



Engineered Bamboo Products

Changing the Materials...

...so we can Change the Methods



BAMCORE[®]

**Climate Positive Building Solutions
- for the Generations to Come**

Hal Hinkle, CEO



Mission: Commercialization of timber bamboo to help **mitigate climate change** and **rural poverty** in the Global South

HUMANITY FACES TWO CRISES

Each requires a fundamentally new solution

1. Exploding Global Demand to
Build:

- Global **Shortage of Skilled** Labor
- **Slow** On-site Construction
- **High Waste** & Inefficiencies
- **Poor Coordination** Across Teams

2. Need to Decarbonize Built World
Fast:

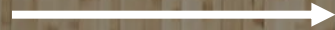
- **Reduce** Legacy Concrete & Steel
- **Optimize Fiber** Usage, Save Wood
- **Improve Operating** Performance
- **Extend Service Life** of Buildings

To address BOTH crises we must change the Materials and the Methods

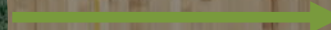
OUR LEGACY MATERIALS LIMIT OUR SOLUTIONS (and are part of the problem)



Steel and concrete contribute to 15% of global annual GHG.



10% of forest cover has been lost since 2001 – equivalent to more than 165Gt of CO₂.



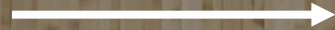
Change to **materials** that *grow faster* and *perform stronger*

WE CAN SAVE CARBON BY REDUCING LEGACY CONCRETE, STEEL, AND SLOW-GROWING TIMBER

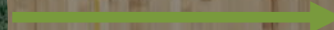
By introducing nature's fastest growing structural fiber-**BAMBOO**



Steel and concrete contribute to 15% of global annual GHG.



10% of forest cover has been lost since 2001 – equivalent to more than 165Gt of CO₂.



Timber Bamboo can sequester 251 Mt/ha in 20 years. Other fast fibers in developments.

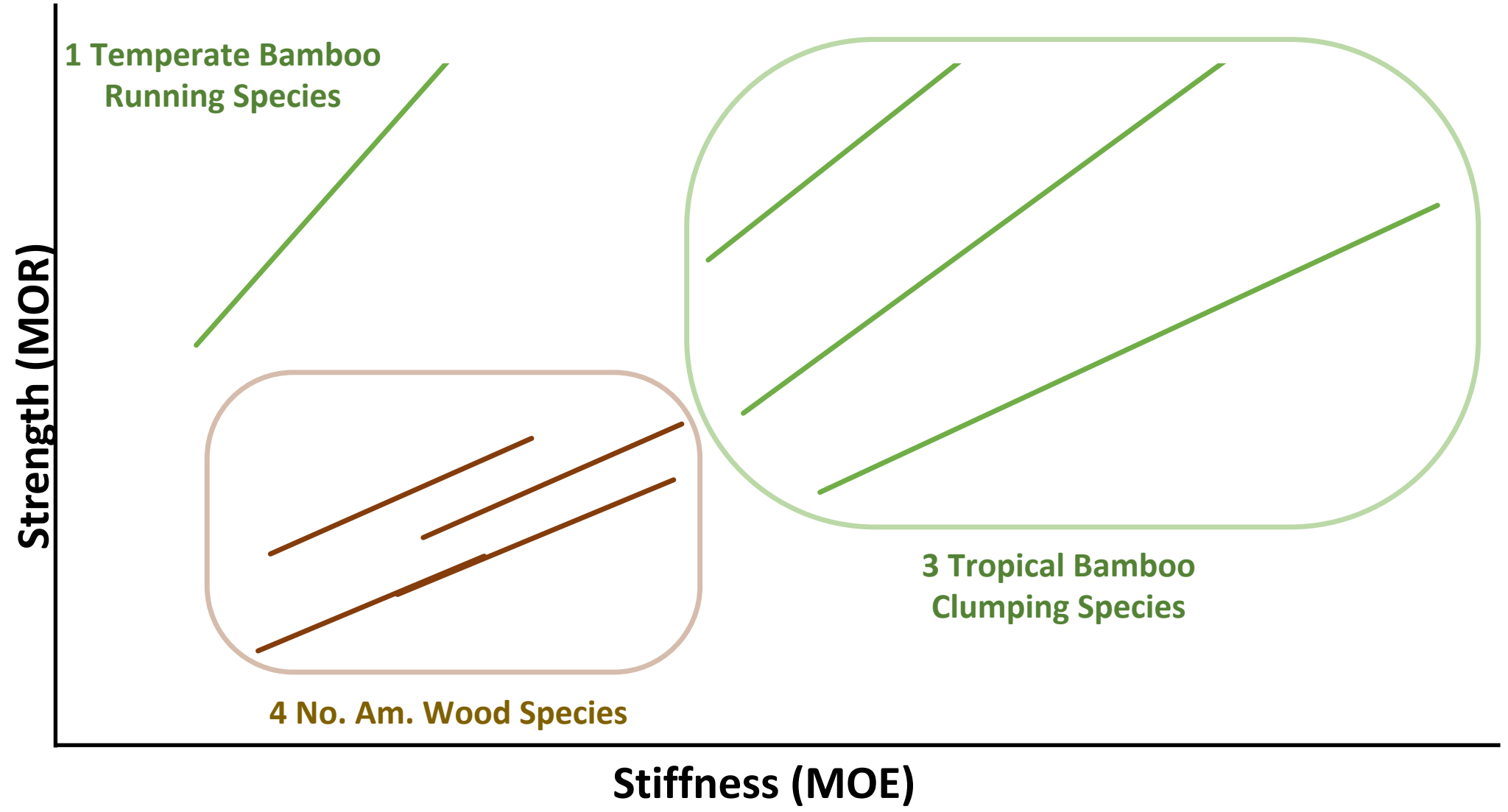
Change the Material - Faster

TIMBER BAMBOOS GROW FASTER Than typical framing timber



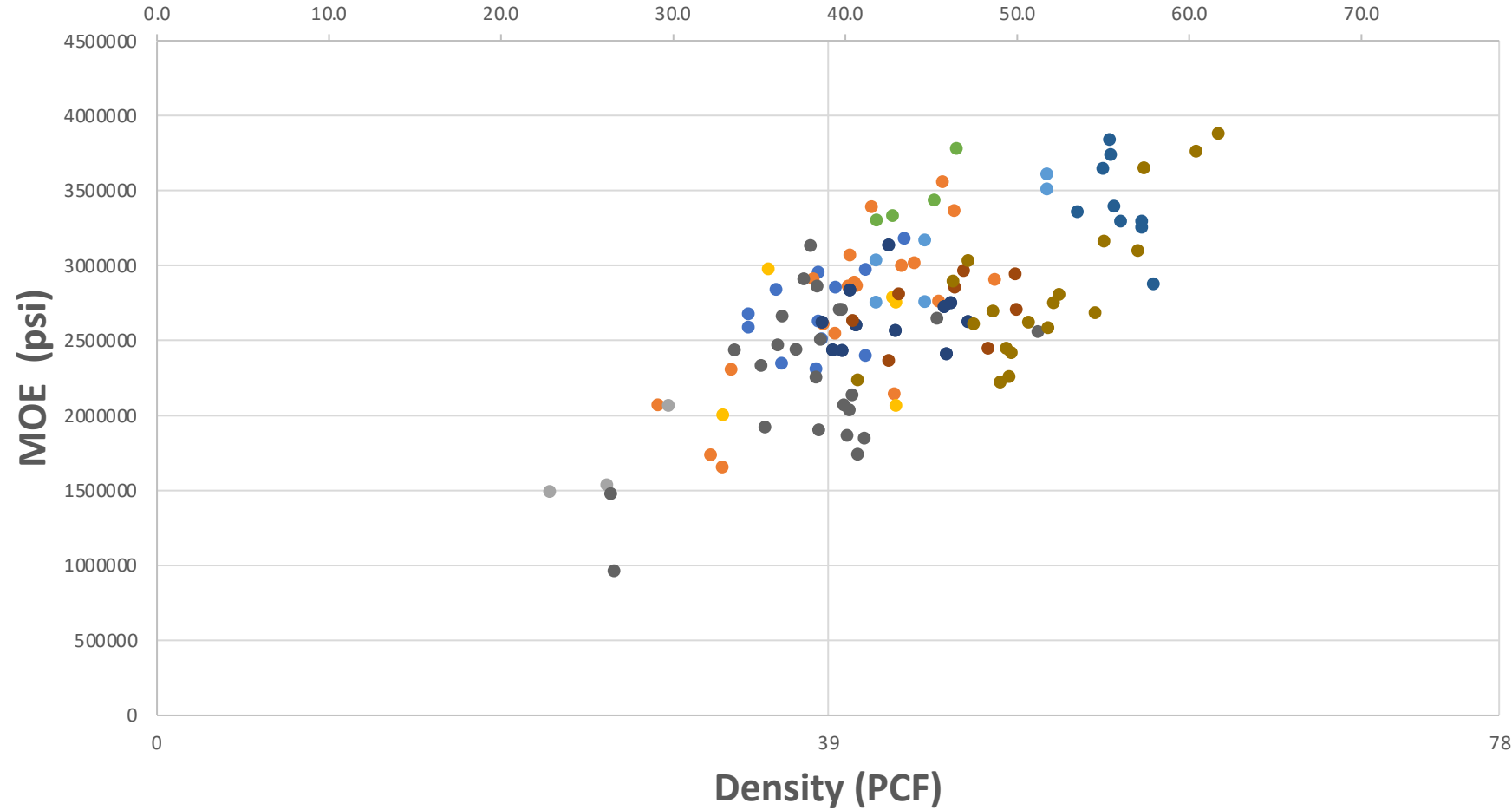
Timber bamboo sequesters between 5x and 10x more CO₂ than wood, and much faster.

Wood v. Timber Bamboo Bending Mechanical Properties



Variation Across Species

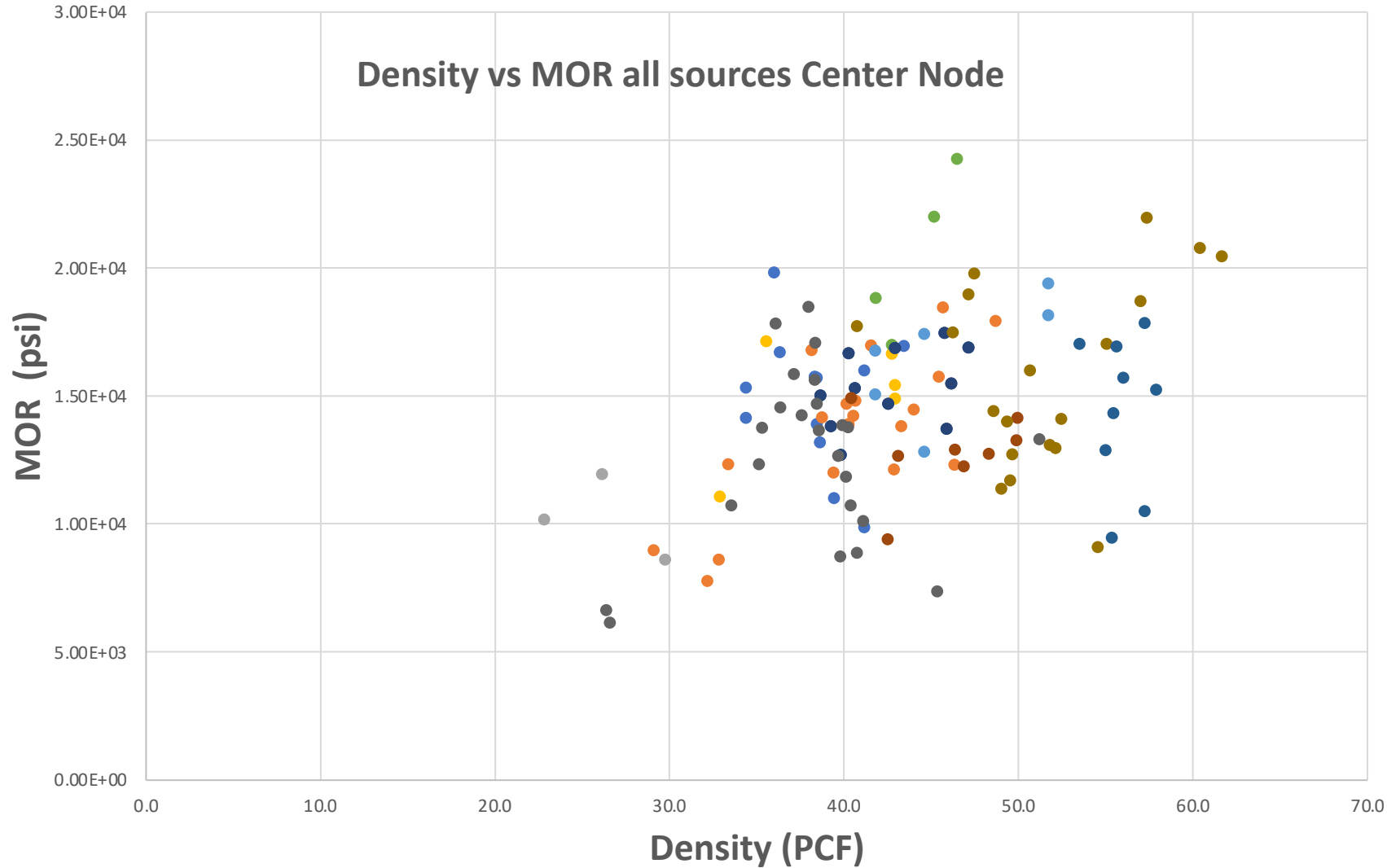
Density vs MOE all sources Center Node



Performance Function of:

1. Species
2. Growing Location
3. Age of Culm
4. Height on Culm
5. Radial Cross Section
6. Node v. Internode
7. Treatment

Variation Across Species

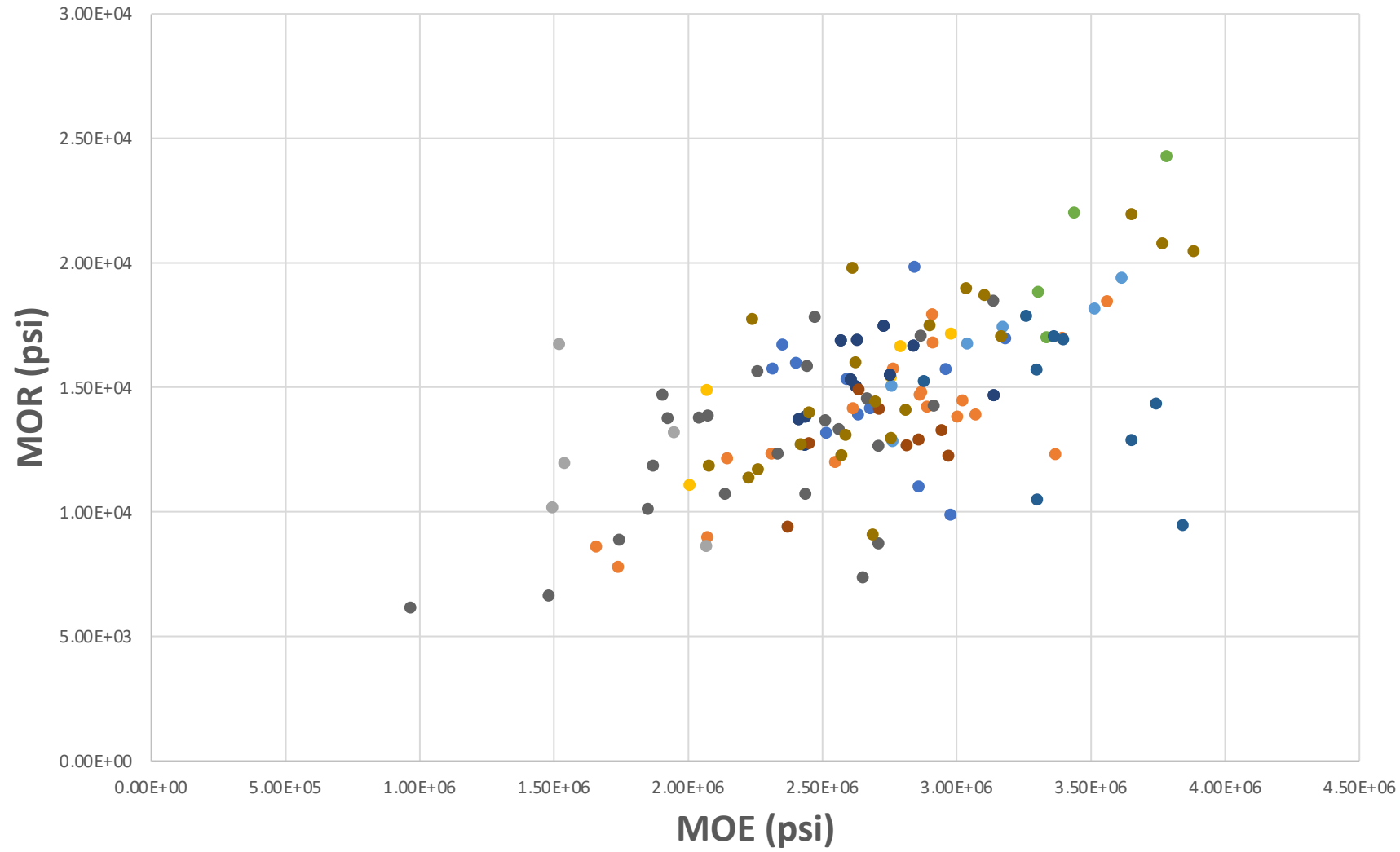


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Variation Across Species

MOE vs MOR all sources Center Node



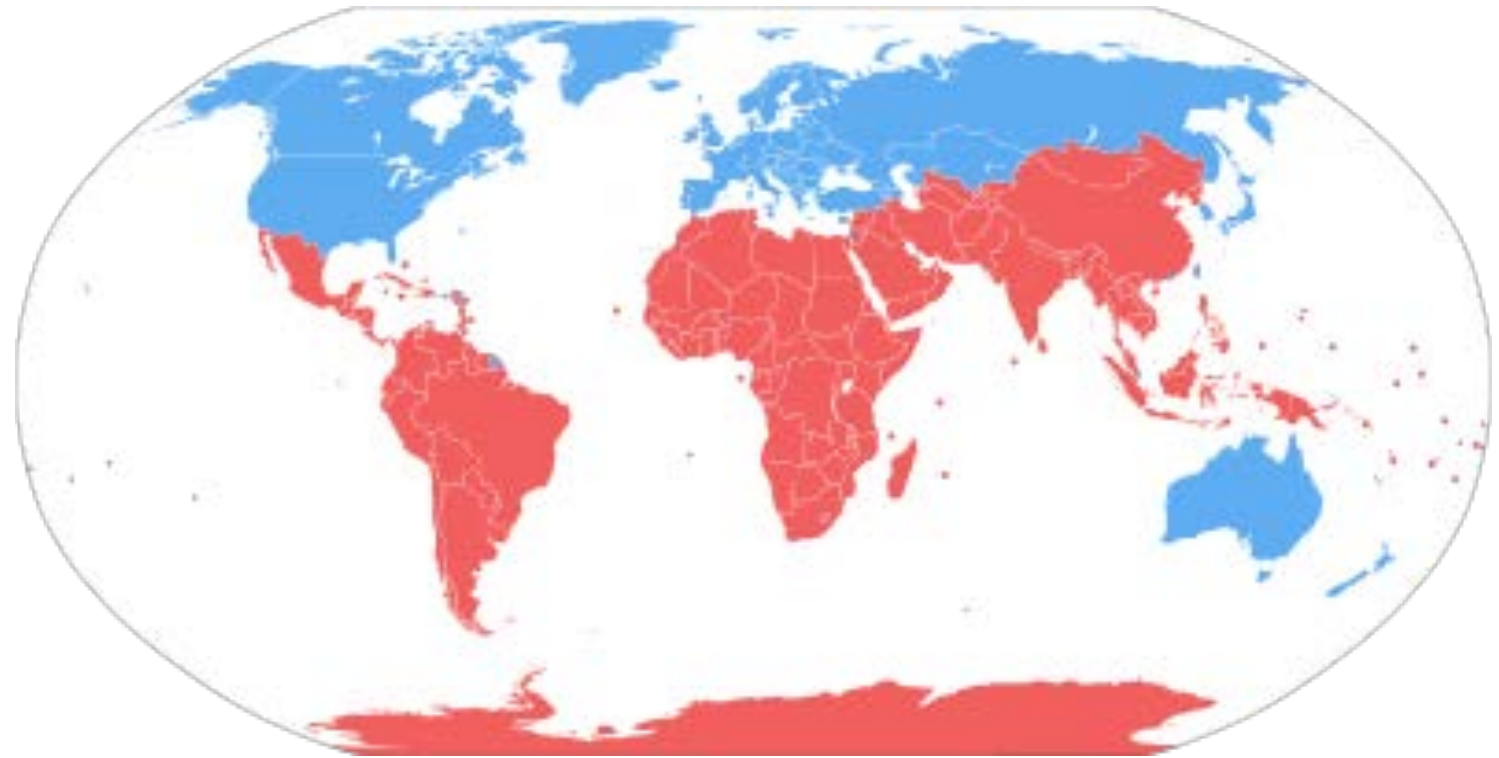
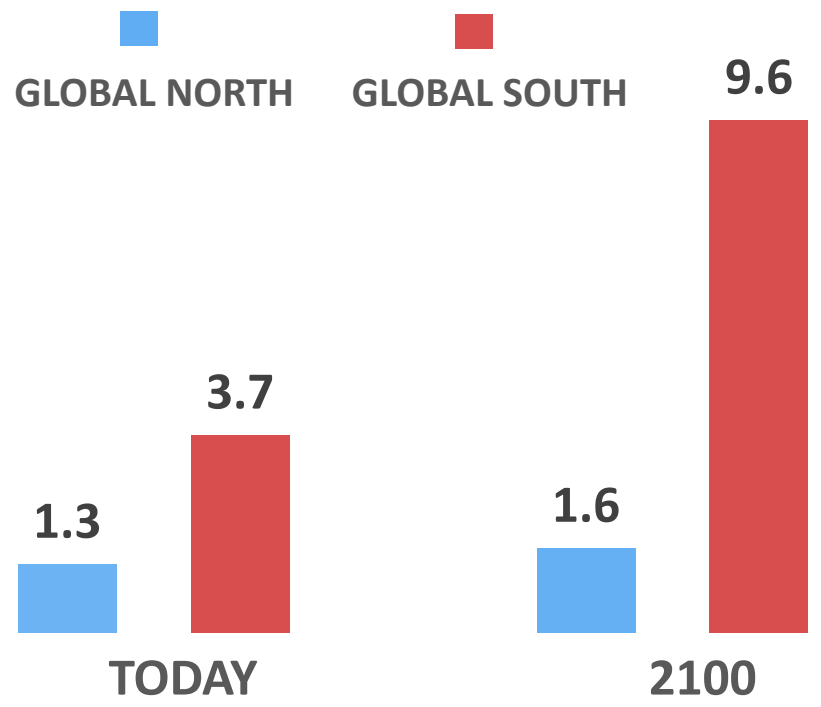
Performance Function of:

- 1. Species
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- 7. Treatment

LIMITS TO BEAUTY PROMISE OF UTILITY



THE BUILT WORLD'S CLIMATE CHALLENGE



	GLOBAL NORTH	GLOBAL SOUTH
Rural Bldg Envelopes	Wood-based Cavity	Cementitious
Urban Bldg Envelopes	Wood-based Cavity	Cementitious
	Cementitious	
Thermal Mass	Mixed	High

**FAST REGENERATING
SUPER STRONG FIBERS
IN CAVITY
BASED ENVELOPES**

USE BIOGENIC FIBERS TO BUILD CAVITY BASED ENVELOPES

1. Harvest



Timber Bamboo



Framing Wood

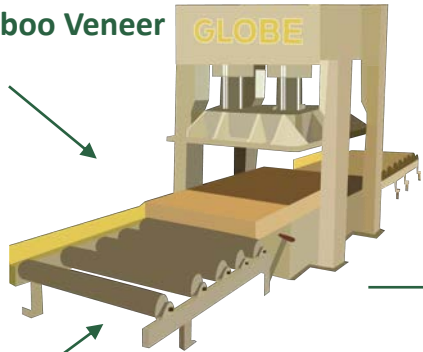
2. Manufacturing



Engineered Bamboo Veneer

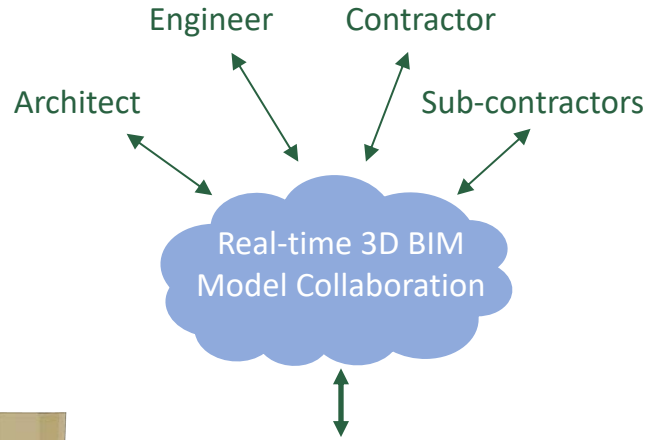


Engineered Plycore



Layup > Glue > Press > Square

3. Cloud-Based Design



Code Compliant Wall Panels



Fully Customized

4. Industrialized Construction



Single Family



Fast/Simple Installation

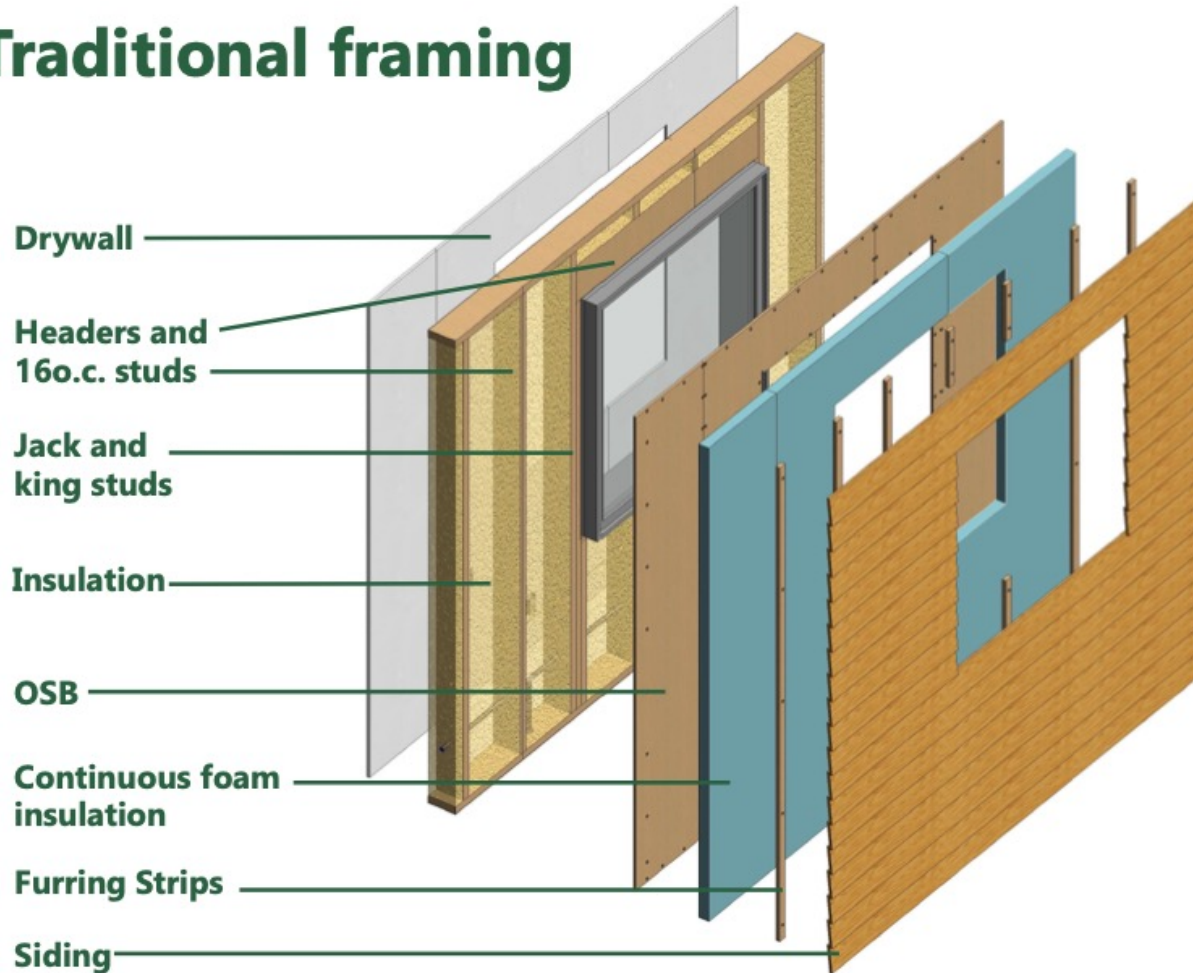


Multi-Family

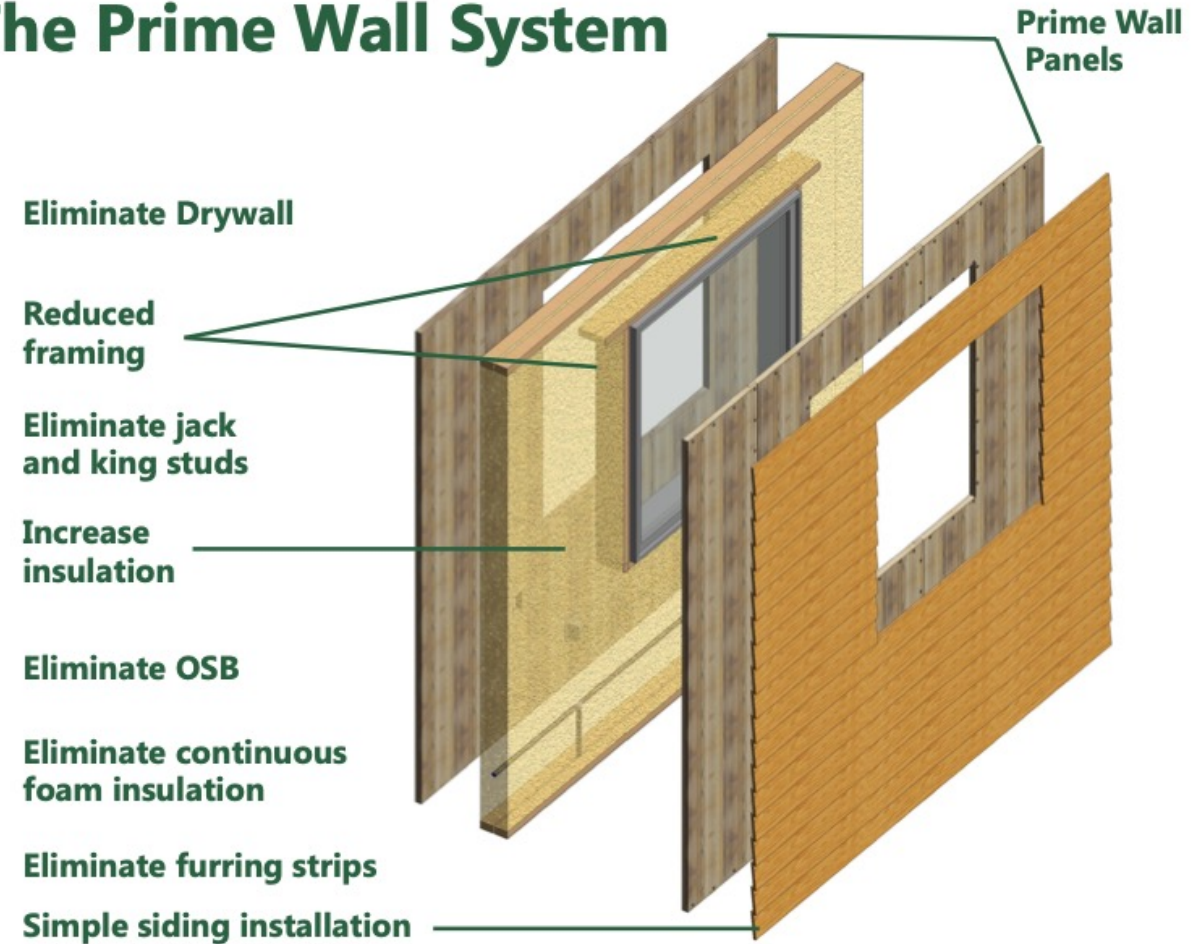
Saving Carbon, Cost, Time & Labor

REINVENT 200-YEAR-OLD "BALLOON" FRAMING

Traditional framing

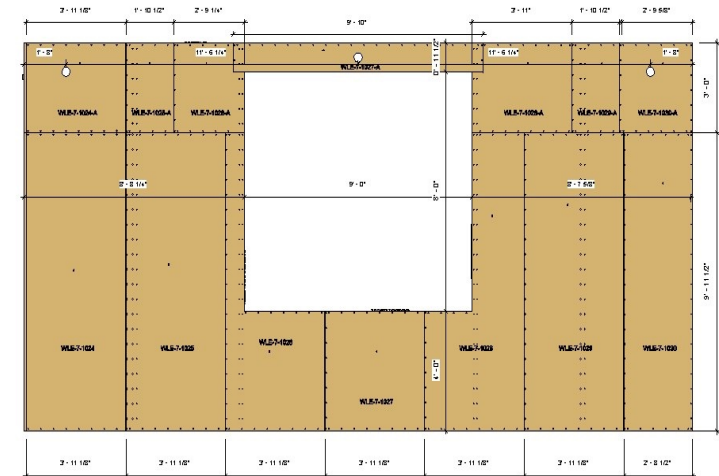
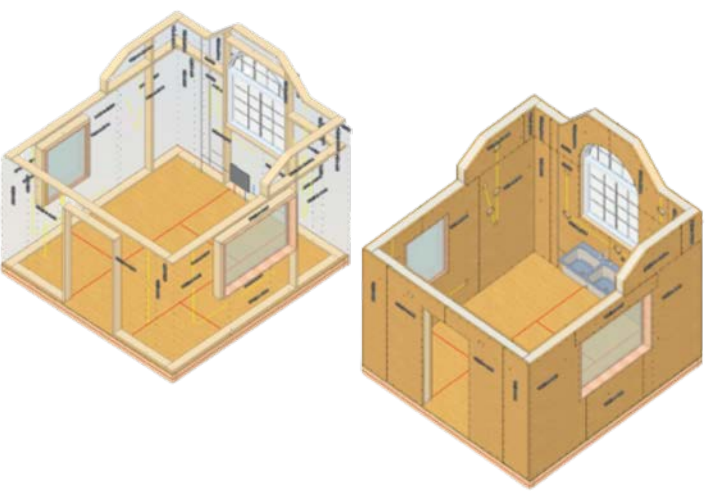
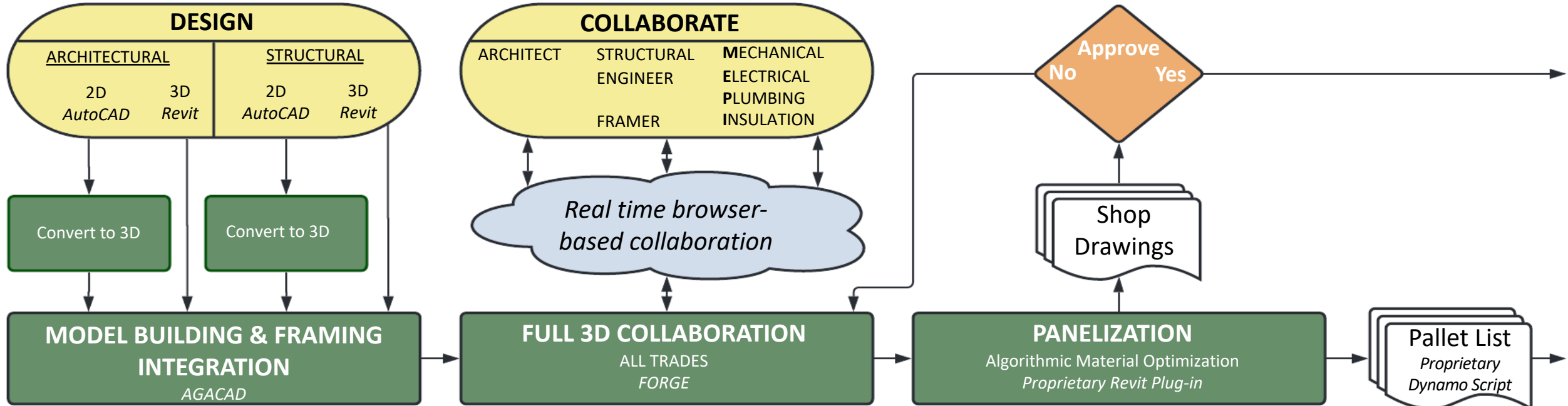


The Prime Wall System



USE CLOUD BASED COLLABORATION TO DRIVE INDUSTRIALIZED CONSTRUCTION

Change the Method 2



Wall/Panel #	MOO	BL	TL	Max Height	Max Width	Panel Sq Ft	Approx Wt	Pallet #	Panel Info
WLS-0-1003	FALSE	FALSE	FALSE	108	31	23.3	107.76	1	
WLS-0-1000	FALSE	FALSE	TRUE	108	44.88	30.26	139.94	1	
WLS-0-1001	FALSE	TRUE	TRUE	20	30	3.87	17.89	1	10'
WLS-0-1002	FALSE	TRUE	TRUE	108	48	32.88	152.08	1	
WLS-0-1002	FALSE	FALSE	FALSE	27.97	41.5	7.36	36.36	1	1 WH
WLS-0-1005	FALSE	FALSE	FALSE	108	48	35.43	163.96	1	
WLS-0-1006	FALSE	FALSE	TRUE	108	48	34.92	161.5	1	
WLS-0-1007	FALSE	TRUE	TRUE	108	48	35.07	162.21	1	
WLS-0-1008	FALSE	TRUE	TRUE	108	48	34.92	161.5	1	
WLS-0-1009	FALSE	TRUE	TRUE	108	22.89	13.81	61.81	1	
WLS-0-1010	FALSE	TRUE	TRUE	20	30	3.87	17.89	1	10'
WLS-0-1012	FALSE	TRUE	FALSE	108	35.03	22.67	104.85	1	
WLS-0-1011	FALSE	FALSE	FALSE	27.97	41.5	7.36	36.36	1	1 WH
WLS-0-1013	TRUE	FALSE	FALSE	108	30.75	22.57	104.15	1	
WLS-0-1009	TRUE	FALSE	TRUE	108	37.75	25.25	110.76	1	
WLS-0-1002	TRUE	TRUE	TRUE	108	48	34.88	161.74	1	
WLS-0-1001	TRUE	FALSE	FALSE	27.97	41.5	7.36	36.08	1	1 WH
WLS-0-1003	TRUE	TRUE	FALSE	108	48	36.57	164.81	1	
WLS-0-1004	TRUE	FALSE	FALSE	108	34	17.84	82.86	1	
WLS-0-1005	TRUE	FALSE	TRUE	108	24.75	18.14	83.89	1	
WLS-0-1006	TRUE	TRUE	TRUE	108	48	35.36	162.4	1	
WLS-0-1007	TRUE	TRUE	TRUE	108	48	35.36	162.4	1	
WLS-0-1008	TRUE	TRUE	TRUE	108	48	36.21	171.23	1	
WLS-0-1009	TRUE	TRUE	FALSE	108	48	36.36	164.28	1	
WLS-0-1009	TRUE	FALSE	FALSE	27.97	41.5	7.36	36.08	1	1 WH
							2520.69		

USE CAD-TO-CAM WORKFLOW TO DRIVE MASS CUSTOMIZATION

Change the Method 2

TRANSLATE TO FABRICATION
GEOMETRIES

*Proprietary
Revit Plug-in*

OPTIMIZE
MATERIAL & PARTS

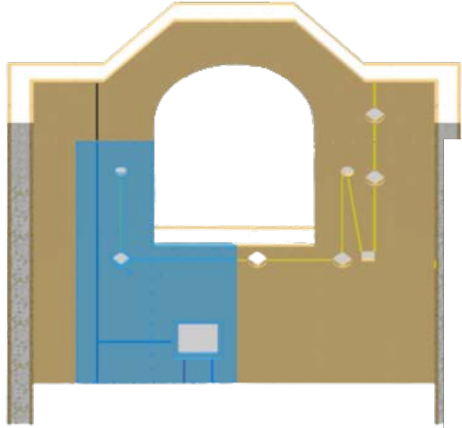
*Proprietary
Inventor Plug-in*

MACHINE
INSTRUCTIONS

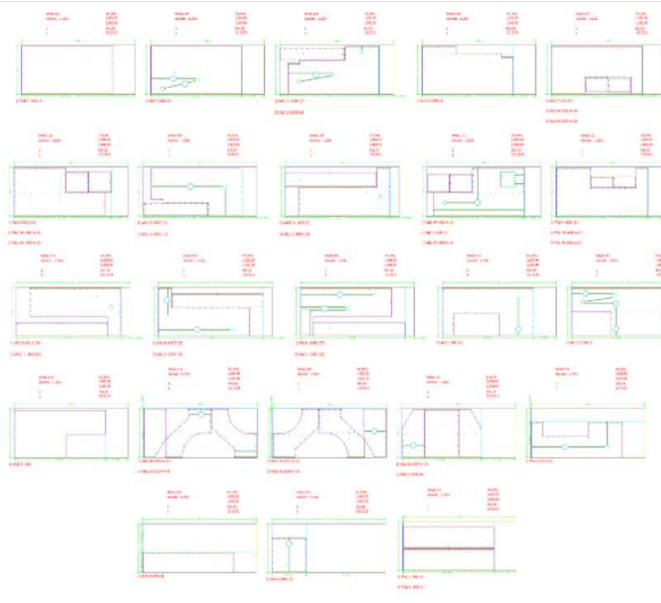
Cimtech

FABRICATION IN THE FACTORY

Onsrud



BamCore Nesting Optimization
Reduces Waste



REDUCE CONSTRUCTION LITERACY NEEDS BRING THE FACTORY TO THE JOB SITE

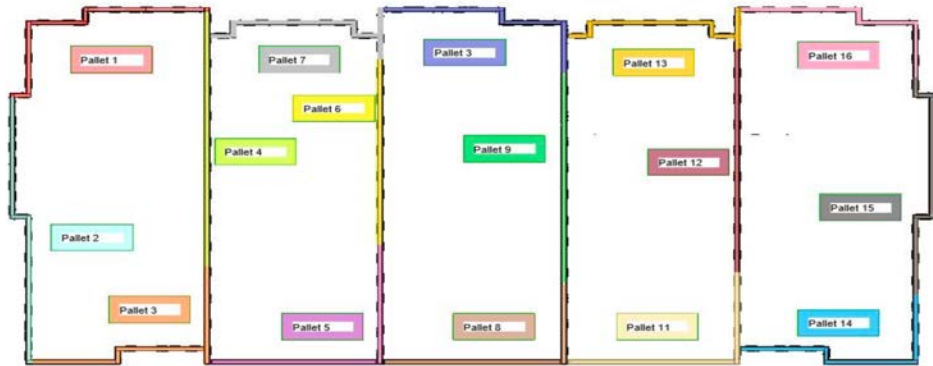
JOB SITE DELIVERY

JOB SITE APPLICATION

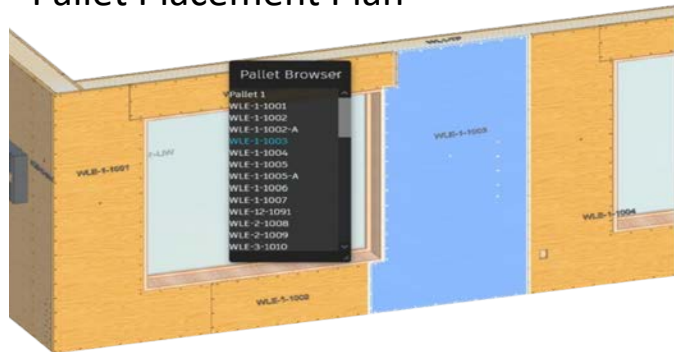
Lumber Cut List
Pallet Browser
Pallet Placement Plan
Installation Animation

PRODUCT

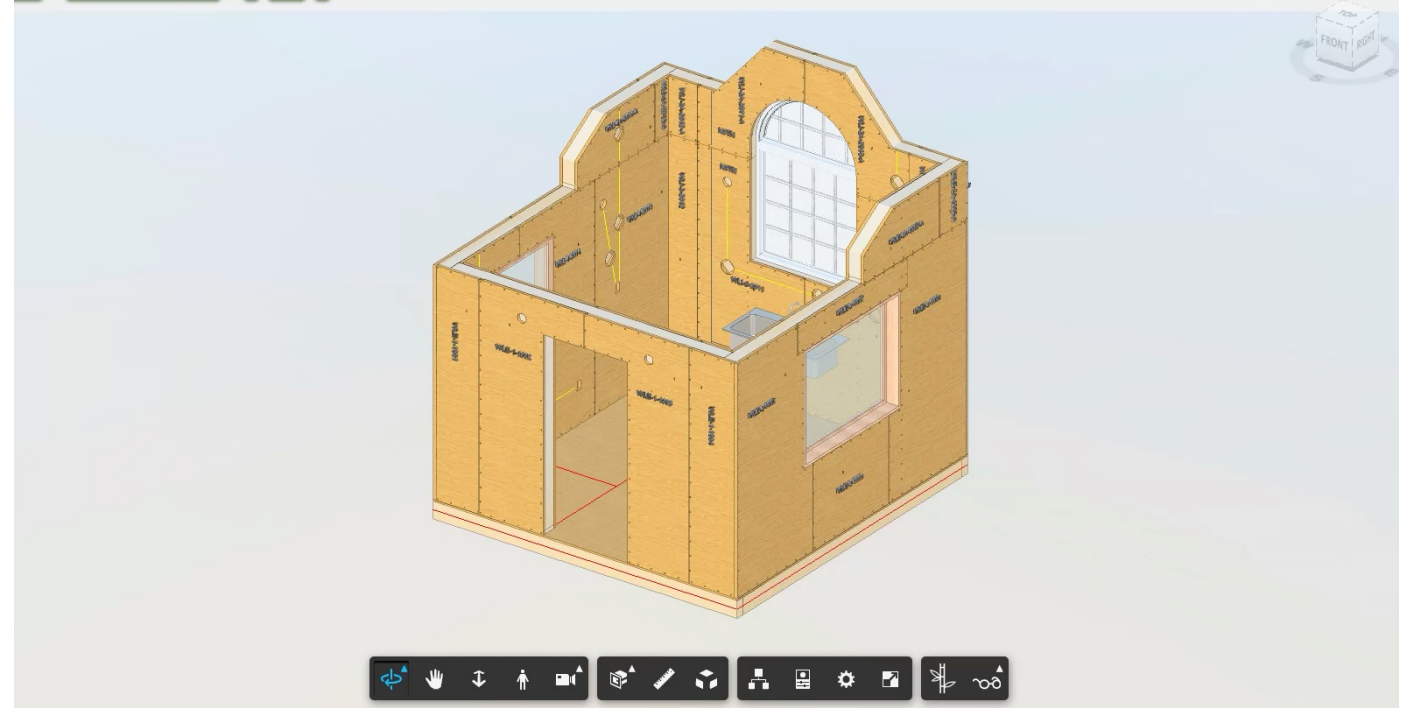
Panels
Plugs & Covers
Oops Jig



Pallet Placement Plan



Pallet Browser



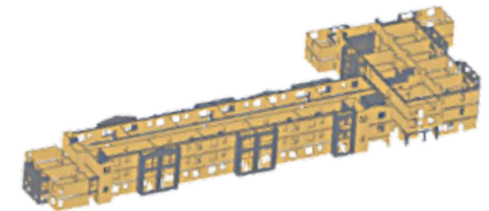
Installation Animation



Single Family



Multi-Family Townhomes



Affordable Multi-Family

THE RESULT CAN BE MASSIVE BY MAKING Buildings more efficient and using them as carbon sinks



223Mt CO₂ savings per
house equivalent.¹

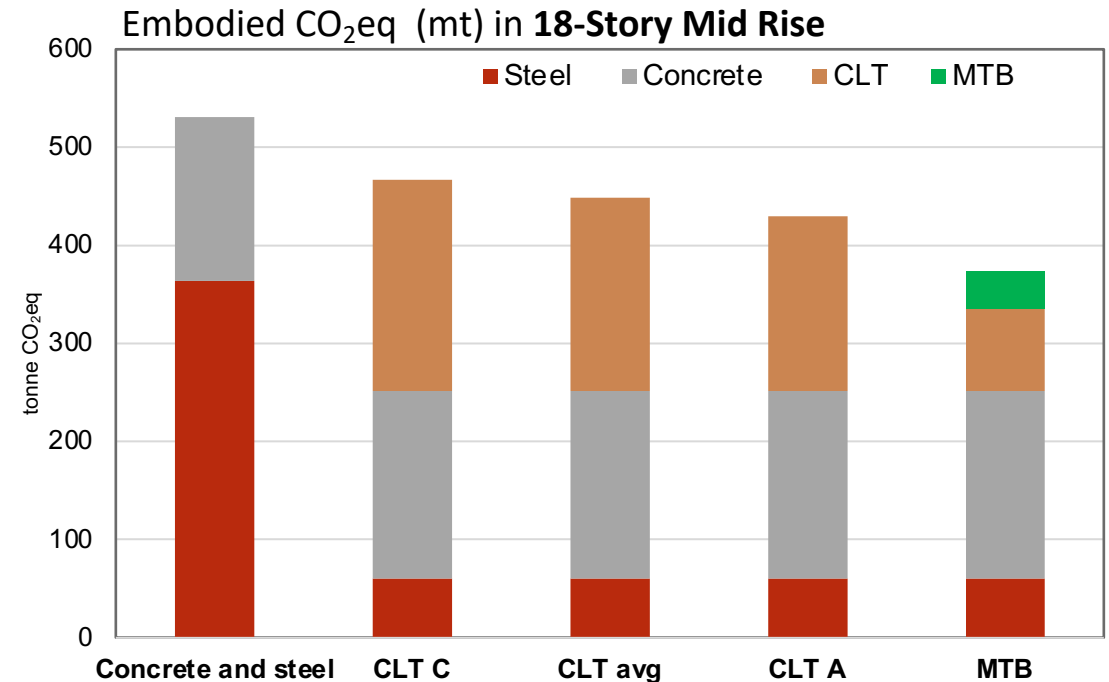
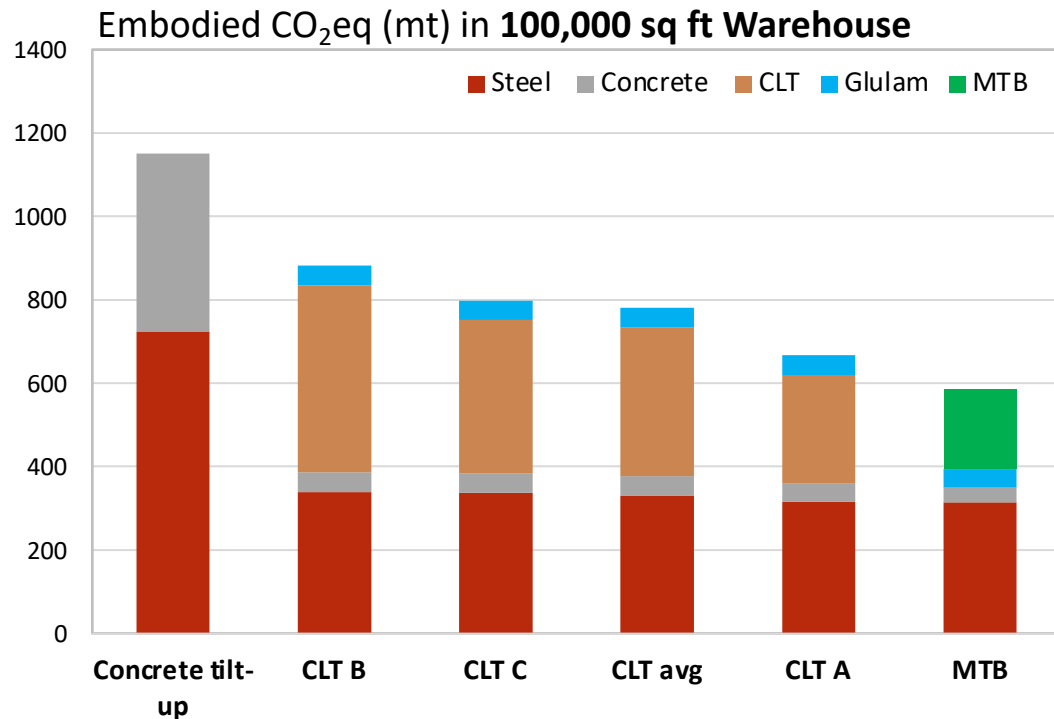


9.6 Gt CO₂ potential GHG
savings at scale.²

¹2020 Quantis LCA

²2020 CEA Emissions Reduction Potential Report. Includes US and European markets penetration until 2050.

OUR MASS TIMBER BAMBOO™ LOWERS EMBODIED CARBON Compared to Legacy Steel, Concrete and even CLT



At the whole building level, **MTB** can lower embodied carbon by up to **25% in warehouses** and **20% Mid Rise buildings** compare to average CLT. Even more compared to legacy steel and concrete.

CLIMATE CONFUSION & BAMBOO QUIZ

1. Buildings with high thermal mass are usually better at protecting us from climate change. True or False
2. On average a hectare of mature timber bamboo will have more stored carbon than a hectare of productive timber forests. True or False
3. In considering climate change, in a world of limited resources would it be better to:
 - a. Make short lived products from fast growing bamboo
 - b. Make short lived products from slow growing wooda. or b.
4. The esthetic appeal of bamboo is the key to maximizing the adoption of bamboo products. True or False
5. To maximize the carbon capturing capacity of bamboo it is best to elongate the harvesting cycle. True or False



BAMCORE®

Thank you!

WE ARE RECOGNIZED AS A NEXT-GENERATION LEADER



IVORY INNOVATIONS
Winner for Construction & Design

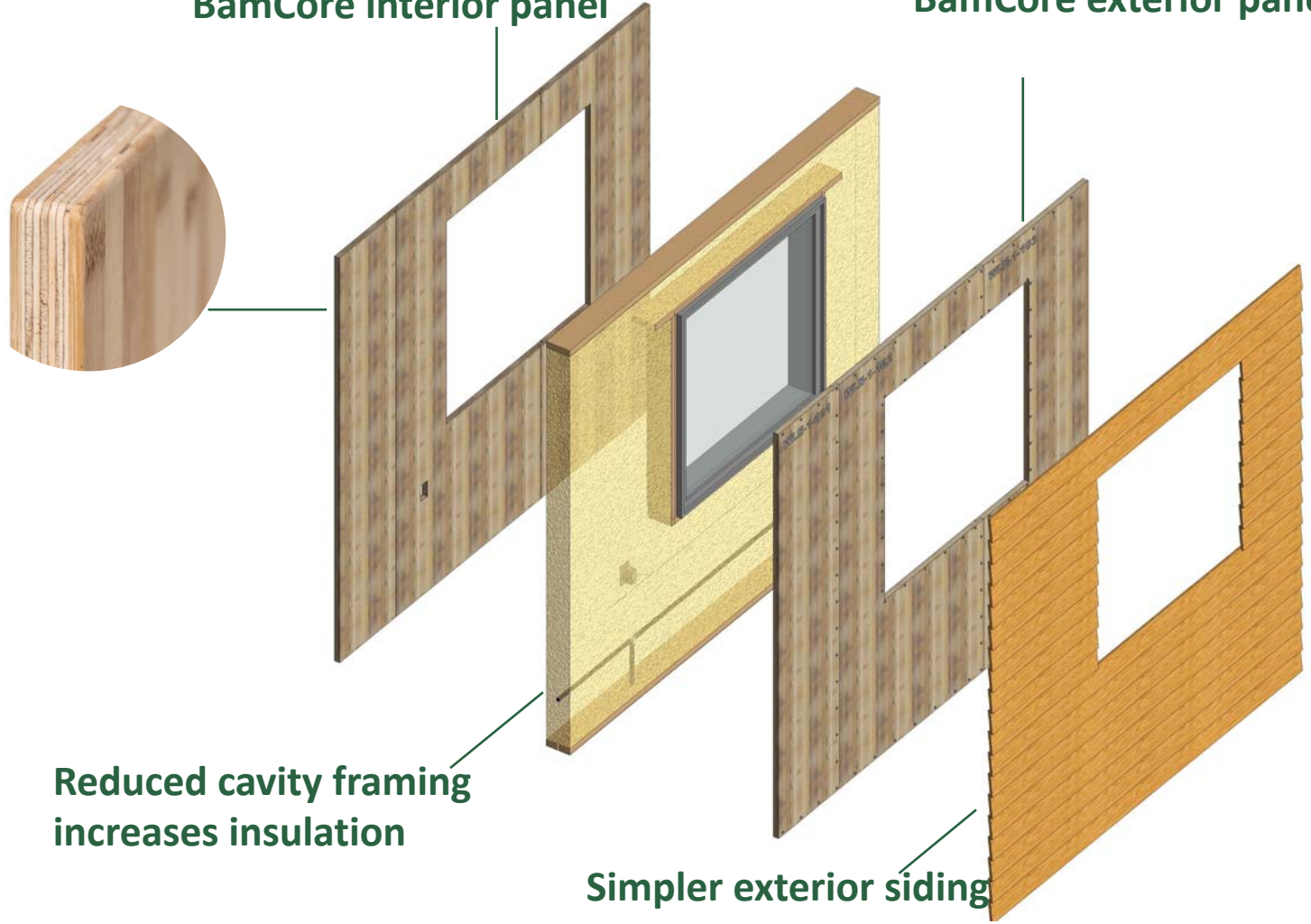
ARCHITECT

2021 Product Call – Top 20

FORGE
BAMCORE
Reducing cost with animated 3D project plans delivered on the jobsite

REINVENT 200-YEAR-OLD "BALLOON" FRAMING

LET'S GET THAT OLDER IMAGE THAT COMPARED STICK AND BAMCORE
BamCore interior panel BamCore exterior panel



Reduced cavity framing
increases insulation

Simpler exterior siding

IN MARKET UP TO 5 STORIES

Patented BamCore Prime Wall® Framing Solution:

- Code-compliant
- Custom pre-fabricated
- Structurally stronger
- Thermally superior
- Acoustically quieter
- Faster installation
- Reduces Waste
- Climate Positive
- Saves money

Eliminates or Reduces:

- OSB
- Drywall
- Jack and king studs
- Furring strips
- Continuous foam insulation

INDIA PARTNERSHIP

The India Opportunity

- India has world's **largest supply of timber bamboo**
- India has idle former **bamboo processing assets**
- India has very well-developed industry of plywood manufacturers for potential contract manufacturing
- Indian population has **intellectual capital** to host worldwide Job Engineering teams
- India has largest prospective **demand for middle/upper class residential & commercial building**
- India well-located to **export to SEA and Middle East**

BamCore's India Partnerships

- Seeks **strategic partner** in India, anchor initial pipeline
- Seeks **strategic investor** to guide development of Indian business line
- Seeks **partnership with GOI** to establish new international carbon credit for bamboo stored in building structures



MAKE IN INDIA

3

Prime Wall® Panels go to **FABRICATION FACILITIES** strategically placed **throughout India.**

The fabrication facility is where the:

- **Design | Bid | Build** process begins.
- Panels are precision cut and
- MEP lines are mapped to plan.

Then the **panels are palletized and SHIPPED TO JOB SITES throughout India.**



1

Timber bamboo is cultivated, **HARVESTED**, cured, and split into usable slats.



2

1

Timber bamboo slats go to be **ENGINEERED** into Prime Wall® panels.

Extend to the Arabian Sea & Southeast Asia market.

4

2

