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# California Biomass Collaboration Proposed State Research Plan

Research Subcommittee  
California Biomass Collaboration  
Linda G. Blevins, Chair

# Research Subcommittee Members

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- Linda G. Blevins, Sandia National Laboratories
- John E. Ferrell, U.S. Department of Energy
- Bryan M. Jenkins, University of California Davis
- Ralph P. Overend, National Renewal Energy Laboratory
- John R. Shelly, University of California
- Valentino M. Tiangco, California Energy Commission

# Research Subcommittee Goals

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- Suggest research that
  - promotes the development of biomass conversion technologies
  - leads to increased use of biomass in California
- Solicit input at forum

# Research Plan Organization

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- Short Term: Present to 2007
  - Motivated by distributed generation clean emission standards
- Medium Term: 2010 to 2017
  - Motivated by 20% renewables goal of RPS
- Long Term: beyond 2017
  - Supported mostly by federal investments
- Relative Importance
  - Short term 60%
  - Medium term 30%
  - Long term 10%

- Priority California Feedstocks
  - Forest thinnings
  - Municipal solid wastes
  - Regional agricultural residues

# Short Term Options I Present to 2007

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- Retrofit existing California biomass-to-energy facilities
  - Improve efficiency, reduce costs & environmental impacts
  - Fuel and power generation infrastructure in place
  - Re-power with integrated gasification combined cycle (IGCC)
  - Internal combustion engines, gas turbines, or even fuel cells
  - Solve gasifier technical issues defined by feedstocks
  - Permitting issues must be addressed
- Directly co-fire in existing coal power plants for 1% increase
- Gasify and co-fire with natural gas in boilers
- Lower the cost of harvesting and transporting woody biomass to energy conversion plants

# Short Term Options II Present to 2007

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- Use biogas from landfills, animal wastes, and other feedstocks
  - Solve technical issues defined by feedstocks
  - Seek new energy conversion devices
  - Policy issues must be addressed
- Use bio-diesel or bio-oils for small power generators
- Develop better gas cleanup for gasifiers
- Notice cleanup technologies developed for other applications
- Consider using low-NO<sub>x</sub> burners in existing biomass power plants

# Medium Term Options 2010 to 2017

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- Gasify biomass and co-fire H<sub>2</sub>-rich gas in existing natural-gas-fired industrial gas turbines
- Develop small, portable biomass conversion units for use on forest thinnings
  - Provide electricity to the grid
  - Convert feedstocks to high energy density fuels
  - Policy issues must be addressed
- Biomass-to-hydrogen

# Long Term Options

# Beyond 2017

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- Implement biorefinery concept
    - Multiple end products
      - Energy
      - Bioproducts
      - Agriculture (food and fiber)
    - Thermochemical Platform
      - Combustion
      - Gasification
    - Biochemical Platform
      - Anaerobic Digestion
      - Fermentation
    - Both

- Currently driven by Federal investments



# Other Research-Related Roles for CBC

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- Hold annual coordination meeting between DOE BioEnergy Center and California Biomass Collaboration
- Become a member of National BioEnergy Center
- Form a Technology Assessment Group to monitor technologies being developed for other segments of the power generation industry and in other countries
  - Coal gasification, black liquor gasification, hydrogen production, etc.
- Perform technical and economic life cycle assessments when possible
- Serve as advisory and review boards for state-funded research

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On Behalf of the Research Subcommittee,  
Thank You

We Welcome Your Suggestions

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