



VERTICALLY INTEGRATED VISION

We envision a world that ships on recycled plastic.

To realize our vision, we will:

- make superior and sustainable composite products that provide long term value to our customers
- drive a global transition toward the responsible use of plastic waste
- relentlessly improve our ability to extract value from the plastic waste stream



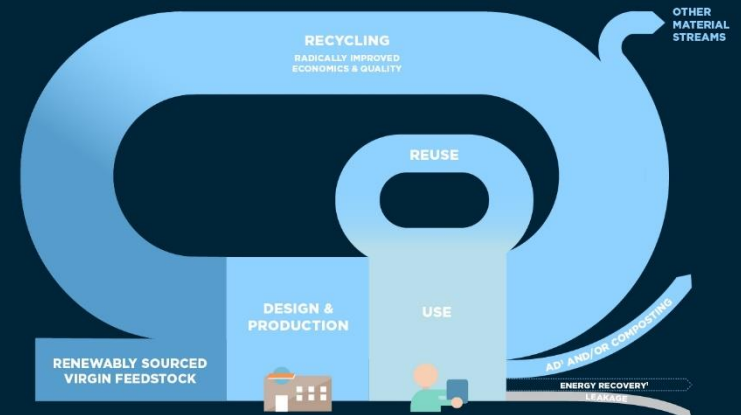
A GLOBAL EFFORT

NEW PLASTICS ECONOMY CATALYSING ACTION



THE NEW PLASTICS ECONOMY

1 CREATE AN EFFECTIVE AFTER-USE PLASTICS ECONOMY



3 DECOUPLE PLASTICS FROM FOSSIL FEEDSTOCKS

2 DRASTICALLY REDUCE THE LEAKAGE OF PLASTICS INTO NATURAL SYSTEMS & OTHER NEGATIVE EXTERNALITIES

WORLD ECONOMIC FORUM, ELLEN MACARTHUR FOUNDATION, MCKINSEY & COMPANY,
A NEW PLASTICS ECONOMY: REIMAGINING THE FUTURE OF PLASTICS (2016)
WWW.ELLENMACARTHURFOUNDATION.ORG/PUBLICATIONS

1 Anaerobic digestion
2 The role of, and boundary conditions for, energy recovery in the New Plastics Economy needs to be further investigated.
Source: Project Mainstream analysis

Tie Market Overview – North America

Ties Sold in North America (per Year)

20 ~ 25 Mio treated wood ties

1.5 ~ 2.5 Mio concrete ties

0.4 Mio steel ties - mostly for
industrial applications

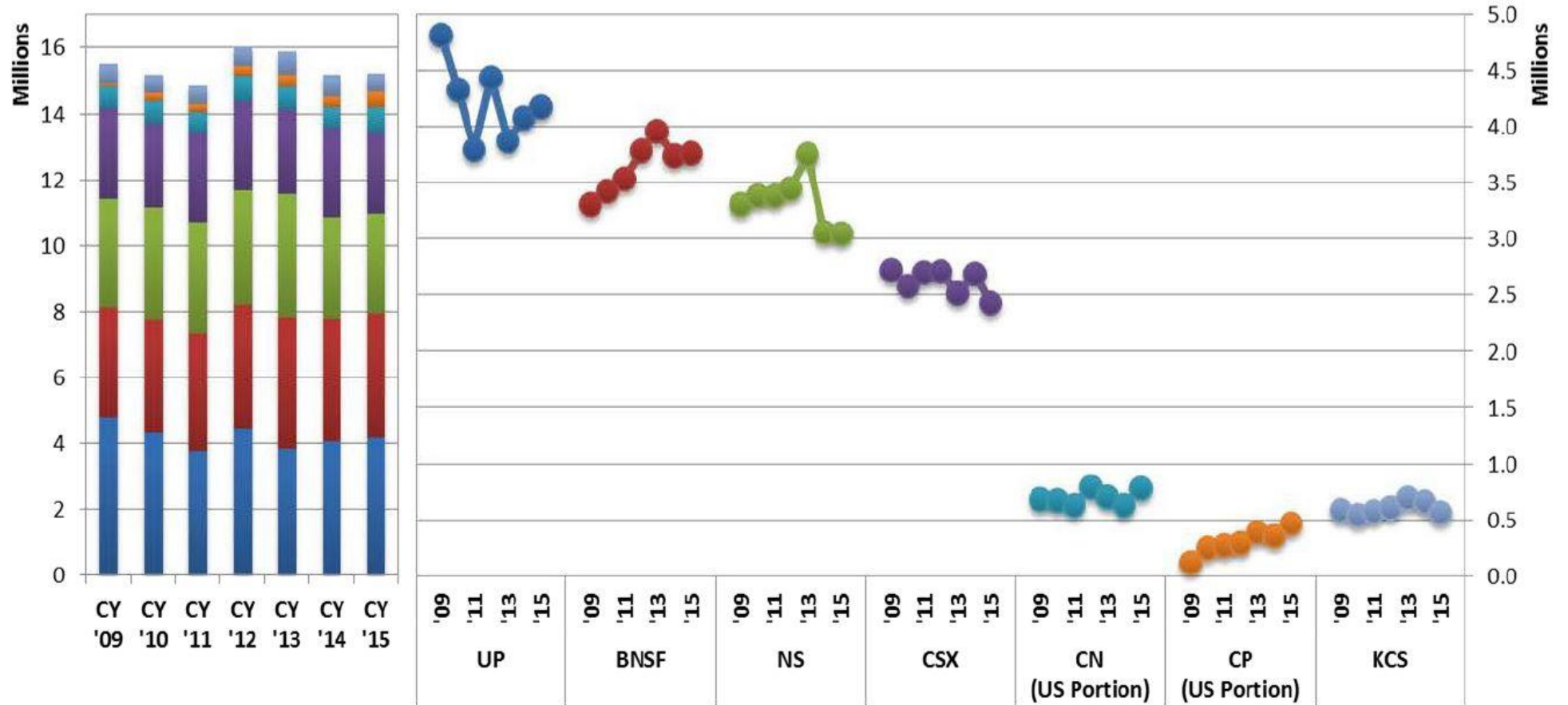
0.2 Mio composite ties (estimate)

Tie Purchases (thousands, annual basis)



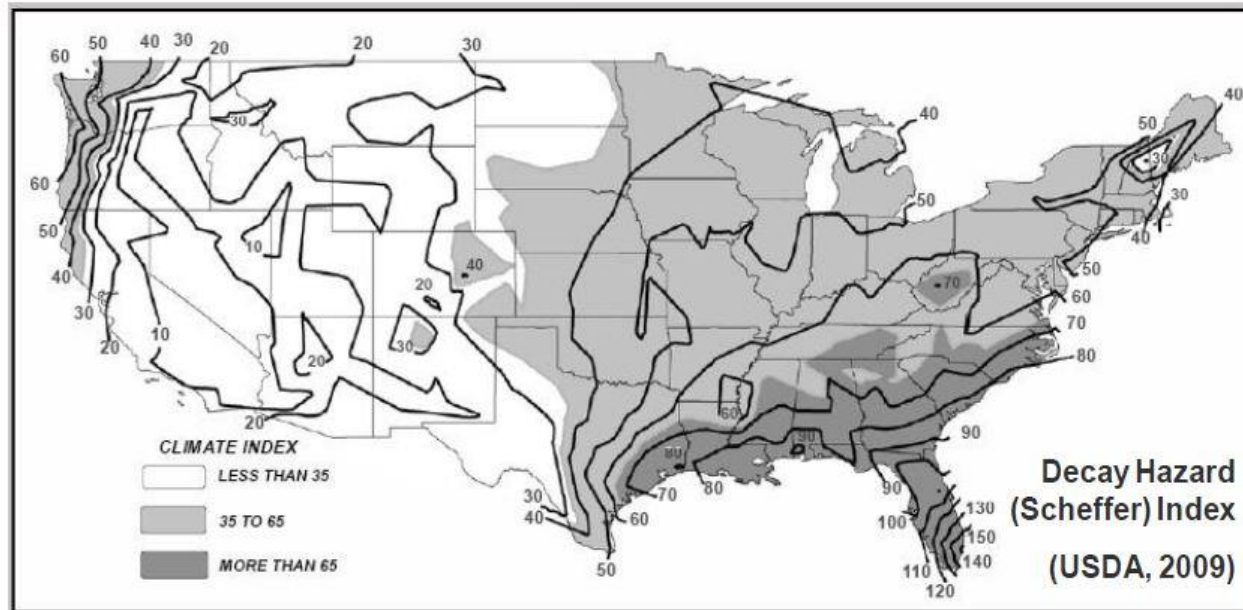
- The above chart shows historical trends for 12-months-rolling purchases of ties in North America. Source: Railway Tie Association (“RTA”)
- About 60% of the total ties are consumed by the US Class I railroads (see next slide).

Class I New Tie Installations by Railroad



South-east regional advantage

- Climatic and biological conditions in the southeast U.S. reduce service life of wood ties and significantly constrain end-of-life disposal. (Regulations preclude the transport of wood waste from termite infested areas.)
- Composite ties promise significant relative benefits in these areas.



Composite Ties

Advantages

- Composites can be engineered to closely match the in-track moduli of wood. This facilitates interspersing composites within existing wood tie infrastructure. (North American railroads typically replace only 25% to 35% of ties at any given time.)
- Longer service life in difficult climates and areas of soft sub-grade.
- Readily recyclable and environmentally friendly.

Challenges

- Competitive production costs.
- Securing consistent raw material supply is critical in achieving scale and delivering quality products.
- Overcoming poor quality history of composite ties.

Once market requirements are met, there is significant market potential for composite ties as a (partial) substitute product for wood ties

Market Requirement for Composite Ties

- Competitive pricing compared to wood ties. Customer feedback indicates that the market will only accept limited premiums (pricing less than \$80).
- Meet Modulus of Elasticity (MOE) and Modulus of Rupture (MOR) test requirements per AREMA Standards. These parameters measure elasticity and stiffness of ties.
- Meet “Spike/Screw Pullout Test” requirement defined by AREMA. This test measures the vertical strength of the fastening system.
- Consistent and homogeneous distribution of material with evenly distributed weight and density.
- Must meet rigorous handling, installation and durability of hard wood tie using the conventional equipment and processes.