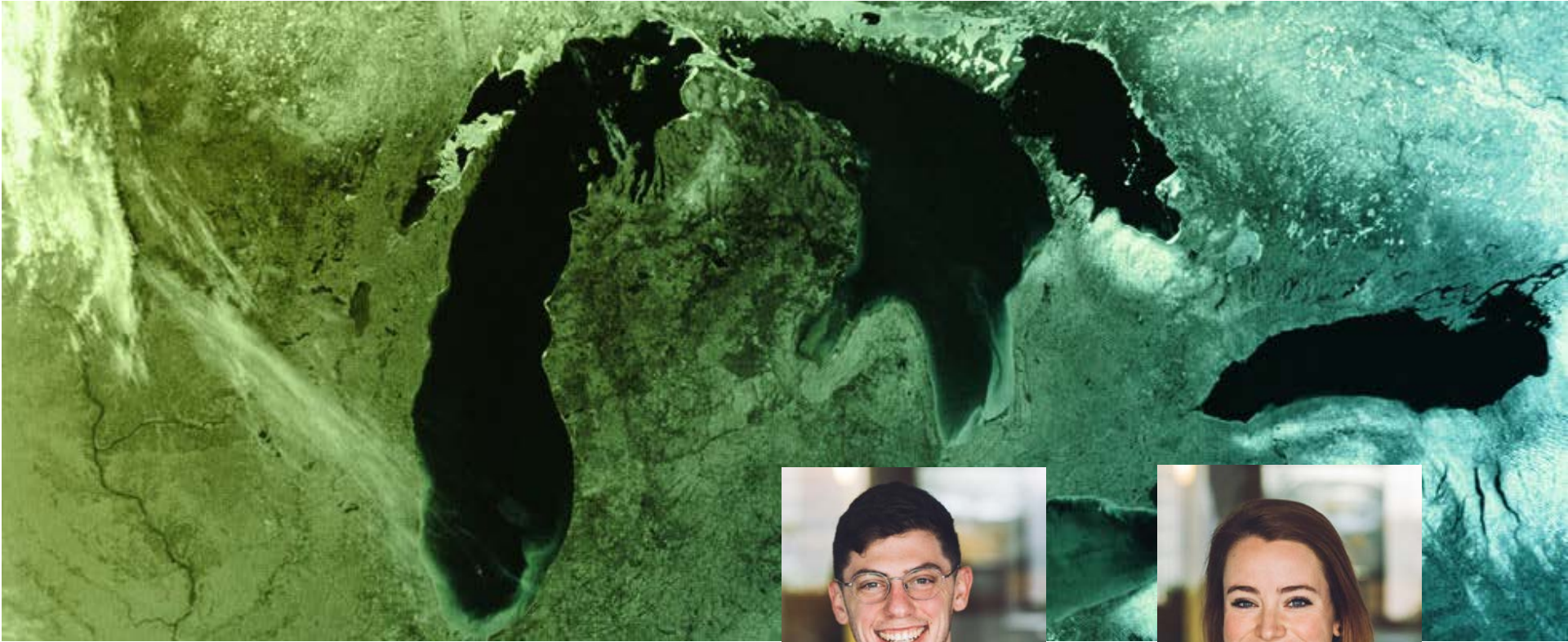




*C&D MATERIALS MARKETS:
IDENTIFYING OPPORTUNITIES
REGIONALLY & LOCALLY*

JULY 31, 2019

ABOUT DELTA INSTITUTE



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delta institute 

ABOUT DELTA INSTITUTE

Delta Institute is a Chicago-based nonprofit that collaborates with communities to solve complex environmental challenges across the Midwest.

Since 1998, Delta's been working with public and private partners.

We **design, test, and share** market-based environmental solutions that yield social, environmental, and economic benefits for communities.



MATERIAL MARKETPLACE SCALES



Region:
EPA Region 5



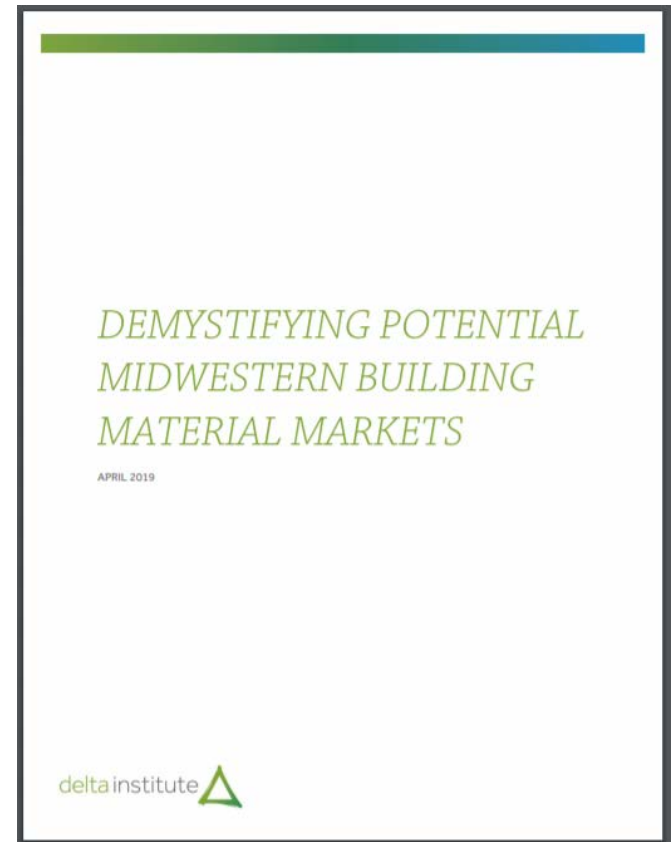
City:
St. Louis



Structure:
St. Louis Warehouse

C&D MATERIAL IN REGION 5

- Construction and demolition (C&D) waste comprises a **significant portion of the waste stream** in the Upper Midwest.
- C&D material represents **economic opportunity** when it is able to enter the market as raw material
- EPA has determined that **recycling C&D material generates creates more jobs, wages, and taxes than any other material stream**



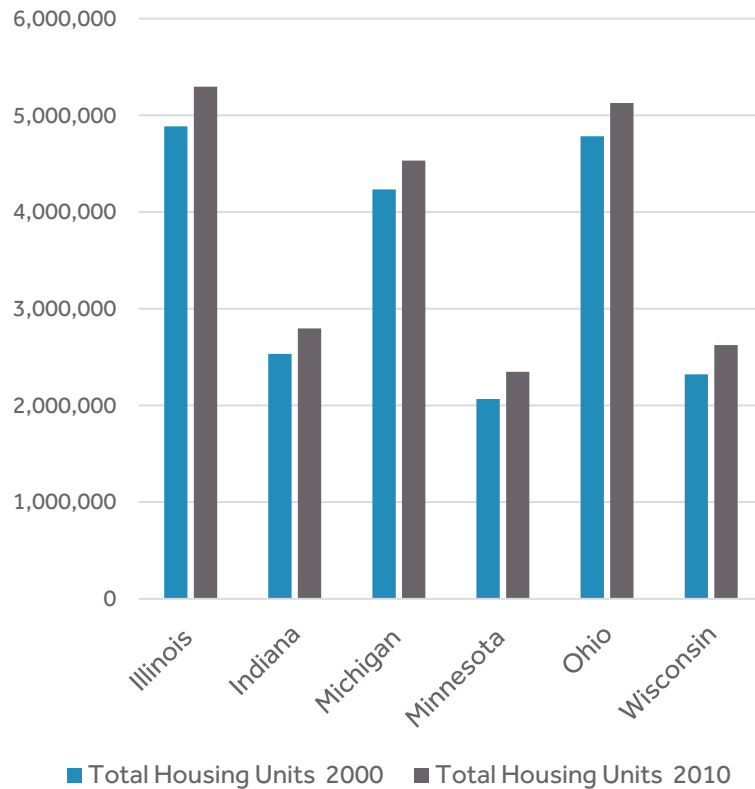
bit.ly/demystifyingwaste

C&D DEBRIS GENERATION

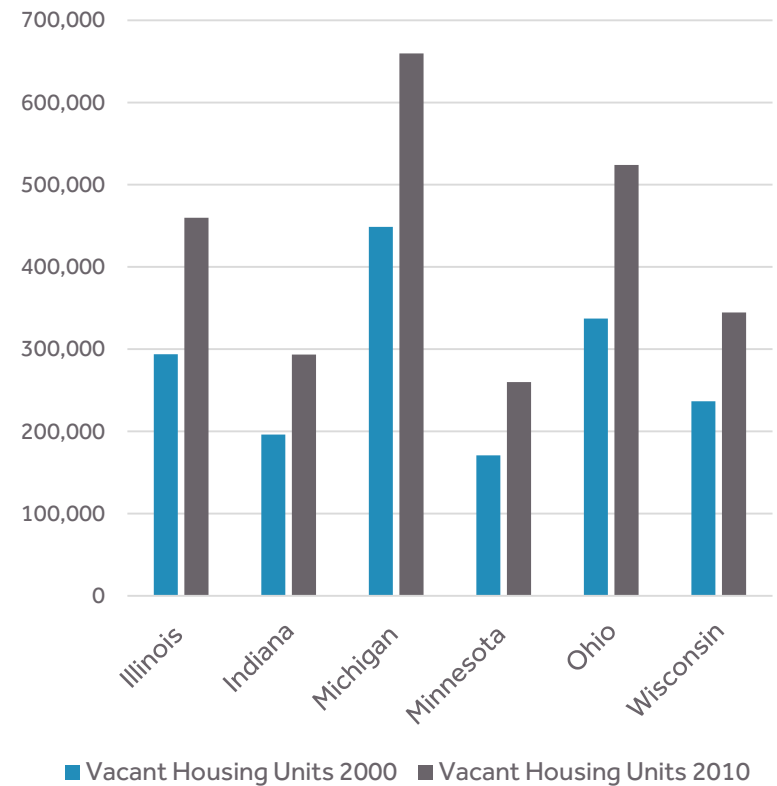
Activity Type	C&D Debris Generation
Residential Construction	4.9 lbs. / sqft. (average)
Nonresidential Construction	4.34 lbs. / sqft. (average)
Residential Demolition	50 - 158.7 lbs. / sqft.
Nonresidential Demolition	36 - 358 lbs. / sqft.
Residential Renovation	3.31 - 72.1 lbs. / sqft.
Nonresidential Renovation	3 - 28.49 lbs. / sqft.

CONSTRUCTION & DEMOLITION

TOTAL HOUSING UNITS BY STATE: 2000 & 2010



VACANT HOUSING UNITS BY STATE: 2000 & 2010



C&D DEBRIS GENERATION BY MATERIAL

Material Type	Estimated Quantity (1,500 sq ft Home)
Framing lumber	4,000 board feet
Standard brick	5,000 bricks
Asphalt shingles	650 sq ft
Concrete	37 cubic yards
Drywall	1,445 sq ft
Siding (80% vinyl, 15% aluminum, 5% other)	1,620 sq ft

MATERIAL PRESENT IN REGION 5

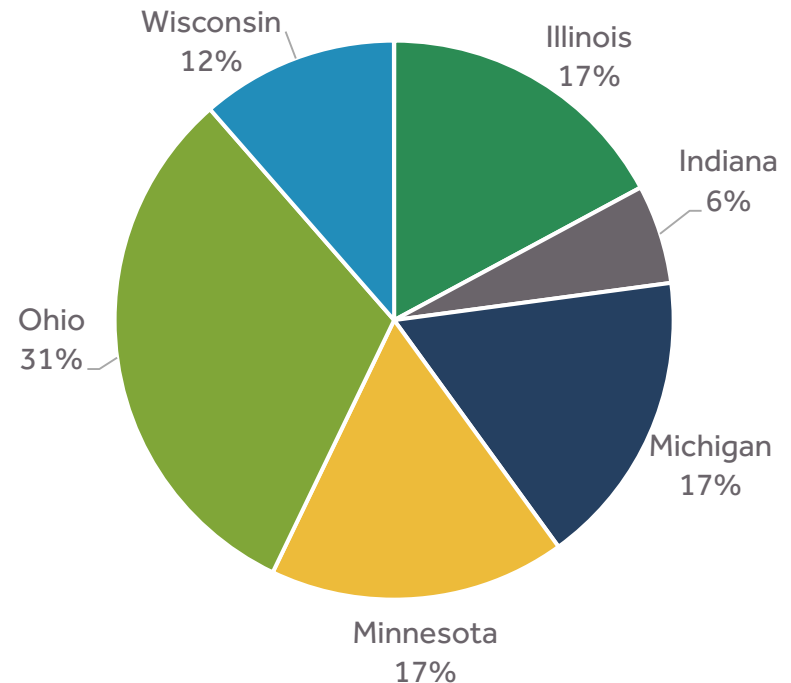
Material	Estimated Quantity (1,500 sq ft home)	Estimated quantity in 16% of Vacant Home Region 5 homes
Framing lumber	4,000 board feet	Over 1.6 billion board feet
Standard Brick	5,000 bricks	Over 2 billion bricks
Asphalt Shingles	650 sq ft	Over 264 million sq ft
Concrete	37 cubic yards	Over 15 million cubic yards
Drywall	1,445 sq ft	Over 588 million sq ft
Siding (80% vinyl, 15% aluminum, 5% other)	1,620 sq ft	Over 658 million sq ft

LUMBER

Three distinct markets for reclaimed wood are relatively well established.

- **Old-growth lumber** recovered from older structures often used in furniture or for aesthetic interior design purposes.
- **Later-period lumber** in good condition can be lightly processed and reused for items like crates or pallets in lieu of virgin material.
- **Low quality wood** can be heavily processed to create products such as mulch, particle board, or wood pellets.

DISTRIBUTION OF REUSED WOOD ORGANIZATIONS IN REGION 5



BRICK

Brick (along with wood) has the most potential for immediate reuse value, but **value can vary widely depending on the age, style, and condition** of the bricks. Holes and frogs, paint, and remnants of tough mortar typically make bricks less valuable for resale.

Though less common than salvaging for reuse, bricks can also be **processed and recycled as aggregate** at different sizes. Sioux City Brick in Iowa sells crushed recycled brick for landscaping and backfill purposes, and as baseball diamond and running track material for their most finely ground brick.



ASPHALT SHINGLES

Existing end markets for recycled asphalt shingles include **addition to asphalt mixes, production of new roofing shingles, and use as aggregate**

In 2009, IL Tollway conducted a study to determine the effect of adding RAS to roadway asphalt mixes. Adding up to 5% RAS to asphalt mixes **reduced costs and improved long term durability of pavement**. Between 2010-2015, over 24,000 tons of asphalt shingles were diverted, resulting in \$21 million in cost savings.



FINDINGS

FINDINGS

Region 5 states are disposing a significant amount of C&D material and have opportunity to divert a portion of that material from landfills

Baseline waste Generation in Region 5:

14 million tons of C&D debris disposed per year



FINDINGS

Data is inconsistent

Throughout Region 5 states, counties, and municipalities, waste generation and characterization data is collected inconsistently,



FINDINGS

There are jobs and capital already present in industries with the potential to include reused or recycled C&D

In Region 5, these industries employ 6,000 to over 14,000 people per state and have \$2 to \$3 billion in sales per state



FINDINGS

Opportunities for reuse are not as prevalent as opportunities for recycling

Markets are generally **much stronger for material recycling than reuse**, and reuse opportunities typically exist at a very small scale.

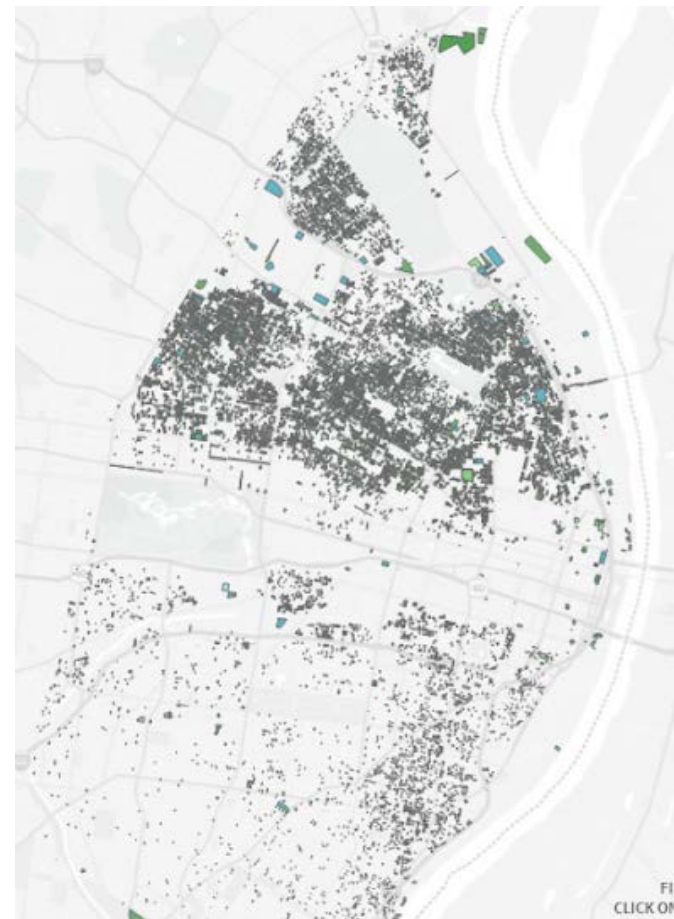
Recycling material is a significant improvement over landfilling, but material reuse can avoid energy-use and costs associated with extracting materials and producing new products, while also diverting material from landfills.

ST. LOUIS
DECONSTRUCTION
MARKET ASSESSMENT



VACANCY & DECONSTRUCTION IN ST. LOUIS

- **~8,000 Vacant Buildings**
 - 90/10 Brick/Frame
 - Most Built Prior to 1930
 - Vacant less than 10 years
 - Concentrated in areas with less access to employment
- **Drain on the region**
 - Quality of life and safety
 - Property tax loss
 - Costs of maintenance



ST. LOUIS DECONSTRUCTION PROGRAM



ST. LOUIS DECONSTRUCTION PROGRAM



DECON BENEFITS

Environmental & Public Health

- Increased Waste Diversion (Reuse and Recycling)
- Increased potential for environmental abatement
- Less dust than standard 'smash & grab' demolition

Economic

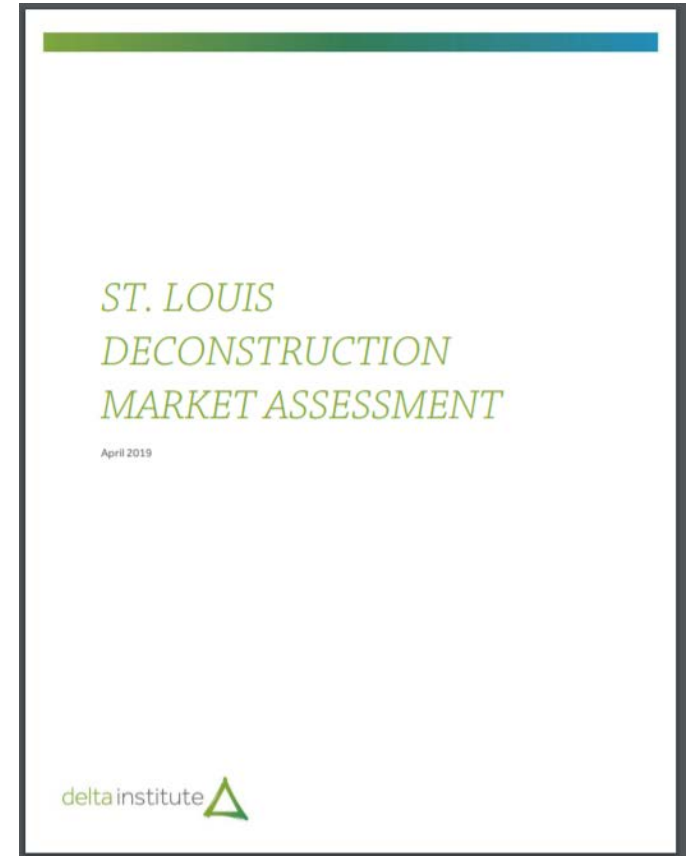
- Job creation (requires more labor)
- Value generated through reused materials
- Opportunity for value added processing
- Opportunity to turn the vacancy challenge to a positive



DECONSTRUCTION MARKET ASSESSMENT

Goals:

- Identify national trends in Deconstruction
- Identify local and regional stakeholders in Deconstruction Market
- Assess regional demand for reclaimed building materials
- Quantify local supply of reclaimed building materials
- Estimate economic & environmental impacts
- Provide recommendations



bit.ly/STLDecon

FINDINGS

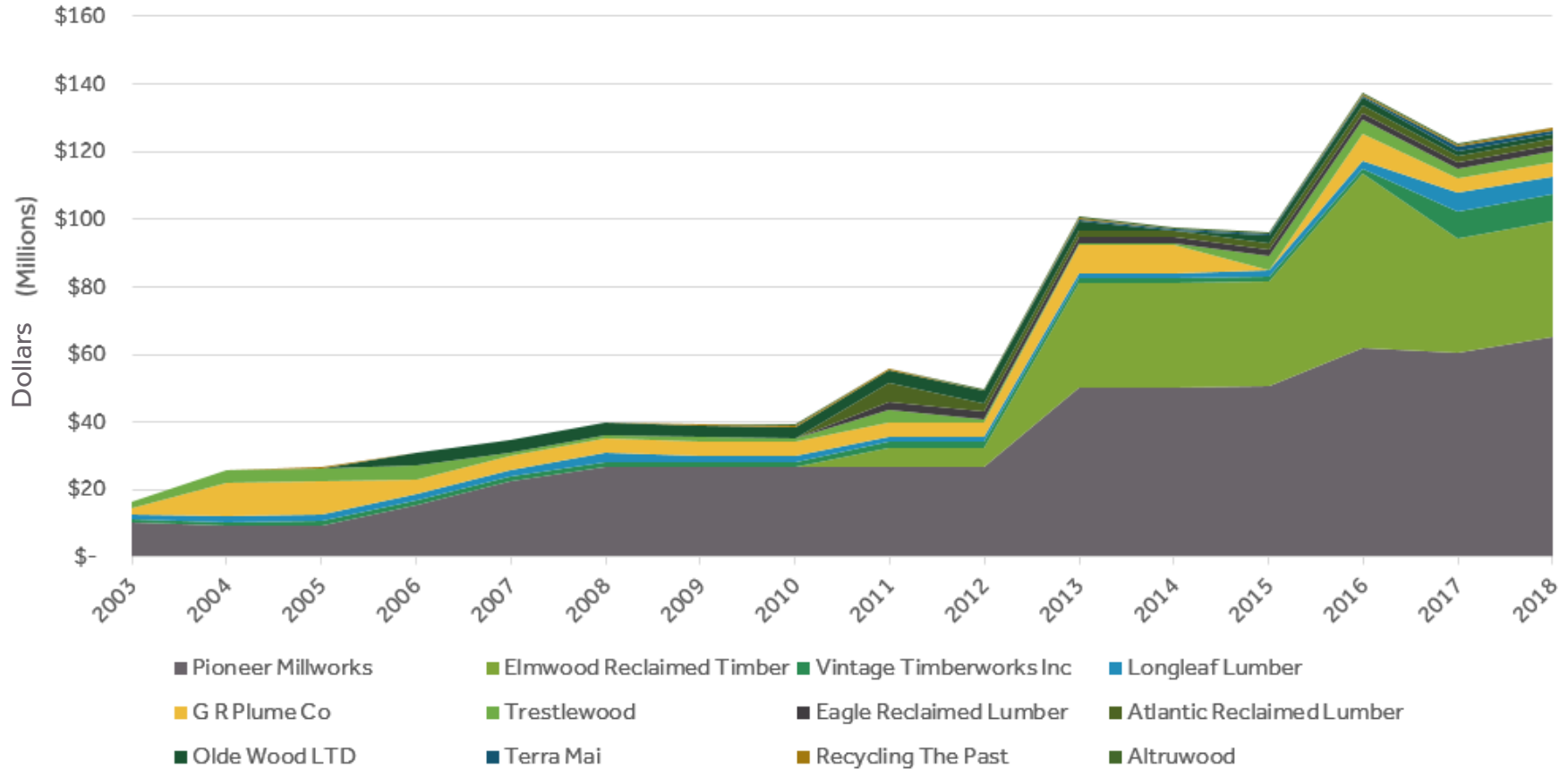
KEY FINDING

Nationally, deconstruction and material salvage industries are growing with support from public and private organizations and agencies.



NATIONAL TRENDS: EMERGING MARKETS

Sales Volume of Key Players in US Reclaimed Lumber Market



NATIONAL TRENDS: POLICY

San Jose, CA (2001)

Contractors pay a deposit, refundable upon receipt of documentation that 75% of C&D debris is recovered and diverted

Madison, WI (2010)

Buildings projects with steel and concrete supports must recycle 70% of materials. New wood supported structures and remodeling projects greater than \$20,000 must reuse or recycle **all** wood, non-toxic metals, scrap drywall, cardboard, and shingles

Cook County, IL (2012)

Minimum 70% of C&D waste from all building projects must be diverted from landfill where 5% of waste from residential projects must be reused

Portland, OR (2016)

Homes built before 1917 must be deconstructed



Illinois' Cook County Approves Demolition Debris Recycling Law

Allan Gerlat | Jul 31, 2012

NATIONAL TRENDS: HISTORIC PRESERVATION



Wabash L Station, Chicago



KEY FINDING

A strong network of stakeholders for both supply and demand of reclaimed building materials exists in St. Louis, and the network has the potential to grow.



STAKEHOLDERS

Stakeholder Group	Description	Role	Benefit from Increase in Material Reuse
Demolition & Deconstruction Contractors	Individuals and companies that generate C&D debris as a byproduct of their work	Generate materials	Increased revenue from reclaimed materials
Building Material Reuse Marketplaces	Retail store and warehouses that sell reclaimed building materials to the public	Make materials publicly available	Increase in materials for resale
Design Build	Entities that incorporate reclaimed materials into building and interior design	Transform materials into high value items Mainstream and introduce aesthetic to broader audiences	Local and reliable sources of materials
Material Wholesale (Regional/National Scale)	Individuals and companies who purchase large quantities of commodity-level salvaged and reused building materials, like brick and lumber, to be retailed	Aggregate materials for large scale processing	More raw materials for processing
Value Added Processors	Entities that use reclaimed building materials to create new products	Transform materials into high value items	Local and reliable sources of materials

KEY FINDING

Salvageable building materials in St. Louis' vacant structures have economic potential and are in high demand.



BUILDING MATERIAL SUPPLY

Total Potential Brick Salvage:

- **24.8 million bricks** (or 49,600 pallets of brick)

Total Potential Lumber Salvage:

- **10.4 million board feet** of old growth lumber



BUILDING MATERIAL DEMAND

Lumber

- Rough sawn lumber
- Old growth lumber

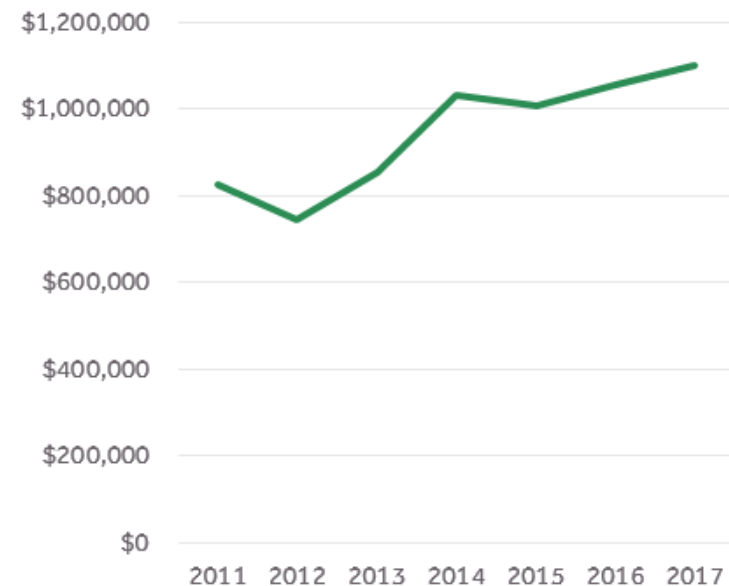
Brick

- Interior and exterior brick
- Quality of St. Louis bricks

Finishes / other

- Interior finishes and appliances, exterior architectural elements

HABITAT FOR HUMANITY ST. LOUIS
RESTORE SALES REVENUE



KEY FINDING

Deconstruction of vacant, publicly-owned properties in St. Louis has the potential to increase the economic impacts of planned vacant structure removal programs.



ECONOMIC IMPACT: MATERIAL VALUE

Group 1: Best Condition

- 100% Salvage Rate

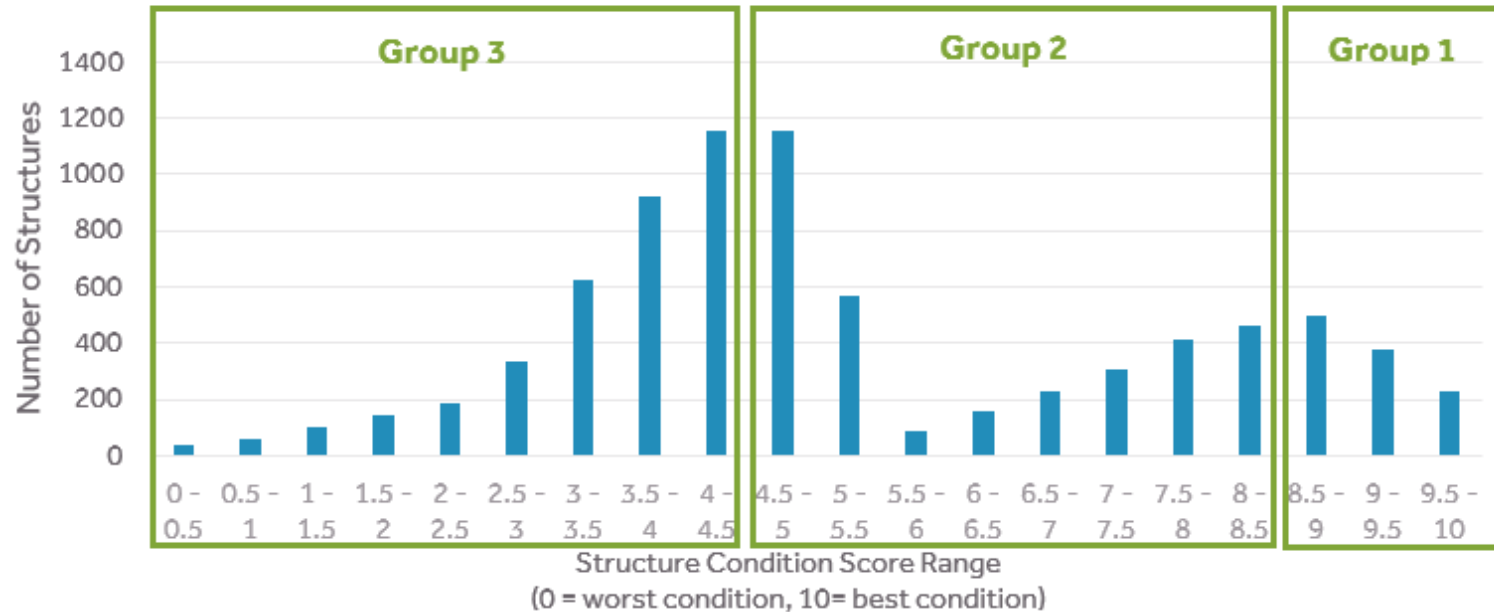
Group 2: Middle Condition

- 50% Brick Salvage Rate
- 25% Lumber Salvage Rate

Group 3: Worst Condition

- 25% of Brick

DISTRIBUTION OF STRUCTURE CONDITION SCORE



ECONOMIC IMPACT: MATERIAL VALUE

Group 1: Best Condition

- \$7.9 Million

Group 2: Middle Condition

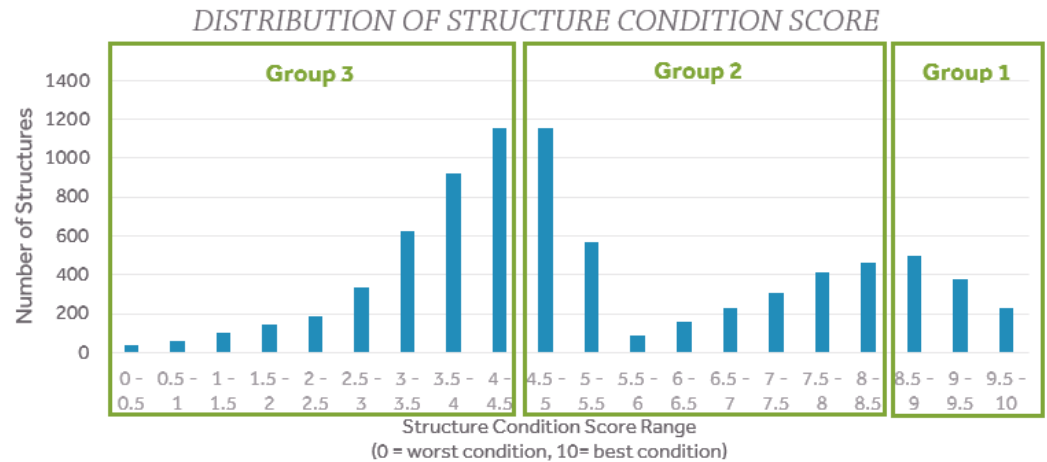
- \$8.1 - \$27.9 Million

Group 3: Worst Condition

- \$2.1 - \$3.4 Million

TOTAL ESTIMATED VALUE:

- \$18.2 - \$39.3 Million



ECONOMIC IMPACT: COST

Demolition



Per Sq. Ft.

Deconstruction



Per Sq. Ft.



ECONOMIC IMPACT: LABOR & WAGES



2-3

Ave. Crew
Size

2-3
Days

Project
Duration

6-8

Ave. Crew
Size

10-15
Days

Project
Duration



ECONOMIC IMPACT: 2018 DEMOLITIONS

Indicator	All Demolition (Baseline)	All Deconstruction (Scenario 1)	10% Deconstruction (Scenario 2)	50% Deconstruction (Scenario 3)
Estimated Labor Hours (Low)	14,336	215,040	21,504	107,520
Estimated Labor Hours (High)	21,504	430,080	43,008	215,040
Estimated Wages Paid (Low)	\$ 243,042	\$3,349,516	\$334,951	\$1,674,758
Estimated Wages Paid (High)	\$ 364,564	\$6,699,033	\$669,903	\$3,349,516

KEY FINDING

Deconstruction and building material salvage has significantly improved environmental outcomes, compared to traditional demolition.



ENVIRONMENTAL IMPACTS

- Produces significantly less dust than demolition
- Reduces risk of lead and particulate exposure
- Results in significant reductions in waste generation and GHG emissions

Reduce Waste Generation by:



Tons



Reduce Green House Gas Emissions by:



MTCO₂E

ENVIRONMENTAL IMPACTS

Material	Estimated Quantity Recovered for Reuse	Waste Reduction Potential	GHG Reduction Potential (MTCO2E)
Bricks	24.8 mil bricks	111,700 tons	14,996
Lumber	10.4 mil board feet	14,800 tons	28,070
TOTAL		126,500 tons	43,066

Reducing 43,066 Metric tons of CO2E is equivalent to removing annual emissions from **over 9,000 passenger vehicles** or conserving over **4.8 million gallons of gasoline**.

RECOMMENDATIONS

RECOMMENDATIONS

Policy:

SLDC and city departments should convene a **local advisory committee** to consider developing legislation to encourage or require building material reuse in St. Louis.

Training:

SLDC in collaboration with other city departments should consider funding and supporting **deconstruction training at multiple experience levels** for demolition contractors and other interested workers.

Prioritization:

SLDC should work with the LRA and Building Division to develop and use condition scoring criteria and building inspector recommendations to help **prioritize building deconstruction.**

RECOMMENDATIONS

Packaging Bids:

SLDC and the LRA should work with the Building Division to bid demolitions and deconstructions in larger packages to allow for significant quantities of materials to be aggregated for donation or resale.

Incentives:

SLDC should encourage real-estate developers and the private sector to salvage reclaimed building materials and incorporate deconstruction into development projects.

Brokering:

SLDC should consider a partnership with state and regional entities to help join or create an online system for brokering reclaimed building materials.

WHAT'S NEXT?



QUESTIONS + DISCUSSION

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