



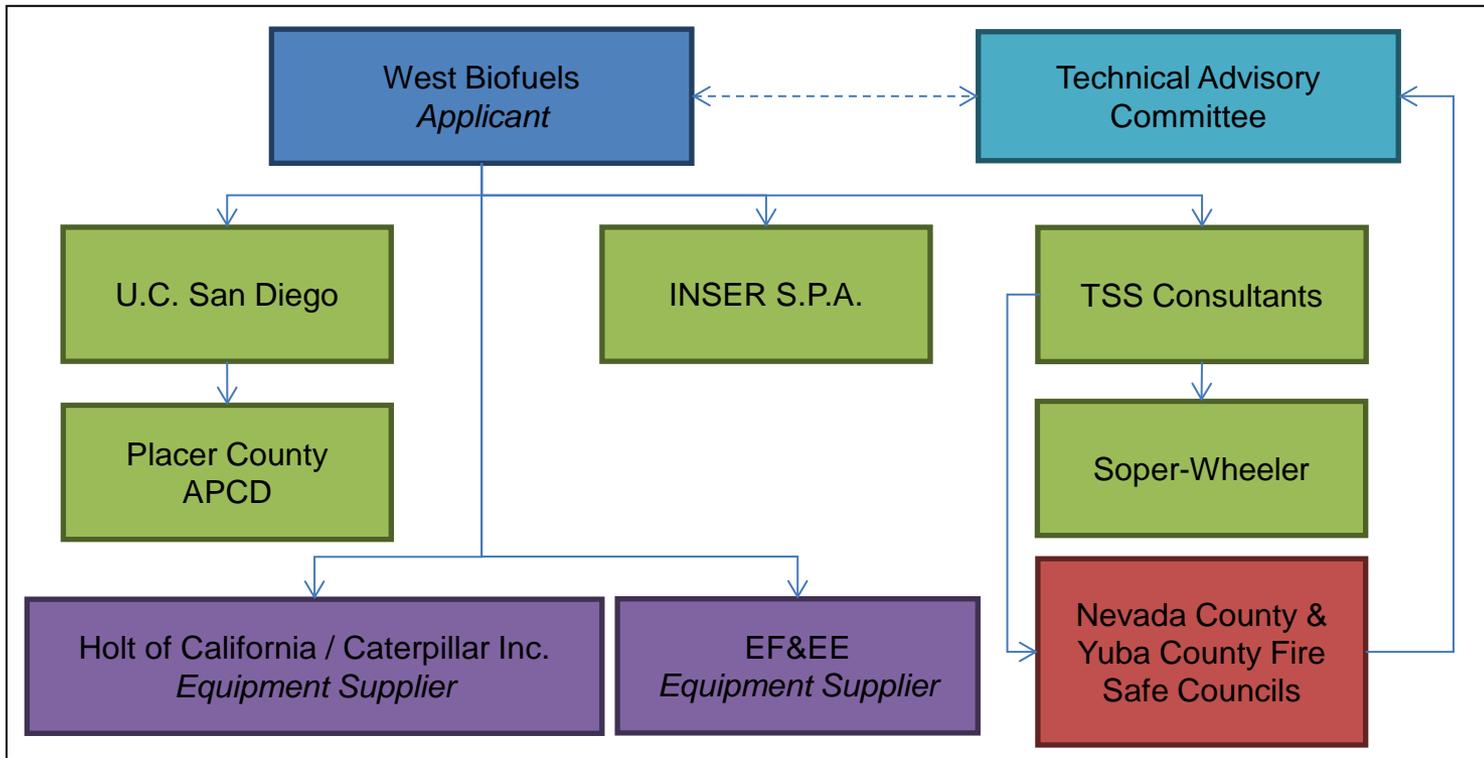
## **MODULAR BIOMASS POWER SYSTEMS TO FACILITATE FOREST FUEL REDUCTION TREATMENTS**

**EPIC Innovation Symposium  
December 3, 2015**

# Project: Modular Biomass Power Systems to Facilitate Forest Fuel Reduction Treatments

- Funded by the California Energy Commission
- Solicitation EPIC PON-14-303, Group 1: Develop Modular Bioenergy Systems for Forest/Urban Interface Areas
- Funds Awarded: \$2,000,000
- Matching Funds: \$539,914

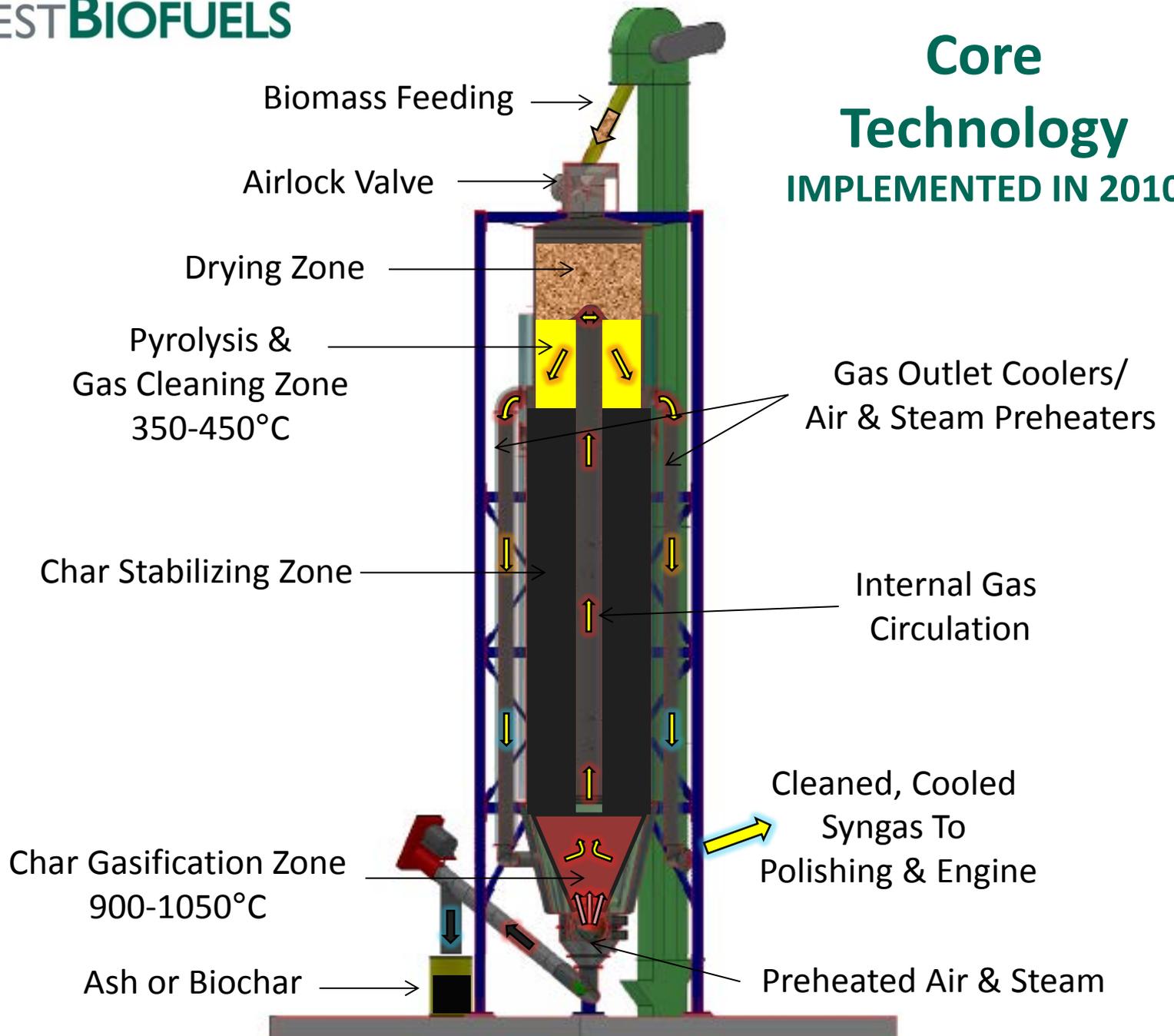
# Project: Modular Biomass Power Systems to Facilitate Forest Fuel Reduction Treatments



# Project Purpose

- Address the lack of proven community-scale wood-to-electricity conversion technologies
- Develop modular system design to reduce capital cost
- Identify best management practices for handling forest wood residue
- Demonstrate continuous gasification operations using forest wood residue

# Core Technology IMPLEMENTED IN 2010



# Project Innovations

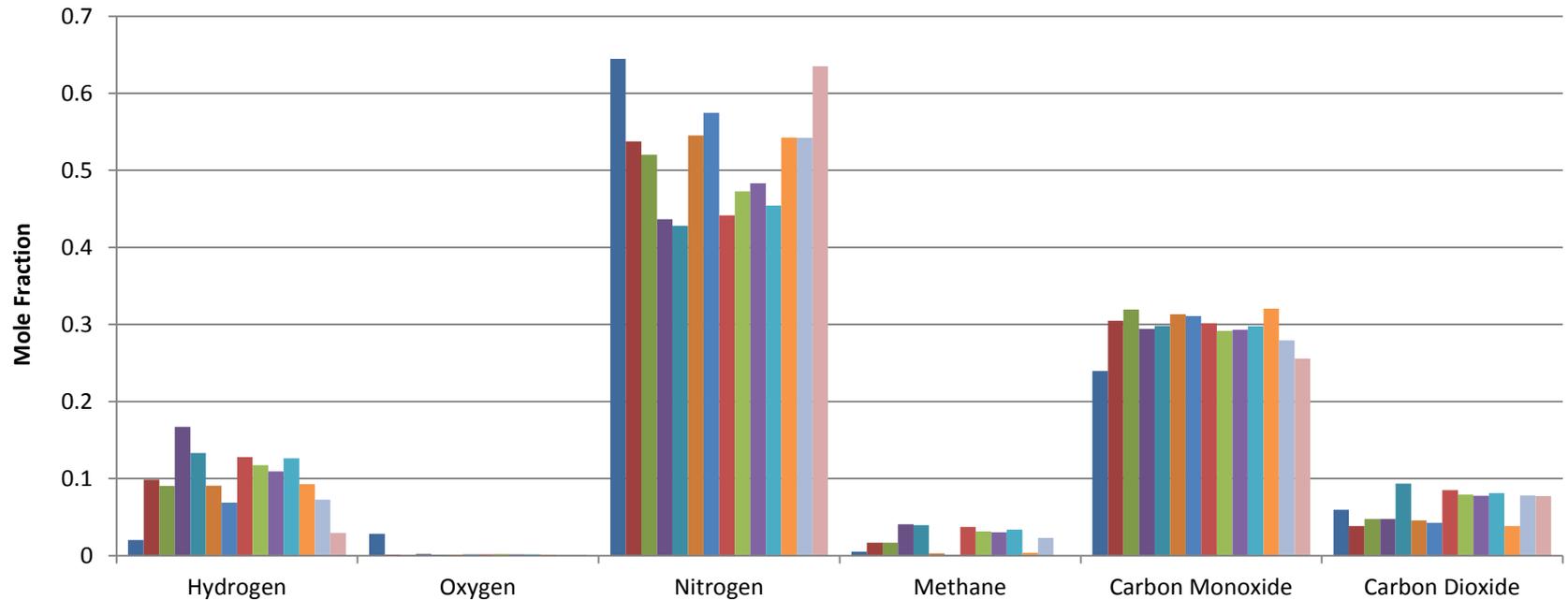
- Modular: 500kW CircleDraft gasification systems that can be produced in California and distributed to project sites for tilt-up installation
- Feedstock Best Management: Develop an understanding of forest feedstock variability across the state and best management practices cost-effective utilization
- California Forest Biomass Residue Mapping: Develop maps that illustrate geographic locations of forest biomass by predominant stand, common management practices, and ownership type

# CircleDraft FOREST FEEDSTOCK



# Preliminary Results

Location	Management Type	Deck Screen	Dry Combustibles	Ash (dry basis)	Moisture Content (wet basis)
Northern Sierra	Forest Thinning	Mid	99.02%	0.98%	19.8%
Northern Sierra	Tops & Limbs	Mid	98.97%	1.03%	8.5%



# Opportunities and Challenges

- Opportunities

- Community-Scale: Opportunity for distributed generation to utilize residue from fire safe operations
- Co-Located Businesses: Share labor, feedstock, and equipment to reduce cost
- Modular: Cost-effective manufacturing and fast construction schedules

- Challenges

- Technology Risk: Insufficient Long-Term Data: 3-year demonstration cycle with five different forest types
- Feedstock Risk: High Variability: Testing feedstock from different forest operations and different in-field processing equipment

# Industry Needs

- Technology Risk:

- Funding long-term commercial demonstration projects
  - Establishes operations data (1 to 2 years programs targeting 7,000+ hrs per year)
- Grant funding to reduce the cost of risk associated with early adoption of innovative technologies
  - Loan guarantee programs are great for the rest of the project financing and are already available
- Assistance for existing failed projects
  - Don't punish those that didn't work the first time

- Feedstock Risk:

- Assistance with long-term feedstock contracting (how to mitigate risk of diesel fluctuations)

# Contact West Biofuels

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