Regional Woody Biomass Feedstock Assessments

Woody Biomass Utilization Workshop

Quincy, California

May 25, 2010

Anatomy of a Woody Biomass Fuel Assessment

- Define Targeted Feedstocks
- Confirm Feedstock Sources
- Define Target Site
- Biomass Available – Gross/Technical/Economical
- Current/Potential Competition
- Current Market Values
- State and Federal Policies
- 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 determine targeted feedstock characteristics. Key physical characteristics include:

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

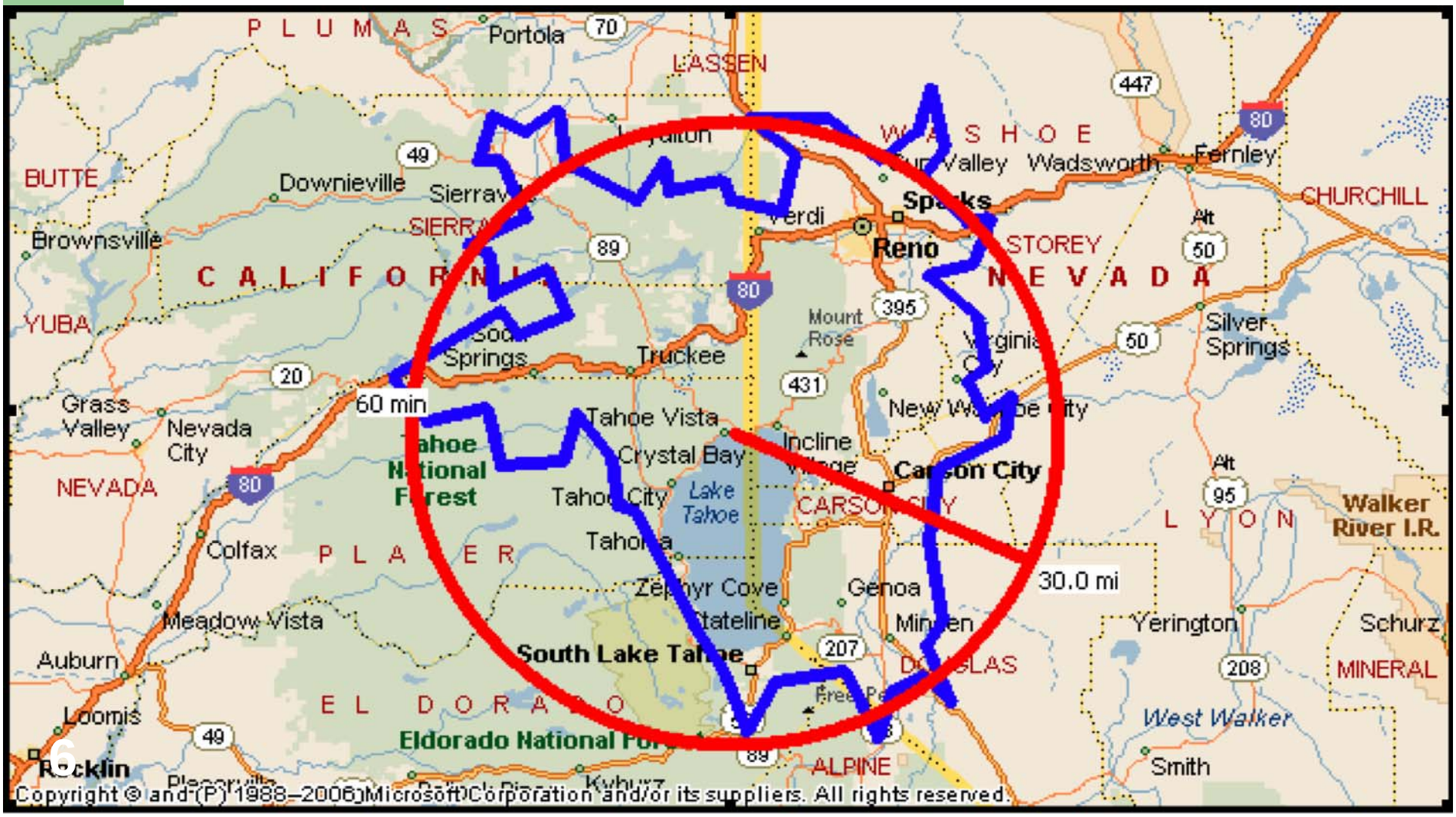
Confirm Sources of Fuel That Meet Project Specifications

- **Forest**
  - Forest operations (fuels reduction, timber harvest residuals)
  - Forest manufacturing byproducts (sawdust, bark, shavings)
- **Agricultural**
  - Byproducts (orchard removals, prunings, shells)
  - Dedicated crops (poplar, willow, eucalyptus, switchgrass)
- **Urban**
  - Tree trimmings, general wood waste
  - Clean construction & demolition wood

Target Study Area

- Define feedstock availability – Target Study Area based on economic haul distances required to source fuel/feedstock.
- Typical radial distances from the targeted site are 30, 50, 75, or 100 miles.

Kings Beach, CA Project
Target Study Area



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, pending policies, community support and actual costs to harvest, collect, process and transport.

Current 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.

Potential Competition

- Assess potential uses/competition for fuel/feedstock.
- Examples (same as those listed on previous slide) 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 - Biomass Crop Assistance Program
  - State – SB 705

Future Fuel Supply Sources and Risks

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

Fuel/Feedstock Supply Assessment – Key Factors

- Meets project specifications.
- Sustainable long term supply located within close proximity (30 to 125 mile radius).
- Economically available (accounting for current/potential competition, state/federal policies).
- Available in quantities and from diverse financially viable sources that support project financing:
  - Minimum 10 year supply, 50% - 70% under contract.
  - At least 2.5 – 3 times facility usage (fuel supply coverage ratio).

Regional Biomass Assessment Reports – Part I

- **Northern Sierra Nevada Biomass Study** – Lynn G. Purvis, June 1995
- **Northeast CA Ethanol Manufacturing Feasibility Study Feedstock Supply and Delivery System** – TSS Consultants, June 1997
- **Big Valley Forest Production and Stewardship Study** – TSS Consultants, February 2006

Regional Biomass Assessment Reports – Part II

- **Coordinated Resource Offering Protocol** (CROP) – Mater Engineering
  - Tahoe Region – May 2007
    - 100 mile radius of Nevada City, California
  - Southern Oregon, Northern California – November 2006
    - 100 mile radius of Lakeview, Oregon
- **Biomass to Energy Forest Management for Wildfire Reduction, Energy Production, and Other Benefits** – USFS Pacific Southwest Research Station, January 2010

Regional Biomass Assessment Reports – Part III

- Additional biomass assessments for purposes of biomass power facility acquisition. Typically required by private sector financial institutions.

Bioenergy Project Development – Fatal Flaw Issues to Consider

- Fuel/Feedstock Supply
- Community Support
- Project Economics
- Appropriate Technology
- Siting/Infrastructure & Permitting

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