Clean Fuels Development in the Southwest and Related Topics

Figure 2

RoundTable Agenda 24 June 2025

Discussion Topic:

What if Northern Arizona Became a Hub for Climate-Smart Industries

Introduction of the Discussion Leaders:
Bill Brandt, Jeffrey Jacobs, Edward Saltzberg, Geetesh Veeravalli

Short Round the Room Introductions

Name, Company, Where you sit in the value chain

AzCaNE | CENTER FOR AN ARIZONA CARBON-NEUTRAL ECONOMY

SHINe

In the spirit of co-opetition, the Industry Roundtable aims to build community and establish a shared understanding of challenges, opportunities, gaps, and needs for a commercially viable clean hydrogen economy in the Southwest and related means to achieve deep decarbonization

Figure 2

Round The Room Introductions

Name

Company

Where you sit in the value chain

AzCaNE | CENTER FOR AN ARIZONA CARBON-NEUTRAL ECONOMY

SHINe

In the spirit of co-opetition, the Industry Roundtable aims to build community and establish a shared understanding of challenges, opportunities, gaps, and needs for a commercially viable clean hydrogen economy in the Southwest and related means to achieve deep decarbonization

RoundTable Prompts

- What would it take for Northern Arizona to become a true hub for climate-smart industries?
- Where do you see the biggest opportunities—or risks—in building a biomass-based value chain at scale?
- What kinds of signals or commitments would help you (or your organization) take the next step toward engagement or investment?
- How can we ensure flexibility in technology pathways while still driving coordinated action?
- What types of data or tools would help you evaluate potential projects more effectively?
- Where do public-private partnerships add the most value—and what partnerships are still missing?

Figure 2

Discussion Topic

What if Northern Arizona Became a Hub for Climate-Smart Industries?

Bill Brandt, Jeffrey Jacobs, Edward Saltzberg, Geetesh Veeravalli

AzCaNE | CENTER FOR AN ARIZONA CARBON-NEUTRAL ECONOMY

SHINe

In the spirit of co-opetition, the Industry Roundtable aims to build community and establish a shared understanding of challenges, opportunities, gaps, and needs for a commercially viable clean hydrogen economy in the Southwest and related means to achieve deep decarbonization

ASU LightWorks
Arizona State University

4FRI “logging slash” to X

Expanding Forest Biomass Utilization in Northern Arizona

Project Overview

- Create a sustainable **unmerchantable biomass** market to mitigate the economic and social impacts of catastrophic wildfires in Northern Arizona.
- Support **collaboration** frameworks among public agencies, private sector partners, and community stakeholders to ensure the long-term **economic** viability of **unmerchantable biomass-based solutions** that contribute to safeguarding forest health.
- https://vimeo.com/1089171228?share=copy#t=0

Woody Biomass Comes in Many Forms

Whole logs

Small logs

Slash

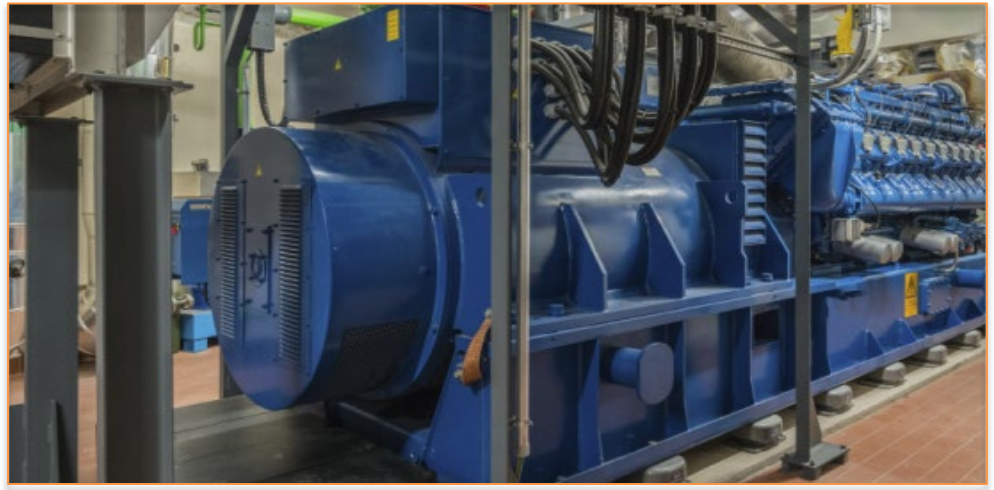
Wood chips

Cost per ton increases with decreased size and moisture content

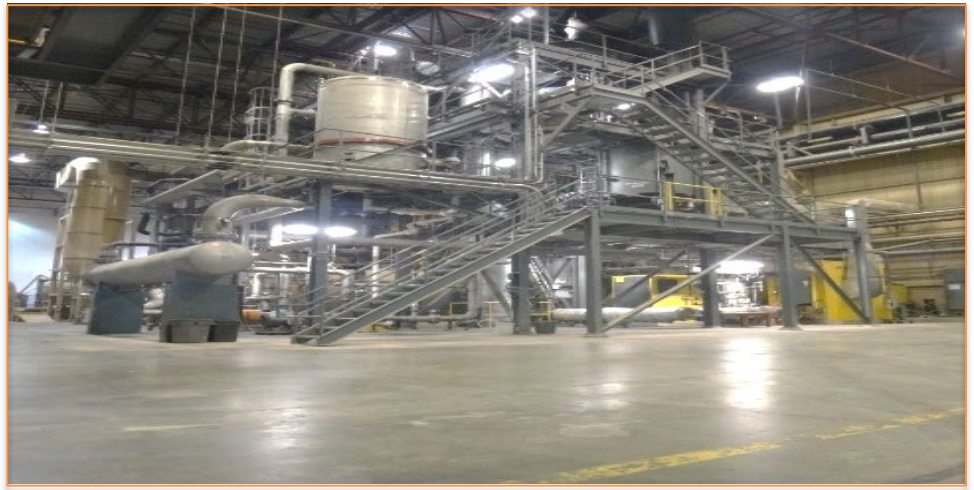
Successful Commercial Scale Conversion of Woody Biomass Relies Upon Thermal Energy

- There are Numerous Variations on this Theme
  - Feedstock size and moisture level?
  - High temperature v. low temperature process?
  - In the presence of oxygen, or no oxygen?
  - In the presence of chemical catalysts?
  - Rapid or slow conversion?
  - Water or air quench of intermediates?

Biomass Conversion Technologies



CHP



Fast Pyrolysis to Bio-oil

Slow Pyrolysis to Biochar

Advanced Gasification to Syngas

Conversion of Woody Biomass in the 4FRI Can Yield Valuable Products

- Carbon dioxide removal credits
- District-scale combined heat & power
- Biochar
- Renewable fuel oil
- Syngas
  - Renewable natural gas
  - e-methanol
  - SAF

Increased complexity & cost

These technologies are not "**science projects**" but proven at small scale

What they require is **reliable, affordable feedstock**

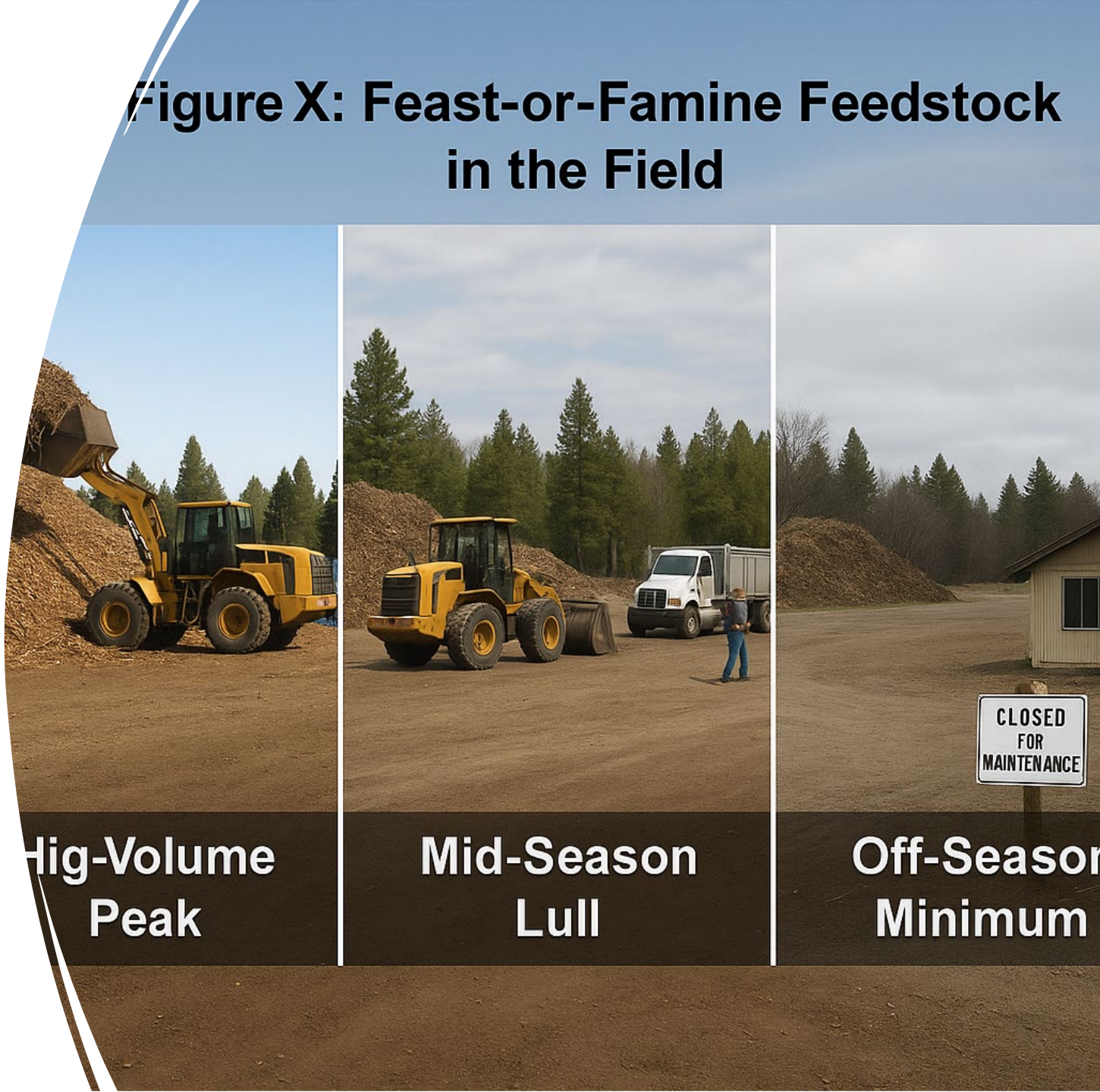
Absent that, project development stops – not because of the technology, but because breaks in the **supply chain**.

The Problem

- **Dense** slash piles of treetops, limbs, and bark after thinning.
- **Escalates** wildfire fuel loads and disposal costs.
- **Unutilized** biomass rots or burns—lost economic value & climate impacts.

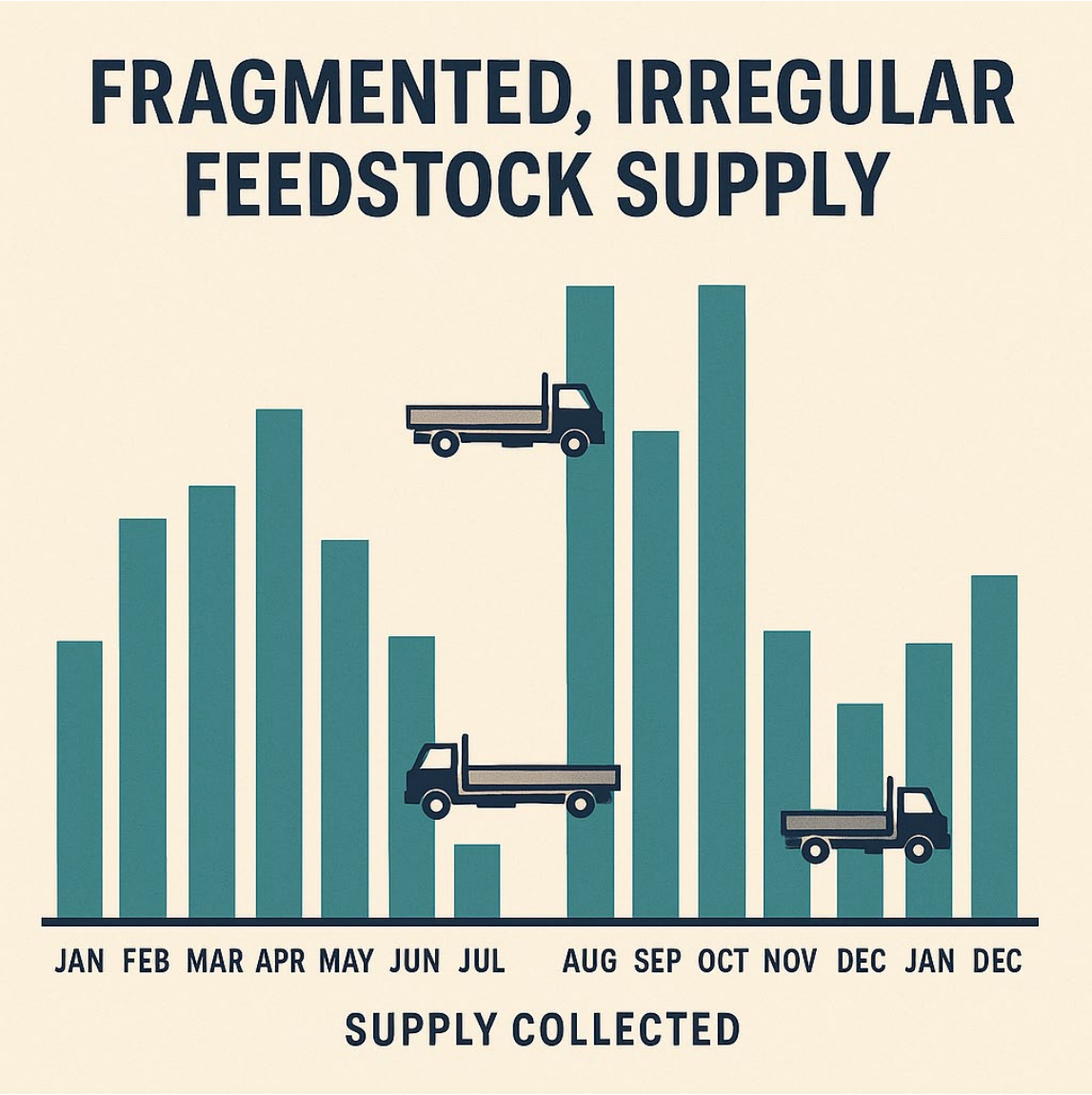
Why Stable Feedstock Matters

Irregular ‘feast-or-famine’ supply raises costs and stalls biomass investment.

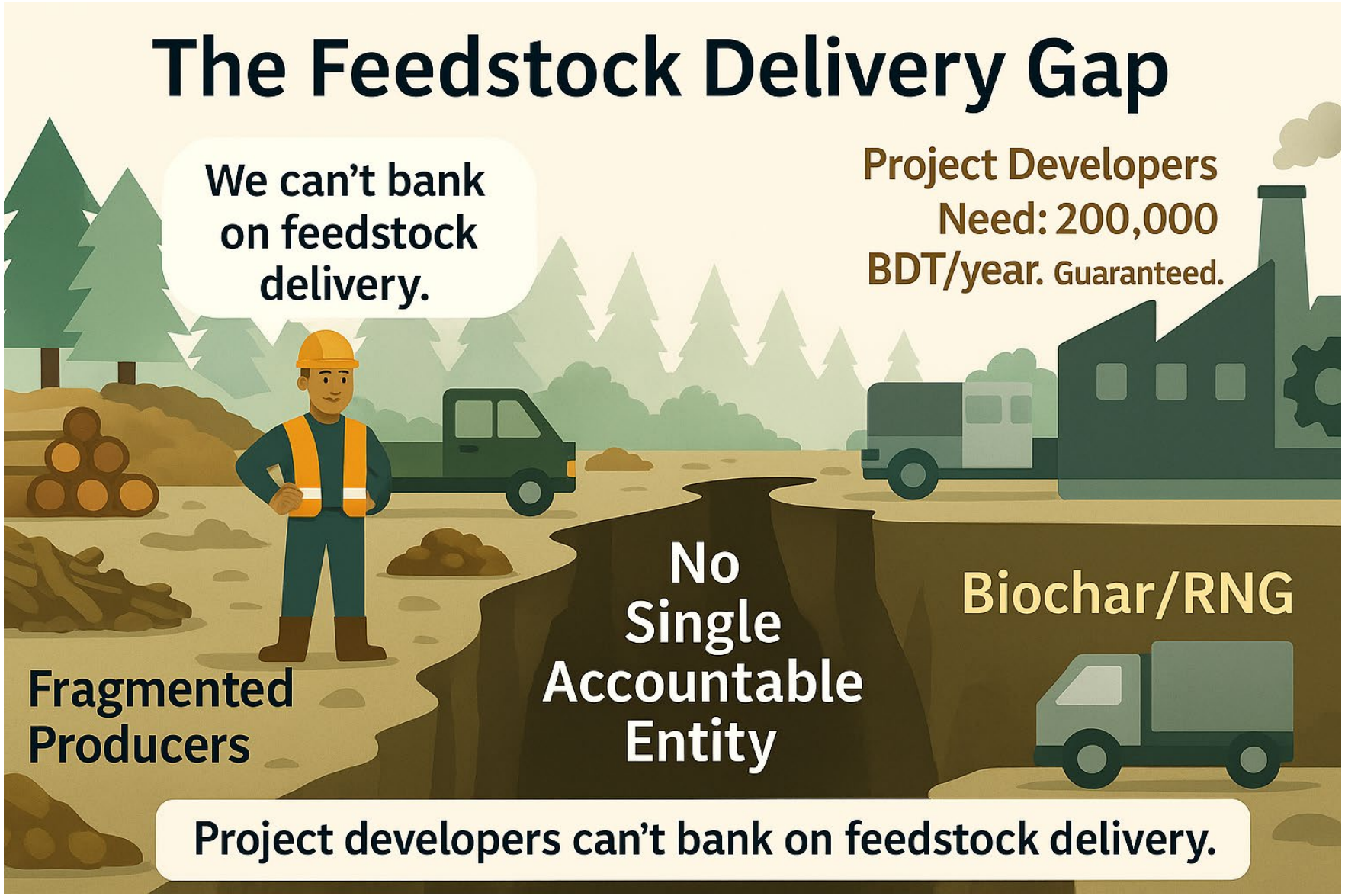


The Biomass Market Failure

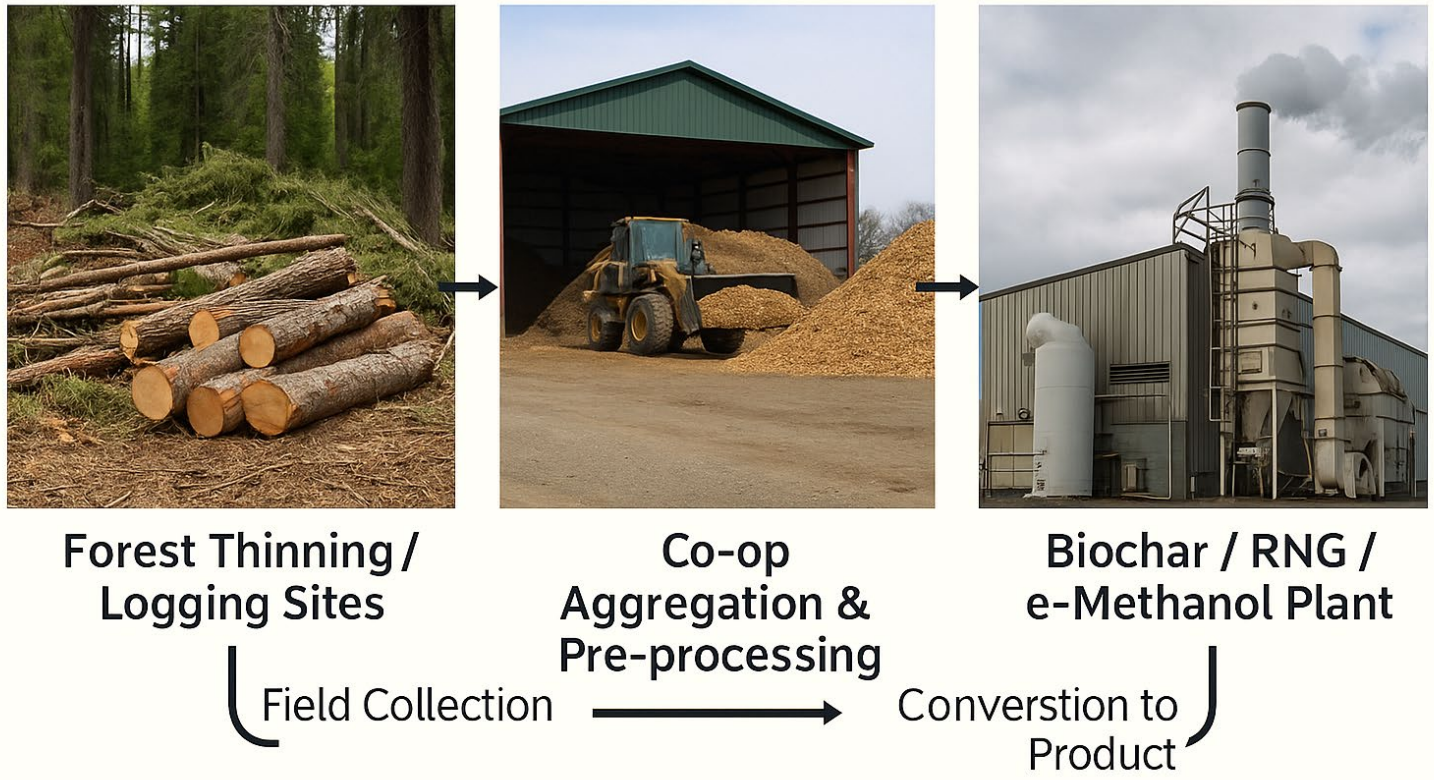
- Hundreds of small slash producers, but a single producer can’t guarantee supply.
- Seasonal surges, long quiet spells—processors can’t plan.
- Financing stalls; slash piles burn or rot.



The Feedstock Delivery Gap

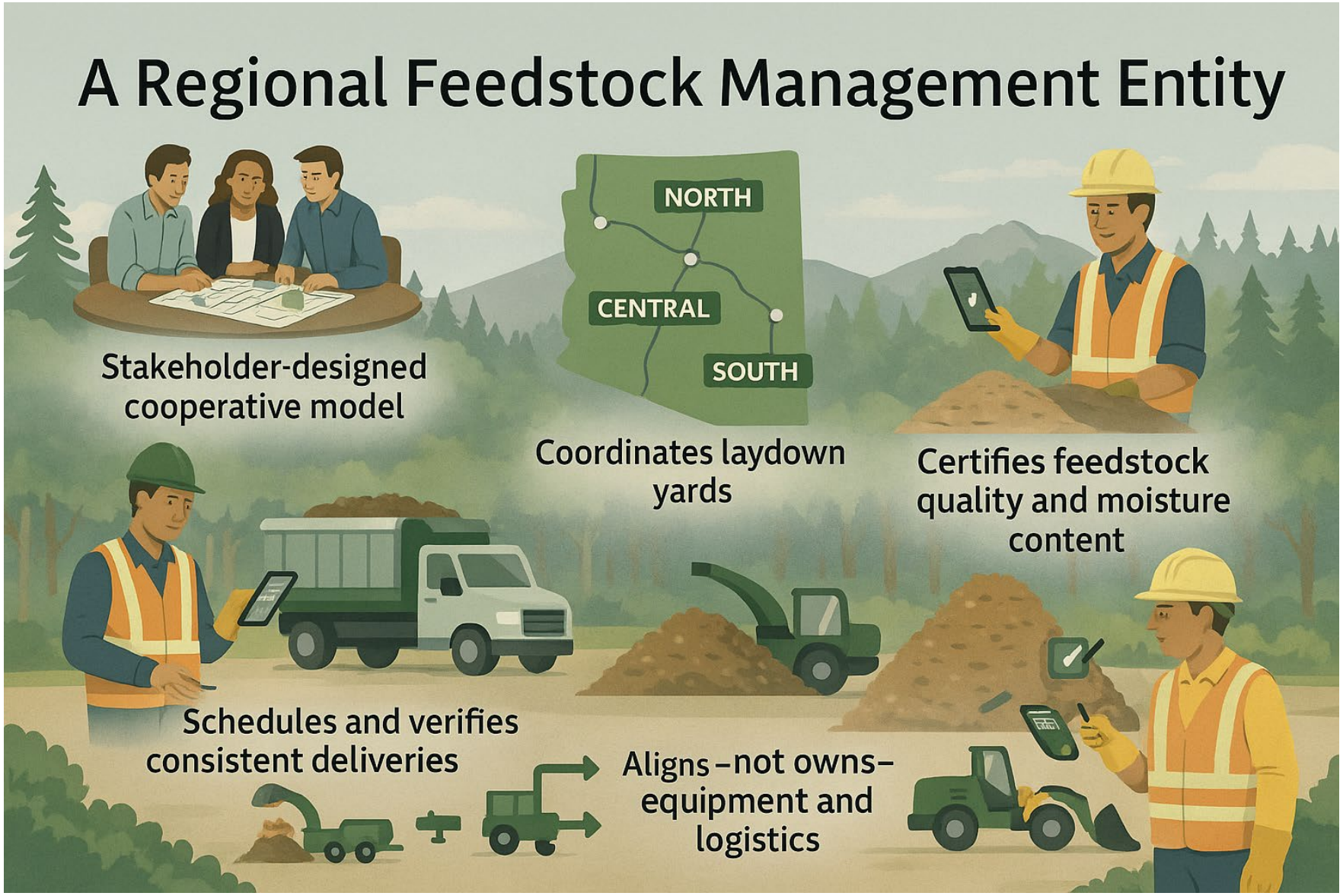


Co-op Role in Biomass Supply Chain



- **Upstream:** Landowners and loggers fell & deck slash at roadside.
- **Mid-stream (Co-op):** Aggregates, chips, dries, tests, and dispatches certified biomass.
- **Downstream:** Biochar / RNG / e-Methanol plant converts chips to high-value products.

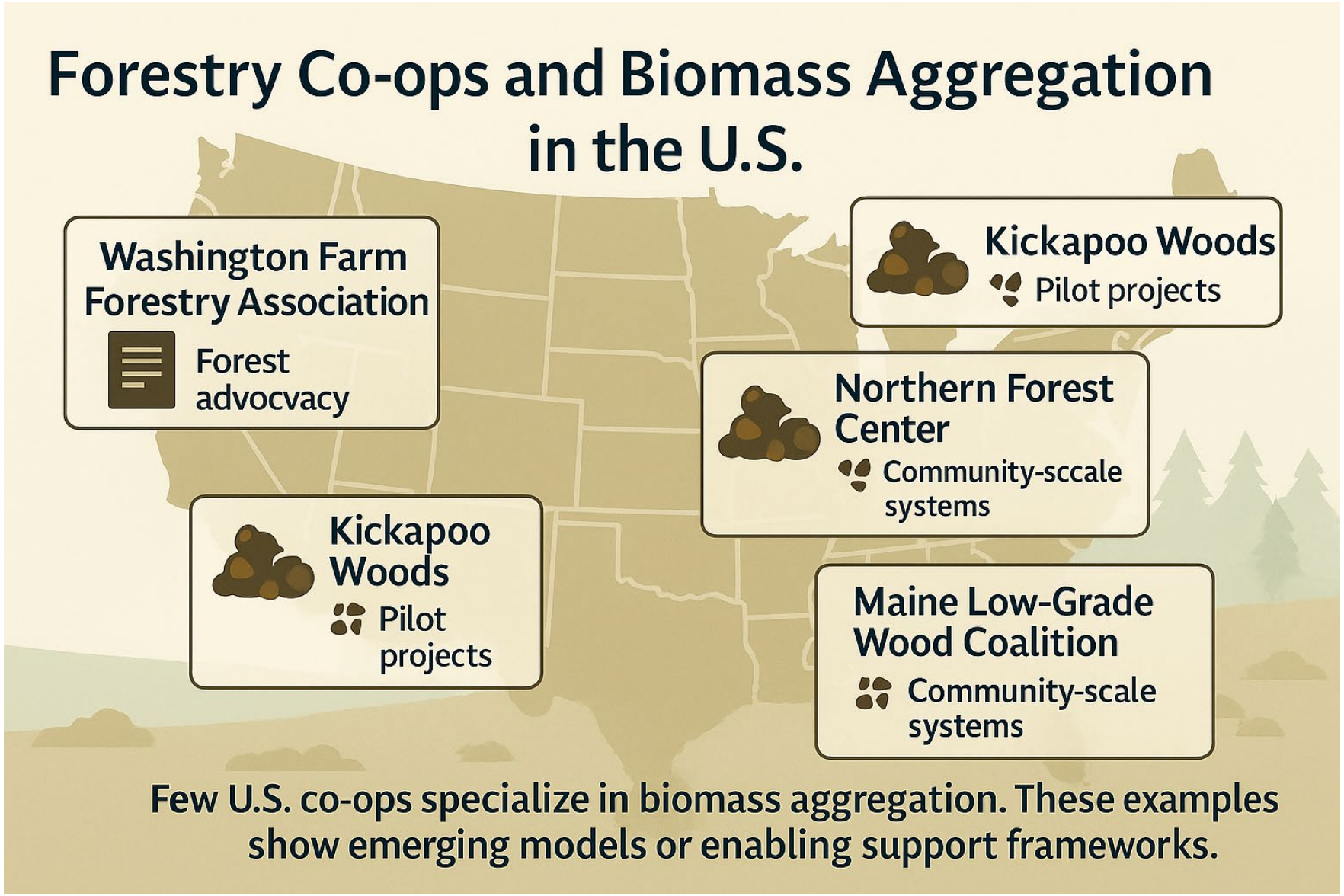
A Regional Feedstock Management Entity



Proven Feedstock Co-ops Worldwide

- **Dartmoor Wood-Fuel (UK)** – 17 woodland members; 4 000 m³/yr woodchip; £100 k turnover.
- **Maslina i Vino (Croatia)** – 50 olive growers; 3 000 t/yr prunings to CHP; €10-15/t revenue.
- **NEWBio Consortium (NE USA)** – 6 states; $10 M public grants; built multi-feedstock value chains.
- **Lake County Biomass Network (OR)** – 14 landowners & mills; 10 k GT in year 1; $500 k wildfire grant.

Forestry Co-ops and Biomass Aggregation in the U.S.



Few U.S. co-ops specialize in biomass aggregation. These examples show emerging models or enabling support frameworks.

Key Controls & Outputs

Controls (Sliders)

Transport cost $/mile

Co-op gate price $/green ton

Processing feedstock cost $/green ton

Outputs (Dynamic Metrics)

- Delivered cost per bone-dry ton
- Unit profit margin (incl. carbon credit capture)
- Project IRR / payback

Why It Matters:

- Wildfire and Watershed
- Cost Effective infrastructure
- Private funding
- Thriving Communities

Key Take Aways:

- Fiber from an additional 25,000 acres of forestland thinning annually.
- Dataroom to make evaluation easy
- Technology agnostic

Q & A | Thank You

- If you have any questions you can ask us now or email us anytime.

- Presented by –
  - **Bill Brandt** - bill.brandt@asu.edu
  - **Jeffrey Jacobs** - jeffrey.jacobs8911@gmail.com
  - **Edward Saltzberg** - esaltzberg@ersadvisors.com
  - **Geetesh Veeravalli** – gveerava@asu.edu

RoundTable Prompts

- What would it take for Northern Arizona to become a true hub for climate-smart industries?
- Where do you see the biggest opportunities—or risks—in building a biomass-based value chain at scale?
- What kinds of signals or commitments would help you (or your organization) take the next step toward engagement or investment?
- How can we ensure flexibility in technology pathways while still driving coordinated action?
- What types of data or tools would help you evaluate potential projects more effectively?
- Where do public-private partnerships add the most value—and what partnerships are still missing?

Thank you for Listening

AzCaNE | CENTER FOR AN ARIZONA CARBON-NEUTRAL ECONOMY

Thank you for your participation

Contact Information

Ellen B. Stechel
Executive Director, Center for an Arizona Carbon-Neutral Economy
Ellen.Stechel@asu.edu
cell: 505-400-4299

Connie Gardiola
Senior Project Manager, Center for an Arizona Carbon-Neutral Economy
Connie.Gardiola@asu.edu
480-965-0183