FOREST BIOMASS FEEDSTOCK ASSESSMENT – KEY FACTORS TO CONSIDER

NORCAL SAF/UC EXTENSION WEBINAR

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TAD MASON, CEO TSS CONSULTANTS

Presentation Overview

- Value-Added Uses
- Anatomy of a Feedstock Supply Assessment
- Contracting
- Observations

Woody Feedstock Value-Added Utilization

A variety of value-added end uses have evolved over time – Some are commercially proven and some (advanced biofuels) are still in the RD & D Phase.

- Lumber products, composite panels, pulp
- Soil amendments
- Post and pole
- Firewood
- Densified fuel pellets
- Animal Bedding
- Landscape cover
- Advanced Biofuels (ethanol, renewable diesel)
- Biomass power (generation or cogeneration)

Anatomy of a Feedstock Supply Availability Assessment

- Select General Vicinity
- Define Targeted Feedstocks
- Confirm Feedstock Sources
- Select Target Site
- Biomass Available – Gross/Technical/Economical
- Current/Potential Competition
- Current Market Values
- State and Federal Policies
- Five Year Availability and Pricing Forecast
- Future Supplies and Risks

Fuel/Feedstock Characteristics

A variety of value-added bioenergy related end uses have evolved over time. The conversion technology employed will be selected based on the targeted feedstock characteristics. If the primary objective is to generate power and/or heat, the key physical characteristics include:

- Heating Value (Btu/dry pound)
- Moisture Content (% moisture)
- Sizing (typically 3” minus)
- Ash Content (% non-combustibles)
- Chemical Make-Up (nitrogen, potassium, lignin)

Examples of Feedstock Supply Sources

- Timber harvest residuals
- Forest fuels treatment residuals
- Forest products manufacturing residuals
- Urban wood waste
- Agricultural byproducts


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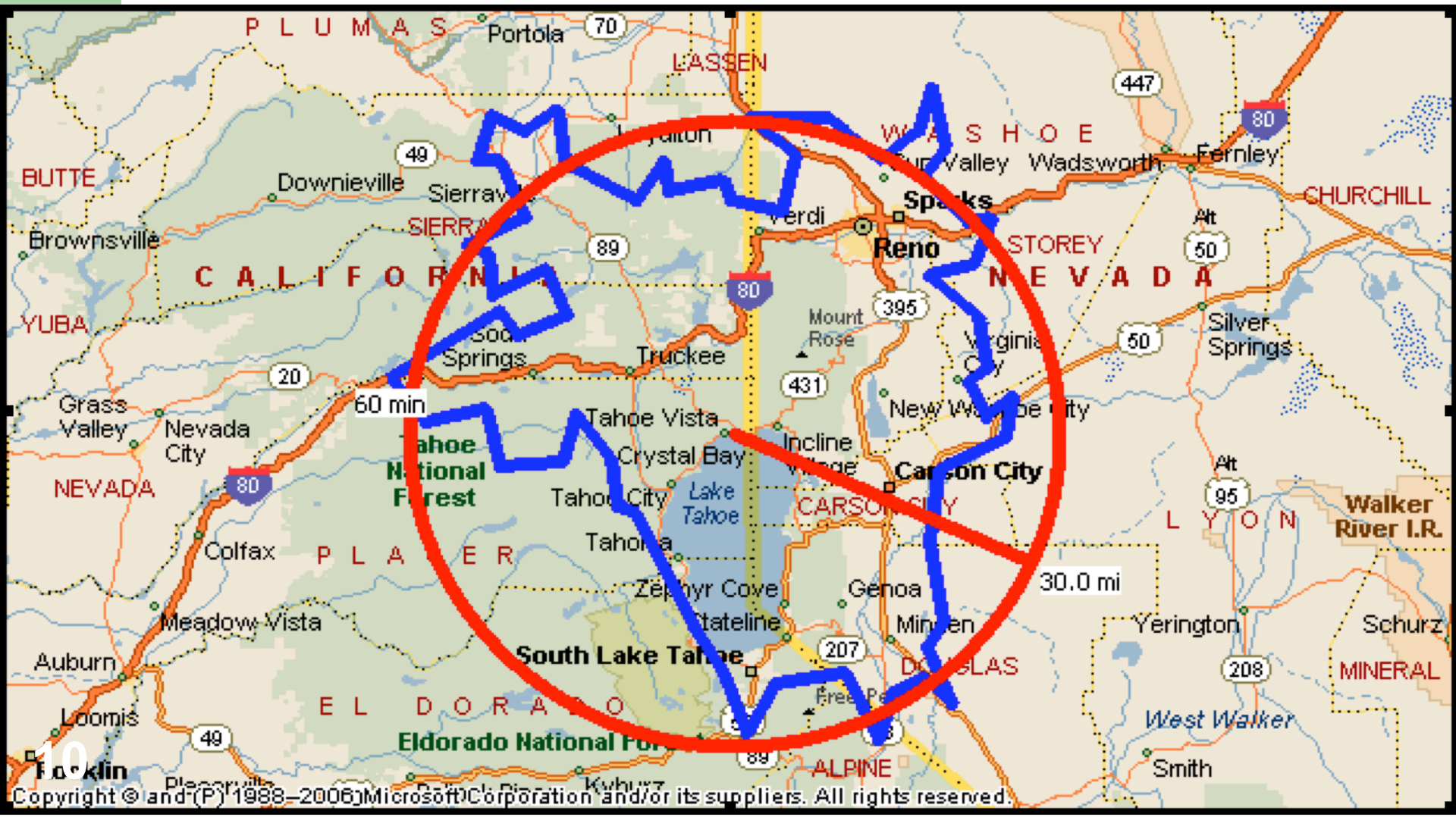
Feedstock Supply Assessment – Key Items to Consider

- Meets project objectives.
  - Defensible communities
  - Watershed health/fire resiliency
  - Reduction of open pile burning
  - Economic development (jobs)
- Sustainable long term supply tributary to the target candidate site (30 - 100 mile radius).
- Economically available (accounting for current/potential competition, state/federal policies).
- Available in quantities and from financially viable sources that support project financing:
  - Minimum 10 year supply, 50% - 70% under contract.
  - Feedstock Coverage Ratio over 2:1

Target Study Area Example



Land Ownership/Jurisdiction Forest Vegetation Cover Example

LAND OWNER/ MANAGER	FORESTED ACRES	PERCENT OF TOTAL
Bureau of Land Management	5,520	1%
Bureau of Reclamation	3,313	< 1%
Department of Defense	914	< 1%
National Park Service	75,007	7%
Private	343,497	32%
State of CA	242	< 1%
USFS	636,845	60%
TOTALS	**1,065,337**	**100%**

Feedstock Supply Availability Assessment Filters

Three filters used to confirm availability of fuel/feedstock resource:

- **Potential** – Gross estimate.
- **Technical** – More refined based on physical recovery and resource policy factors.
- **Economic** – Very refined using current competition/demand, potential competition, community support and actual costs to harvest, collect, process and transport.

Current & Potential Competition

- Assess current uses/competition for fuel/ feedstock.
- Examples include:
  - Other bioenergy projects.
  - Furnish for composite panel manufacturing.
  - Raw material for soil amendment/landscape cover.
  - Feedstock for densified fuel pellet facility.

Key State and Federal Policies

- List existing policies that impact fuel/ feedstock availability and pricing. Some may only be available for defined periods or are currently being considered:

Federal

- Stewardship Contracts
- Collaborative Forest Landscape Restoration Act
- Biomass Crop Assistance Program

State

- Oregon Biomass Producers Tax Credit
- Senate Bill 705

Future Feedstock Supply Sources and Risks

- Emerging technologies may improve fuel or feedstock recovery.
- Proposed state or federal policies may improve or reduce fuel recovery options.
- External factors such as housing starts, or diesel pricing that may impact future supplies/economics of fuel recovery/ transport.

Collection, Processing and Transport Costs Example

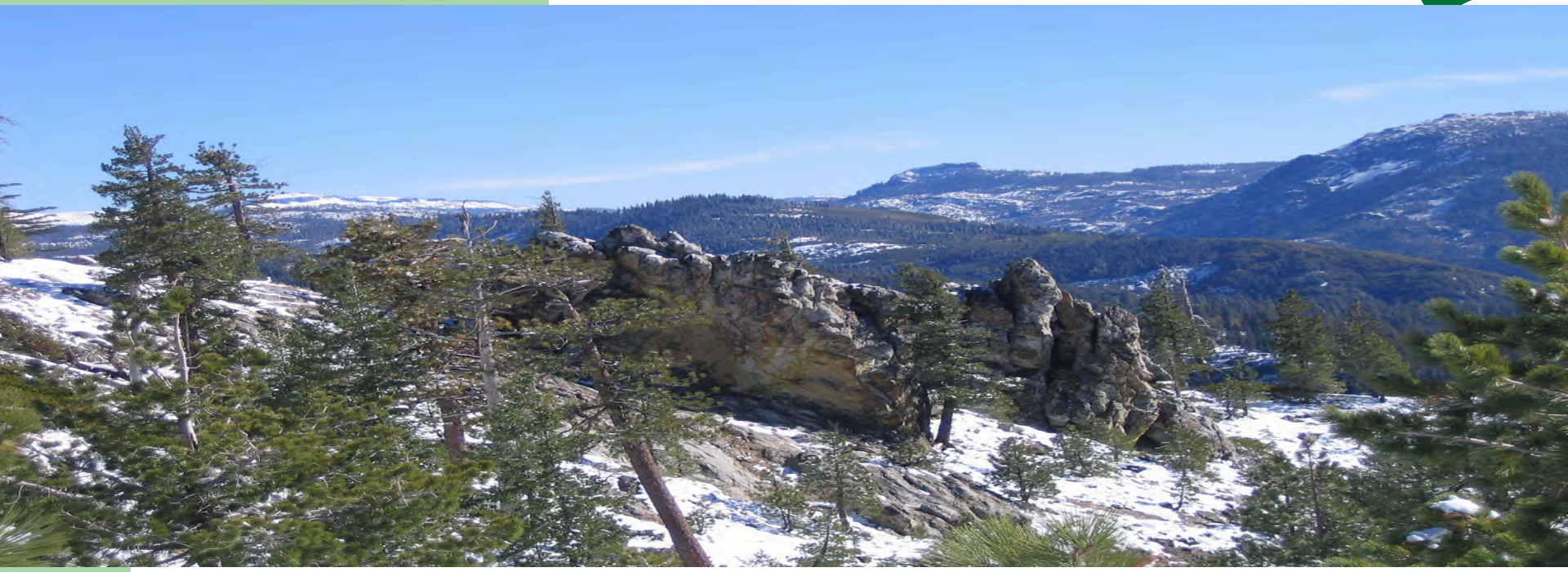
BIOMASS MATERIAL SOURCE	DELIVERED MATERIAL	LOW RANGE	HIGH RANGE
Timber Harvest Residuals – USFS (Bass Lake RD)	Chips	$45/BDT	$60/BDT
Timber Harvest Residuals – Private land	Chips	$45/BDT	$60/BDT
Pre-Commercial Thinning Activities – USFS (Bass Lake RD)	Small Logs	$34/GT	$40/GT
Fuels Treatment Activities – USFS (Bass Lake RD)	Chips	$45/BDT	$60/BDT
Fuels Treatment Activities – Eastern Madera County Fire Safe Council	Chips	$50/BDT	$70/BDT
Fuels Treatment Activities – Coarsegold Resource Conservation District	Chips	$50/BDT	$70/BDT
Urban Wood Waste – Local landfills and transfer stations	Chips	$40/BDT	$50/BDT

Feedstock Contracting

- Memorandum of Agreement
- Letter of Intent
- Short Term Purchase and Sale Agreement
  - Usually 6 to 12 month term
- Long Term Purchase and Sale Agreement
  - Typically 3 to 5 year term
  - Escalation clause (CPI/NYMEX Diesel Price)
  - Price adjustment tied to feedstock quality

Bioenergy Project Development - Deal Killer Issues to Consider

- Fuel/Feedstock Supply
- Community Support
- Offtake Agreements
- Project Economics
- Appropriate Conv. Technology
- Siting/Infrastructure & Permitting



Tad Mason, CEO TSS Consultants
Rancho Cordova, California
916.600.4174
tmason@tssconsultants.com

www.tssconsultants.com