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Creating forest sector solutions

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Modified Wood Products

End-use Markets & Substitution

Trends in the US and Europe

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FPIinnovations

- Private, not-for-profit forest research institute
- Research and knowledge transfer for the Canadian forest sector
 - Wood supply, forest operations, wood products, pulp & paper



Introduction

- Technologies for wood modification and wood-plastic production known for a long time
- Factors contributing to recent market growth
 - Concerns about wood preservatives
 - Concerns about illegal logging of tropical species
 - Higher prices of tropical wood and other naturally resistant species
- Leading products
 - Thermally modified wood
 - Wood-plastic composites

Thermally modified wood

- Kiln-dried wood at high temperature, low oxygen
 - Removes organic components, resin
 - Better weather resistance
 - Better dimensional stability
 - Darker colour



Photo credit:: SEESIn Wood

Thermal Modification

- Improves Dimensional Stability
- Increases Biological Durability
- Reduces Wood EMC 40-50%
- Lowers Water Permeability
- Eliminates Cupping
- Darkens Color

Makes Your...

Oak look like,
Black Walnut or
Wenge

Hickory or Ash
look like
Ipe or Ebony

Maple or Birch
look like
Mahogany or Teak

Pine or Spruce look
like Cedar

ADD VALUE TO YOUR WOOD ... WITHOUT CHEMICALS

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Wood & Wood Products
Magazine, August 2010

Thermally modified wood

- Exterior end uses



Photo credit: International ThermoWood Association, Cambia Wood



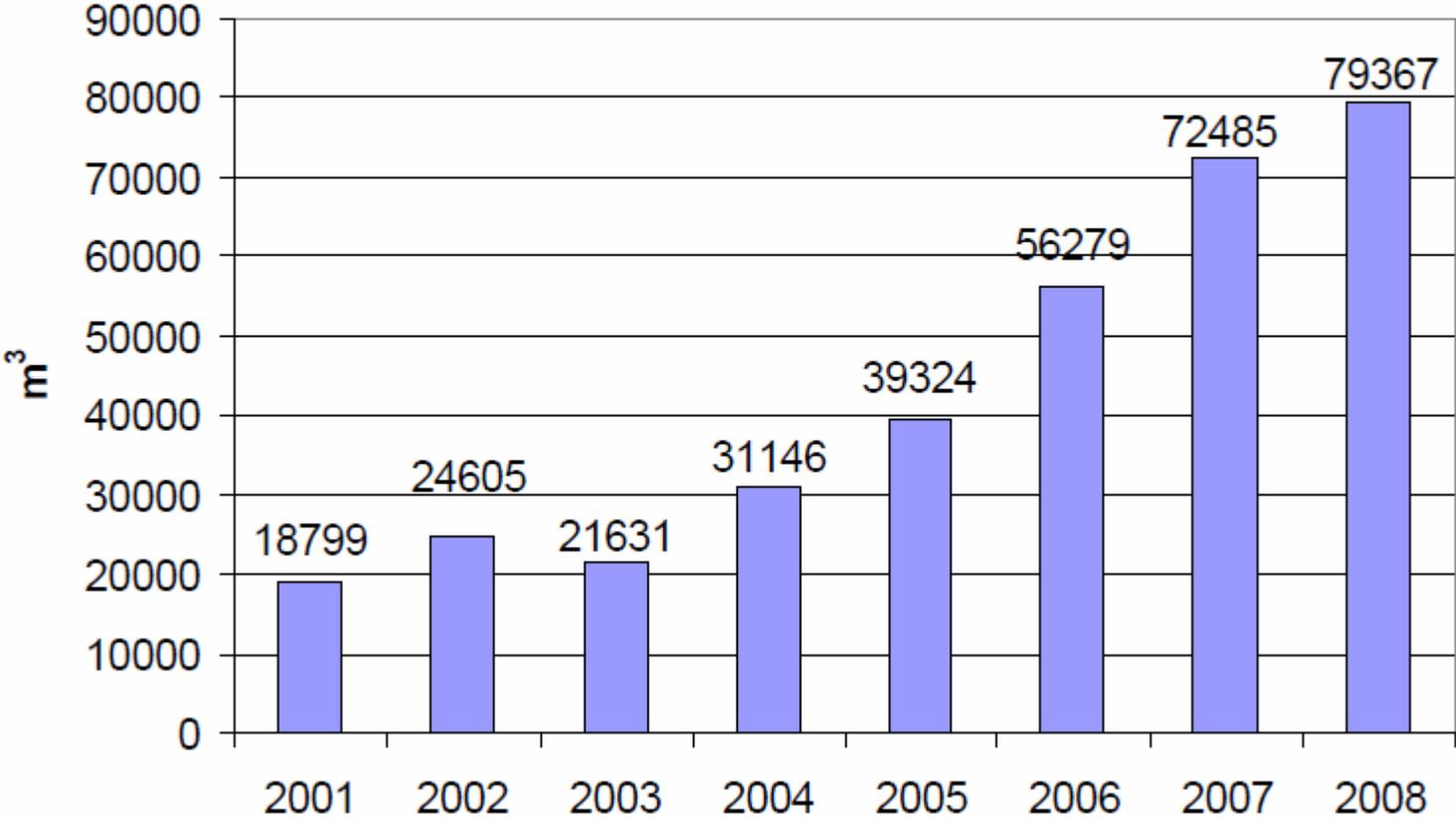
Thermally modified wood

- Interior end uses
 - Photo of hardwood flooring



Thermally modified wood

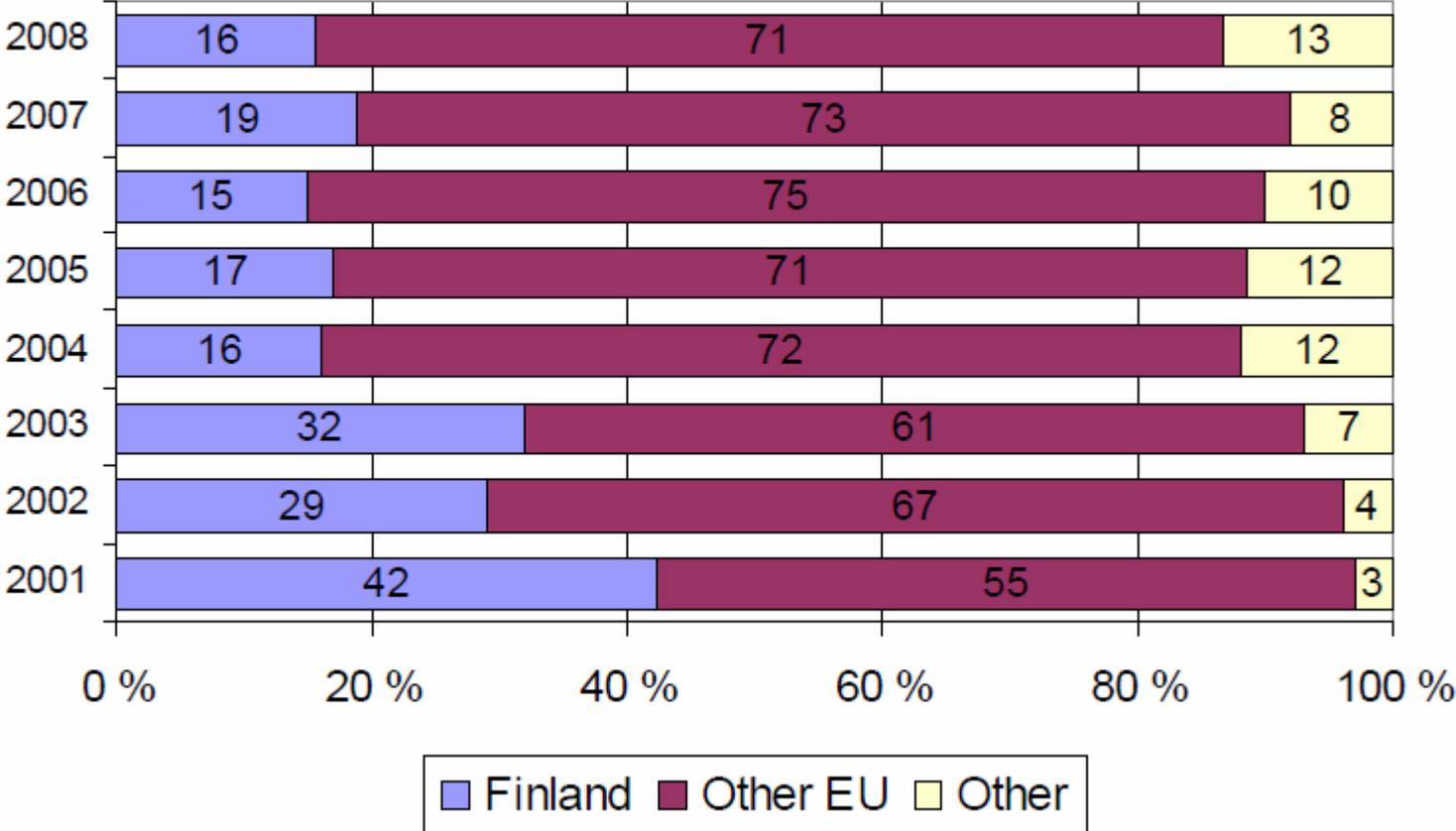
THERMOWOOD SALES PRODUCTION



Source: International ThermoWood Association

Thermally modified wood

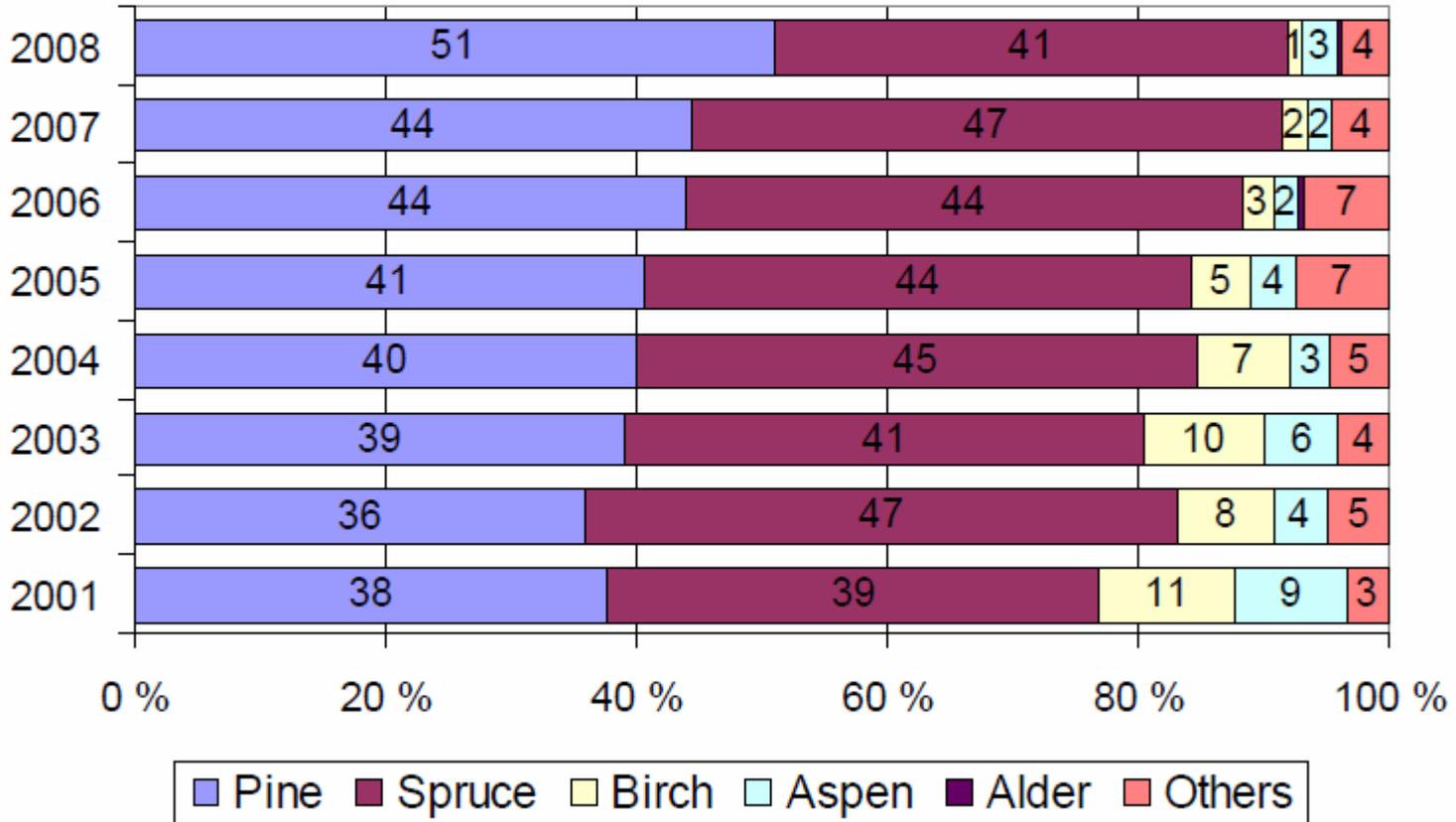
MARKET AREA



Source: International ThermoWood Association

Thermally modified wood

THERMOWOOD WOOD SPECIES



Source: International ThermoWood Association

Wood-plastic composites

Compared to wood

- Less moisture sorption
- Easier to design
- Less maintenance (most wood species)
- Heavier
- Lower E-modulus
- More expensive (most wood species)



Compared to plastic

- Cheaper
- Lighter
- Stiffer
- Lower thermal deformation
- More brittle

Wood-plastic composites

Market perceptions

- US and Canada: cheap replacement for treated wood
- Europe: high-tech product for specific applications; replacement for tropical hardwoods

Source: trex.com

Trex Brasilia® Decking.

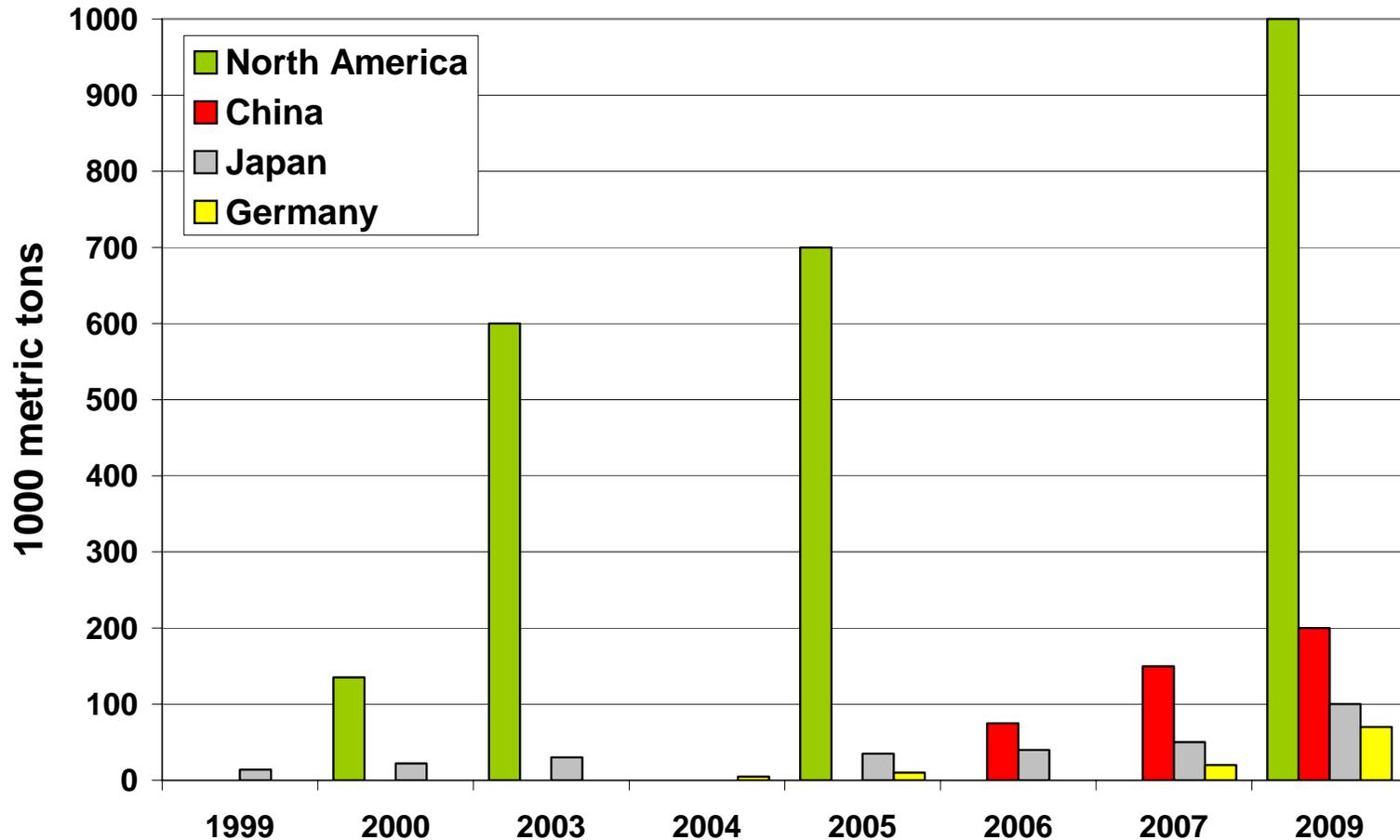
Know that luxurious, variegated stripe of Brazilian hardwoods? It's the primary inspiration for our beautiful Brasilia Decking. Every time you wander out, you can enjoy the exotic look and lush feel of the rainforest underfoot without an ounce of guilt.

.....
 Gallery

.....
 Colors

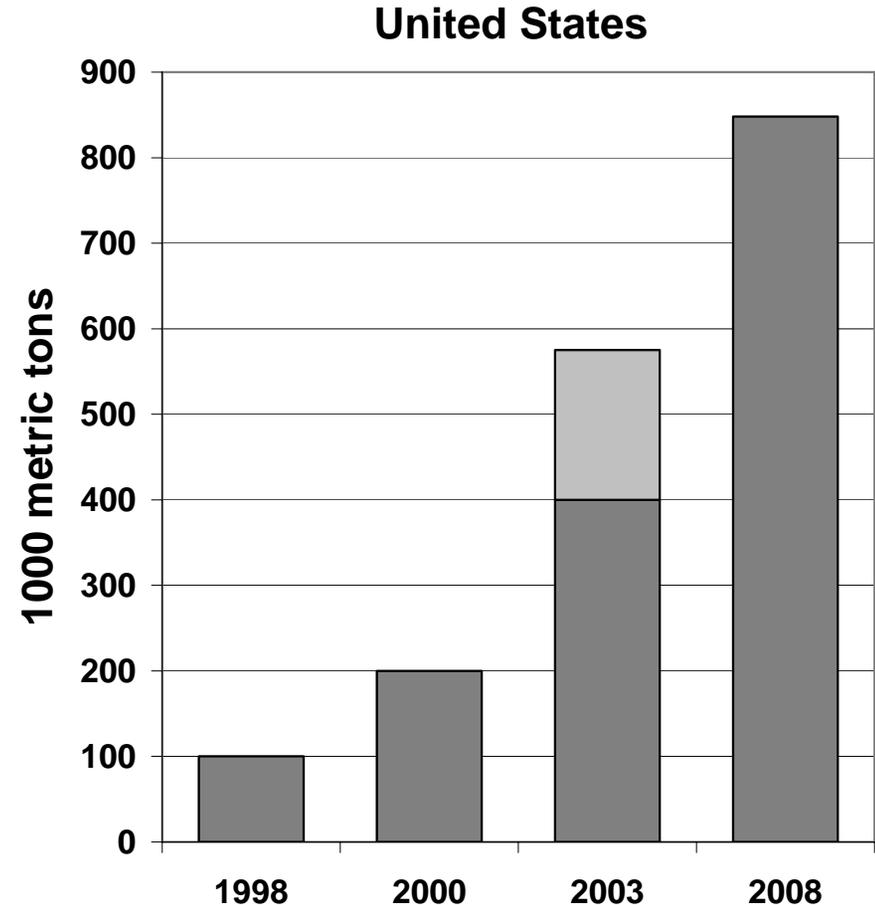
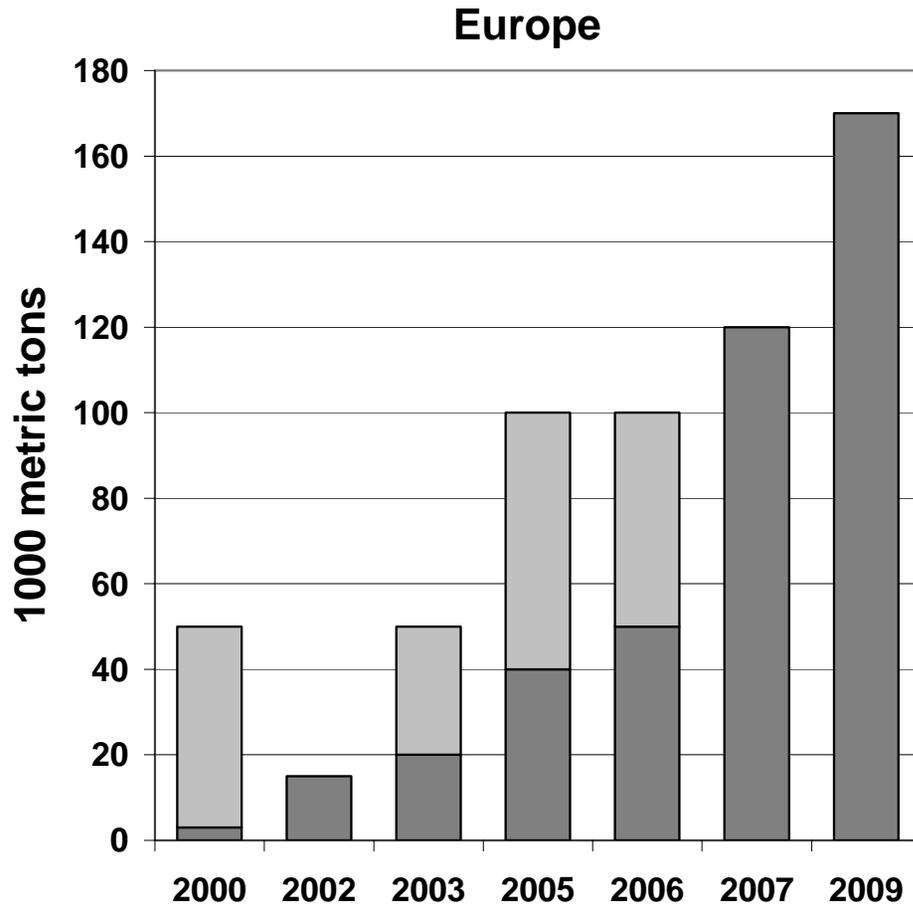
Wood-plastic composites

WPC market volume



Source: Various, in Carus 2009; The Freedonia Group 2009; German WPC Congress

Wood-plastic composites



Source: Various, in Carus 2009; The Freedonia Group, 2009; German WPC Congress 2009

Wood-plastic composites

- Photos

Wood-plastic composites

Common end use applications

- Automobile parts
- Benches
- Cladding/siding
- Decking and railing
- Fencing
- Flooring
- Furniture
- Landscape timber
- Moulding & trim
- Pallets, packaging
- Patios, gazebos & walkways
- Picnic tables
- Playground equipment
- Roofing
- Window & door frames

Less common end use applications or under development

- Bridge decking
- Concrete formwork panels
- Container floors
- Deck planks on dragon boats
- Facing panels
- Marine structures, boardwalks
- Musical instruments
- Tableware
- Toys
- Utility poles

Wood-plastic composites

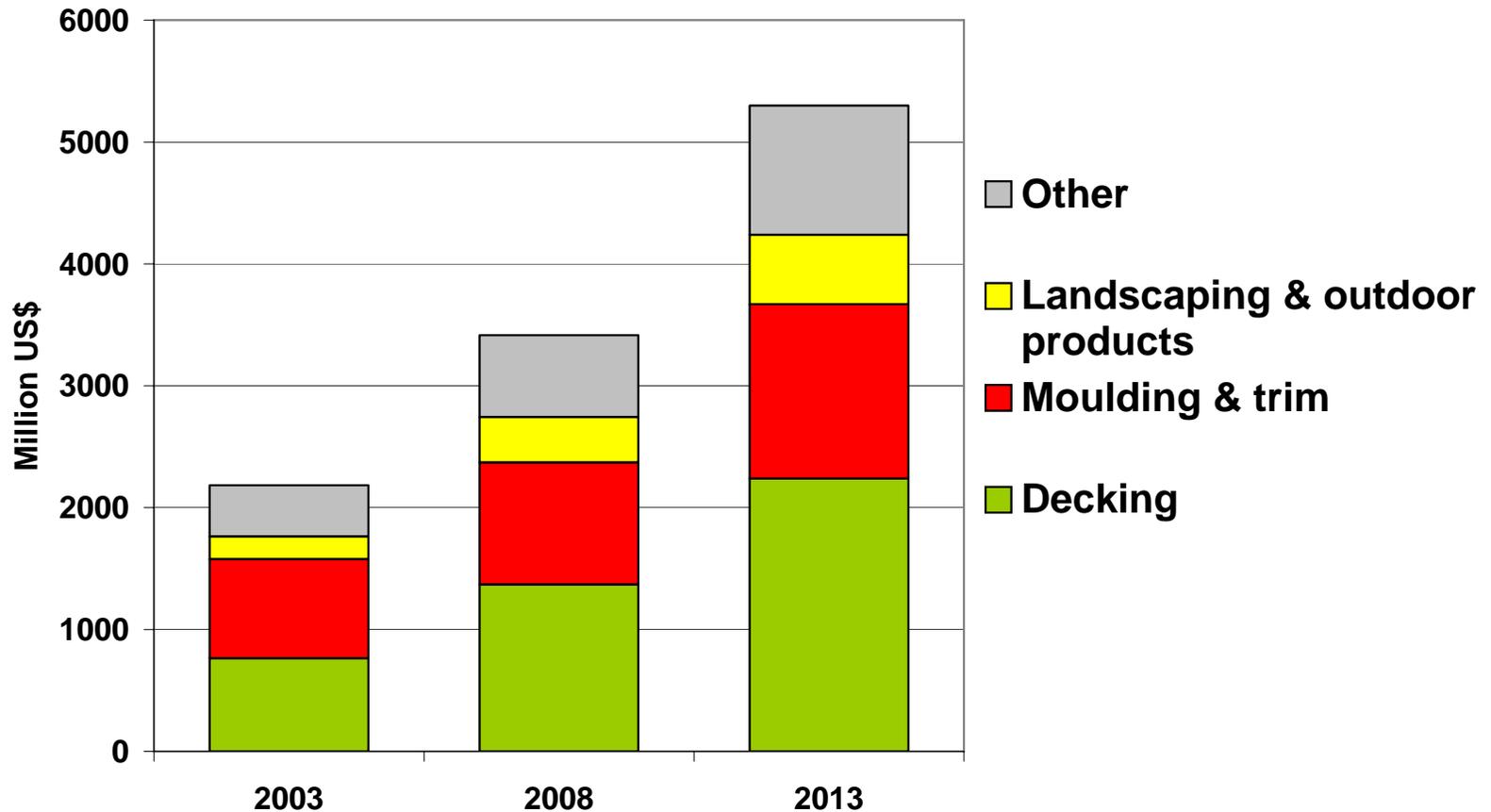
- Accuracy of available market figures?

Year	WPC in decking	Market (US)	Source
2003	19.3%	New decks	NAHB Research Center
2003	10.3%	New, R&R	Freedonia
2003	32.7%	Builders & contractors	Cintrafor
2004	25.3%	Consumers*	FPInnovations

*Next deck material

Wood-plastic composites

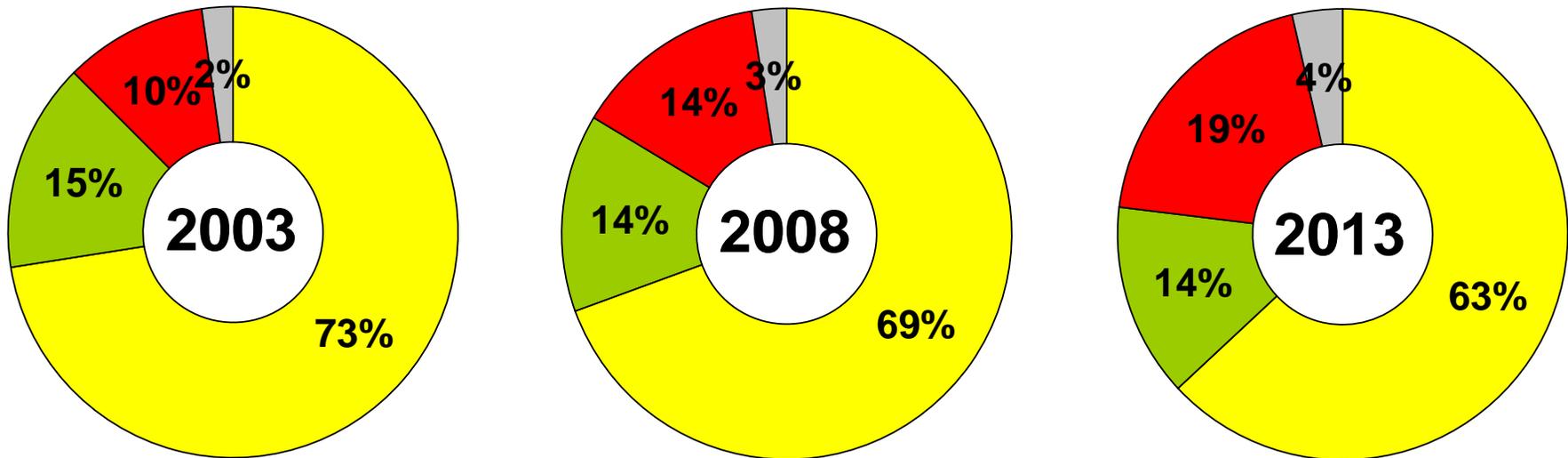
US demand for WPC & plastic by application



Source: Adapted from The Freedonia Group

Wood-plastic composites

Material use in decking in the US

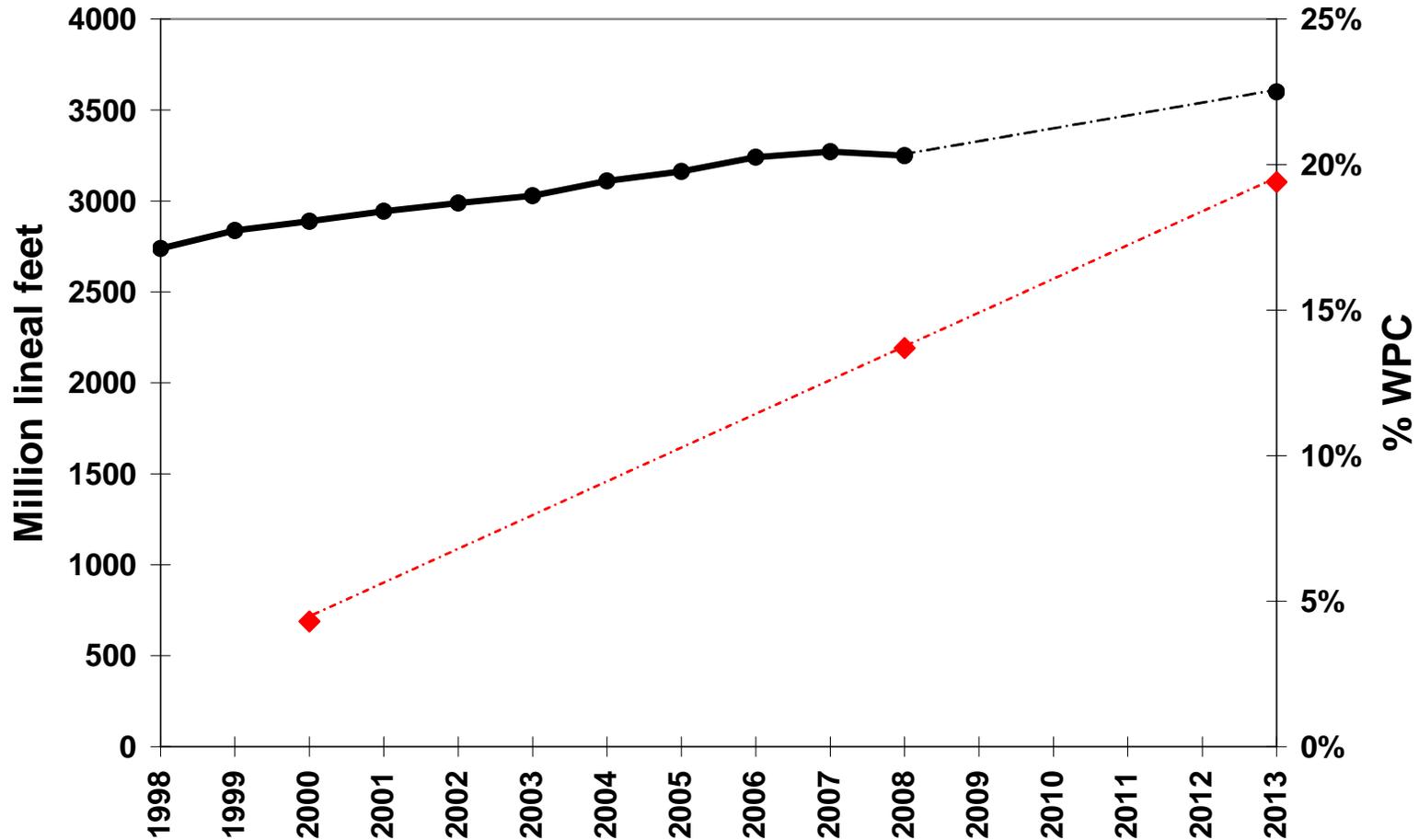


- Pressure-treated wood
- Other wood (tropical, cedar, redwood)
- WPC
- Plastic & other materials

Source: Adapted from The Freedonia Group

Wood-plastic composites

US demand for decking



Source: Adapted from The Freedonia Group

Pricing

Decking price examples

Decking boards, US market (US\$/metre)

WPC hollow	WPC solid	Thermally modified softwood	Cumaru 1x6, 8-16'+	Ipe 1x6, 8-16'+
5.74	7.15	7.22	7.38	9.81

Low deck with rails, 8x4m, installed (US\$)

Pressure treated softwood	WPC	Ipe
8 700	11 000	12 000

Decking boards, UK market (GBP/metre)

Pressure treated softwood	Thermally modified pine	Yellow balau	Ipe	WPC hollow
2.65	3.49	6.99	7.14	7.57

Implications for tropical hardwoods

Perceived and real “greenness” of products is important

- Forestry practices
- Chemicals in treated wood
- Recycling
- Local
- Carbon footprint

Tools & strategies used

- LCA
- Environmental Product Declaration (EPD)
- Forest certification
- High quality, lasting products



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Thank You

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