2016 Fall Workshop – C&D Recovery and Management: Deconstruction Options

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What is Deconstruction?

The systematic dismantling of a structure in order to preserve the building materials for reuse.

What's the difference between recycling and reuse?

Amount of energy used to process materials

RECYCLE REUSE

Melting down and recasting of structural steel

Chipping of wood for mulch

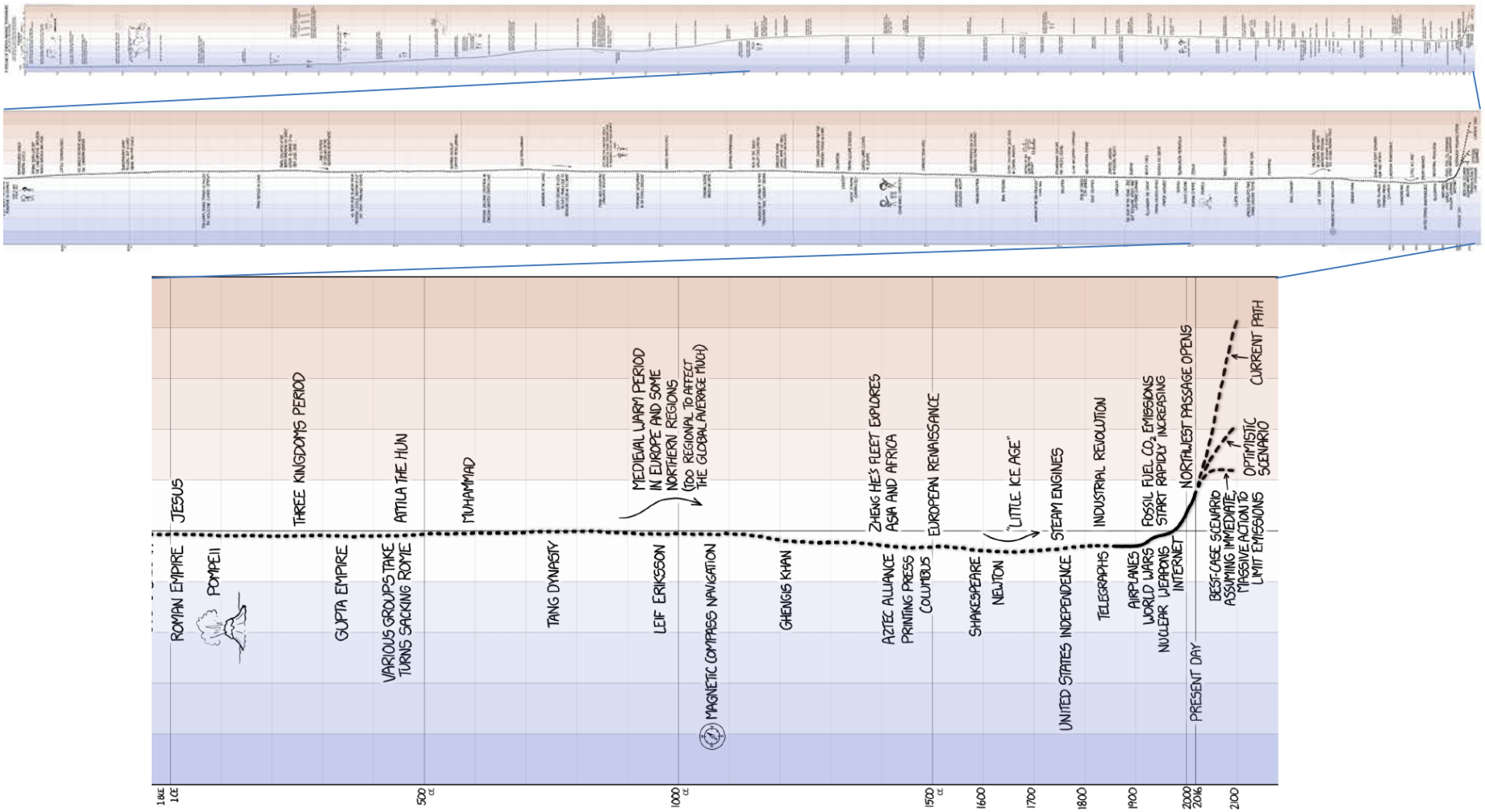
Denailing of 2x4's

Why Deconstruct?

Why Deconstruct?

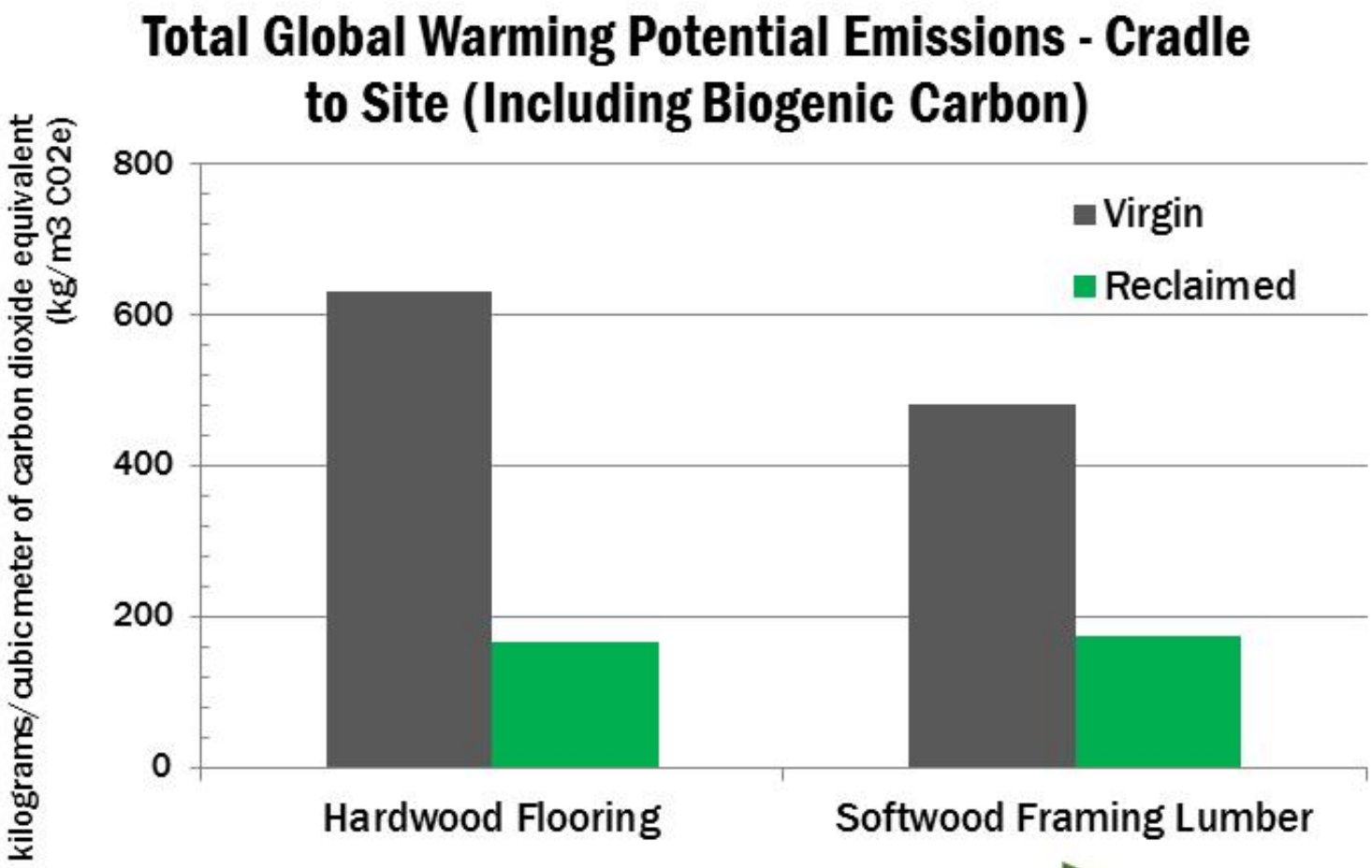
- **The planet**

A Timeline of Earth's Average Temperature Since the Last Ice Age



http://xkcd.com/1732/

Environmental Impact of Sourcing Reused Materials



Source: *Life Cycle Energy and Carbon Emissions for New and Recovered Softwood Framing Lumber and Hardwood Flooring*
Bergman, et al

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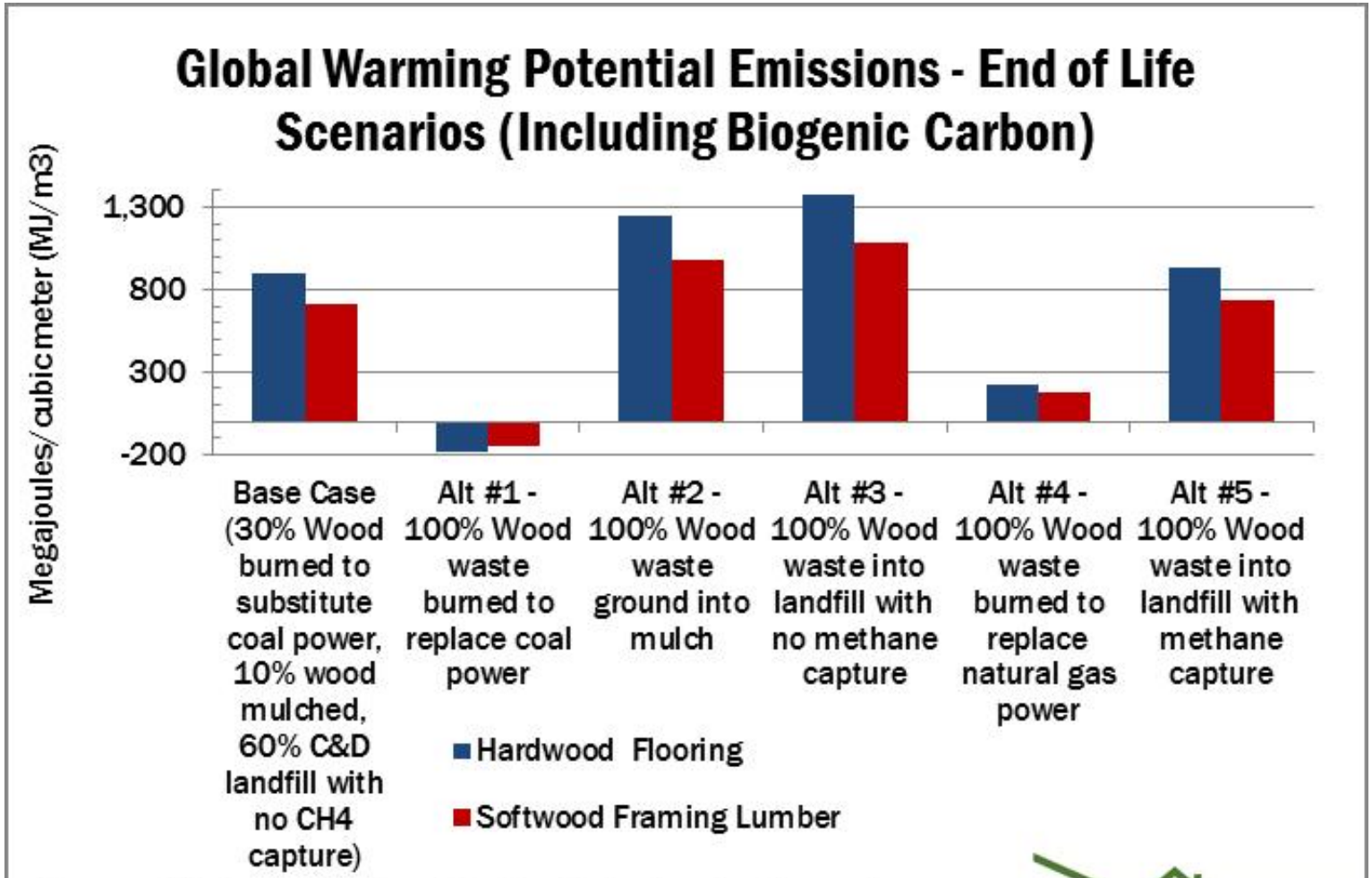
Impact of Reuse - Environmental



Source: *Life Cycle Energy and Carbon Emissions for New and Recovered Softwood Framing Lumber and Hardwood Flooring* Bergman, et al

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Why Deconstruct?

- **The planet**
- **The people**

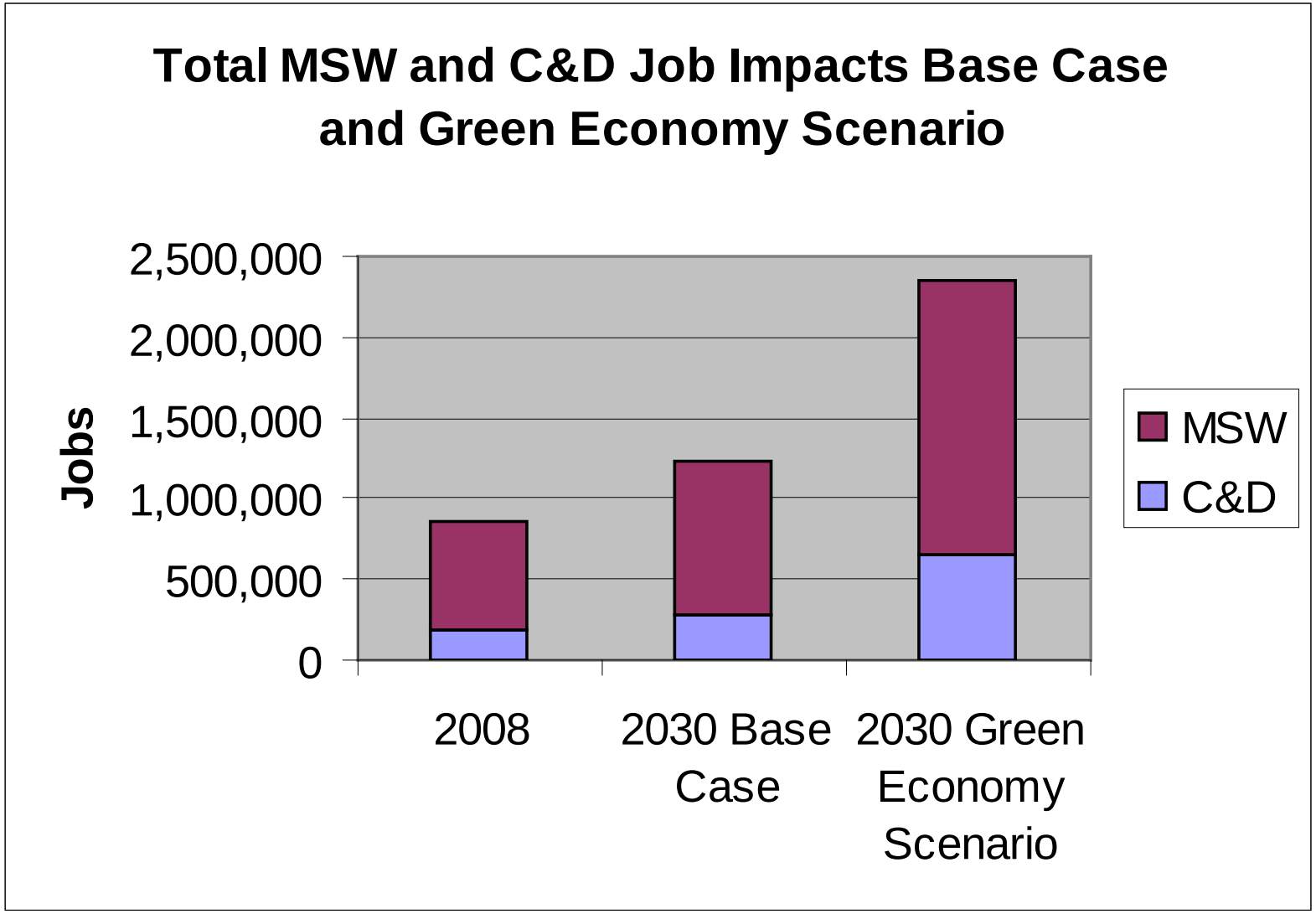
Impact of Reuse - Jobs

The reuse and recycling industry produces upwards of 7 jobs per 1000 lbs of MSW, as compared to less than 1 job per 1,000 lbs of waste landfilled.

- "More Jobs, Less Pollution: Growing the Recycling Economy in the U.S." Prepared by the Tellus Institute November, 2011

More Jobs, Less Pollution: Growing the Recycling Economy in the US.

Tellus Institute with Sound Resource Management.



Why Deconstruct?

- The planet
- The people
- Policy Requirement

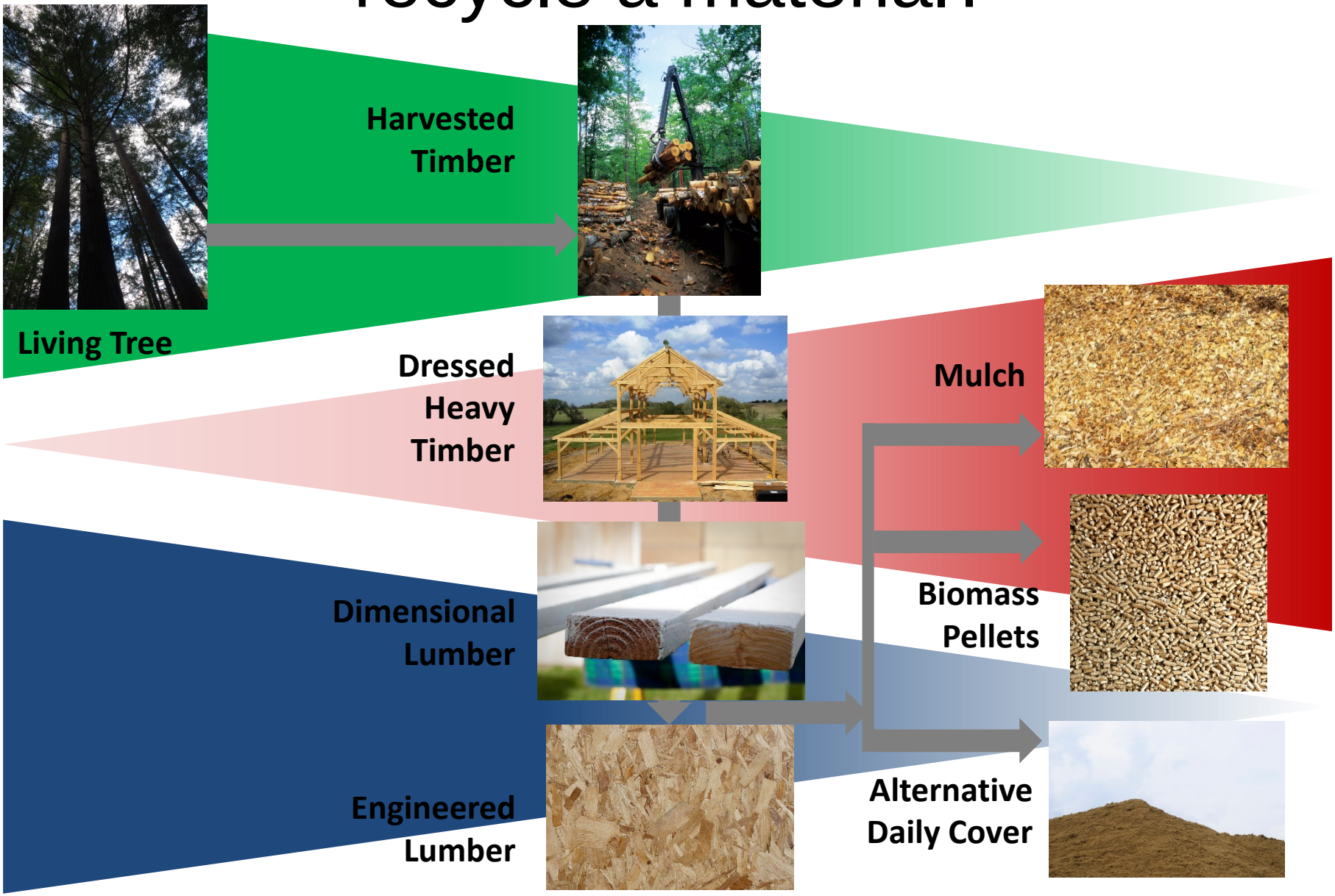
Policy Examples

- Language/law/ordinance that explicitly
  - Requires reuse and deconstruction (e.g. 5% reuse requirement, *Cook County*)
  - Restricts the use of demolition, or the landfilling of materials (e.g. Ban on C&D waste in landfills, *Massachussetts*)
  - Requires reuse and deconstruction (*Portland, OR… Gary, IN …)*

Why Deconstruct?

- The planet
- The people
- Policy Requirement
- Profit

How many times can you reuse or recycle a material?



Direct Economic Impact

Each year more than 17 million tons of recoverable C&D wood materials are landfilled at a cost of more than $500 million.

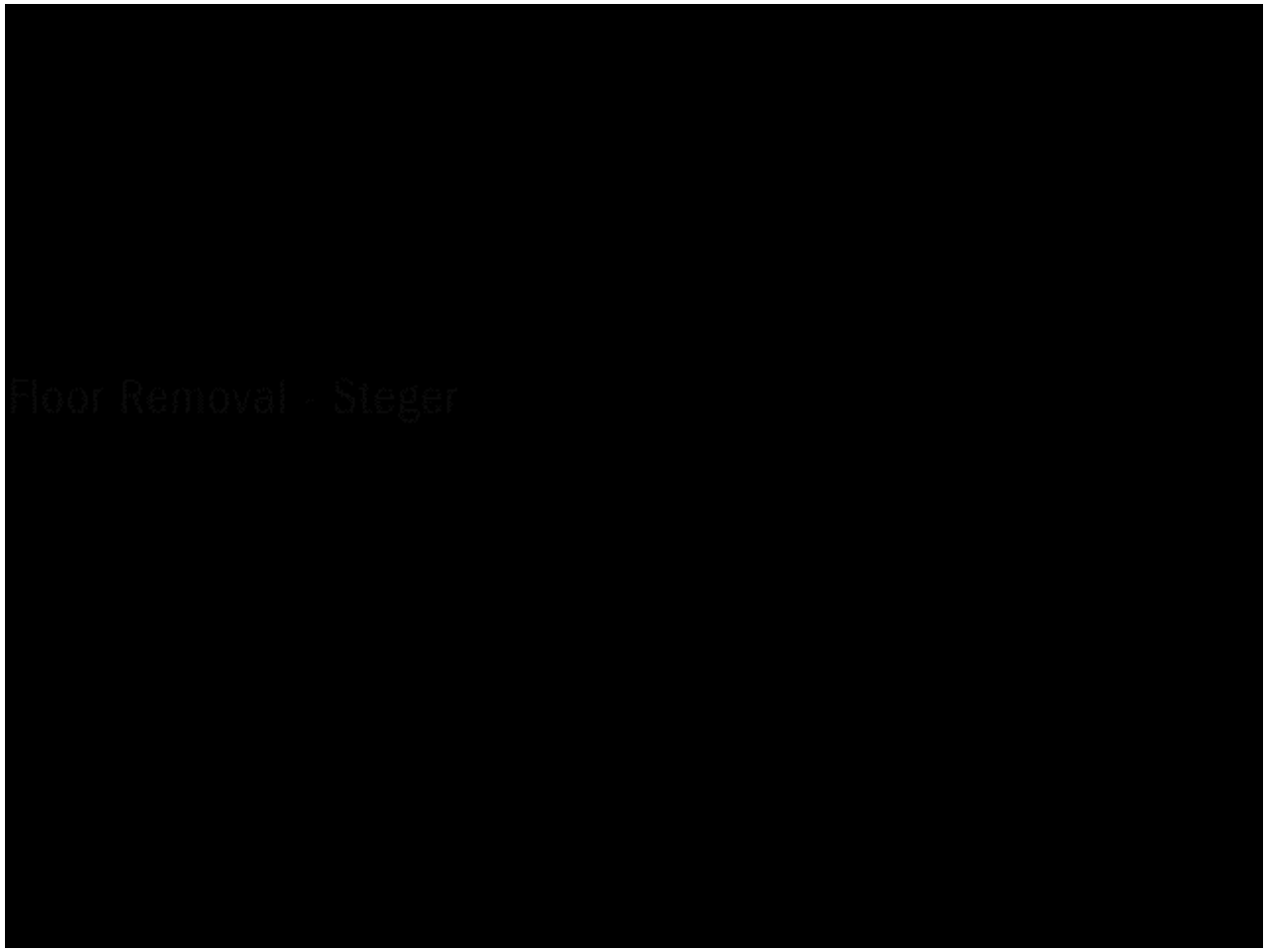
"Municipal Solid Waste(MSW) and Construction and Demolition(C&D) Wood Waste Generation and Recovery in the United States" Dovetail Partners

How to Deconstruct?

Deconstruction Method: piece by piece, (100% by hand)

- Labor Intensive
- Highest reclamation rate and quality
- All about access

Deconstruction Method: piece by piece, (100% by hand)



Deconstruction Method: knock down (tip and sort)

- Reduced disassembly time, almost entirely sorting and processing time
- Reduced risk by eliminating working at height
- Limited usefulness- only appropriate for certain buildings
- Strategic unbracing of the building.

Deconstruction Method: Mechanized (hybrid of machine and hand)

- Reduced hand labor, increased machine labor
- Reduced risk by minimizing working at height
- All about identifying removable units and safely extracting them

Local Resources

- BMRA Decon Project Management Training "Decon for Demo Contractors"

Next class scheduled for January, 2017

Local Resources: BMRA Members

Evanston ReBuilding Warehouse

BLUEEARTH DECONSTRUCTION

REBUILDING EXCHANGE

Questions?

Additional resources are available at www.bmra.org

or

Anne Nicklin anicklin@bmra.org

773-340-BMRA (2672)

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Working to create a vibrant materials reuse economy as part of a world without waste.

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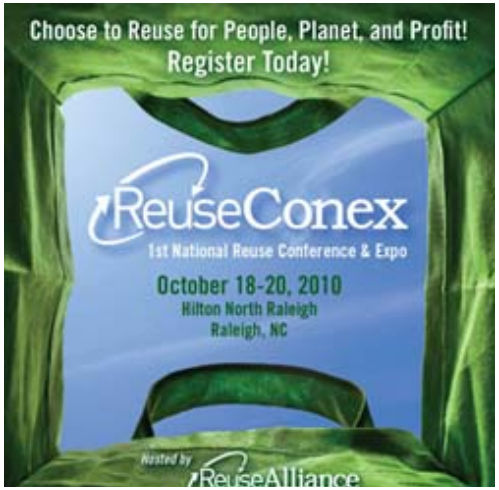
Elevating the Issue: Outreach, Events and Advocacy



AMERICAN SUSTAINABLE BUSINESS COUNCIL

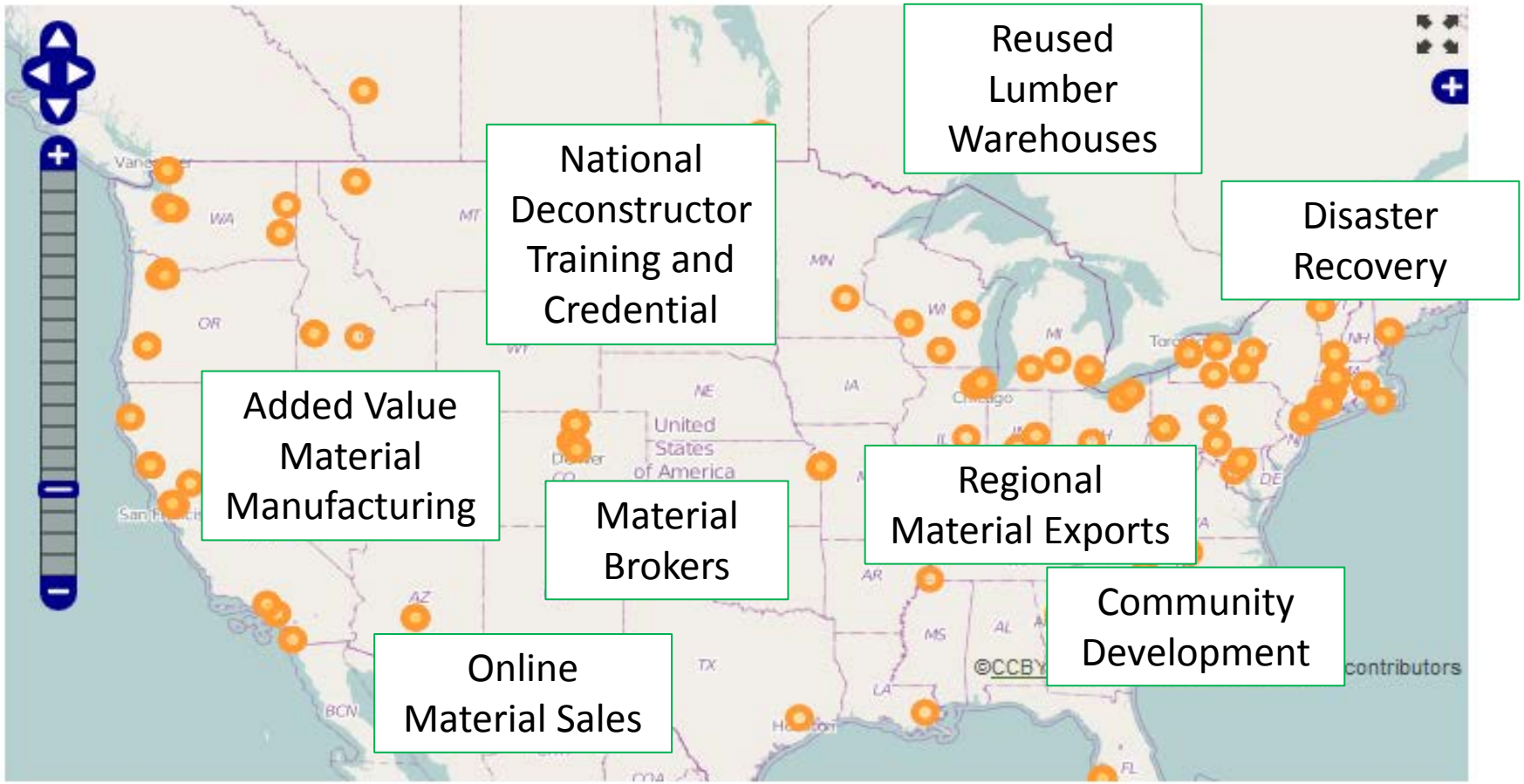
American Wood Council

GREEN BUILD

Moving the Market: Directory of Nationwide Resources

bmra.org/directory_map

Map Directory



Moving the Market: Professional Training and Resources

Introduction to Deconstruction - Workbook (Public Edition)

By Building Materials Reuse Association

View this Author's Spotlight

Paperback, 389 Pages ☆☆☆☆☆ This item has not been rated yet

Price: $165.00

Ships in 3-5 business days

Introduction to Deconstruction:

A Comprehensive Training Workbook

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Introduction to Deconstruction - A Comprehensive Textbook
This textbook is the only one of its kind, containing valuable information on deconstruction and materials reuse assembled from the best practitioners in the country and reviewed by a diverse technical advisory group. This unparalleled resource was previously available only to licensees of the BMRA curricula and BMRA members.
391 pages, Color paperback.

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WasteCap Resource Solutions

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Building Materials Reuse Association

Check in: 8:30am - 9:00am
Class: 9:00am - 4:30pm

DECONSTRUCTION TRAINING COURSE

Wednesday, February 4th

Hosted by the

MMSD
PARTNERS FOR A CLEANER ENVIRONMENT

260 West Seeboth Street Milwaukee, WI 53204

Join the Building Materials Reuse Association and WasteCap Resource Solutions, who have teamed up to create and provide this new Deconstruction Training workshop. Take away the eight steps and necessary skills to create, develop, manage, monitor, document and promote a successful deconstruction project from beginning to end! LEED AP's and Green Associates are eligible for **7.5 Continuing Education Units** through GBCI. Additionally, architects are eligible for **7.5 Learning Units through AIA**

Standard Cost - $325

BMRA, WasteCap and Association Members - $285

- *Includes lunch and materials*
- *Ask about our group rates*

To Register Visit:

www.wastecap.org/training

Who Should Attend?
Contractors
Architects
Reuse and Recycling Specialists
Haulers
Building Inspectors
Consultants
Construction Site Managers
Green Building Specialists
Regulators

aogden@wastecap.org - 414-961-1100

Objectives & Benefits

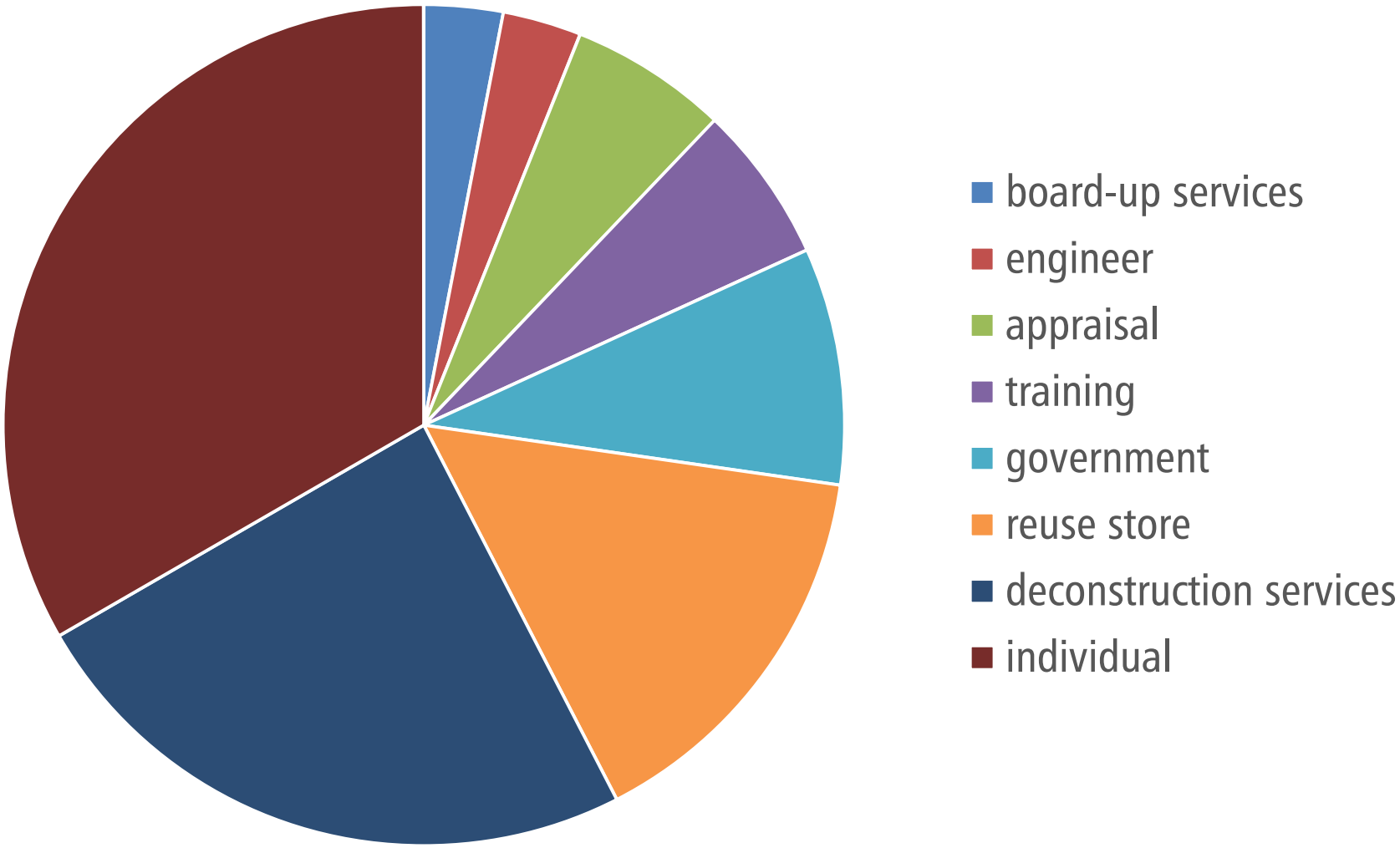
- Learn how to manage a deconstruction site and the recovery of materials while gaining knowledge of the economic, social and environmental benefits.
- Learn how to best educate crews for maximum efficiency and compliance.
- Receive educational materials, monitoring checklists, economic analysis worksheets and much more.

About The Trainers

WasteCap Resource Solutions has more than twelve years of experience in training building professionals on reuse and recycling of materials.

The Building Materials Reuse Association provide increasing opportunities for the recovery and reuse of building materials in an environmentally sound and financially sustainable way.

Inspiring the Industry: Membership



We Need Your Support To:

- **Advocate** for materials recovery and reuse
- **Engage** the construction and demolition community.
- **Provide** public access to reliable information on deconstruction and reuse
- **Share** our educational resources through online learning, school programs, and workforce development

Why should we pay attention to building materials?

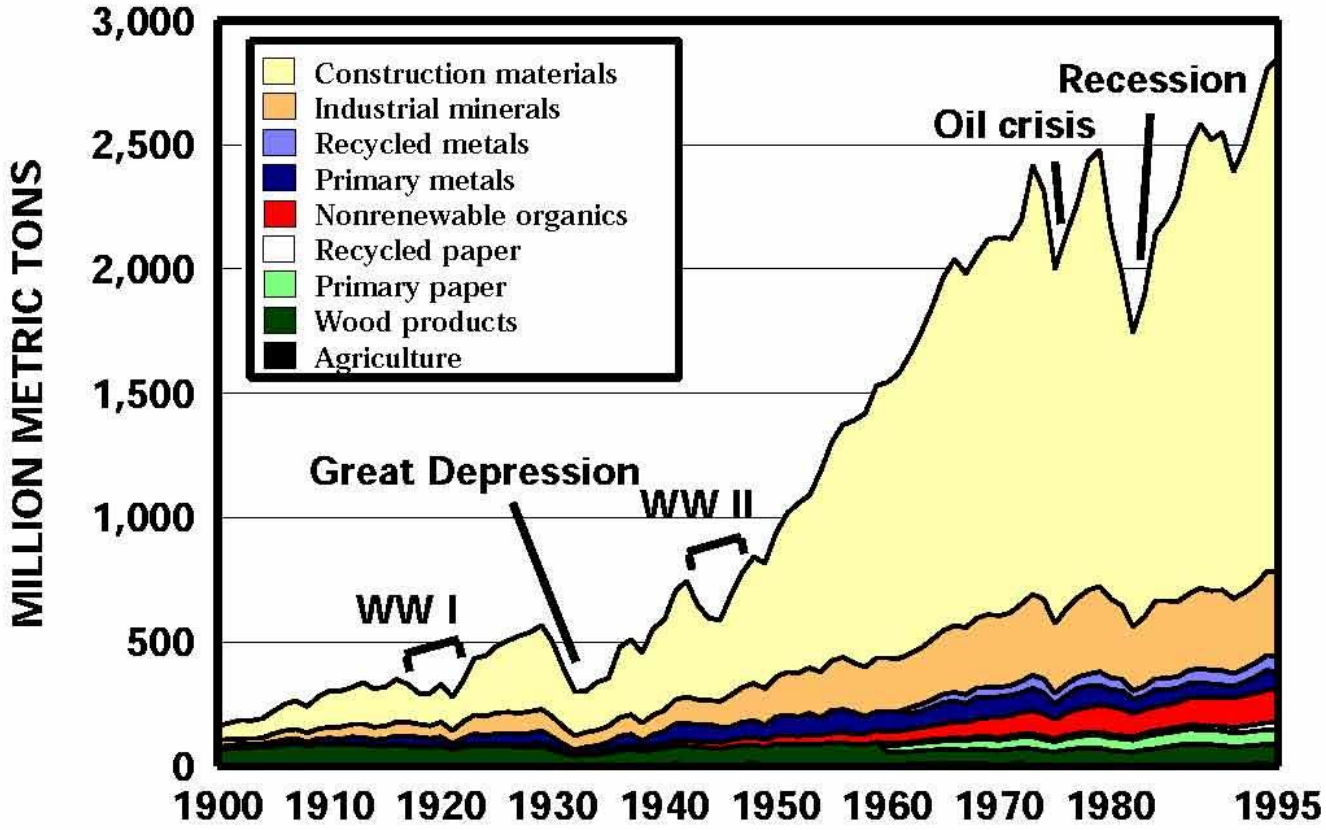
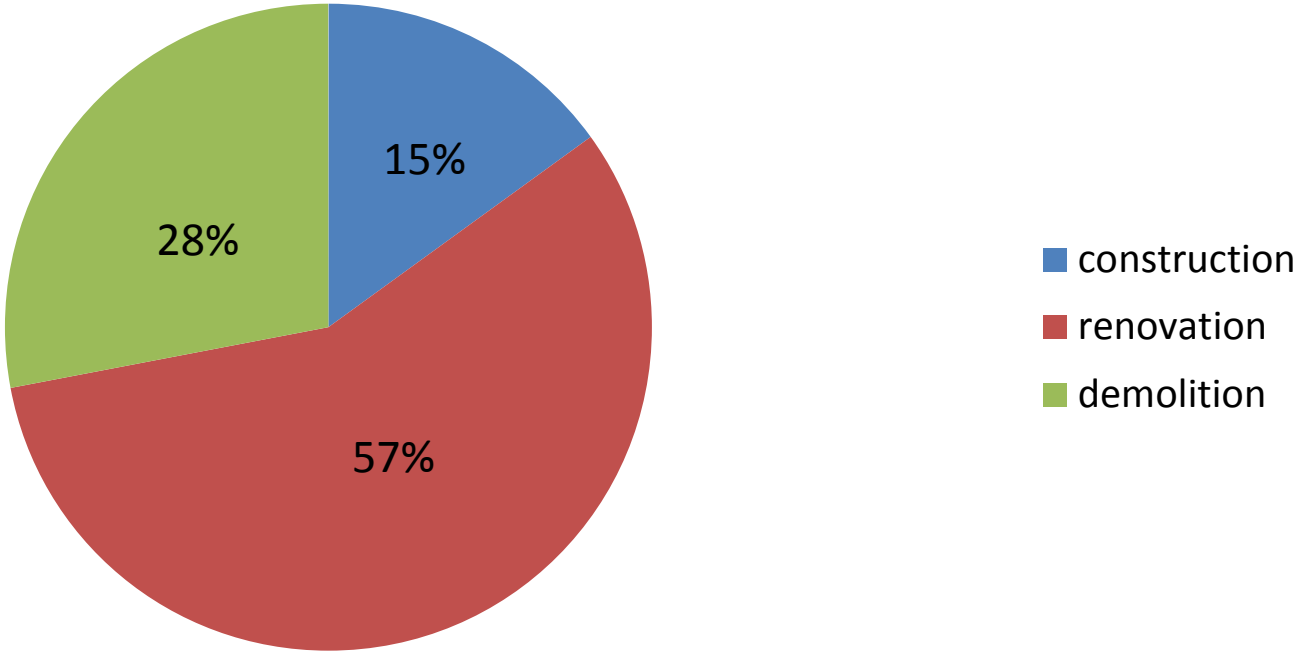


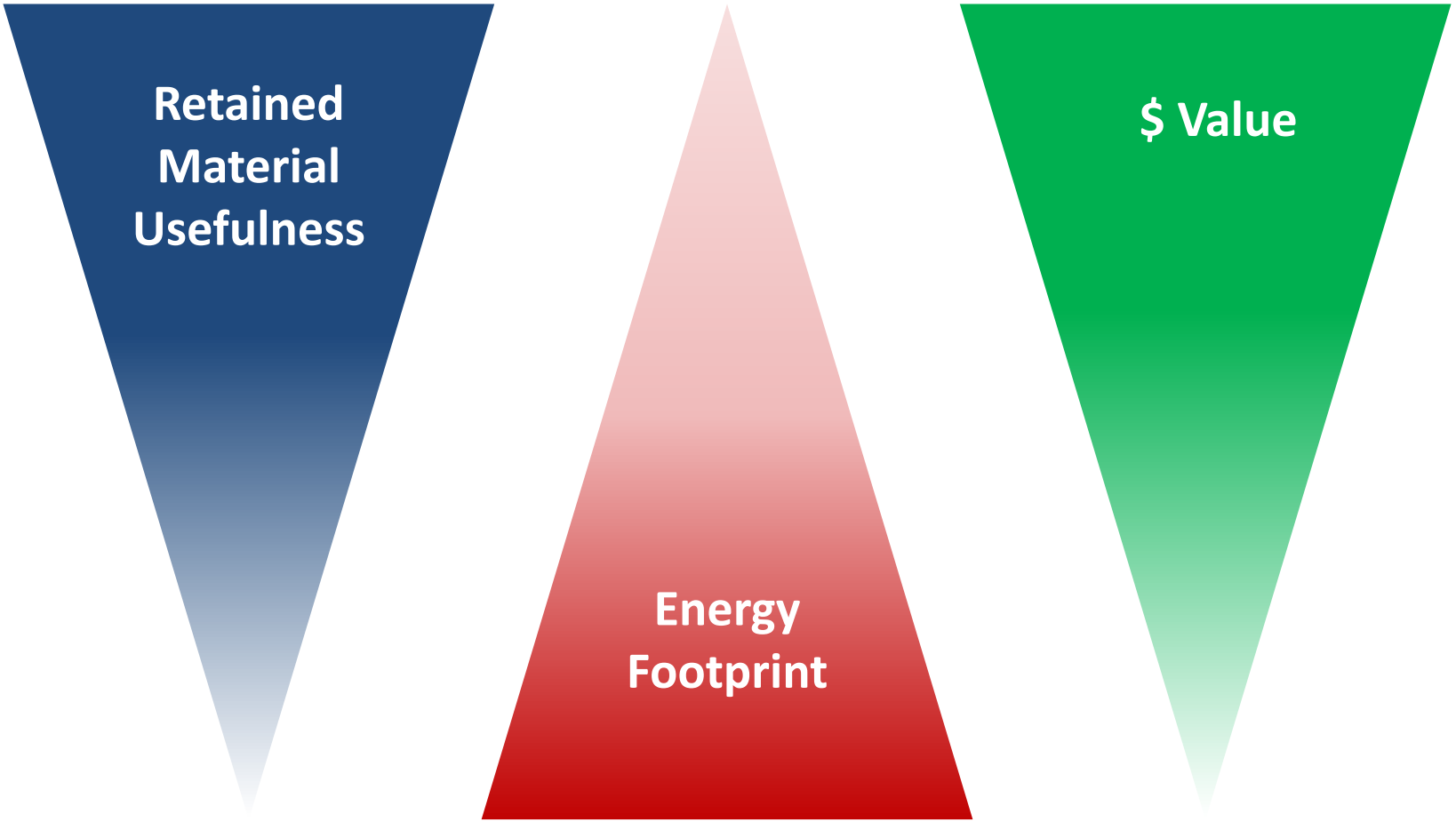
Figure 1. Measurement of the amount of raw materials consumed in the United States. WWI, World War I; WWII, World War II (5).

When should building materials recovery and reuse be included on a project?

Estimated Amount of Residential Building-Related C&D Materials Generated in the U.S. During 2003 - EPA



What is Highest Best Use?



Non-Structural Salvage – Commonly Removed Items

Item	Skill Level	Considerations
Carpet	Medium	Relatively simple removal (mind the nails in wall to wall) Markets vary significantly
Kitchen Appliances	Low	Ensure that all utilities are safely shut off, use appliance dollies to save your back. Strong market.
Service Appliances (furnace, etc.)	High	Market varies according to the age of equipment, significant safety issues on utility shut off.
Cabinets	Medium	Reusability depends on initial quality, plywood carcasses are hardier than particle board. Remove countertops first where possible.
Medicine Cabinets	Low-Med	Remove the shelves first, and internal connections to pull from wall.
Light Fixtures	Med-High	Shut off/lockout circuit breaker, loosen fixture, unfasten wire connections, protect fixture.
Finished Wood Floors	Low-Med	Remove base trim, start on tongue side, gently pry along the length. Denail.
Doors	Low-Med	Maximum value for door + jamb. Remove trim first, detach jamb + door from wall.

Full Deconstruction– Commonly Removed Items

Item	Skill Level	Considerations
Insulation	Medium	Batt or board insulation is easily salvaged following removal insulation is generally unrecoverable.
Ductwork	Med-High	There is a high scrap value, though reuse value is dependent considerations to untape, and remove screws.
Roofing	High	Safety is of prime concern in removing roofing. Asphalt shingles recycling while sheet, slate, and tile roofing is highly reusable.
Sheathing	Med-High	Plywood sheathing has high salvage and reuse value, while exposure,
Lumber	Med-High	Follow the guidelines of last on/first off. Maintain integrity of (trusses) as possible.
Exterior Siding	Medium	High value siding should be protected, and then removed method.
Brick	Med-High	Stabilize walls and chimneys, greater reuse value is in solid volume.

MATERIALS; WHAT'S AVAILABLE

- Reusable & recyclable building materials
  - - Concrete, asphalt, masonry
  - - Lumber
  - - Metals
  - - Asphalt roofing
  - - Carpet & pad
  - - Architectural items
  - - Mechanical, plumbing & electrical items
- Over 80% of a house can be reused or recycled





Non-Structural Salvage – Extraction Methods

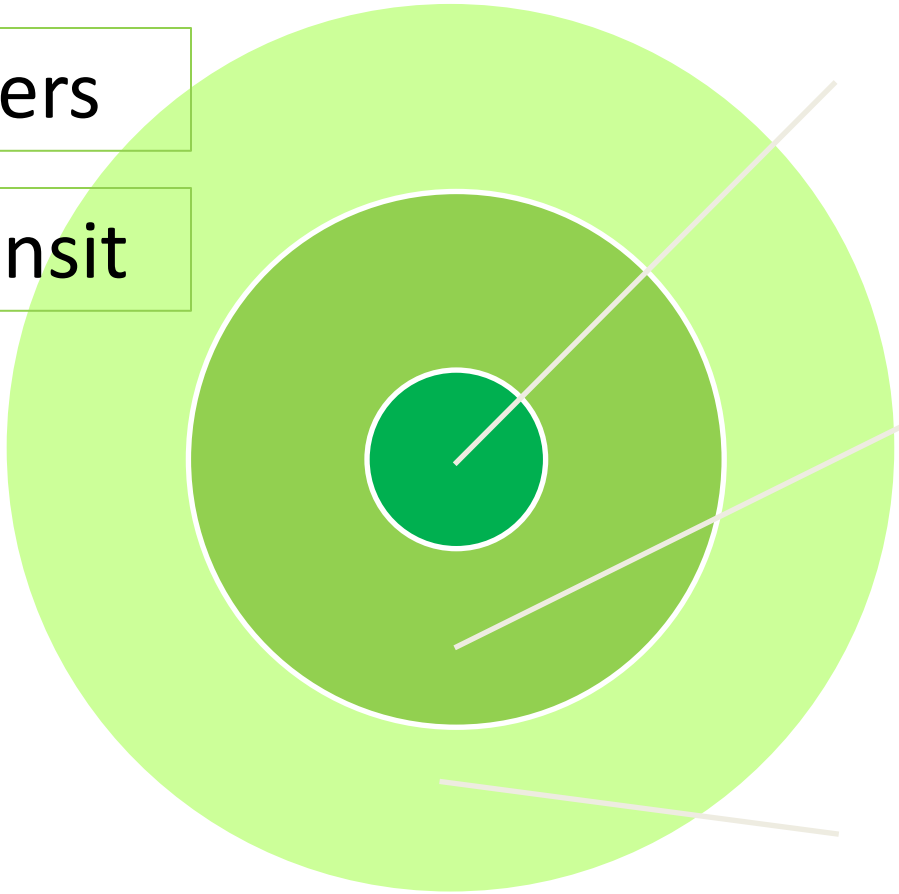
- Simply Lift
  - - MRF and demo site extraction
- Unplug and Pull
  - - appliances
- Hand Tool Removal
  - - Fixtures, flooring, cabinets, etc.
- Hand Power Tool Removal
  - - Doors, windows,
- Team Extraction
  - - Bathtubs, countertops, etc.

Material Sourcing Locations and Logistics

Quantities & Quality

Material Brokers

Shipping & Transit



On Site Sourcing

Reuse Store

Internet Sales

The Existing Market: Types of Deconstruction Operations

- **Small Scale: Non-Structural Salvage** (e.g. Habitat for Humanity, Historical Societies, Commercial Architectural Salvage)
  - *Market Share:* Highly local, distributed widely across the country, minimal impact on the C&D waste stream
  - *Trends*: These operations are growing, particularly with greater support from HfH national, and increasingly accessible market for resale of architectural salvage
- **Medium Scale: Structural and Non-Structural Salvage** (e.g. deconstruction contractors, remodeling contractors)
  - *Market Share*: Highly local, demand for services is tightly connected to sales opportunities and/or regulatory demands
  - *Trends*: These operations are growing in established regions with strong support for reuse/resale and in areas that have promoted deconstruction with regulation such as vacant home removal allowances or C&D landfill bans.
- **Large Scale: Full Building Removal** (e.g. deconstruction contractors, dismantling contractors)
  - *Market share:* These are local and national operations that are capable of addressing a consistent local demand, or traveling to take advantage of out of region opportunities
  - *Trends:* These operations fluctuate with the still inconsistent demand for whole building deconstruction. As the market grows, it is expected that demolition contractors will enter as service providers.

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The Existing Market: Types of Reuse/Resale Operations

- **Retail Storefront**
  - Highly local, 1-3 stores within a region, staff can include volunteers with tasks ranging from material processing to retail.
- **On-Site Auction Sales**
  - Highly local, no storefront, though there is often warehousing. Minimal staff to facilitate sales and identify material value, little to no material handling.
- **Furniture Making / Added Value Products**
  - Ranges from highly local operations within reuse stores to national providers of flooring, etc. Staff varies by operation, ranges from material handling and finishing to sales and installation.
- **Material Brokerages / Online Sales**
  - Ranges from highly local to nationwide with craigslist and planetreuse type outlets. Little centralized staff, though there is a growing use of material shipping.
- **Large Scale Suppliers**
  - Operates in parallel to new materials sales with operations like Duluth Timber. Staff varies according to operation with suppliers typically sub-contracted.
- **In-house reuse**
  - As contractors are able to identify end uses or new installations for materials, there is an increasing retention of materials for on-site or in-house reuse. Staff varies according to operation, includes emphasis on material processing for reuse.

Trend – All of these resale markets are growing throughout the country, especially in those regions that have a strong demand for reclaimed materials.

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Calculating the Value of Reuse

The Value of Reuse is 100% dependent on what matters to you and your client.

- First cost?
- Lifecycle cost?
- Material Quality?
- Environmental Impact?
- Community Support?
- Workforce Development?

Quantifiable

Economic Benefits of Reuse – Quantifying your Project

Supply (Deconstruction)

Cash for goods – *can you sell the materials?*

Donation receipts for goods – *is the owner eligible for a tax benefit?*

Tipping fees – *where are you located? Tipping fees can top $85/ton in some areas.*

Demand (Reuse)

Low cost, high quality materials for the project – *What is the available cost? What would the cost be for a comparable new product?*

Material Availability – *Does a comparable material exist new?*

First Cost

Salvaged

$275

New

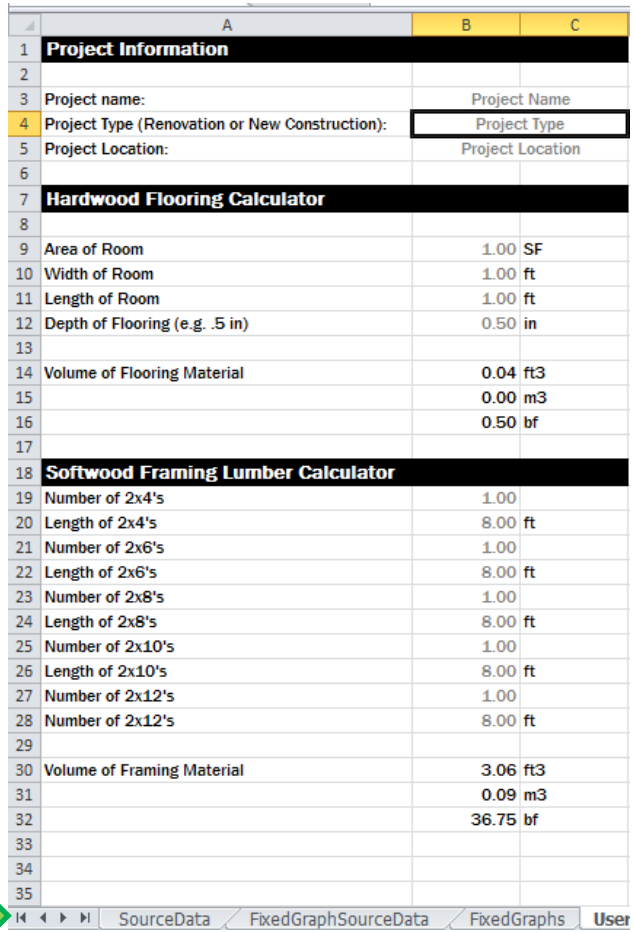
$1,250

Impact of Reuse - Environmental

Cumulative Energy Impact:

- **New Framing Lumber** **6,470 MJ/m^3**
- **Recovered Framing Lumber** **320 MJ/m^3**

Source: "Life Cycle Energy and Carbon Emissions for New and Recovered Softwood Framing Lumber and Hardwood Flooring", Bergman et al

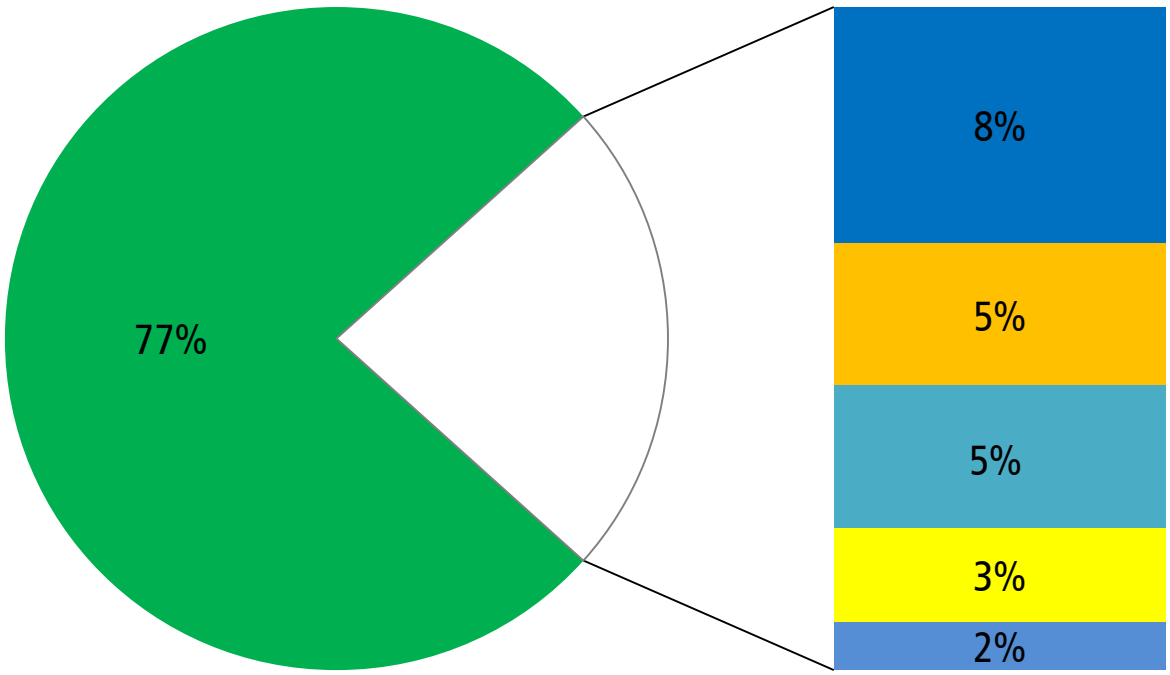


	A	B	C
1	**Project Information**		
2			
3	Project name:	Project Name	
4	Project Type (Renovation or New Construction):	Project Type	
5	Project Location:	Project Location	
6			
7	**Hardwood Flooring Calculator**		
8			
9	Area of Room	1.00	SF
10	Width of Room	1.00	ft
11	Length of Room	1.00	ft
12	Depth of Flooring (e.g. .5 in)	0.50	in
13			
14	Volume of Flooring Material	0.04	ft3
15		0.00	m3
16		0.50	bf
17			
18	**Softwood Framing Lumber Calculator**		
19	Number of 2x4's	1.00	
20	Length of 2x4's	8.00	ft
21	Number of 2x6's	1.00	
22	Length of 2x6's	8.00	ft
23	Number of 2x8's	1.00	
24	Length of 2x8's	8.00	ft
25	Number of 2x10's	1.00	
26	Length of 2x10's	8.00	ft
27	Number of 2x12's	1.00	
28	Number of 2x12's	8.00	ft
29			
30	Volume of Framing Material	3.06	ft3
31		0.09	m3
32		36.75	bf
33			
34			
35			

SourceData | FixedGraphSourceData | FixedGraphs | User

available at www.bmra.org

Have you Ever Included Reclaimed Materials on a Project?



- Yes, we have in the past
- No: Aesthetics - the materials did not look right
- No: Cost - the materials ended up being way to expensive
- No: Owner - the owner was unhappy with the materials
- No: Schedule - the logistics of using these materials was incredibly difficult
- No: Quality - the reclaimed materials did not meet our specifications

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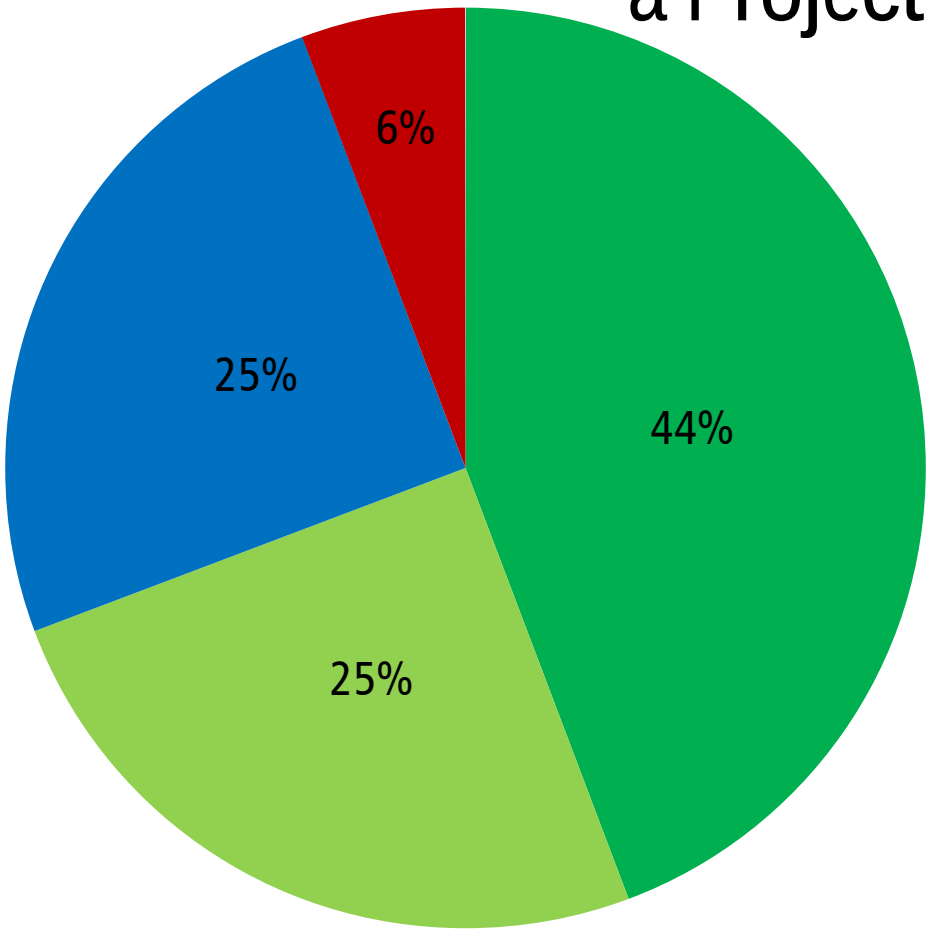
Are you Currently Including Reclaimed Materials on a Project?



- Yes, we've got a project that's reusing materials
- Yes, we've used deconstruction to ensure that materials are available for reuse.
- No, we haven't been able to find a way to support reused materials on a current project

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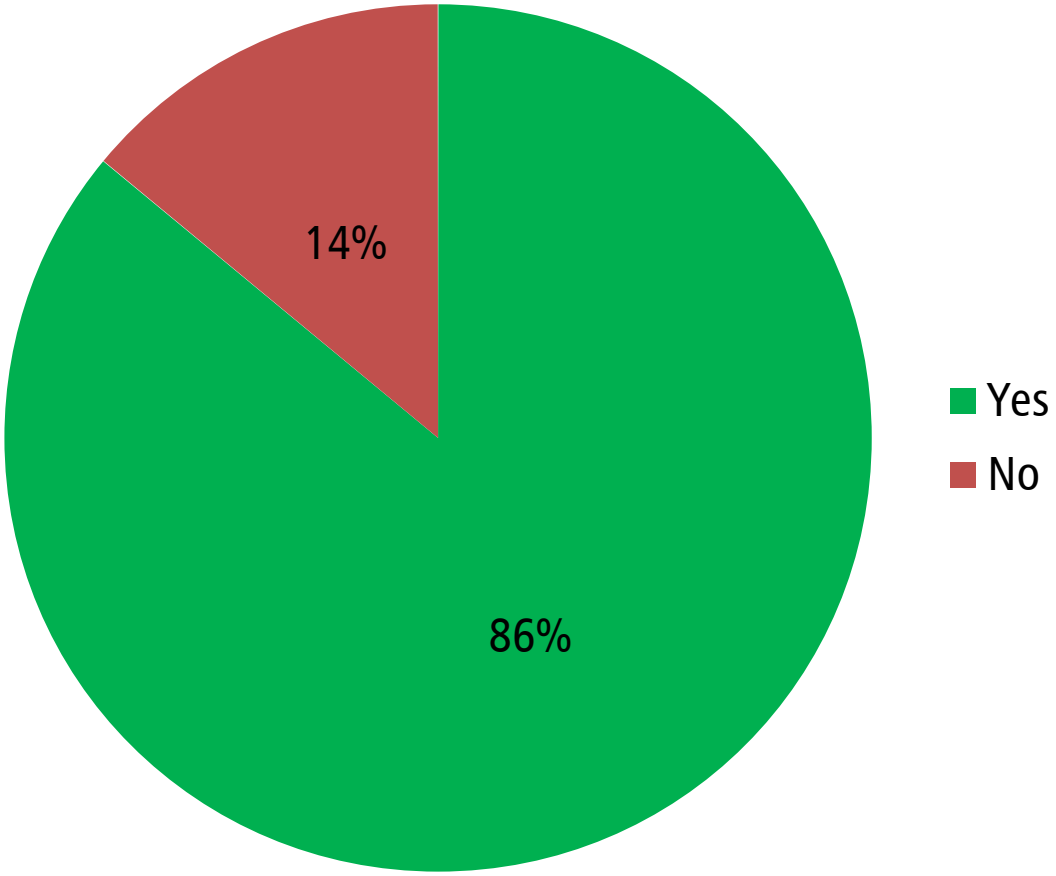
Was the Inclusion of Reclaimed Materials a Success?



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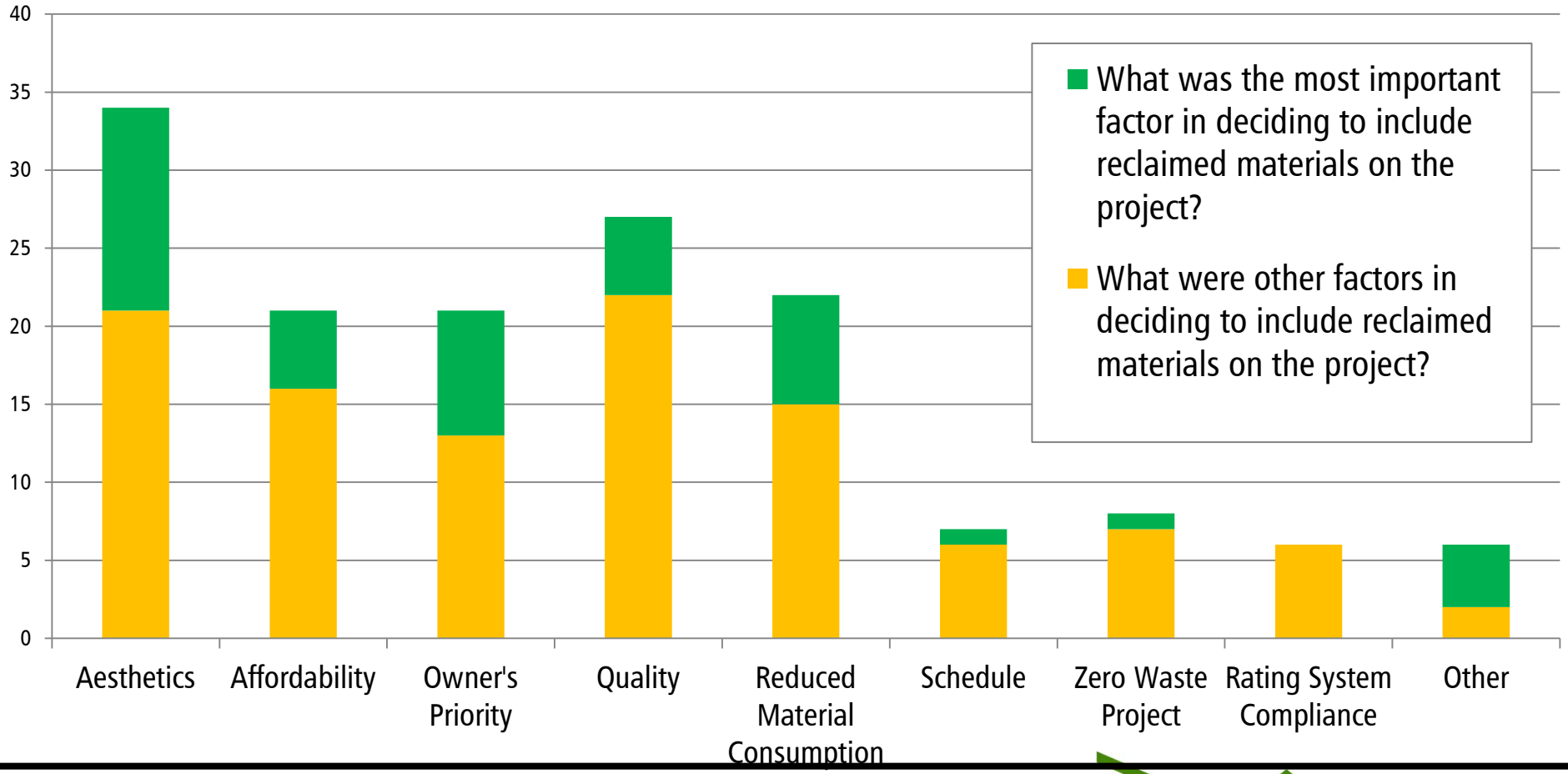
What Were the Factors in Selecting Reclaimed Materials for Project Inclusion ?



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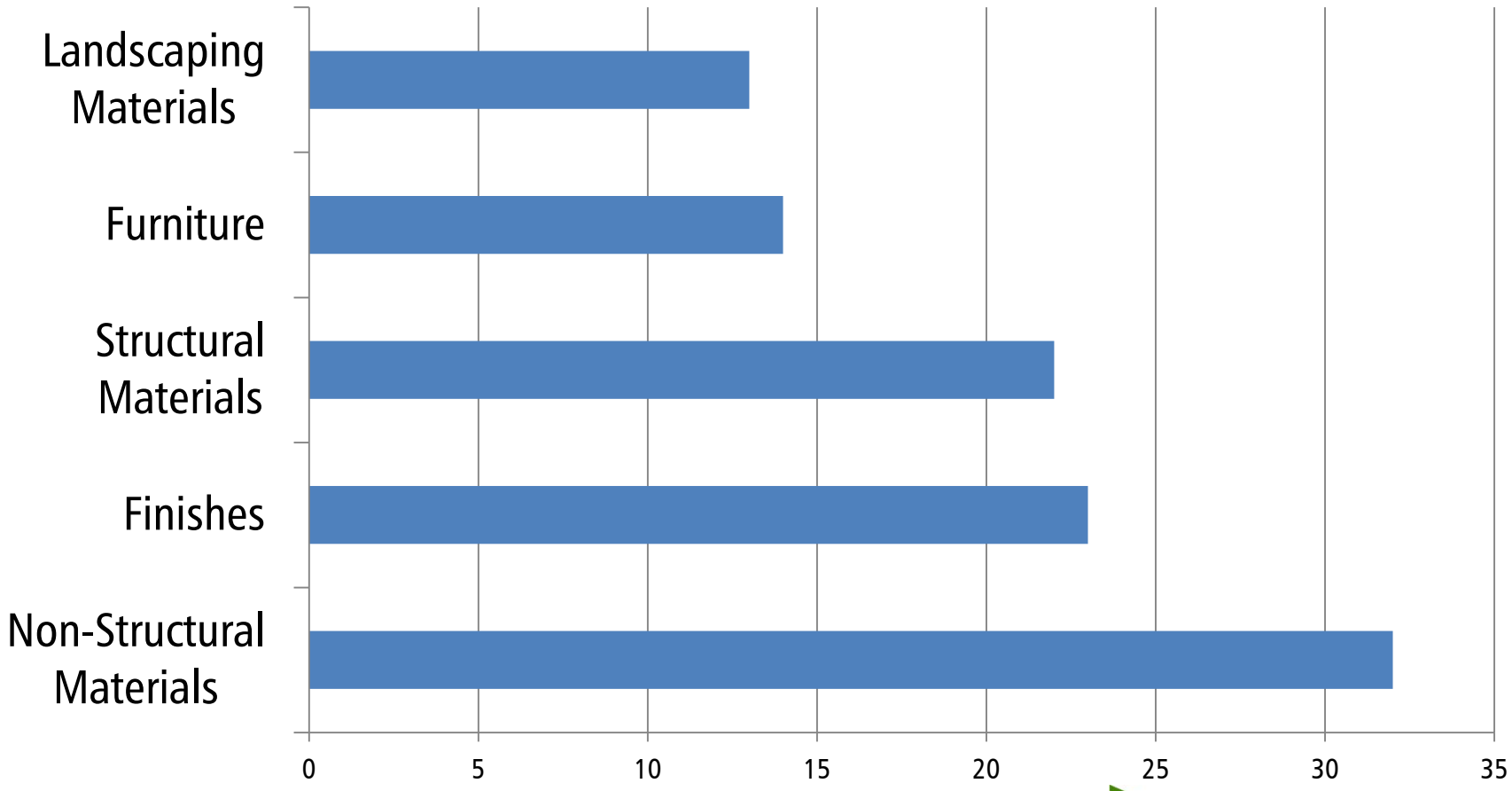
What Kind of Reclaimed Materials did You Source??



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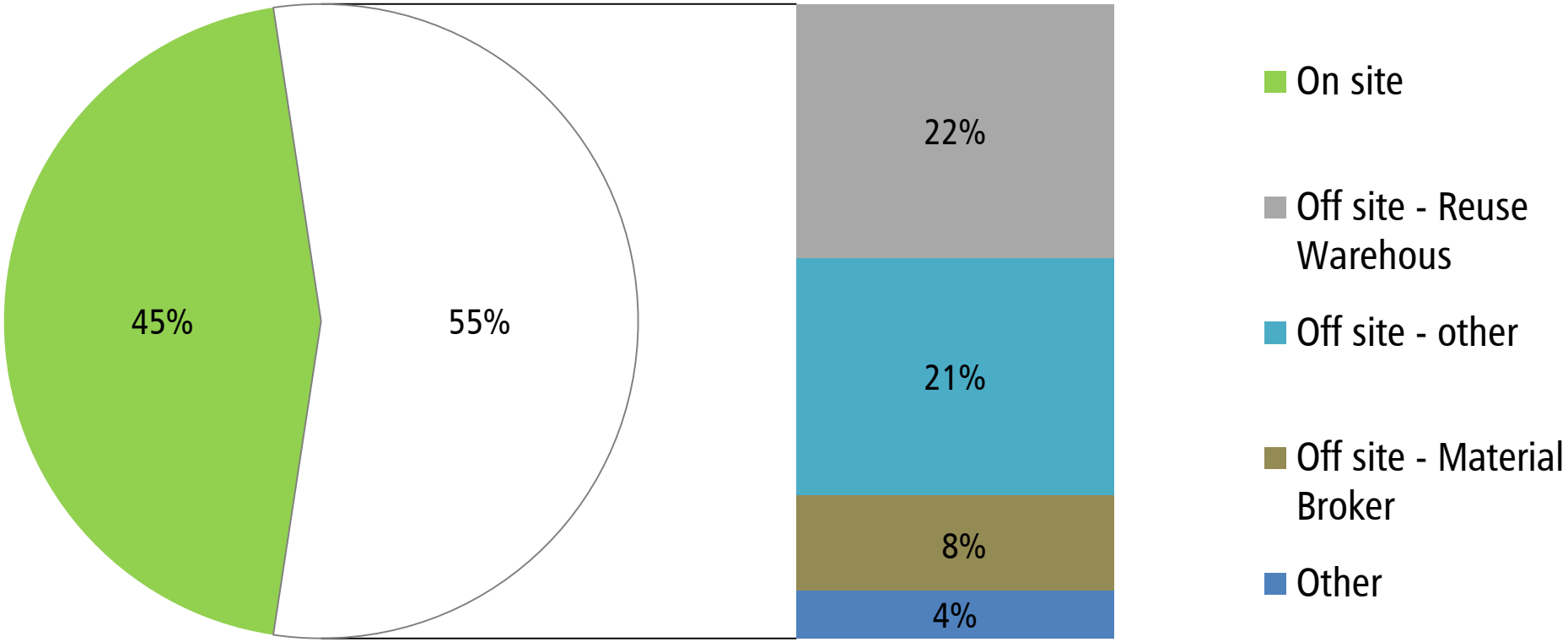
Where Did you Source your Materials?



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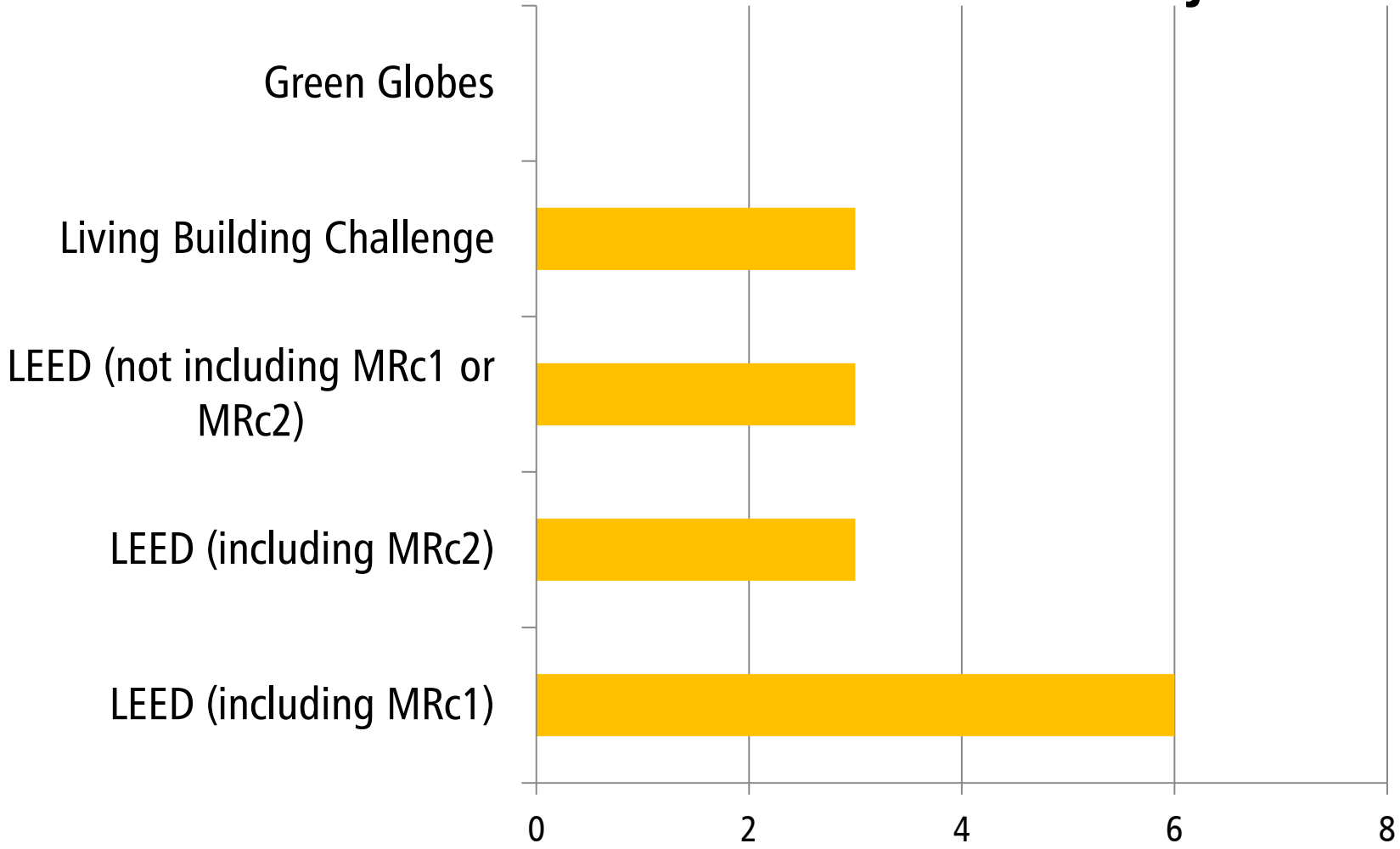
Did You Seek Certification for This Project?



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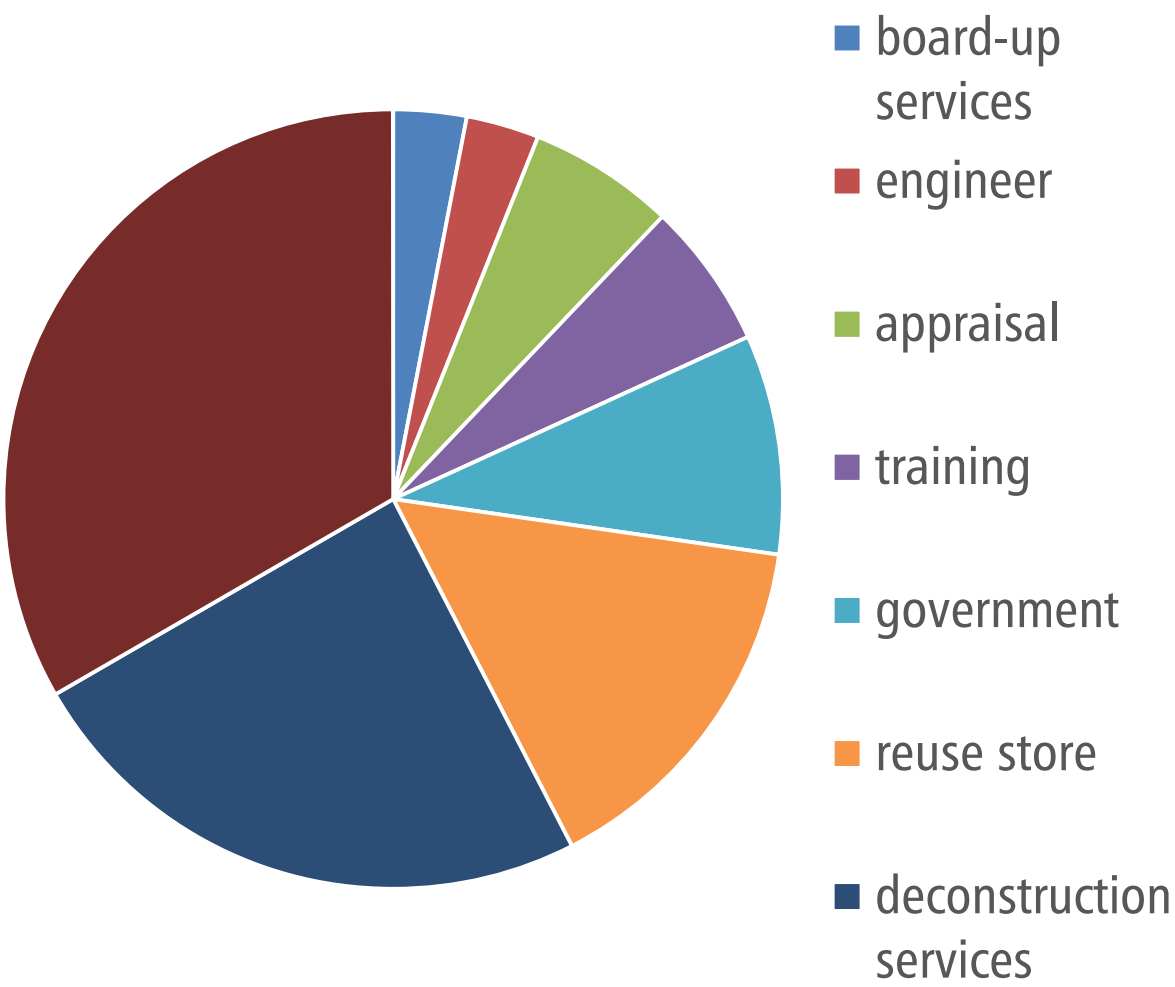
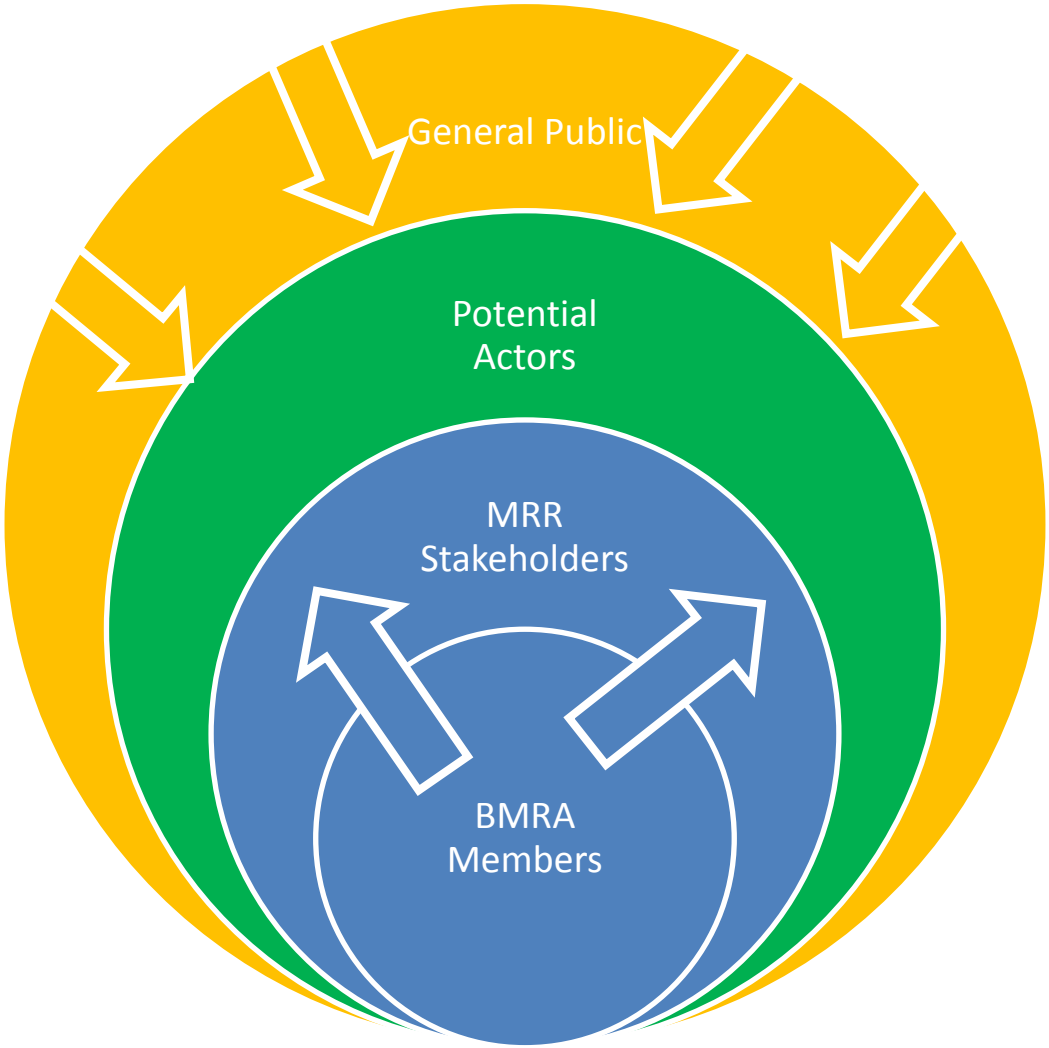
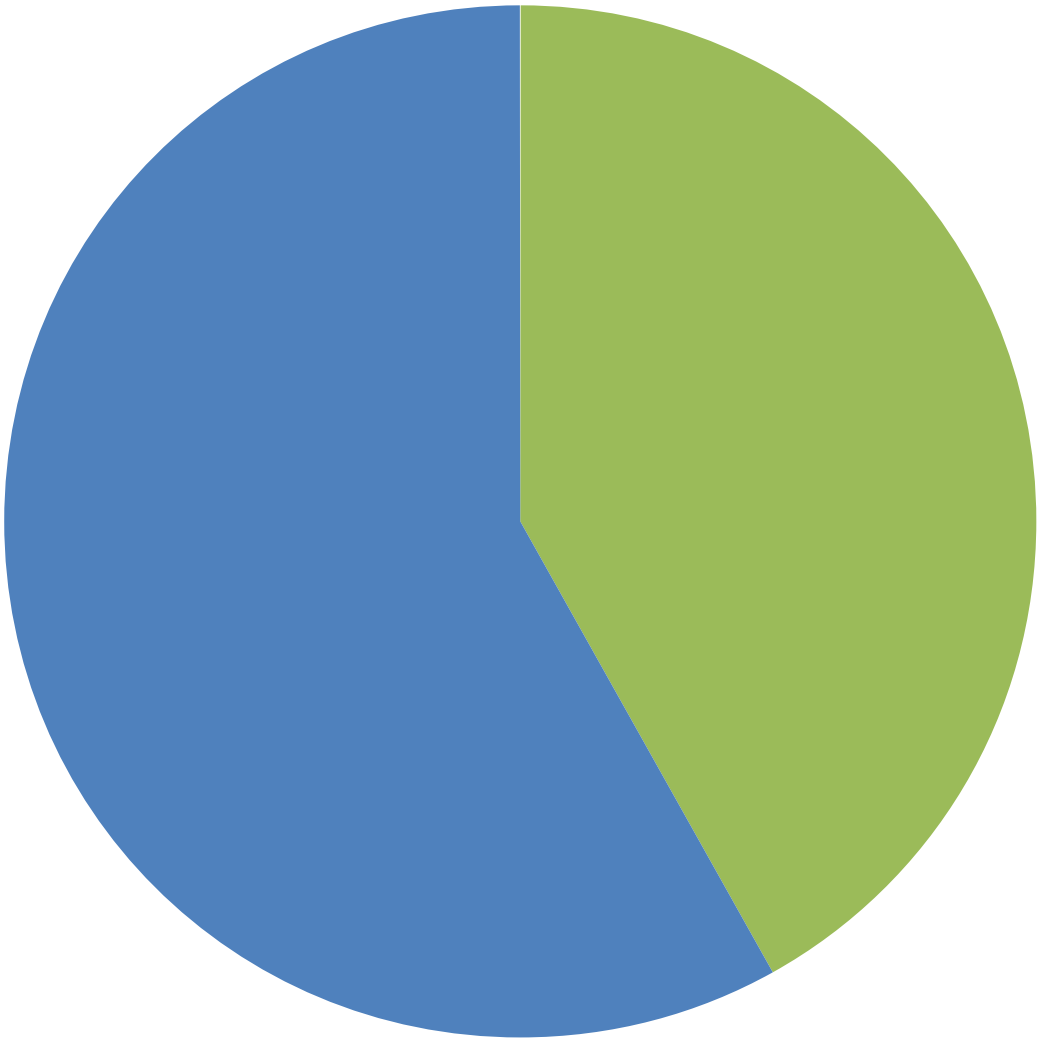
BMRA Membership - Primary Service Line




General Public
Potential Actors
MRR Stakeholders
BMRA Members

National Waste Characterization 2003



http://www.epa.gov/wastes/conserve/imr/cdm/pubs/cd-meas.pdf

City of Chicago Waste Characterization 2009

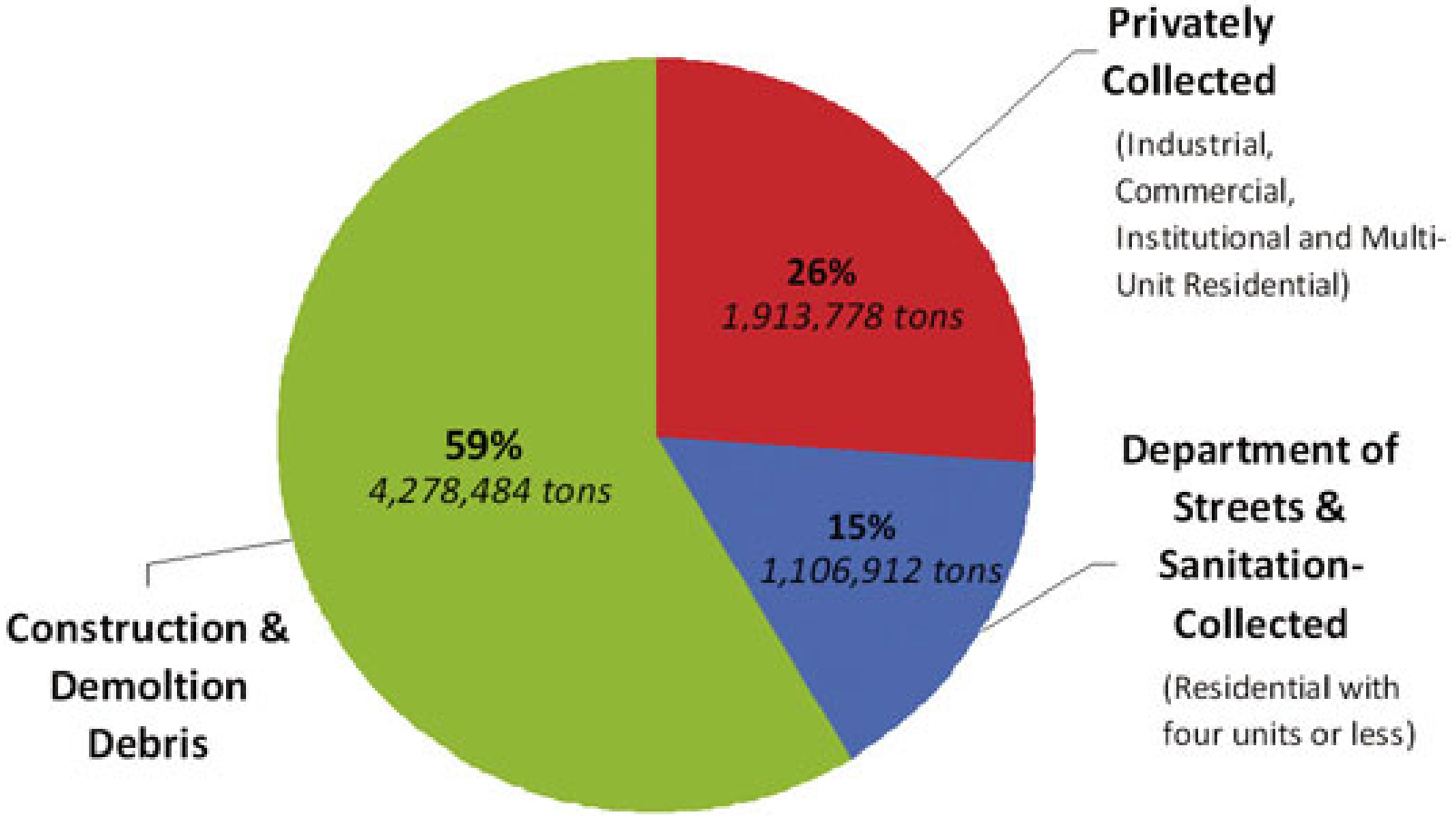
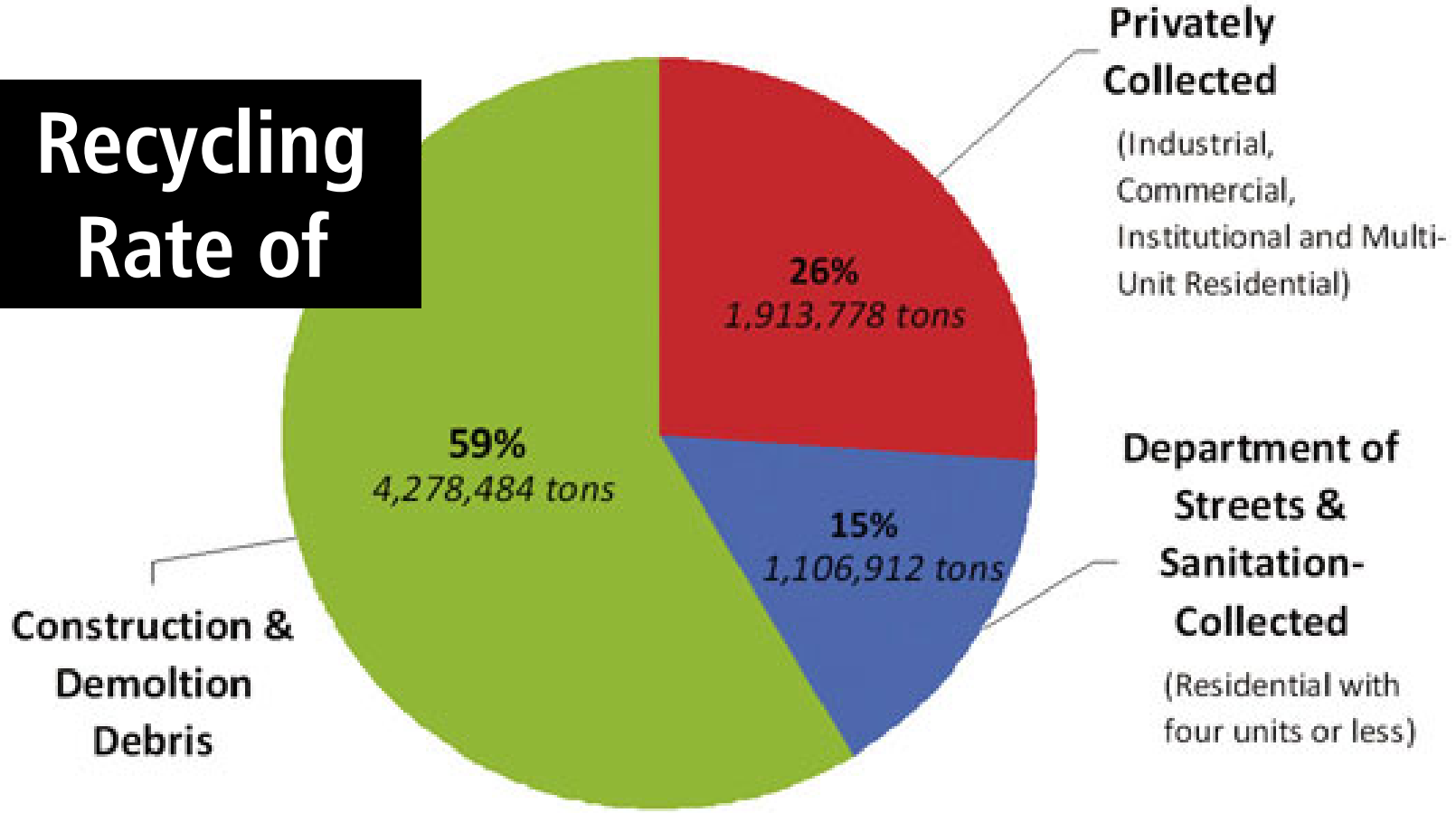


Figure 2. Waste Generation by Sector

http://www.cityofchicago.org/content/dam/city/depts/doe/general/RecyclingAndWasteMgmt_PDFs/WasteAndDiversionStudy/WasteCharacterizationReport.pdf

City of Chicago Waste Characterization 2009

Recycling Rate of



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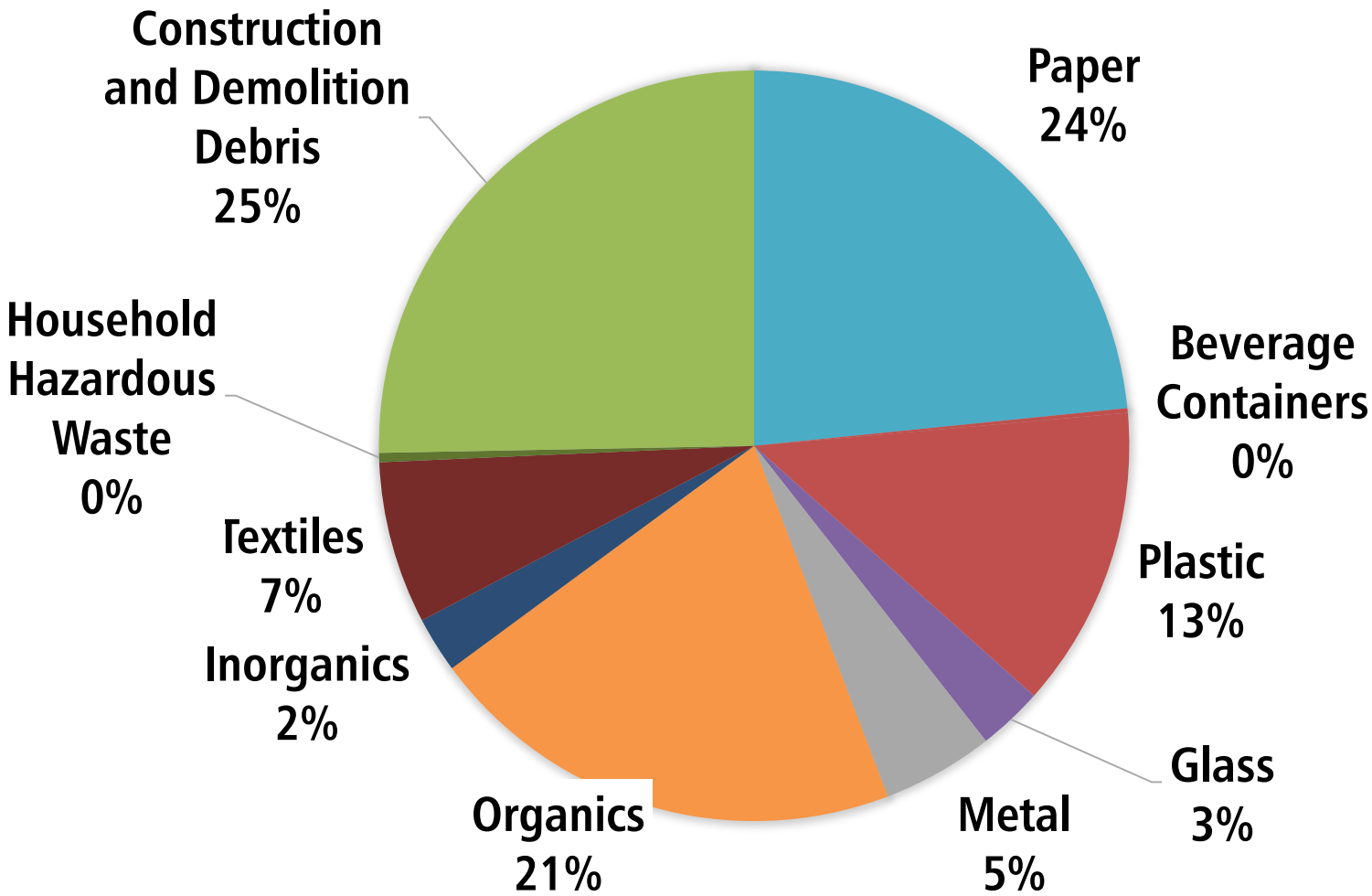
State of Illinois Landfill Waste Characterization 2009



http://www2.illinois.gov/gov/green/documents/waste%20study.pdf