World Bamboo Congress
Bamboo Fiber for Industry

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Presenter:
David Knight
Co-Founder, President/CEO
Resource Fiber –
The Only U.S. Integrated Bamboo Fiber Company

Bamboo and its unique material properties are significantly underutilized in large-scale industrial applications.

Resource Fiber is:

- manufacturing high performance bamboo products;
- growing a sustainable bamboo forest in Alabama to support its bamboo product strategies; and
- selling bamboo fiber to other industrial users.
Recognized Industry Leaders

100+ years experience in bamboo industry

David Knight, CBI
Co-Founder, Investor
President/CEO
Co-Founder, Teragren Bamboo

Ann Knight
Co-Founder, Investor
CCO/EVP
Co-Founder, Teragren Bamboo

Marsha Folsom
Co-Founder, Investor
Chief Development Officer
Former First Lady, Alabama

Mary Valenta, DBA, CPA
Financial Expert, Investor
Principal, On The Green
Former CFO, O'Neal Steel

Lee Slaven
Investor
COO, Manufacturing
Former R&D Director, Teragren

Roger Lewis
COO, Agriculture
Investor
Principal, Lewis Bamboo

Scott Bryant
Land Asset Manager
Investor
Principal, Cyprus Partners
Recognized Industry Professionals Lead Resource Fiber

Co-founders David and Ann Knight established Teragren Bamboo in 1998 with an emphasis on environmentally and socially responsible practices.

- 1 million SF manufacturing facility in China
- Grew revenue 30% to 40% annually for over 10 years
- Rated #1 in Consumer Reports multiple years running
- Teragren serviced over 4,000 flooring stores in North America
Notable Teragren Installations

Notable Installations
A curated selection of commercial and public projects that use Teragren products

1. **Rio Piedras Apartment Building**
   - Location: San Pedro Sula, Honduras
   - Signature: Natural Bamboo Flooring and Vertical Grain Cerealized Panels

2. **U.S. Environmental Protection Agency**
   - Location: Denver, CO
   - Signature: Natural Bamboo Flooring and Vertical Grain Cerealized Panels

3. **Chicago Museum of Science & Industry**
   - Location: Chicago, IL
   - Signature: Strand Bamboo Solid Strip Flooring

4. **U.S. Department of Energy Solar Decathlon**
   - Location: Washington DC
   - Signature: Engineered Bamboo Panels and specialty developed Open Weave Bamboo Jutis

5. **West Coast Green Harbinger House**
   - Location: San Jose, CA
   - Signature: Color-Bamboo Flooring

6. **Yale University's Green Building Project**
   - Location: New Haven, CT
   - Signature: Strand Bamboo Solid Strip Flooring

7. **Butter Hotel**
   - Location: Nashville, TN
   - Signature: Strand Bamboo Solid Strip Flooring and Strand Panels

8. **Amazon RE Search + Technology Center**
   - Location: Seattle, WA
   - Signature: Natural Bamboo Flooring Vertical Grain Natural Panels and Custom Star Pads
Why Create Sustainable Companies?

- Sustainability must balance:
  - responsible environmental management
  - social justice
  - wealth creation
    - corporate and local communities

The world needs it....
Global Population (billions)

- Already 40% over carrying capacity of earth
- Adding ~80 million people annually
- 2.4 billion MORE people in next 30 years

Global Middle Class

- Triple use of natural resources by 2050
- Fiber demand to continue pressure on native & old growth forests

Source: Brookings Institute (2017)
Carbon Emissions & Climate Change

- Atmospheric carbon – 409 PPM
- Hasn’t been this high in 800,000 years
- Ice melting, storms and droughts intensifying, oceans warming, sea levels rising
- Carbon footprint of middle class is 50% higher
- Average human uses 100 pounds of plastic each year

Source: NOAA (2018)
Bamboo and its unique material properties are significantly underutilized in large-scale industrial applications.

- Middle class are consumers
- Consumption behavior won’t drastically change
- Materials used in products must change

- Bamboo can make a big difference…. 
Why Bamboo?

Rapidly Renewable
- Yields 6X more fiber than trees
- Plants withstand extreme weather events

Sustainable
- Captures 5X more carbon than a like-sized wood forest
- Requires little water, no synthetic fertilizer or pesticides

Versatile
- Lightweight with the tensile strength of steel
- Superior mechanical properties
- Used in industrial products and integrated into plastics and carbon fiber
3-Pronged Market Approach

- Raw fiber
- Pressed products
- Bio-composites
Industry Problems

- Limited old growth wood fiber
- Toxins
- Carbon
- Waste

Bamboo Solutions

- Products properly engineered and manufactured replicate old growth wood fiber
- No creosote or toxic preservatives required
- Bamboo & its products can durably sequester carbon
- Bamboo fiber displaces petroleum-based fibers in plastics, carbon fiber & polymers
- No waste. Cradle-to-cradle manufacturing; also used in biocomposites
Resource Fiber In-Field Bamboo Nursery

- Located in Alabama
- 100 acre in-field nursery
- Largest commercial-scale bamboo nursery in U.S.
Bamboo Farms

- Resource Fiber-owned farms
- Preferred Farmer Program
  - U.S.
  - International
- Companion plants for soil nutrition
International Supply Relationships

- Developing pre-processing facilities globally to export bamboo mats to U.S.
- Goal to manufacture & sell bamboo products regionally
- Support local communities by developing local bamboo resources and creating jobs
- Help existing native bamboo forests become more productive
- Increase carbon sequestration through Resource Fiber’s managed bamboo forest initiative
Built to Scale

- Manufacturing process designed to replicate
- Replicate in U.S. & other countries
- Manufacturing located within bamboo regions
- Wide variety of products utilizing same manufacturing process
- Start with pre-processing facility for bamboo mat export, expand into finished products
Raw Bamboo Fiber

- Off-fall from manufacturing process
- Biomass bamboo farms in U.S.
- Bio-composites
  - Plastics
  - Carbon fiber
  - Polymer for additive manufacturing (3-D printing)
- Mechanical properties superior to hemp, jute & other plants
Additive Manufacturing (3-D Printing)

- World record for largest 3-D project
- Oak Ridge National Laboratory
- Utilized Resource Fiber bamboo fiber

- Printed Cobra (no bamboo)
- Future of manufacturing
Attracting Major Corporate Customers

- Large industrial customers
  - Four Berkshire Hathaway companies
  - Largest tall building form contractor in U.S.
  - Several railroads
  - Top tier furniture manufacturer
  - Others in U.S. transportation sector
Department of Energy Grant Funding for Bamboo Biocomposites

- Awarded $80,000
  - Research & Development

- Awarded $551,000
  - Transportation product
    - Light weighting
    - Reduction in supply chain energy use
  - Cradle-to-cradle
  - Competitively priced
Carbon Positive Strategy

Carbon Positive is the state at which an entity is removing/absorbing more GHG than it is emitting.

William McDonough, FAIA, William McDonough + Partners Architects
Co-creator of the Cradle-to-Cradle®
products program

Operate with 100% Renewable Energy
Develop Bamboo Carbon Offset Program
Monetize Bamboo Carbon Offsets
Summary

- **U.S. Demand**
  - Industrial demand increasing
  - Some companies require domestic U.S. supply
  - Sustainability increasingly important
  - Carbon offsets important
  - U.S. industries embracing bamboo now
    - Transportation
    - Construction
Thank you

David Knight
Co-Founder, President/CEO

dknight@resource-fiber.com