

From Waste to Value: Forest & Mill Residue to Drop-In Fuels

Mary Dinh
Project Manager

Red Rock Biofuels
Fort Collins, CO

RRB's Management Team has Extensive Experience in Plant Construction and Ops





Terry Kulesa CEO

- 17yrs biofuels
- \$650M+ construcNon
- CoFounder/CEO, IR1
- Former VP OperaNons at Pacific Ethanol
- Former GM Ace Ethanol & Ethanol 2000
- MBA University of Minnesota



Jeff Manternach CFO

- 13yrs biofuels
- \$400M+ project finance
- \$75M+ grant funding
- CoFounder/CFO, IR1
- Former VP Finance at Pacific Ethanol
- MBA, MS Natural Resources University of Michigan



Jim Moore
Dir. Engineering

- 13yrs biofuels
- \$1B+ construcNon
- IR1 Group 5yrs
- 30+yrs design, engineering, project mgmt, construcNon
- Former Director of Engineering at Pacific Ethanol
- ProU, DTC, AMEC, UCB, S&B



Joe Winckler
Dir. OperaNons

- 23yrs biofuels
- \$700M+ construcNon
- IR1 Group 6yrs
- Former GM of OperaNons at Pacific Ethanol
- Former PM at Ace Ethanol, Ethanol 2000

Experience

- Four senior execs w/ 1323yrs experience each in renewable fuels
- Worked together for 10+ years
- Financed, built, & operated 6 renewable fuels plants; operated 3 more

Forest Residue



"The potential for impact is substantial;

~ 4-6 % of the continental U.S.'s annual emissions come from forest fires, healthy forestlands can sequester ~ 12% of the national emissions annually."

Source: Redefining renewable biomass: A policy change with cascading outcomes (NARA Tribal Parntership Program: Moore-Drougas, Schwartz, James, and Durglo)



Passive Forest Management



Active Forest Management



Forest Management Costs





Forest Management Costs

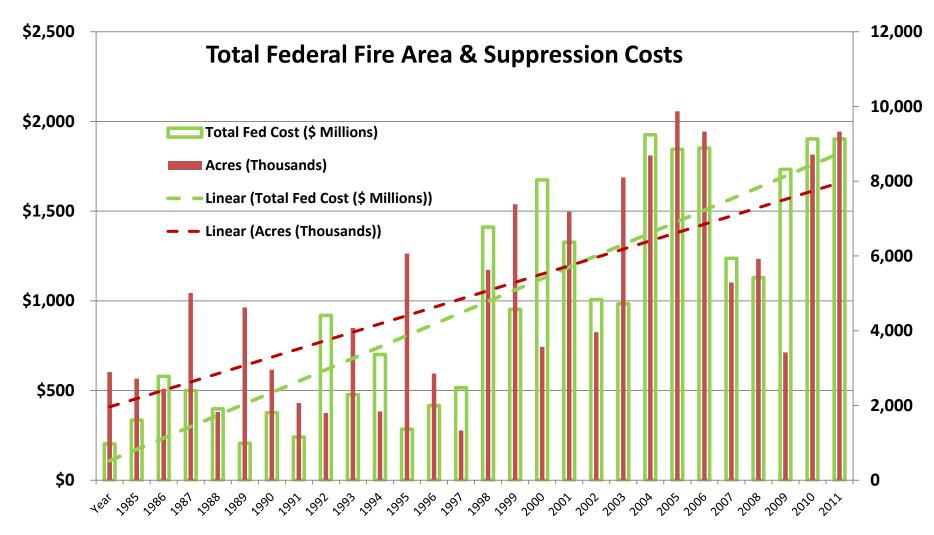
Fighting Forest Fire = \$5,000 per acre

Forest Thinning = \$500 per acre



Growing Problem in Western Forests





National Interagency Fire Center – Suppression Costs

Timber Residue & Mill Waste





RRB Conversion Process Overview





140,000 bdt/yr of Woody Biomass

- Forest Residue
- Sawmill Residue



Gasifier



Fischer-Tropsch



Hydroprocessing

15 MGY of Renewable Drop-In Fuels



40% Jet - ASTM D7566



40% Diesel - ASTM D975



20% Naphtha – ASTM D3735

RRB applies commercially proven FT process at biomass scale







Fischer-Tropsch Germany, 1920's

Hydroprocessing

Russia, 1930's



England, early 1800's (Baltimore Gas Works, 1816)



Sasol, Shell & Others
Coal or natgas feed only;

No ability to scale down

100,000 bbl/day



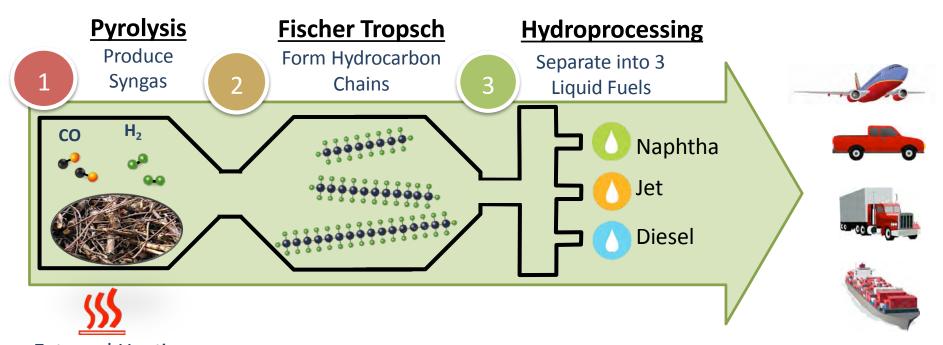
Red Rock Biofuels

Modular and Scalable; Biomass/NatGas flexible

1,000 bbl/day via novel technology

RRB Conversion Process & Products





External Heating (NO wood combustion)

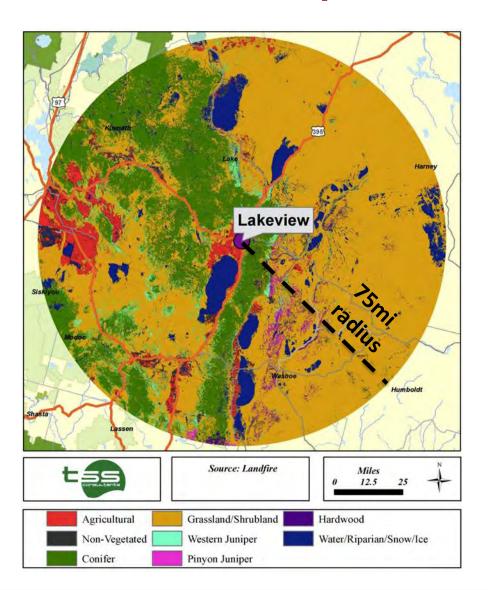
Project Location





Lakeview has Ample Biomass Resources





Woody Biomass Availability
1.5 – 2.5x need

RRB'S Lakeview, OR Site:

Excellent Feedstock & Product

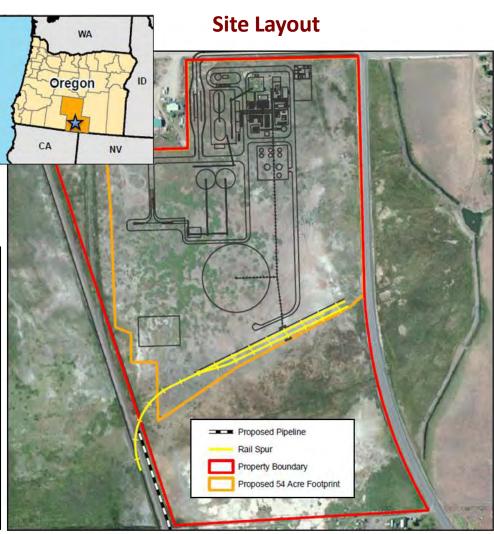
RED ROCK

Logistics

- Feedstock availability
- Enterprise zone site
- Highway access
- Rail access
- Natural Gas

Greenfield Site





Fuel Off-Take Agreements







World Class Project Partners

























Thank You!



Mary Dinh

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