

The background of the slide is a close-up photograph of a wooden surface, likely a table or desk, showing a prominent wood grain pattern. The wood is light-colored with dark, wavy lines. A solid blue horizontal bar is positioned at the top of the image, containing the title text in white.

# Biomass and Our Low-Carbon Future

**Marcus Kauffman**

**ODF Biomass Resource Specialist**

**Forest Biomass and the Bioeconomy, Vancouver WA**

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# Forests and carbon

- Forests, woodlands and harvested wood products represent the largest carbon sink in the US
- Collectively, these forests offset more than 11% of annual emissions in the US.
- Using forests as a climate mitigation strategy means doing more than the current baseline.



Forests and the low-carbon economy:  
the transition is underway.

Low-carbon products: biochar,  
torrefied wood, bio-jet and mass  
timber

Old reality: renewable energy  
concerns: peak oil, energy independence



New reality: low-carbon energy  
concerns: climate change, GHGs



Wood...  
is both renewable and low-carbon



# Forest residuals



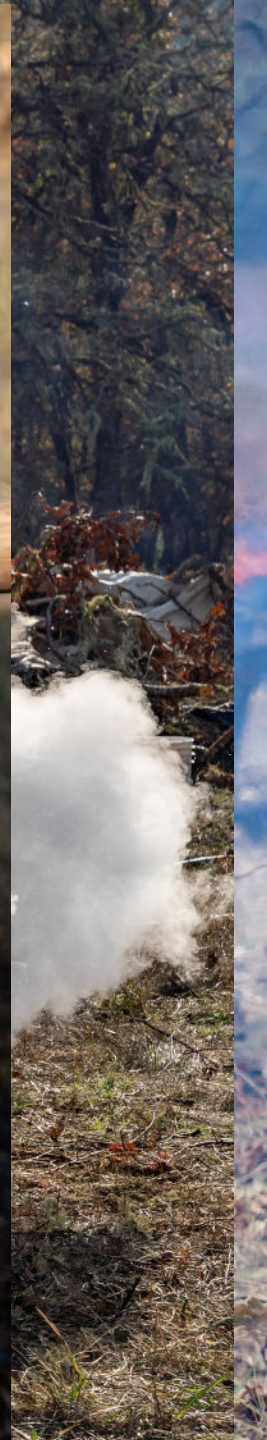
# Low-Carbon Products

- Biochar
- Export white wood pellets and torrefied wood
- Bio-jet
- Mass timber construction





Biochar  
product



# ROI Carbonator 500



# Integrated Biomass Resources

## Wallowa, Oregon



# IBR Basics

- 28 employees currently
- Integrated operation using forest restoration by-products
  - Bundled firewood
  - Post and poles
  - Pulp and paper chips
  - Short saw logs
  - Soil amendment with biochar (coming soon)

# Export Pellets and Torrefied Wood



# European Export Pellets

- Europe's carbon policies drive US demand
  - 32 wood pellet plants operating in US SE
  - 9.4 mil tons capacity
  - Co-fire with coal and 100% biomass use

Manufacturing facilities with capacity and status, July 2018

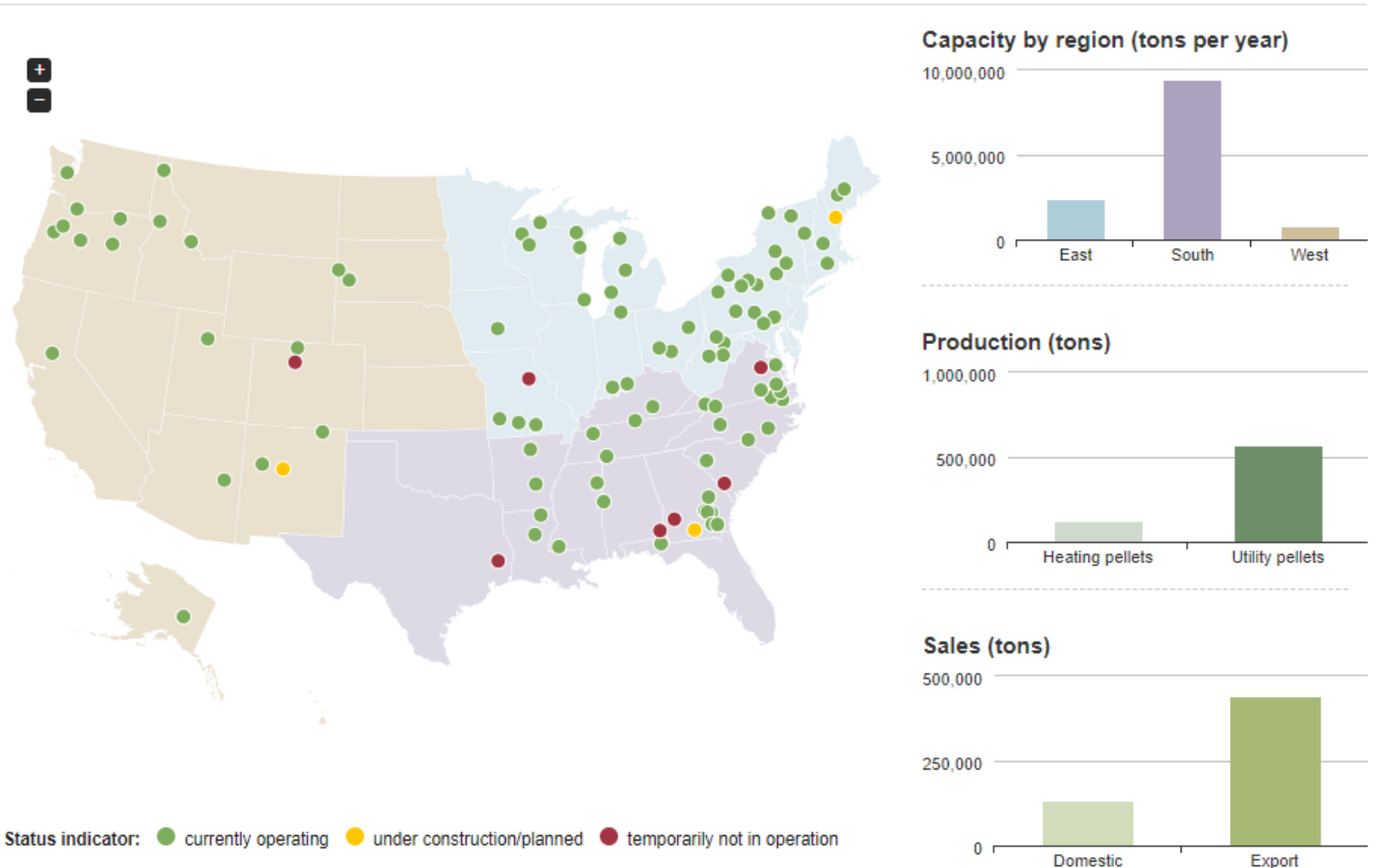
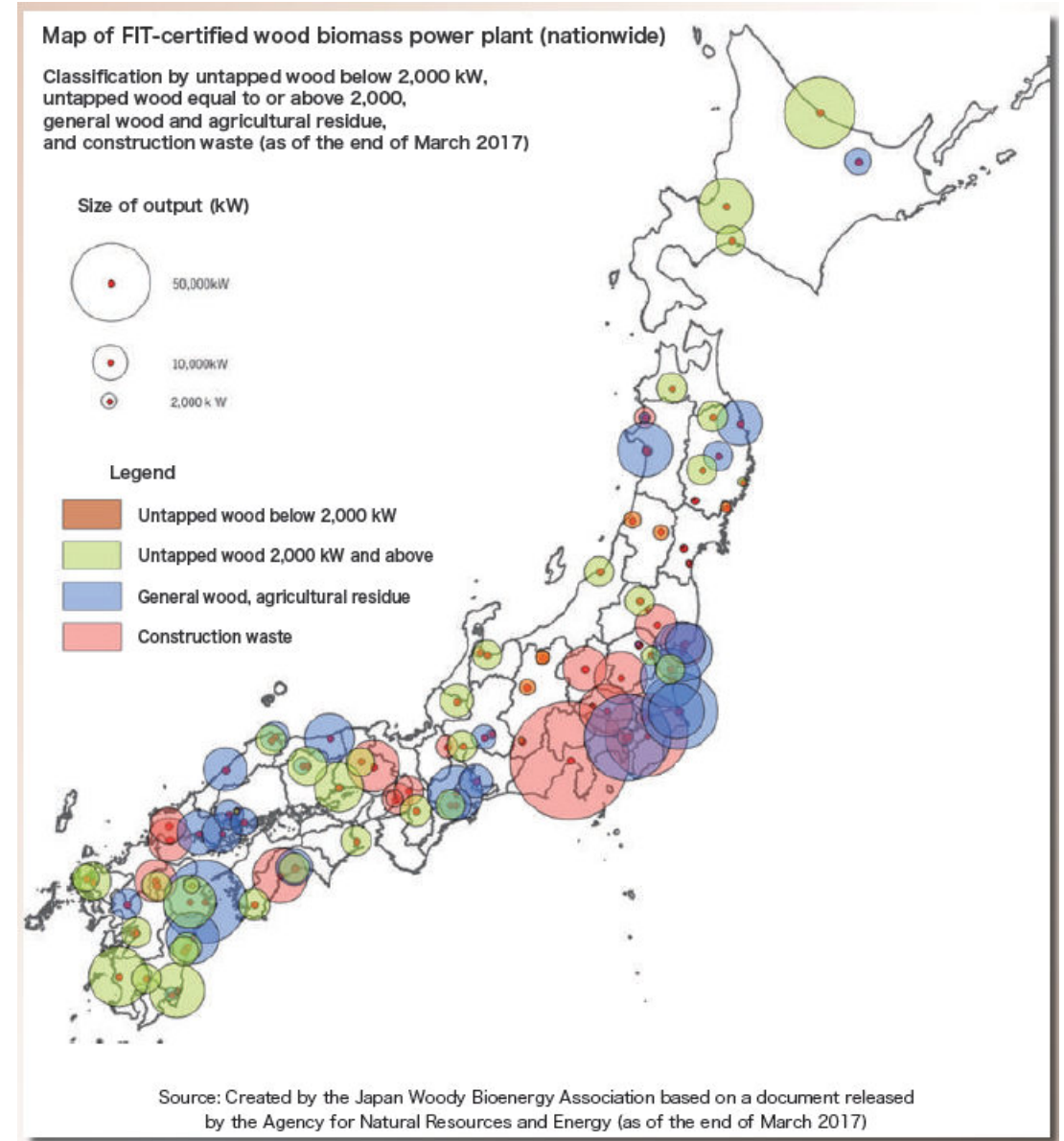


Table 1. Densified biomass fuel manufacturing facilities in the United States by state, region, and capacity, July 2018

# Asian carbon policies

- Japan
  - Feed in Tariff policy
  - 3.2 GW of biomass-fired capacity approved
  - 500+ MW already commissioned
  - Canada is largest pellet supplier
  - Wood faces competition from palm kernel shells (PKS)
- South Korea
  - RPS requires utilities to increase renewables
  - Consuming 1.5 to 2 mil tons of wood pellets/year
  - Vietnam is largest supplier
  - Wood faces competition from palm kernel shells (PKS)



Oregon  
Torrefaction  
co-locating at  
Malheur  
Lumber Co. in  
John Day





# Restoration Fuels, LLC

- Subsidiary of US Endowment for Forestry & Communities
- Approx. \$15.5 mil build
- 18-20 employees
- Construction has begun
- 100,000 tons finished product
- 150,000 green tons forest biomass
- Co-fire with coal
- Customers in Japan & So. Korea



# Export pellets



# Redrock Biofuels



# Redrock Biofuels

- 12.5 mil gallons of bio-jet
- Renewable diesel and naphtha
- \$200+ mil 2-yr build
- Sales to FedEx and Southwest Airlines
- 155,000 BDT forest biomass residues
- EPA Renewable Identification Number
- Oregon Low Carbon Fuel Standard
- Sales in to California



# Mass Timber



# Manufacturing

- Softwood lumber consumed for North American mass timber during 2018 equates to **less than one half of one percent** of the 2017 North American softwood lumber production.
- North American Mass Timber Panel manufacturing capacity grew **1000% from 2010 to 2020**, and continues to expand rapidly. This equates to the addition of a new production facility almost every year.



# Projects

- In 2018, approximately **70 mass timber buildings** were constructed in the United States, representing **2.8 million square feet of space**.
- At the rate of completed projects, sales projections are expect could **double year over year**.

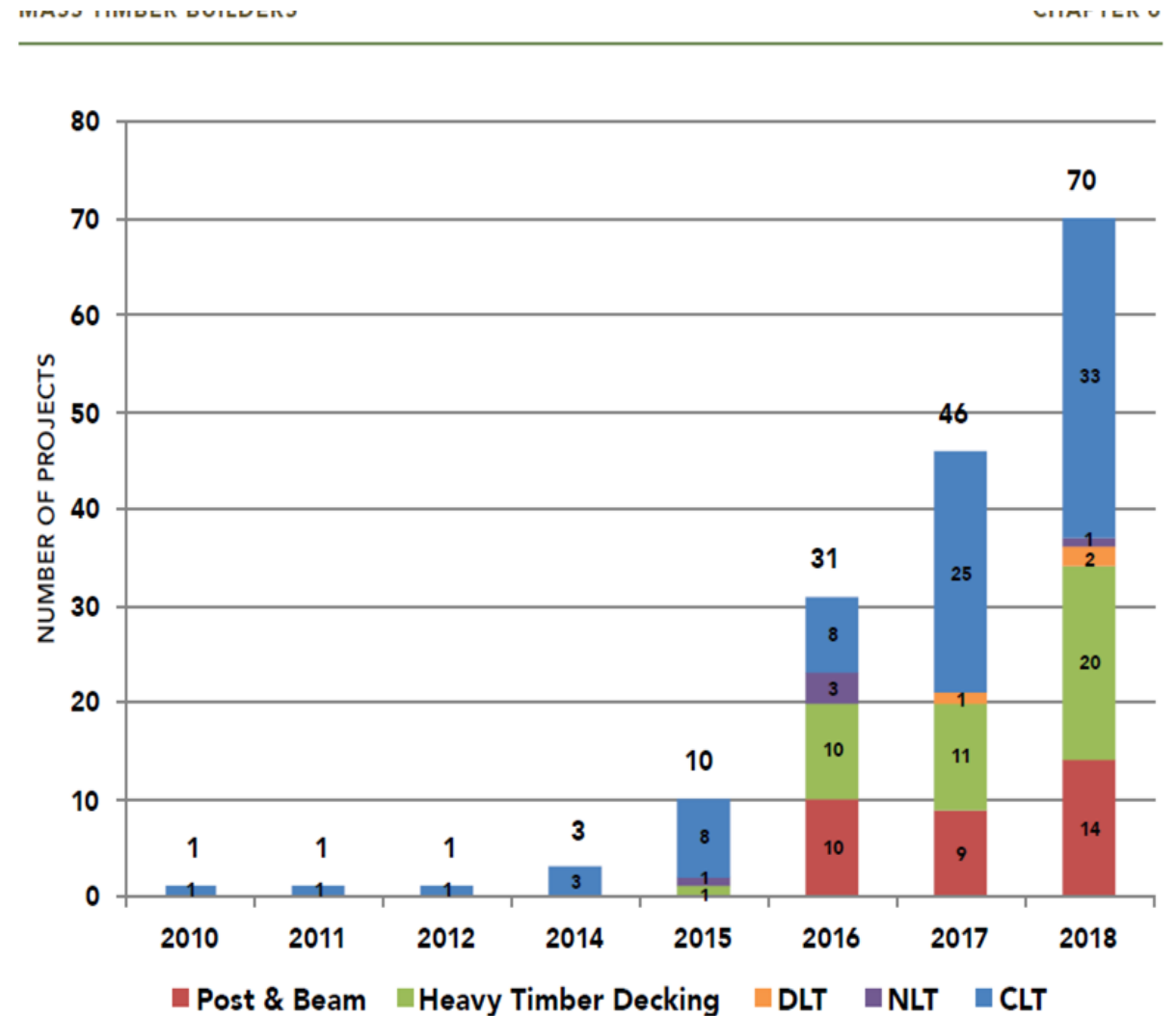


FIGURE 6.7: UNITED STATES PROJECTS BY PRIMARY MASS TIMBER MATERIAL









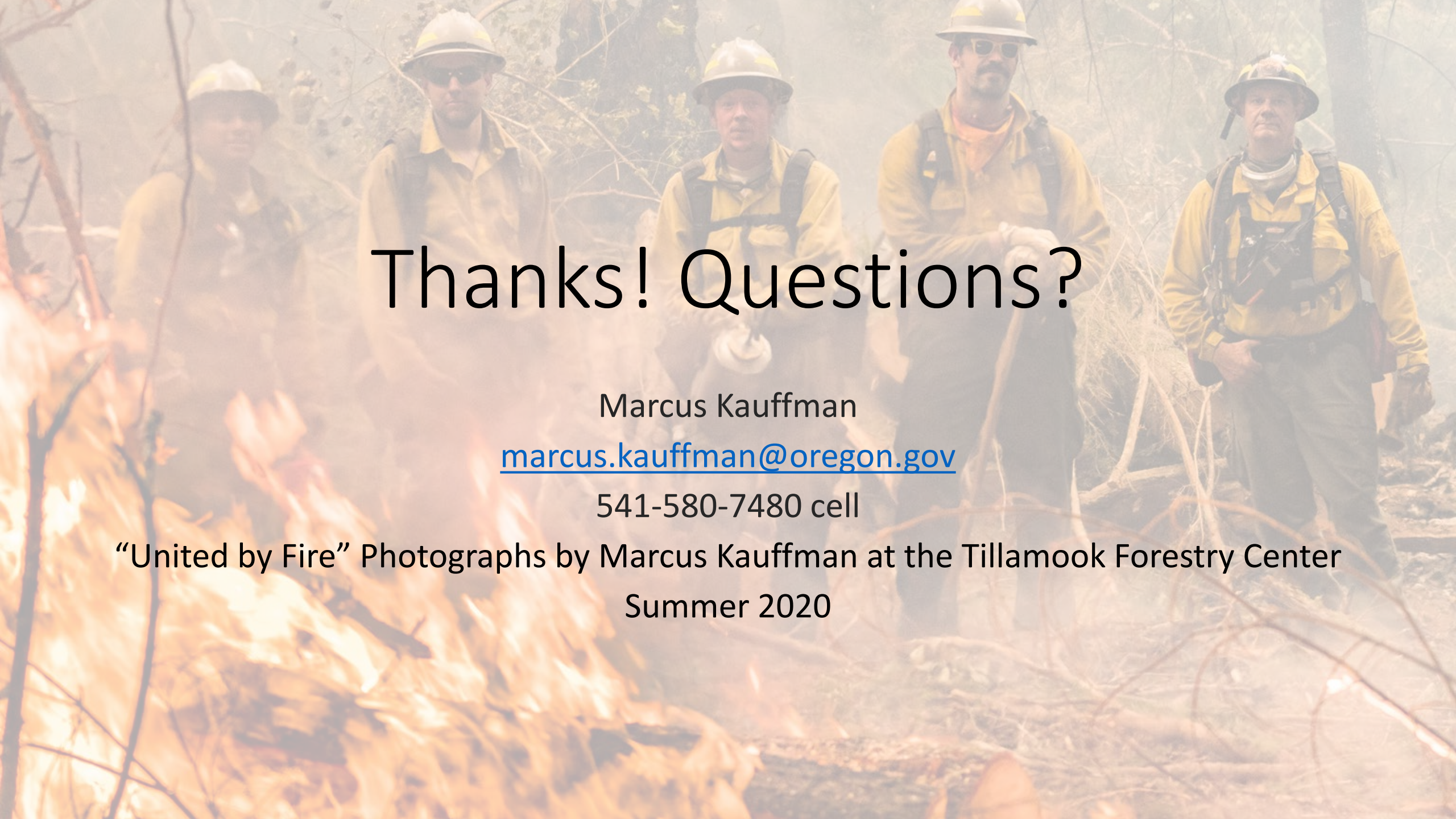




# The next breakthrough?

- Small diameter ponderosa pine panel
- Testing at Tall Wood Design Institute in Corvallis
- Mass timber could support forest restoration



A photograph of five firefighters in yellow gear and hard hats standing in a smoky forest. In the foreground, there is a large fire burning brightly. The firefighters are looking towards the camera.

# Thanks! Questions?

Marcus Kauffman

[marcus.kauffman@oregon.gov](mailto:marcus.kauffman@oregon.gov)

541-580-7480 cell

“United by Fire” Photographs by Marcus Kauffman at the Tillamook Forestry Center  
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