Research • Collaboration • Innovation

2015-2017 MANUFACTURE STUDY FOR CROSS LAMINATED TIMBER ACCELERATION IN OREGON & SW WASHINGTON

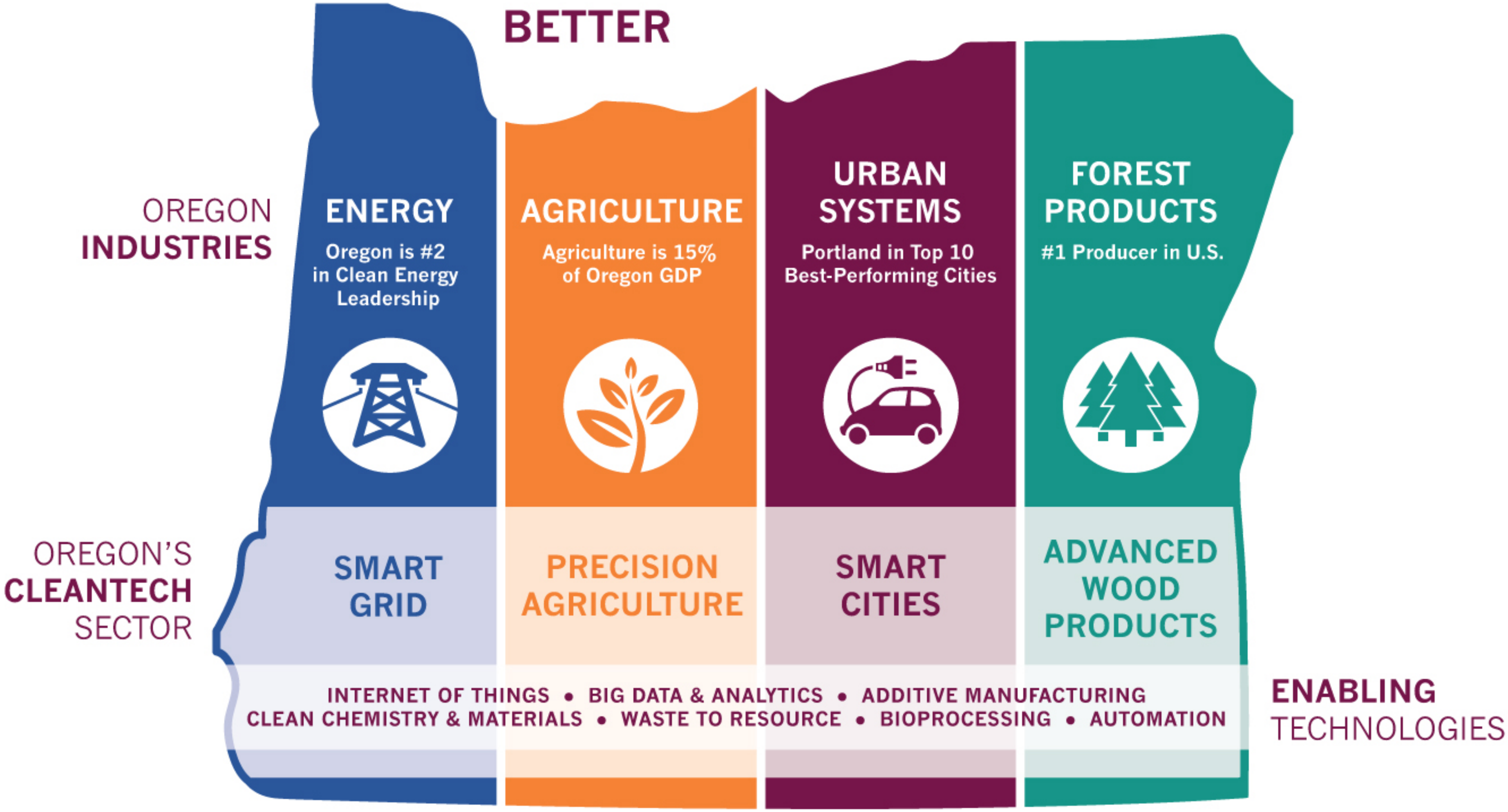
Pacific NorthWest Economic Region

Portland, OR July 24, 2017

David Kenney
President & Executive Director

OREGON BEST

CLEANTECH MAKES OREGON INDUSTRIES **BETTER**



SOURCES: Oregon Forest Resources Institute; Oregon Business Plan; CleanEdge "2015 US Clean Tech Leadership Index"; Milken Institute, "2015 Best-Performing Cities"

Photo Courtesy of: Business Oregon

2015-2017 MANUFACTURE STUDY FOR CROSS LAMINATED TIMBER ACCELERATION IN OREGON & SW WASHINGTON

$120,885 FEDERAL SHARE EDA FUNDS

$82,606 NON-FEDERAL MATCHING SHARE

MANUFACTURE STUDY FOR CROSS-LAMINATED TIMBER ACCELERATION IN OREGON & SW WASHINGTON, 2015-2017

MARKET SIZING

NATURAL RESOURCE CAPACITY

CAPABLE PRODUCERS

ECONOMIC IMPACT

BARRIERS TO MARKET

THE PATH FORWARD

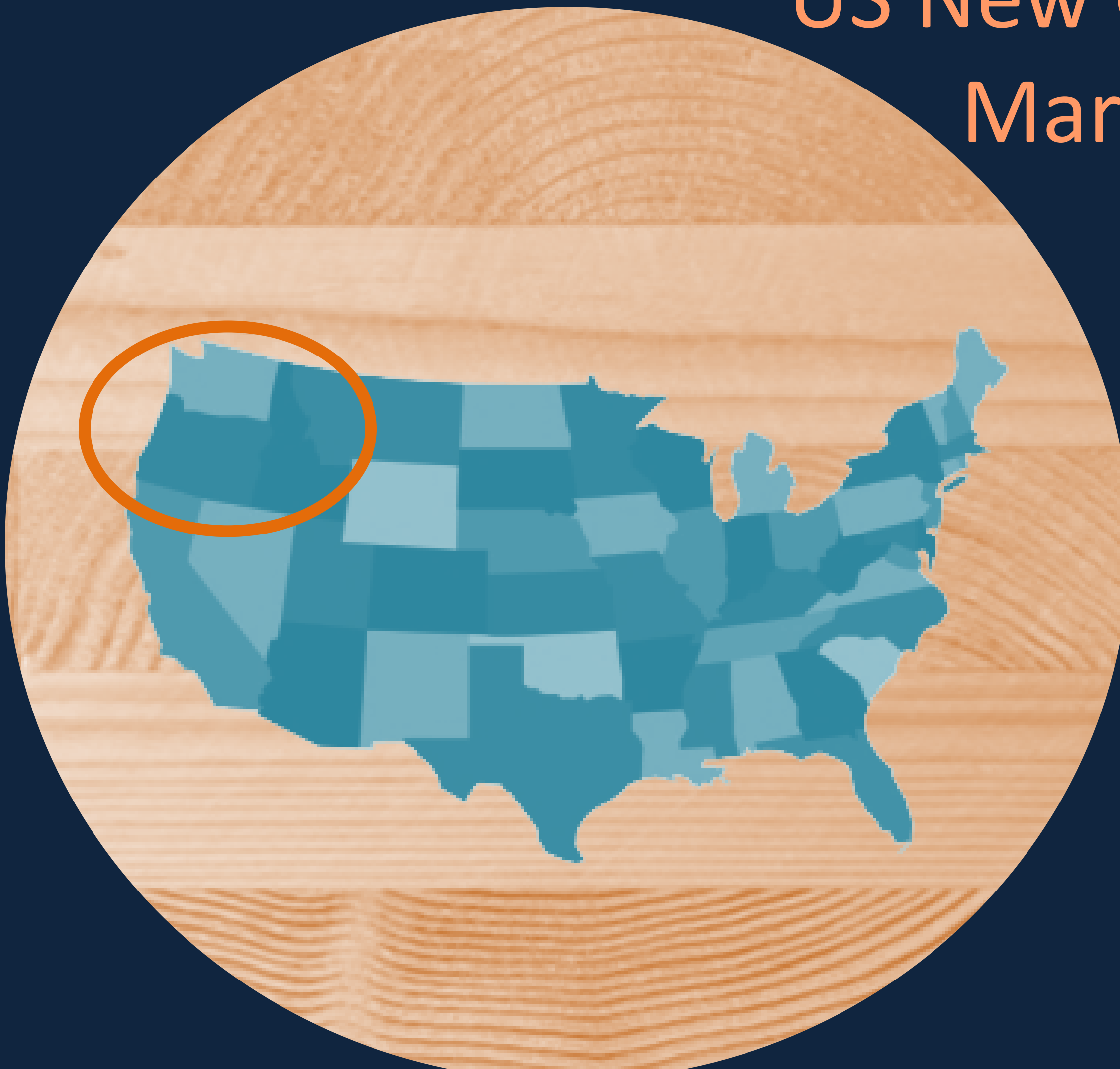
FEASIBILITY STUDY OBJECTIVES:

- Accelerate global competitiveness
- Support environmentally sustainable development
- Provide relief and support to economically distressed and underserved communities

Overarching Question...

Will an increased demand challenge the sustainability of the forests?

NATURAL RESOURCE CAPACITY



US New Construction Market Opportunity ~6.1bbf

Annual Demand

Provided by:

FPInnovations

US Market Estimation, 2016

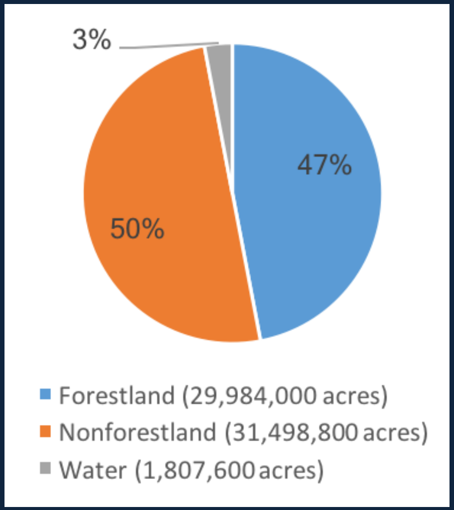
MARKET SIZING

OREGON BEST

Regional Supply

Oregon & SW Washington has tremendous production potential

Approximately 60 million acres in Oregon alone!



Oregon Land Base, OFRI

- 47% is identified as forestland
- ~80% of that classified as “timberland” or “land capable of productively growing commercial grade timber”
- The timberland designation does not include forestland with lower forest productivity or regions where production is restricted (wilderness areas, national parks, or other reserved areas
- Significant potential for commercial forest production and activity.

NATURAL RESOURCE CAPACITY

Import Substitution

- Raw materials to remain in region as demand increases
- Long Term Potential Impact: pricing changes
- Near Term Potential Impact: production demands likely to have limited impact on broader market pricing

Supply Chain Gap Statement

- Abundant dimensional material to support additional production enterprises regionally,
- Kiln dry softwood lumber is standard lumber that has been dried (typically 15% moisture content) in kilns
  - 12% ± 3% moisture content for CLT production Oregon: 21/69 mills in the region produce kiln dry lumber
  - Assumption: 60/40 No. 2 grades and No. 3 grades of KD lumber used for CLT
  - 1.625 bbf of No. 2 and No. 3 grade processed in Oregon

NATURAL RESOURCE CAPACITY

OREGON BEST


CONVENING PARTNERSHIPS TO IMPROVE PREDICTABILITY & REDUCE RISK

Pacific Northwest Manufacturing Partnership

Oregon Forest Resources Institute

Oregon Department of Forestry

Sustainable Northwest

Clackamas County

TALLWOOD DESIGN INSTITUTE

Oregon State University

THE PATH FORWARD

MANUFACTURE STUDY FOR CROSS-LAMINATED TIMBER ACCELERATION IN OREGON & SW WASHINGTON, 2015-2017

MARKET SIZING

NATURAL RESOURCE CAPACITY

CAPABLE PRODUCERS

ECONOMIC IMPACT

BARRIERS TO MARKET

THE PATH FORWARD

OREGON BEST

ADVANCED WOOD PRODUCT MANUFACTURING STUDY FOR CROSS-LAMINATED TIMBER ACCELERATION IN OREGON & SW WASHINGTON, 2015-2017

Pacific Northwest Manufacturing Partnership

David Kenney, Executive Director/CEO
Johanna Brickman, Director of Collaborative Innovation
Tricia Clemans, Special-Projects Manager
Karl Mundorff, (former) Director of Research Programs

Lech Muszynski, Wood Science & Engineering Professor
John Turner, (Former) Advantage Accelerator Co-Director
Chris Knowles, Faculty Advisor
Amanda Terhes, C2C Director
Brent Lawrence, Graduate Research Assistant
Christina Lawrence, Graduate Research Assistant
Trent Thompson, Undergraduate Research Assistant

David McFeeters-Krone, OMEP Affiliate/Consultant

Michael Ebinger, Director, WSU Center for Innovation
Nick Pangares, Intern

Rick Gruen, Forest & Ag Economic Development Manager

Ethan Martin, Northwest Regional Director

Donna Greene-Salter, Strategic Initiatives Project Manager
Karen Goddin, Asst. Director Economic Strategies
Chris Claflin, Business Development Manager
Michael Meyers, Economist
Marc Zolton, Research & Policy Analyst
Dana Shannon, Global Trade Specialist

John Tokarcyk, Policy Analyst Forest Resources

Tom Nelson, Economic Development Manager

Anne Fifield, Economic Development Planner

... Plus several other supportive staff from these organizations

Additional Materials

SUMMARY STATISTICS FOR KILN DRY LUMBER PRODUCERS IN OREGON AND SW WASHINGTON THAT SHARED PRODUCTION FIGURES

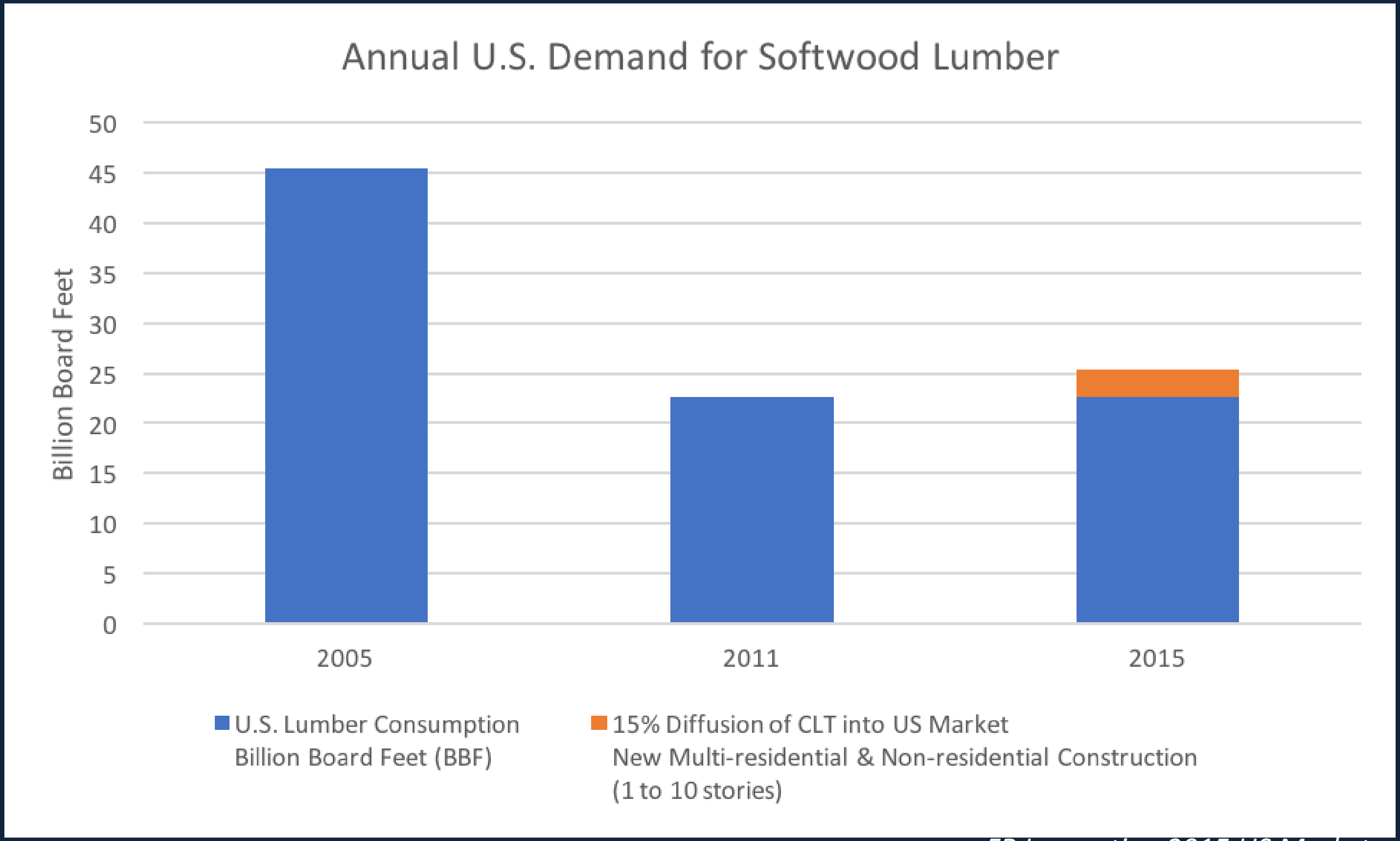
	total board feet	average board feet	proportion
annual KD lumber production	2,574,671,232	135,509,012	
#2 or equivalent	1,392,950,522	73,313,185	54%
#3 or equivalent	242,008,845	12,737,308	9%
Douglas Fir	1,624,882,996		63.1%
Hemlock Fir	615,153,236		23.9%
White Fir	166,822,500		6.5%
Western Hemlock	89,537,500		3.5%
Ponderosa Pine	64,500,000		2.5%
Sitka Spruce	13,775,000		0.5%

NATURAL RESOURCE CAPACITY

Oregon State University OSU

OREGON BEST

MANUFACTURE STUDY FOR CROSS-LAMINATED TIMBER ACCELERATION IN OREGON & SW WASHINGTON, 2015-2017



FP Innovation 2015 US Market

NATURAL RESOURCE CAPACITY

OREGON BEST

WHAT BARRIERS EXIST FOR GETTING PRODUCT TO MARKET?

Product Demand	More projects, less hurdles to meet code – prescriptive language, tested assemblies & connections
Manufacturing	Cost efficiency, capacity, CLT design & utilization
Distribution	Transportation logistics, export strategy
Raw Material	Combine species, 12% moisture content (versus 15-18% for commodity, certainty of sale), small diameter sources – efficiency, access to federal/state timber
Education & Workforce Training	Manufacturers, transportation/distribution, forestry, lending institutions & Insurances, permitting projects, construction: General contractors, sub-contractors, framers, and erectors
Prescriptive Projects & Language	Assemblies and connections tested then made publicly available, more projects!
Testing	Seismic and fire safety, hybrid systems, exposure, mass timber connections & assemblies
Infrastructure	Production facilities

BARRIERS TO MARKET

TARGET EDUCATION PLAN: TARGET SECTORS

Supply Side

Short Term Needs

Manufacturer education
Distribution

Long Term Needs

Forestry management
Manufacturing efficiencies
Distribution systems

Demand Side

Short Term Needs

Permitting projects
Project design assistance
Construction/subcontractors

Long Term Needs

Managed, long-term education plan
Timber Innovation Act
Prescriptive projects & language
Testing of assembly systems
Shared knowledge

BARRIERS TO MARKET

HIGHLIGHTS…

Manufacturing

- Demand exceeds the Oregon capability to supply panels to even local building projects
- If potential producers see the demand, there is interest in entering production market
- Foreign partnership & investing possibilities

Natural Resources & Lumber Production

- 92% of raw material supply comes from private ownership
- Concern: Need federal timber to support nearing demand - private forest owners are nearing sustainable harvest levels
- Increased demand for CLT expected to absorb timber export, bring value add to lumber and logs harvested in Oregon

More Building Projects

- Construction labor /skill training & demonstrations needed
- Need for regular structural testing updates to design teams & building officials
- Suite of common CLT assemblies/connections tested – make public

THE PATH FORWARD

Economic Development

- Impacts of tax revenue, jobs (PNW & US), employer benefits
- Expected demand for CLT will translate to the rural communities
- Attract federal funding to support investment & strategic efforts

Continue Momentum

- Legislator support for follow-on projects & initiatives
- Testing for structural assemblies (fire, seismic, acoustic)
- Local sourcing, local labor policies

WHAT'S NEEDED?

THE PATH FORWARD

Innovation

Design/efficiencies (CNC), handling, kit designs, fasteners/connections, weather/shipping protection, on site services, auxiliary products

Incentives to Build

- Provide streamlined permitting for buildings using Oregon CLT
- Permitting costs waived or reduced for structures using CLT
- CLT Design Contests or programs to assist with testing, permits, challenges
- Carbon cap & trade system – purchase offsets from projects
- Funding support for creating a suite of tested assemblies/connections

Induce Investment in Manufacturing

- Seek foreign or out-of-state partnerships
- Equipment/facility/capital investment support (grants, loans, manufacturing support)
- Grants or subsidies for equipment (or assistance into federal programs, including R&D tax credit)
- Loan guarantees for equipment
- Creating a protected purchasing program (or guaranteed cost savings subsidy) for government buildings built with Oregon mass timber.

Policies & Initiatives

- Jurisdictions adopt: Carbon First Approach, net zero, or push for carbon neutral
- Carbon credit system (cap & trade)
- Sector or building type "Wood first" policies (ie. schools, hospitals, public facilities)
- Local sourcing, local labor policies
- Create lobbying task force

CROSS-LAMINATED TIMBER ACCELERATION IN OREGON & SW WASHINGTON, 2017-2019

- RAW MATERIAL SUPPLY
- DISTRIBUTION
- BUILD CAPACITY & EFFICIENCY
- ECONOMIC IMPACT
- PRESCRIPTIVE LANGUAGE
- OTHER BUILDING TYPES

GOING FORWARD:

- R&D to target under utilized species, lower grade, and/or small diameter timbers in CLT production
- Domestic & export distribution strategy for Oregon produced CLT
- Increase manufacturing capacities, efficiencies, and capabilities
- Continue to measure/track the economic impact
- Accelerate the prescriptive language for building with CLT/mass timber
- Get outside of the 4-8 story target market and push for cost-competitive designs for other building types