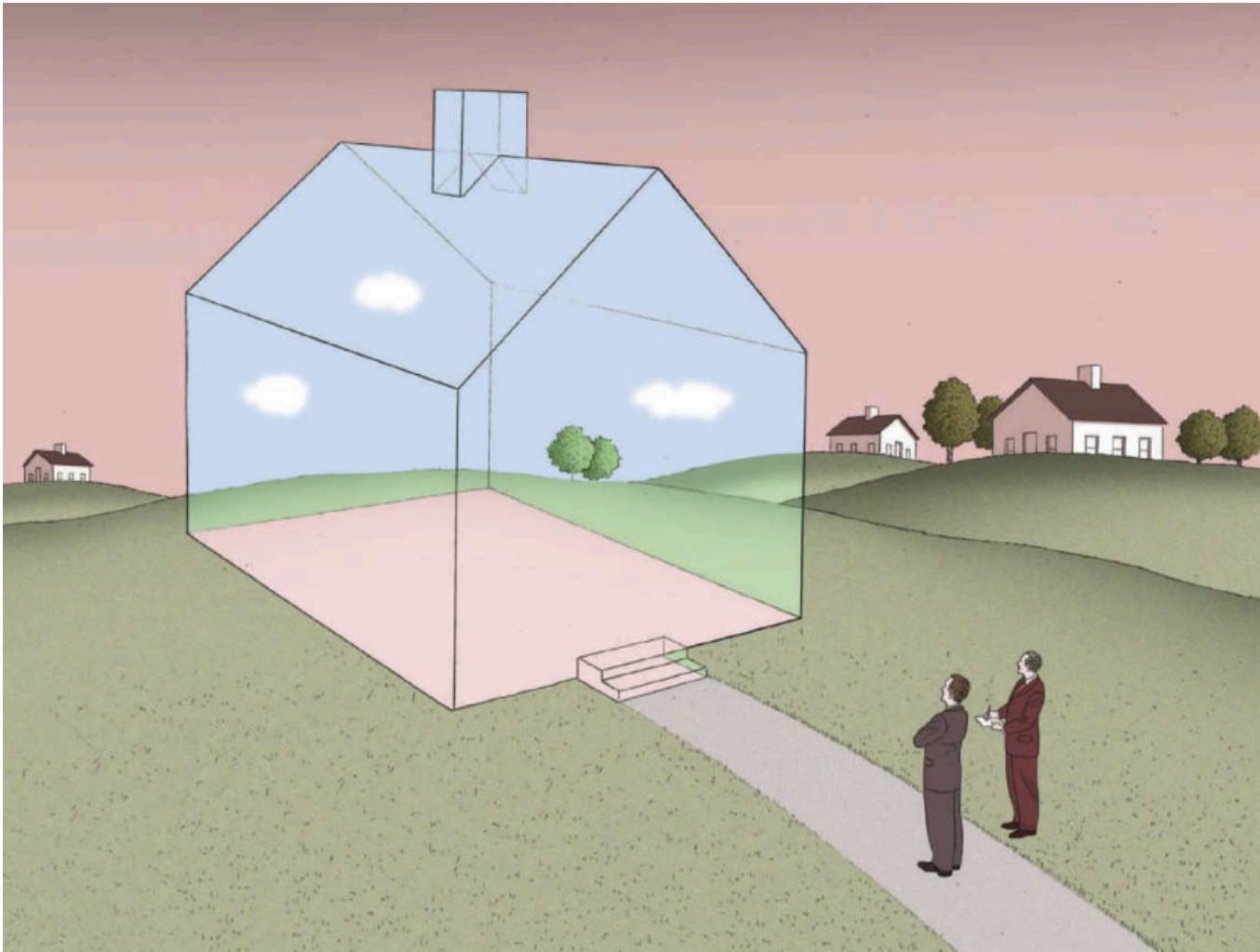
UN Habitat, *State of the World's Cities 2010/2011*; McKinsey Global Institute, *Urban World: Cities and the rise of the consuming class*, 201



Time Value of Carbon!



Increasing Societal Expectations of Transparency

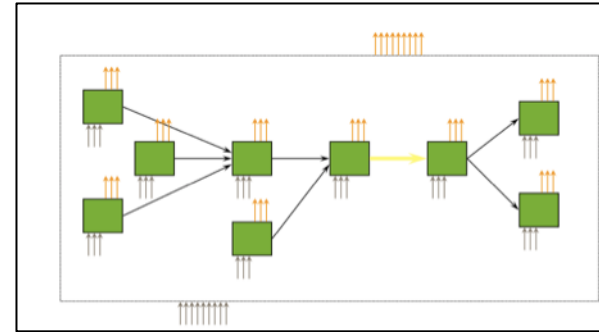


Art: Guy Billout, from *GreenSource* magazine

Impacts of Materials

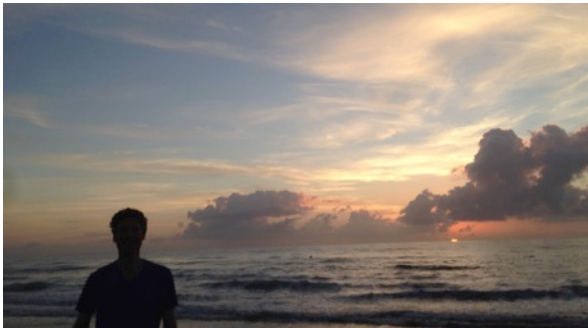


Habitat / Biodiversity



Life Cycle Assessment

Health



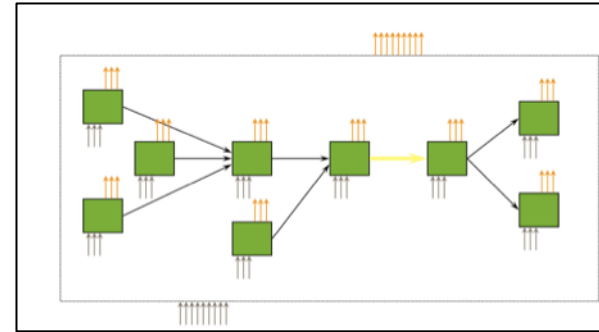
Social Equity



Impacts of Materials

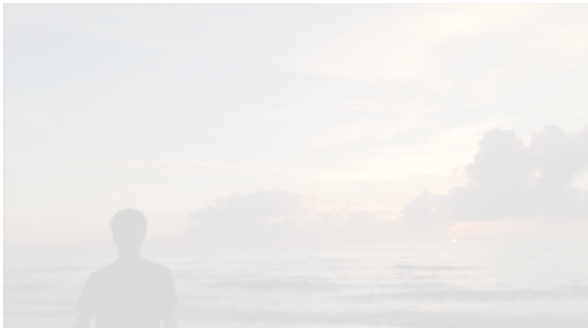


Habitat / Biodiversity



Life Cycle Assessment

Health



Social Equity



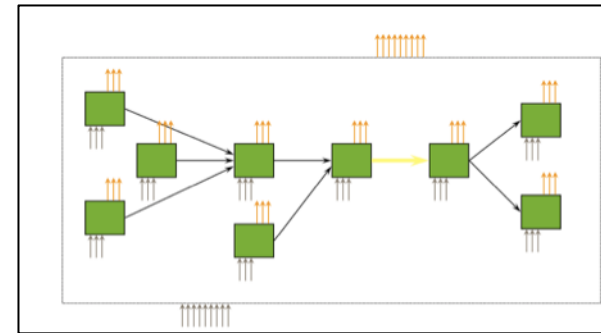
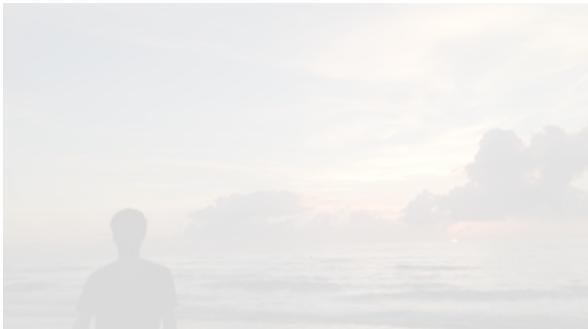
Impacts of Materials

Addresses:

Energy, Carbon,
Emissions to air & water

Habitat / Biodiversity

Health



Life Cycle Assessment

Social Equity



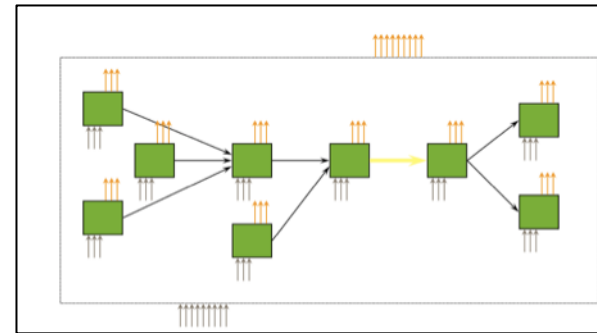
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Energy, Carbon, Emissions
to air & water

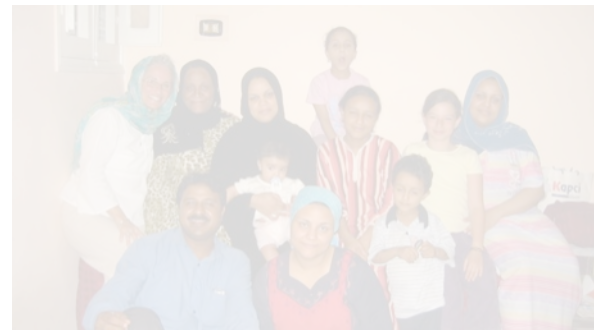
LEED v4 Credits:

Whole-Building LCA,
Environmental Product
Declarations



Life Cycle Assessment

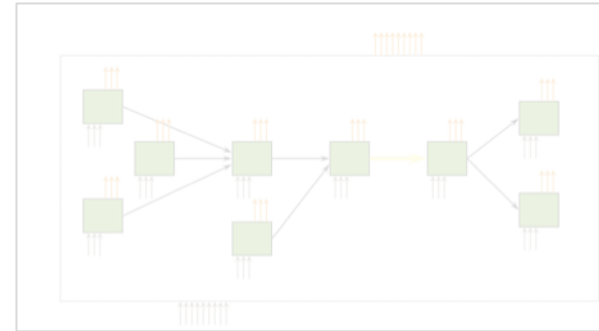
Social Equity



Impacts of Materials

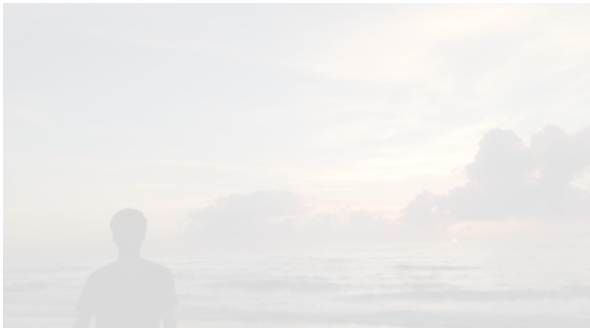


Habitat / Biodiversity



Life Cycle Assessment

Health



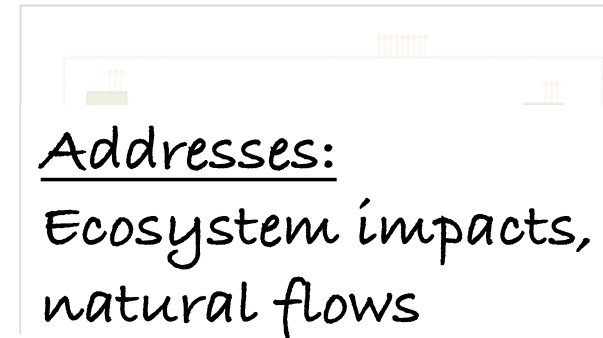
Social Equity



Impacts of Materials



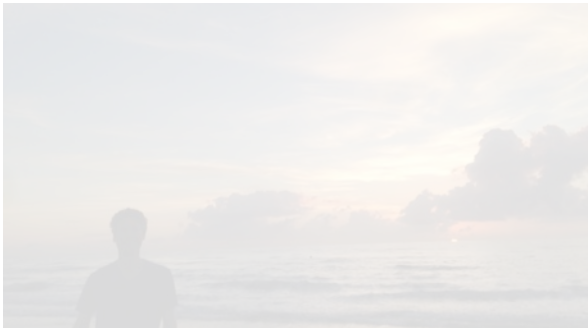
Habitat / Biodiversity



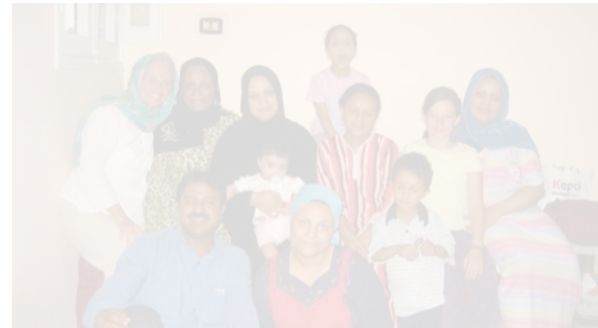
Addresses:
Ecosystem impacts,
natural flows

Life Cycle Assessment

Health



Social Equity

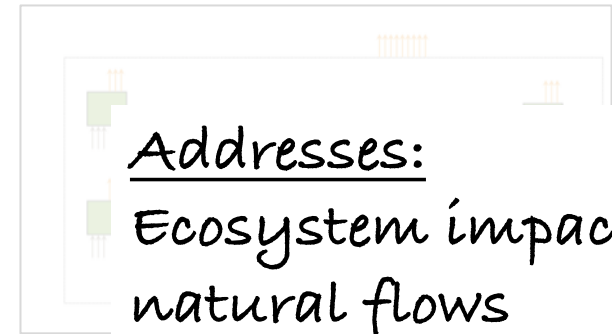
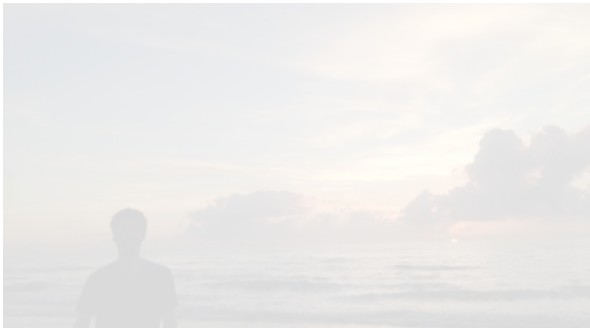


Impacts of Materials



Habitat / Biodiversity

Health



Addresses:

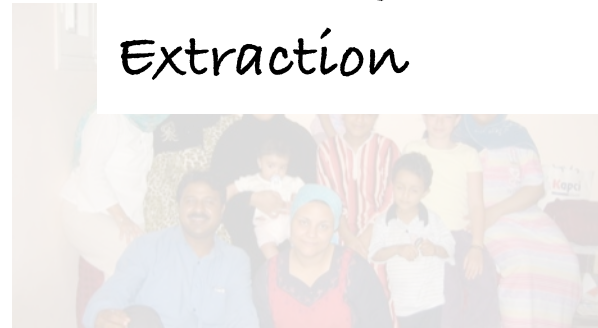
Ecosystem impacts,
natural flows

Life

Soci

LEED v4 Credits:

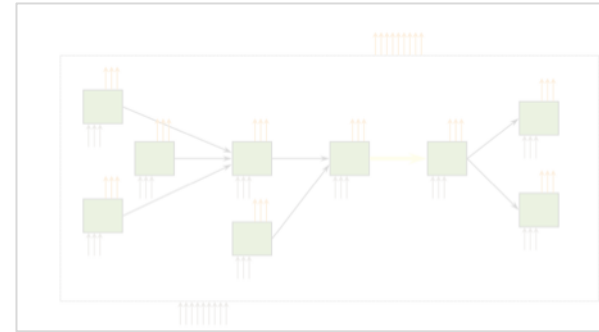
Raw Materials
Extraction



Impacts of Materials

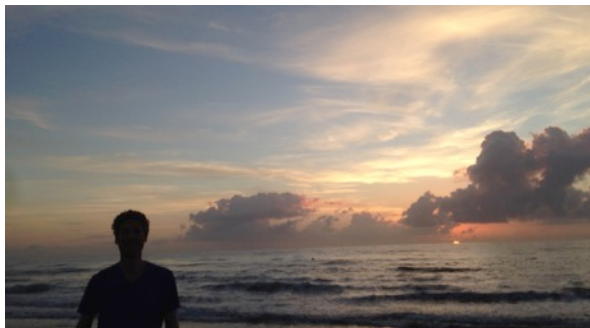


Habitat / Biodiversity



Life Cycle Assessment

Health



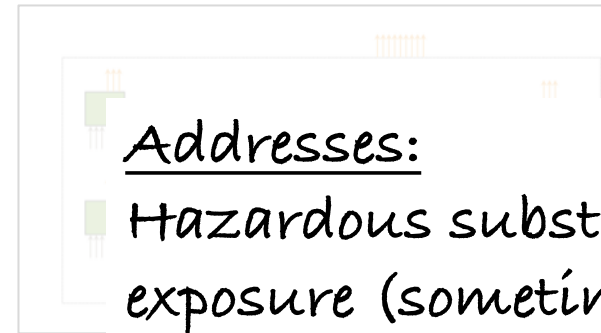
Social Equity



Impacts of Materials



Habitat / Biodiversity

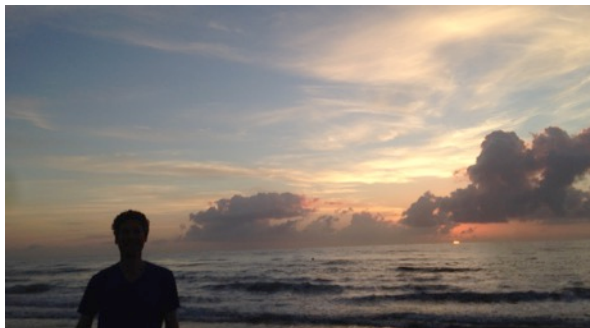


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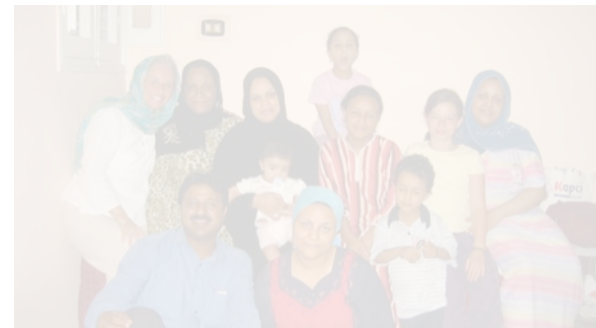
Hazardous substances,
exposure (sometimes)

Life Cycle Assessment

Health



Social Equity

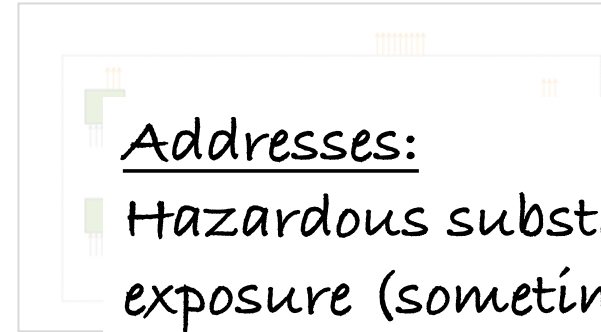
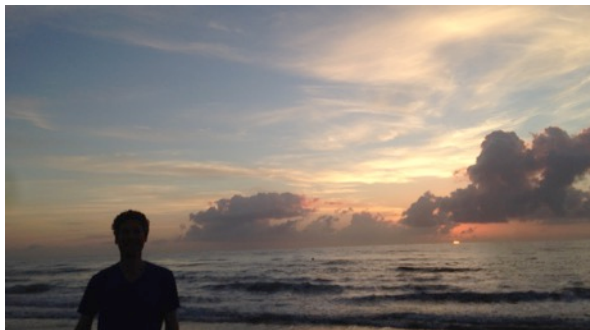


Impacts of Materials



Habitat / Biodiversity

Health



Addresses:

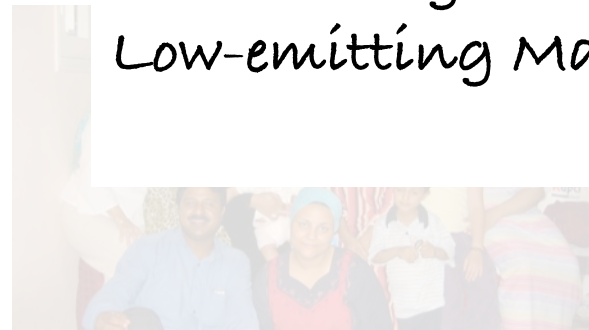
Hazardous substances,
exposure (sometimes)

Life

LEED v4 Credits:

Material Ingredients,
Low-emitting Materials

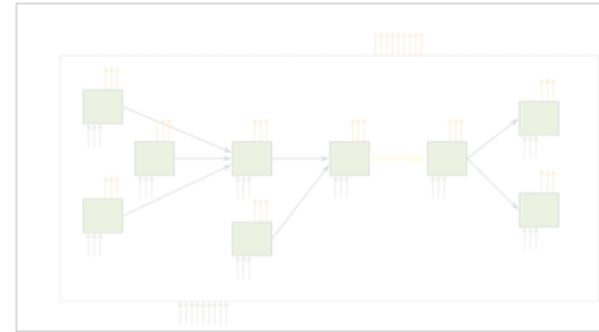
Soci



Impacts of Materials

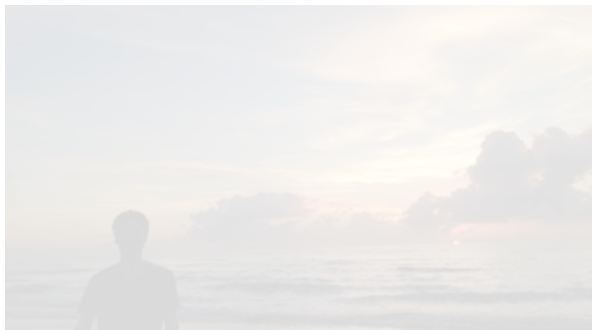


Habitat / Biodiversity



Life Cycle Assessment

Health



Social Equity



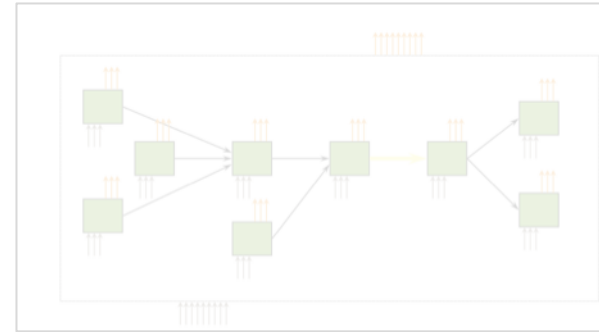
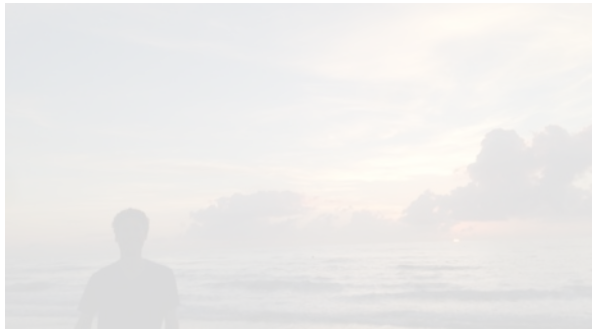
Impacts of Materials



Addresses:

Fair labor practices,
worker protections,
anti-corruption

Health



Life Cycle Assessment

Social Equity



Impacts of Materials

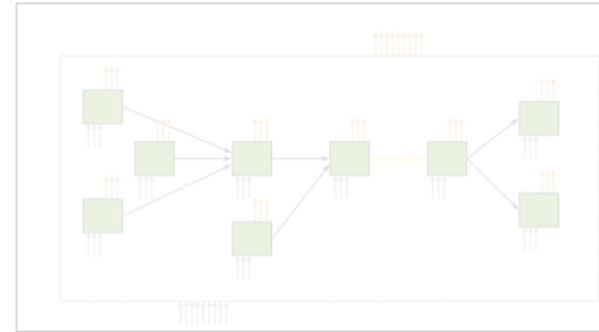


Addresses:

Fair labor practices, worker protections, anti-corruption

LEED v4 Credits:

Social equity within the supply chain (Pilot Credit)



Life Cycle Assessment

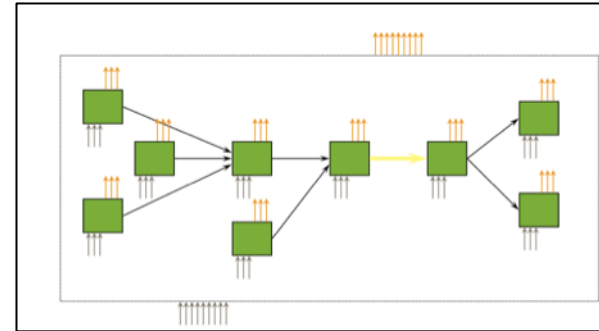
Social Equity



Impacts of Materials

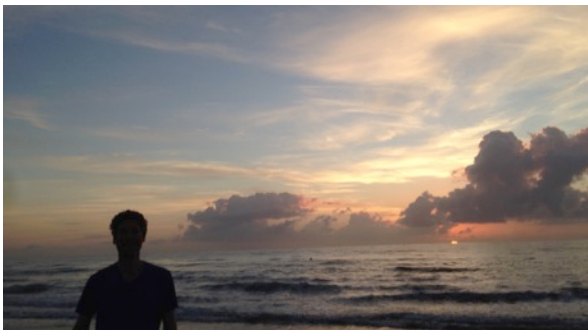


Habitat / Biodiversity



Life Cycle Assessment

Health



Social Equity

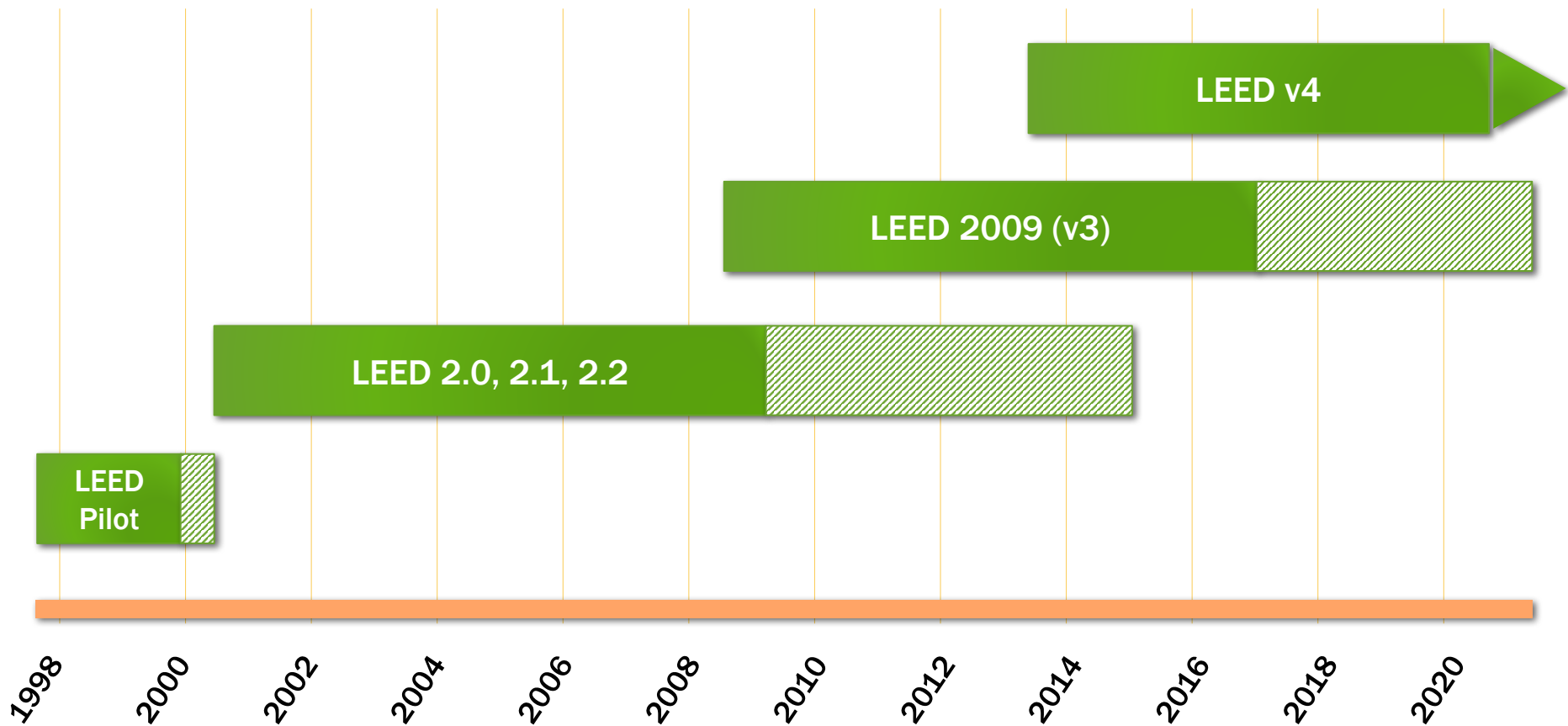


LEED Rising to the Challenge

- LEED version 4: Most substantive update of credit requirements in LEED's history
- Biggest changes in Materials category

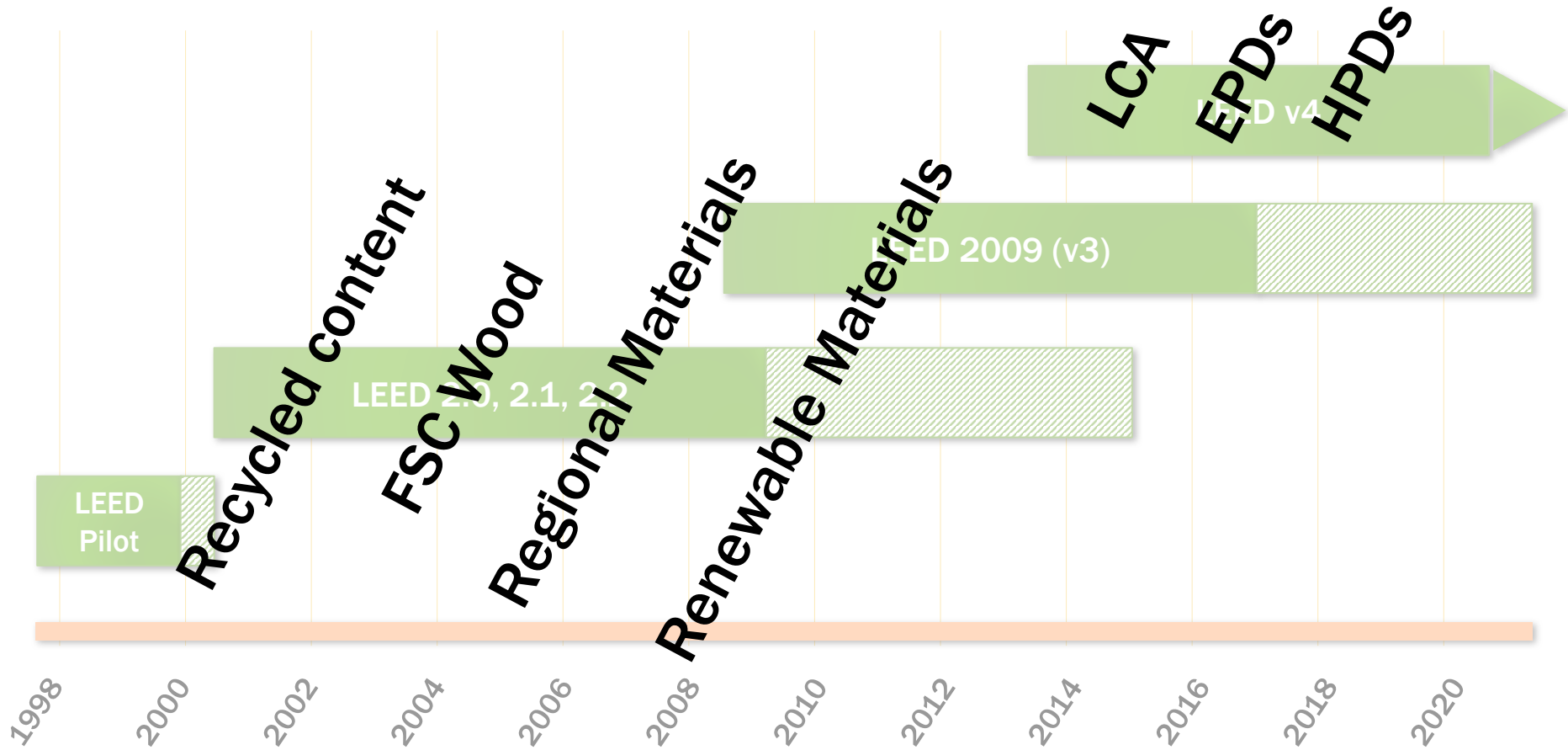


LEED Timeline



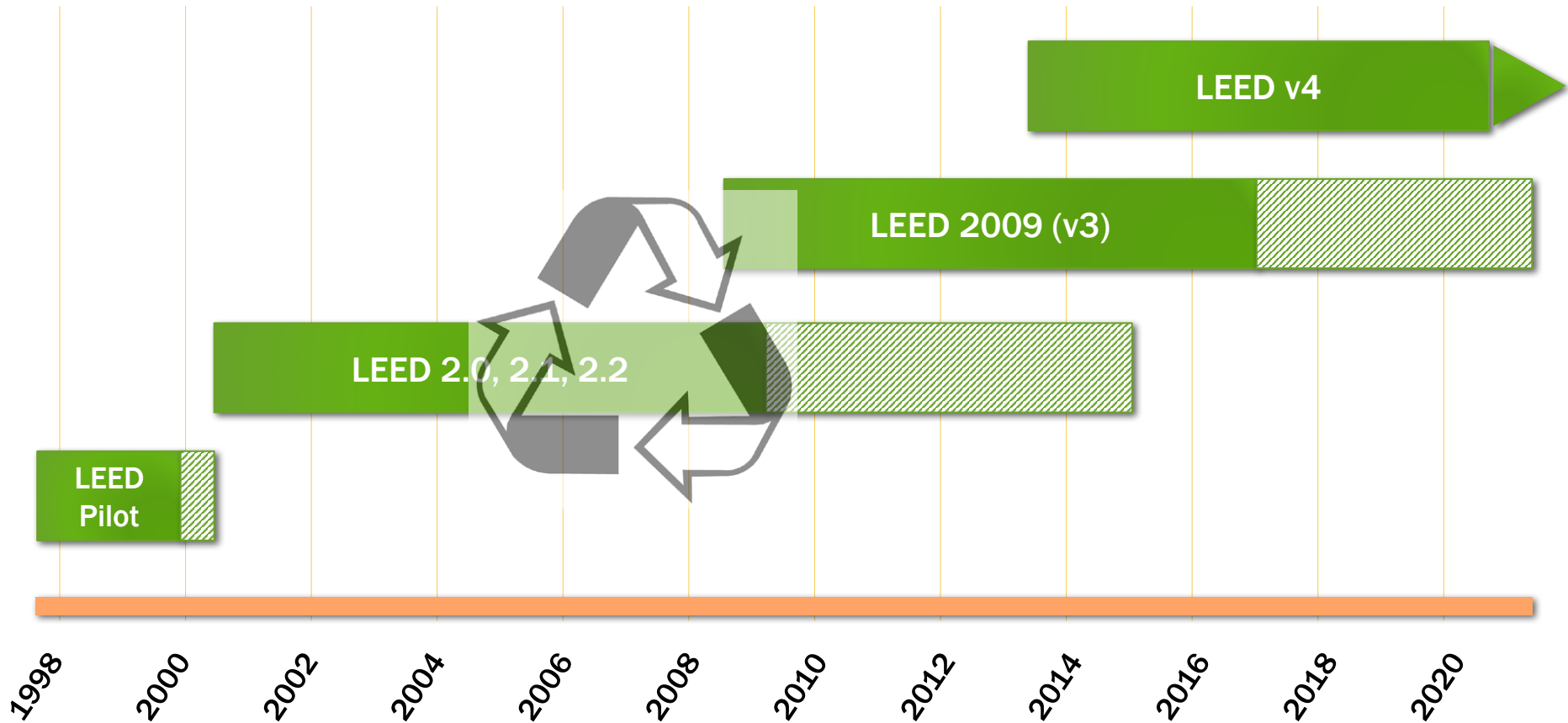
LEED Commercial Interiors, Existing Buildings, Core & Shell, Homes, Schools, Healthcare, Multifamily, Neighborhoods, etc.

LEED Timeline



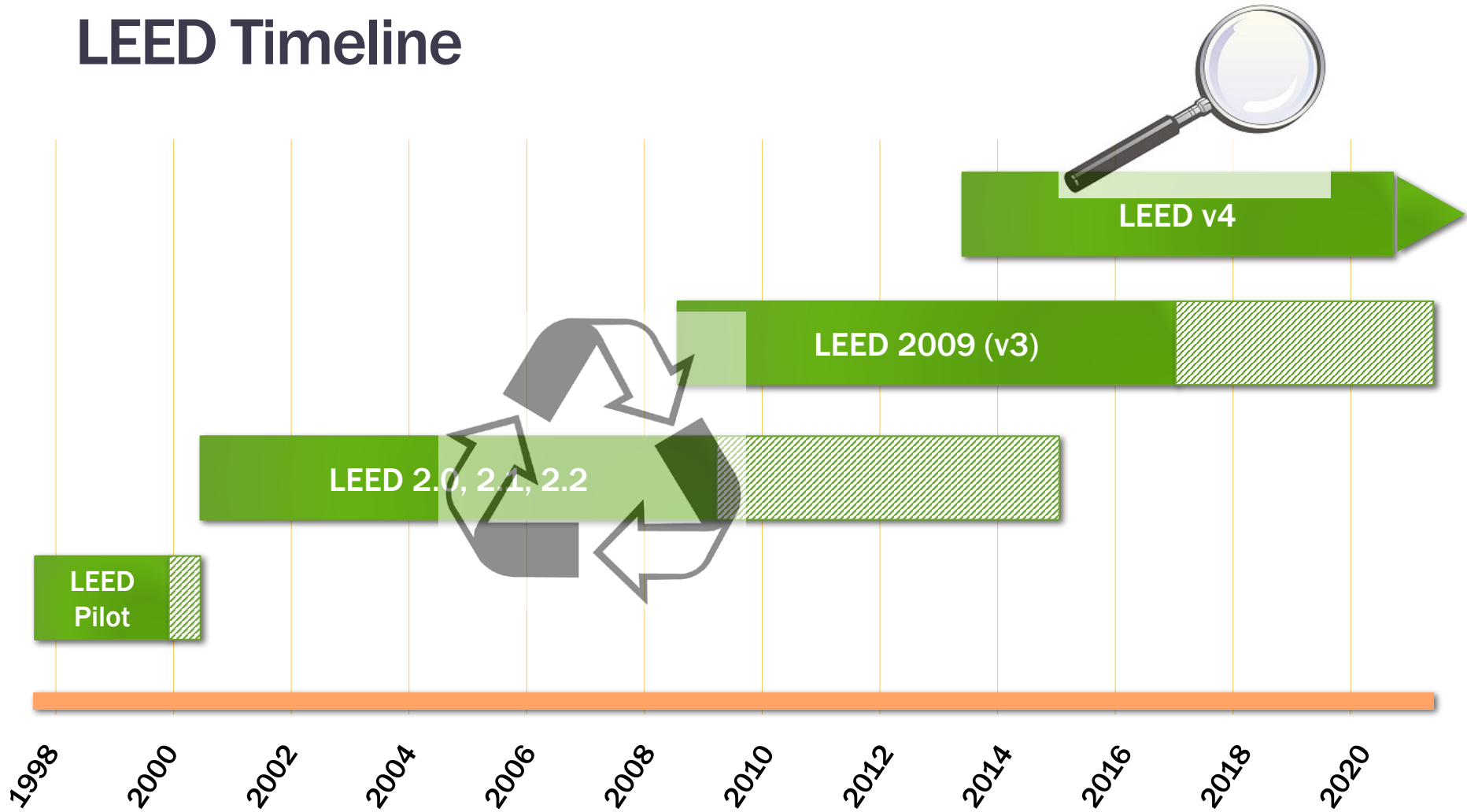
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LEED Timeline



LEED Commercial Interiors, Existing Buildings, Core & Shell, Homes, Schools, Healthcare, Multifamily, Neighborhoods, etc.

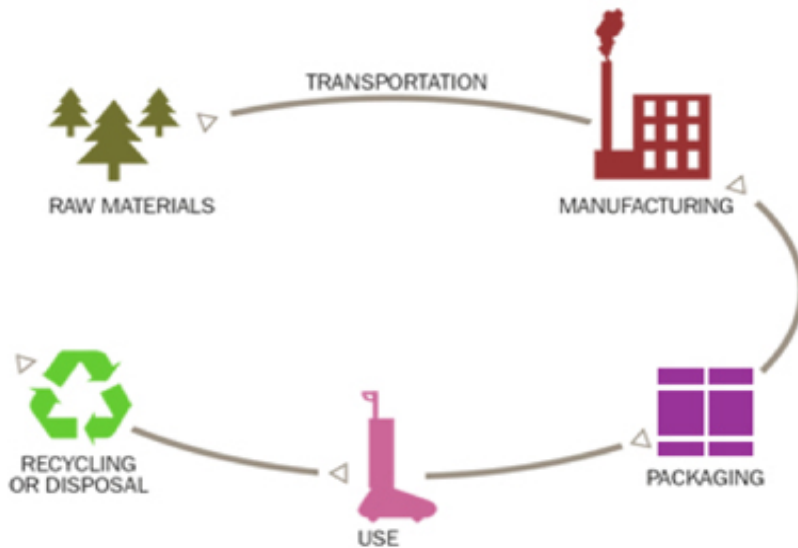
LEED Timeline



LEED Commercial Interiors, Existing Buildings, Core & Shell, Homes, Schools, Healthcare, Multifamily, Neighborhoods, etc.

LEED v4: A more sophisticated look at materials

- Environmental Life-cycle assessment (LCA)
- Disclosure and transparency
- Take-back programs (extended producer responsibility)



Where a product is made, how it's made and what's in it are becoming paramount.

Reporting is the first step

- New credits reward openness about a product's ingredients and environmental footprint, regardless of how well the product measures up.
- Why?
 - Because reporting is a new thing
 - Because it's hard to establish performance thresholds for lack of data
- The credits also reward products that achieve certain targets.

LEED v4: Building Product Disclosure and Optimization Credits

- MRc BPDO: Environmental Product Declarations
 - ✓ Option 1: EPDs
 - ✓ Option 2: Multi-attribute Optimization
- MRc BPDO: Sourcing of Raw Materials
 - ✓ Option 1: Reporting
 - ✓ Option 2: Leadership Extraction Practices
- MRc4 BPDO: Material Ingredients
 - ✓ Option 1: Reporting
 - ✓ Option 2: Optimization
 - ✓ Option 3: Supply Chain Optimization

LEED v4: Building Product Disclosure and Optimization Credits

- MRc BPDO: Environmental Product Declarations
 - ✓ **Option 1: EPDs**
 - ✓ Option 2: Multi-attribute Optimization
- MRc BPDO: Sourcing of Raw Materials
 - ✓ Option 1: Reporting
 - ✓ **Option 2: Leadership Extraction Practices**
- MRc BPDO: Material Ingredients
 - ✓ **Option 1: Reporting**
 - ✓ Option 2: Optimization
 - ✓ Option 3: Supply Chain Optimization

BPDO CHEAT SHEET

The three Building Product Disclosure and Optimization (BPDO) credits in LEED v4 are pushing the industry into new territory. USGBC has done a great job defining and spurring manufacturers to support some options, but others are not yet (as of mid-2017) achievable, for a range of reasons. So go after the easy ones, and don't waste time on others until they're within reach.



ENVIRONMENTAL PRODUCT DECLARATIONS (EPDS)



RAW MATERIAL EXTRACTION



MATERIAL INGREDIENTS

OPTION 1

DISCLOSURE (1 POINT)

EASY

(AND GETTING EASIER ALL THE TIME)

- ▶ 20 product-specific EPDs from at least 5 suppliers
- ▶ Industry-average EPDs count at ½ value

GOOD TARGET FOR EXEMPLARY PERFORMANCE (40 EPDS)



NOT ACHIEVABLE AT THIS TIME

- ▶ Corporate sustainability reports have to include specifics on raw material extraction. Almost none of them do (yet).

IN THE FUTURE Will become viable after we see results from USGBC work with suppliers to define and develop examples of compliant CSRs. Even after that happens, however, it may a while before a critical mass of companies publish them.



EASY

(AND GETTING EASIER ALL THE TIME)

- ▶ 20 disclosure statements from at least 5 suppliers
- ▶ Lots of disclosure statement options

GOOD TARGET FOR EXEMPLARY PERFORMANCE (40 DISCLOSURE STATEMENTS)



OPTION 2 (& 3)

OPTIMIZATION (1 POINT)

NOT ACHIEVABLE AT THIS TIME

- ▶ 50% (by cost) of products have to show better-than-baseline performance in several environmental impact categories.
- ▶ No more than 30% can be from structure & enclosure, a major obstacle

IN THE FUTURE Will become viable for more projects once USGBC revises or refines 30% structure/enclosure requirement and approves more certifications as indicative of across-the-board improvements.



DOABLE

(ESPECIALLY WITH THE SWITCH FROM FSC-ONLY TO LEGAL WOOD)

- ▶ 25% (by cost) of products have to meet one of the options: take-back program, bio-based, salvaged, recycled content, or "legal wood".
- ▶ No more than 30% can be from structure & enclosure

IN THE FUTURE Watch out for potential changes to the legal wood pilot credit that could make it more restrictive.



NOT ACHIEVABLE AT THIS TIME

- ▶ No more than 30% can be from structure & enclosure
- ▶ Hazard avoidance

IN THE FUTURE Will become viable for more projects once USGBC revises or refines 30% structure/enclosure requirement.

OR

- ▶ Supply chain optimization
- ▶ 25% (by cost) of products have to show:

IN THE FUTURE Once suppliers get on board with documenting supply chain optimization it should become within reach.



LOCAL MATERIALS COUNT DOUBLE!

(EXTRACTED, MANUFACTURED, & PURCHASED WITHIN 100 MILES)
This could make a difference for wood, aggregate, salvage items in the Raw Material Extraction credit.

Use LEED so it doesn't use you

- LEED v4 has many compliance options
- Which of them align with your values and strategic objectives?



BPDO: Environmental Product Declarations

Option 1

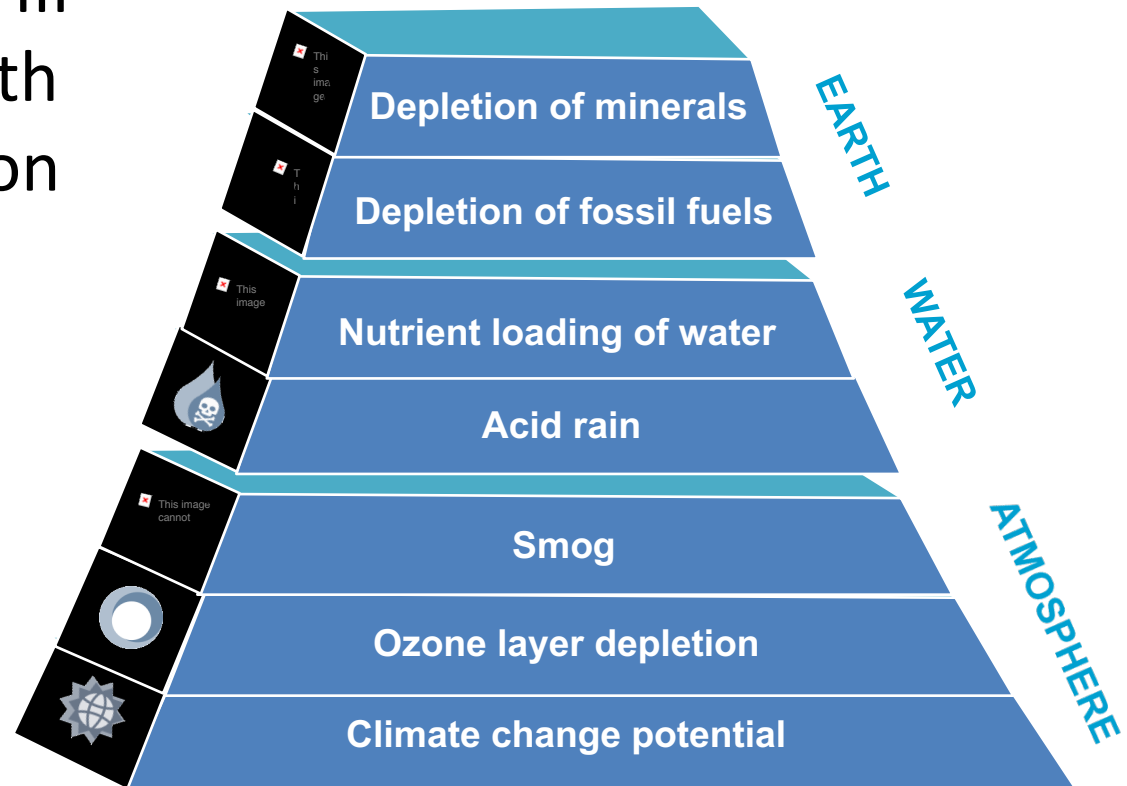
- 20 products with ISO-compliant EPDs
- EPDs that cover a product category but aren't product-specific count at $\frac{1}{2}$ value
- LCA report not summarized in an EPD @ $\frac{1}{4}$ value

Option 2

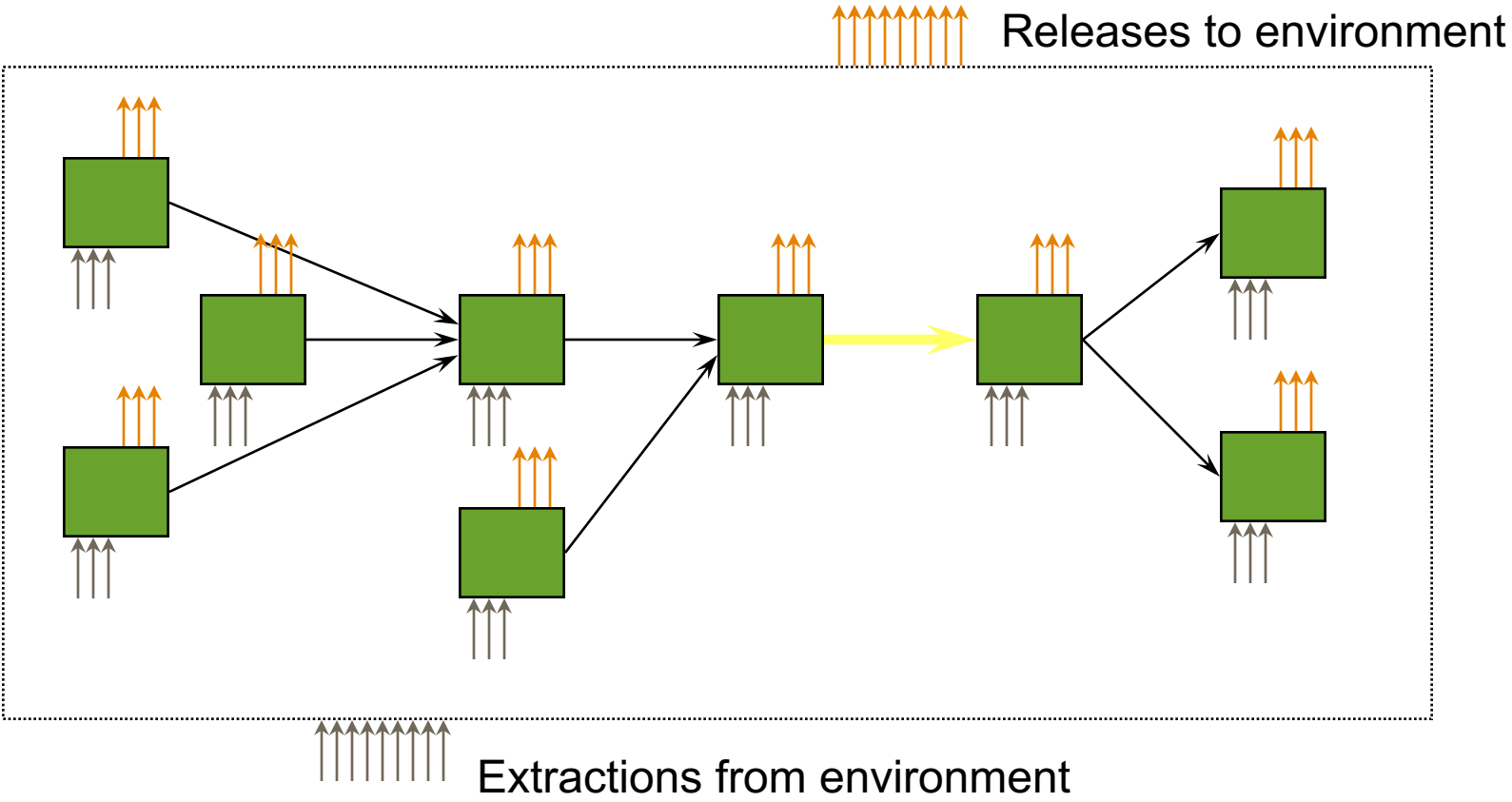
- 50% of products by cost are better than industry average in at least 3 LCA categories...
- And independently certified!

Intro to EPDs

Product-specific Type III Ecolabel. Products with third-party certification (Type III), including independent verification

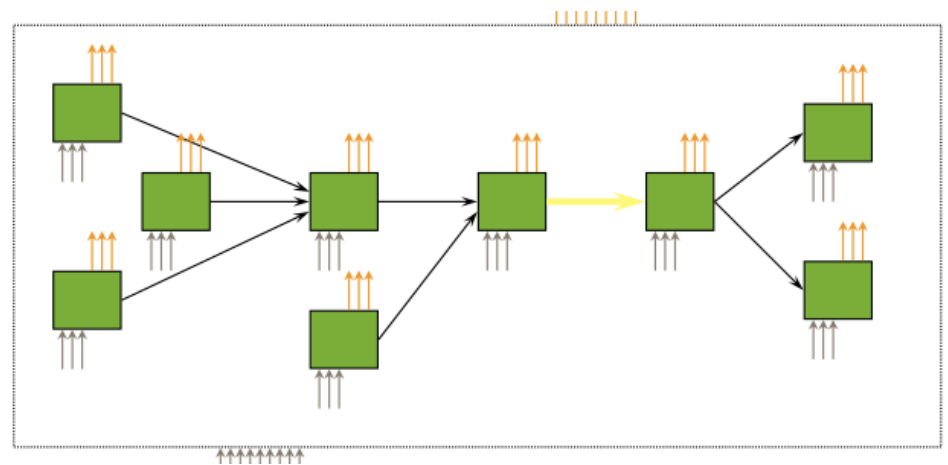


Life Cycle Assessment

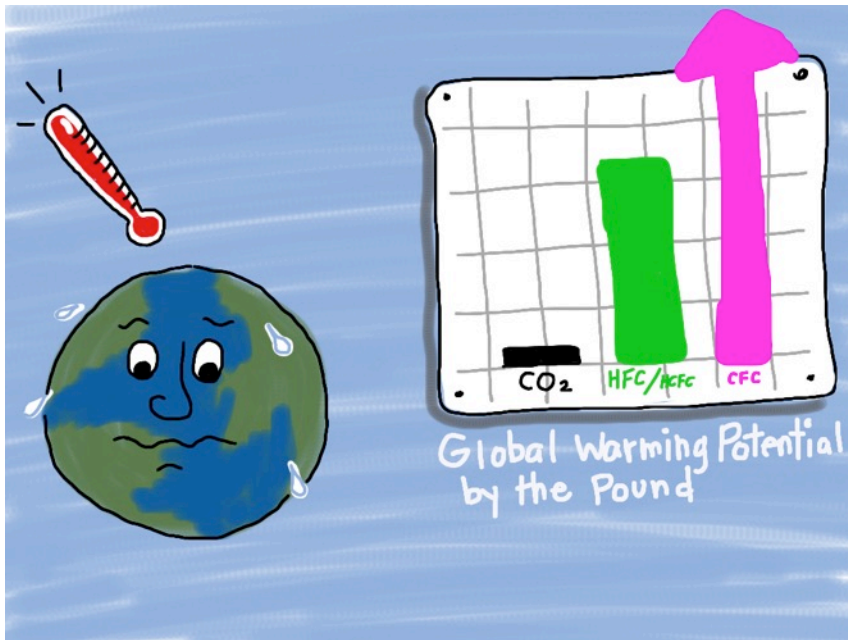


Environmental Product Declaration

- “Type III Environmental Product Declaration,” as defined by ISO 14025
- Summarizes a life-cycle assessment (LCA)
- Can be brand-specific or “industry-wide”



Impacts like ...



Art: Julie Gieseke, www.mapthemind.org



Photo: BriYYZ, CC BY-SA 2.0

Impacts like ...

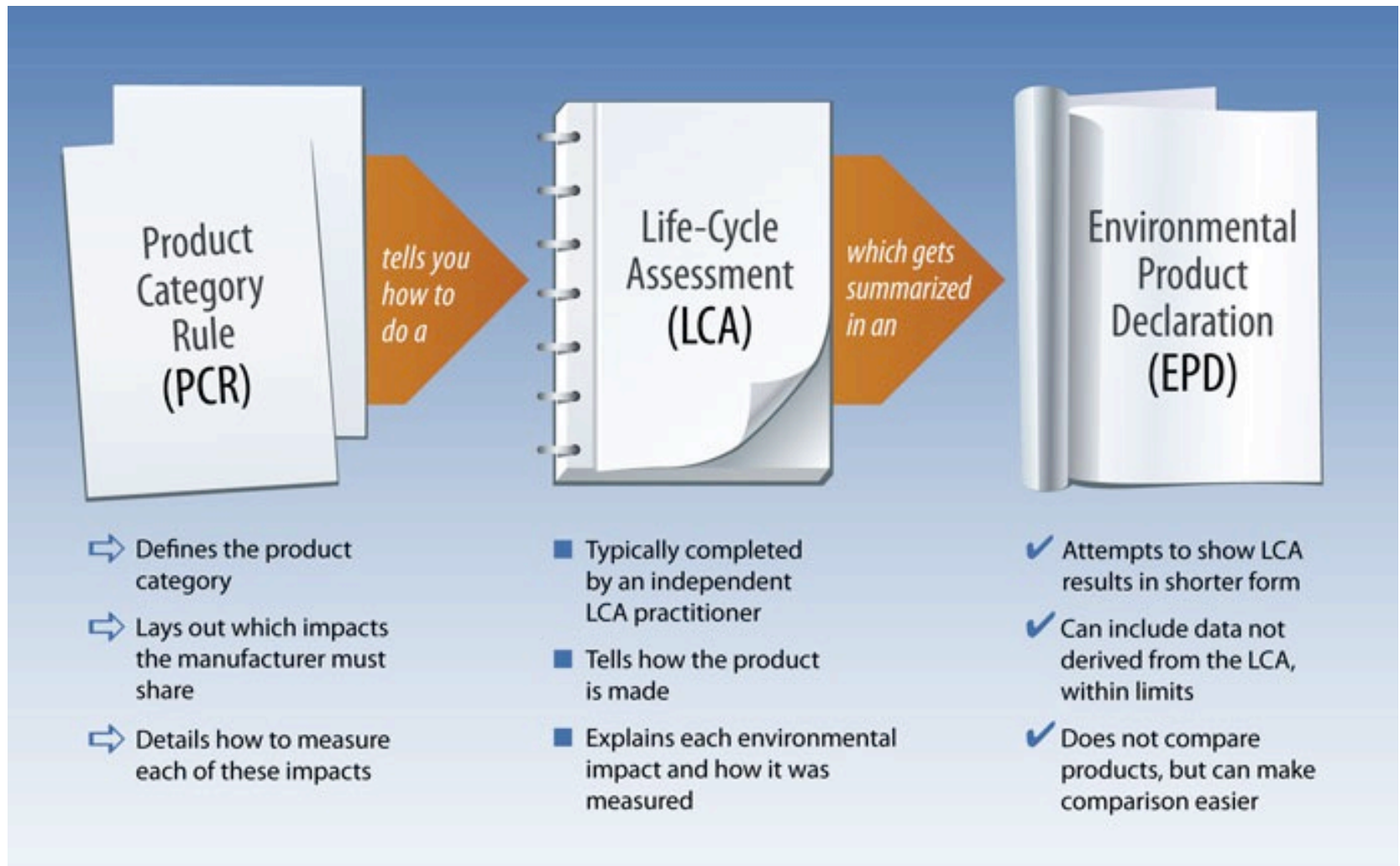


Photo: Alexandr Trubetskoy, CC BY-SA 3.0



Photo: Alexandr Trubetskoy, CC BY-SA 3.0

Environmental Product Declarations



LEED Conforming EPDs have:

1. An approved PCR
2. A reviewed LCA
3. Been independently approved
4. Conformance with relevant ISO standards

BPDO: Sourcing of Raw Materials

Option 1

- 20 products with corporate sustainability reports (CSR) that *include environmental impacts of extraction operations*
- If not independently verified, count at ½ value

Option 2

- 25% of products with:
 - Take-back programs
 - Sustainable agriculture
 - Certified (or legal) wood
 - Salvaged materials
 - Recycled content

BPDO: Material Ingredients

Option 1

- 20 products with inventory of contents and their hazards
 - Manufacturer's inventory
 - HPD
 - Declare
 - Cradle to Cradle
 - BIFMA level
 - ...

Options 2&3

- 25% of products with:
 - No Benchmark 1 hazards
 - Cradle to Cradle Silver+
 - REACH (outside US)
 - Supply Chain Optimization

Health Product Declarations (HPD)

- Open Standard for disclosing product contents and their associated health hazards
- Published by manufacturer
- Allows for keeping specific contents secret
 - But the function and any hazards from those contents must still be disclosed
- Allows for different levels of disclosure, most commonly:
 - to 1,000 ppm
 - to 100 ppm



Contents of a Typical HPD

- Common name (e.g., formaldehyde, fly ash)
- CAS number (e.g., 82115-62-6; 68131-74-8)
- Percentage that the substance comprises in the finished product (often a range)
- Role of the substance in the product (e.g., binder, stabilizer)
- Any known health hazards that regulators or scientists have associated with the substance, as determined via GreenScreen (does NOT consider risk of exposure to the substance)

Comparison to Safety Data Sheet

- Relatively new SDS is much more comprehensive than its predecessor, the Material Safety Data Sheet, or MSDS. It still differs fundamentally from the HPD in two respects:
 - The SDS requires the listing of hazardous contents only, while the HPD is structured to list all contents.
 - Hazards are identified by the manufacturer based on screening against a series of Globally Harmonized System (GHS) hazard categories, not by reference to a predetermined set of “authoritative lists.”

What Makes an HPD LEED-compliant?

Using HPD 2.0 for USGBC's LEED v4 Material Ingredients Credit

Option 1 requirements are shown in blue
 Option 2 requirements are all Option 1 plus those shown in orange

Product Name by Manufacturer Name
 CLASSIFICATION:
 PRODUCT DESCRIPTION:

Health Product Declaration v2.0
created via:

Section 1: Summary

CONTENT INVENTORY

Threshold (per material)

- 100 ppm
- 1,000 ppm
- Per GHS SDS
- Per OSHA MSDS
- Other

Residuals and impurities considered in X of Y materials

- see Section 2: Material Notes
- see Section 5: General Notes

Based on the selected Content Inventory Threshold:

Characterized..... Yes No

Are the Percent Weight and Role provided for all substances?

Screened..... Yes No

Are all substances screened using Priority Hazard Lists with results disclosed?

Identified..... Yes No

Are all substances disclosed by Name (Specific or Generic) and Identifier?

CONTENT IN DESCENDING ORDER OF QUANTITY

Summary of product contents and results from screening individual chemical substances against HPD Priority Hazard Lists and the GreenScreen for Safer Chemicals. The HPD does not assess whether using or handling this product will expose individuals to its chemical substances or any health risk. Refer to Section 2 for further details.

MATERIAL | SUBSTANCE | RESIDUAL OR IMPURITY
GREENSCREEN SCORE | HAZARD TYPE

MATERIAL | SUBSTANCE | GS | HAZ | HAZ | HAZ; SUBSTANCE | GS | HAZ | HAZ | HAZ; SUBSTANCE | GS | HAZ | HAZ | HAZ; SUBSTANCE | GS | HAZ | HAZ | HAZ; SUBSTANCE | GS | HAZ | HAZ | HAZ; RESIDUAL OR IMPURITY | GS | HAZ | HAZ | HAZ; MATERIAL | SUBSTANCE | GS | HAZ | HAZ...

Number of GreenScreen BM-4/BM-3 contents: ...

Contents highest concern GreenScreen Benchmark or List Translator Score:

Nanomaterial:

INVENTORY AND SCREENING NOTES

Overall Requirement
 The HPD must be complete – responses provided in all data fields in compliance with requirements of HPD Open Standard; see Checklist for a Compliant HPD

Exceptions may exist for Special Conditions and must be explained in the Inventory and Screening Notes.

Options 1 and 2: Must be "Yes".

Options 1 and 2: Must be "Yes"

Options 1 and 2: May be either "Yes" or "No." If "No" is checked, contents must still be Characterized and Screened


Option 2: To qualify for 150% of cost may not be "Benchmark 1" or to qualify for 100% of cost may not read "LT-1" or LT P-1

Option 2: Must be 100 ppm and must apply to all listed contents

Options 1 and 2: "1000 ppm" and/or "100 ppm" must be checked and must apply to all listed contents. Threshold applies to product for Basic Inventory and materials or product for Nested Materials and Substances format.

Options 1 and 2: Must be filled in and there is no minimum number of "considered" materials. There must be an explanation of why residuals and impurities were or were not considered.

BPDO Material Ingredients Option 1 Programs

- Health Product Declaration 
- Manufacturer's inventory
- Declare
- Cradle to Cradle & C2C Material Health
- ANSI/BIFMA e3 (BIFMA level certification for furniture)
- UL Product Lens
- ACT Facts (for contract textiles)

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Declare.

Product Name
Manufacturer Name

Final Assembly: City, State, Country
Life Expectancy: 000 YEARS
End of Life Options: Recyclable (42%), Landfill

Ingredients:

Ingredient One (Location, ST), **The Second Item** (Location, ST), **Next Ingredient** (Location, ST), **Living Building Challenge Red List***, **Different Part of the Product. Another Component. More Stuff. US EPA Chemical of Concern. Yet Another Item. Non-toxic Element. Pieceofthewhole. Component of Concoction. ThirdFromTheEnd. ECHA REACH Substance of Very High Concern. Last Ingredient.**

*LBC Temp Exception III-E11 Lead and Hardware

Living Building Challenge Criteria:

XXX-0000

LBC ZONE 0

Declaration Status

EXP. 12/2010

00 00 00

LBC Red List Free

LBC Compliant

Declared

MANUFACTURER RESPONSIBLE FOR LABEL ACCURACY
INTERNATIONAL LIVING FUTURE INSTITUTE™ declareproducts.com

Intentionally simple in scope. By focusing on product ingredients, we hope to 'level the playing field' and create a platform for constructive conversations about the human health and ecological impacts of the decisions we make.

Options: Take back program; Salvageable or reusable; Recyclable (%); Landfill; Hazardous waste (%).

Raw Material and Final Assembly locations assist project teams in meeting the Appropriate Sourcing Imperative, intended to support the growth of regional economies rooted in sustainable practices, products and services.

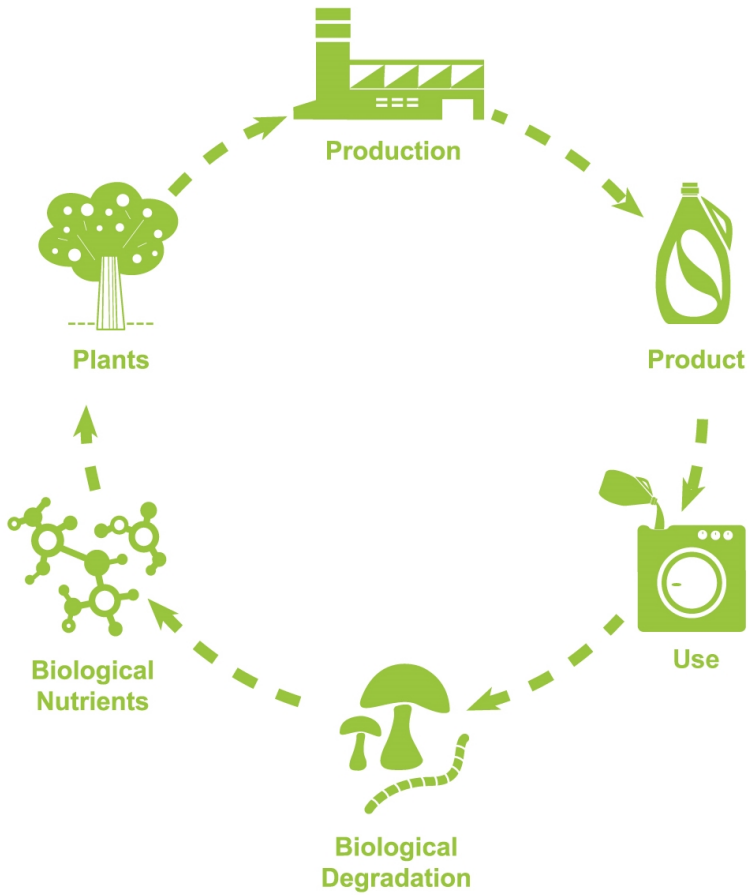
All constituent parts of a product.
Items are color coded to communicate potential hazards:
Living Building Challenge Red List
US EPA Chemical of Concern Action Plan Published
ECHA REACH Substance of Very High Concern Candidate
Not referenced in any of the three programs noted above

Temporary Red List chemical exceptions applied for specific product types.

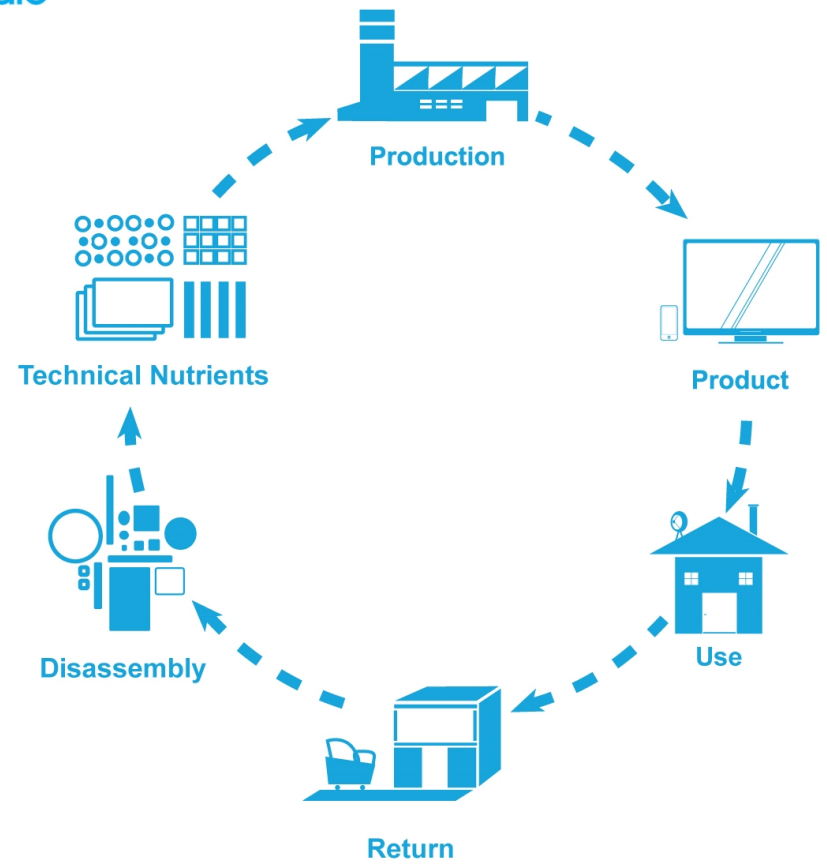
Declare identifier for company + product
Valid for 12 months, starting with the date of issue

CSI MasterFormat 2010 classification

Verification that a product complies with the Living Building Challenge Red List.



Biological Cycle
for Products for consumption



Technical Cycle
for Products for Service

Sample Scorecard

The overall certification level is the lowest level of achievement in any one of the five attributes

		PRODUCT Company Version 3.0 Recertification every 2 years				
SILVER		BASIC	BRONZE	SILVER	GOLD	PLATINUM
	Material Health				✓	
	Material Reutilization				✓	
	Renewable Energy			✓		
	Water Stewardship			✓		
	Social Fairness				✓	

100% assessed: no risks to humans or the environment

Materials are actively captured at end of use and reutilized

At least 5% renewable energy

Active water management and effluent monitoring

Auditing practices throughout the supply chain

Quick reference to determine a product's level of optimization toward human and environmental health



No C2C Banned
List Substances



No exposure from
carcinogens,
mutagens or
reproductive toxicants



Safe for humans and
the environment
Fully-optimized

What's up with risk vs. hazard?

Hazard Avoidance

Pros:

- Simple
- Clear intention

Cons:

- Not always achievable
- Risk of unfortunate substitutions

Risk Assessment

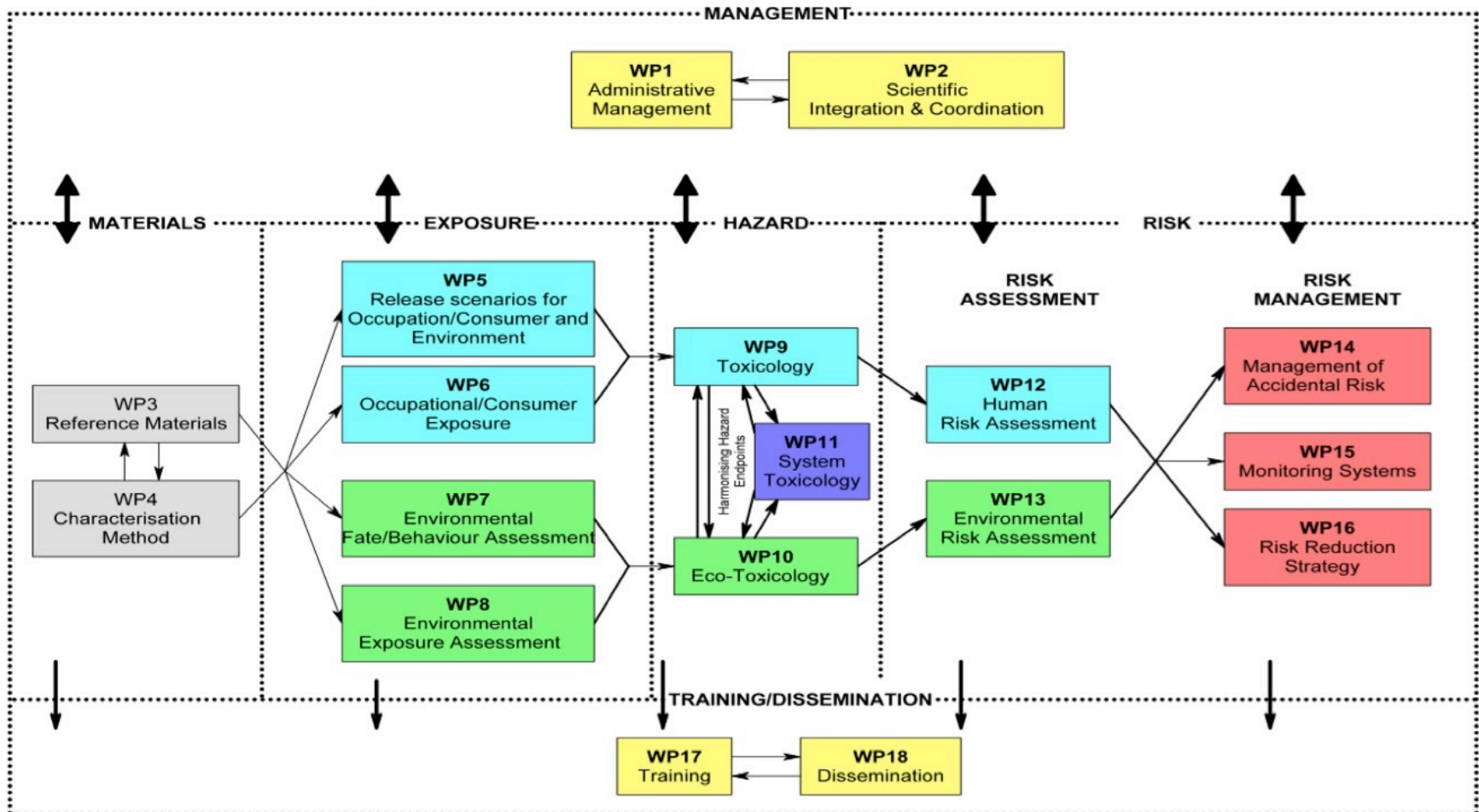
Pros:

- Addresses the actual concern

Cons:

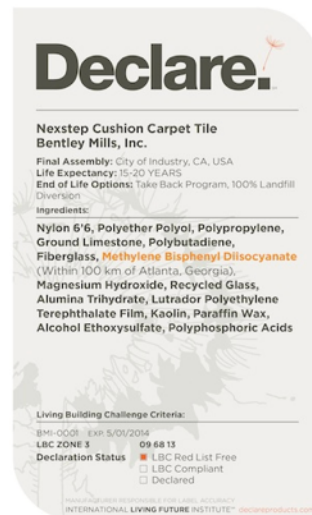
- Subject to assumptions
- Tactic for delays, obfuscation
- Rarely includes all affected populations

Risk = Hazard + Exposure



Two Ways Suppliers Can Go Transparent

Tell all with a self-declaration



Pay consultants to research and certify that the product is safe



Risk Management Hierarchy

1. Eliminate the use of hazardous ingredients
2. Minimize the use of hazardous ingredients where elimination is not possible
3. Transition to more effective control measures where hazardous ingredients remain, and
4. Manage those remaining hazardous ingredients responsibly with a goal of zero exposure and discharge to humans and the environment.

Facilitated Conversation, Q&A

What substances are you concerned about, and why?

What ecosystem impacts are you aware of? How do you try to mitigate these when specifying products?

How might you assess the carbon impacts of your projects?



Thank You!