

# What is woody biomass and how is it utilized to produce energy?

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Using Wood to Make Renewable Energy

University of California Cooperative  
Extension Workshop

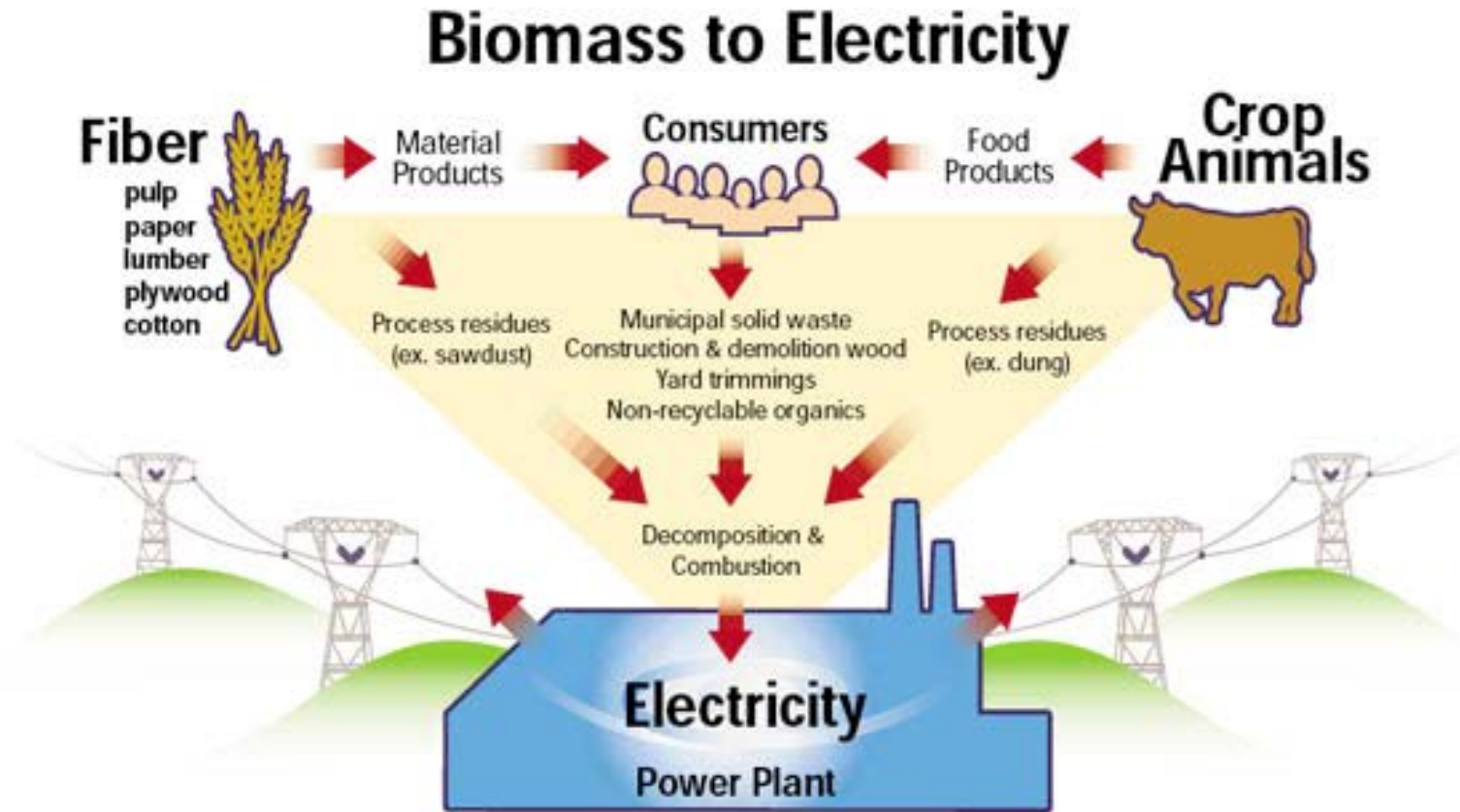
May 17, 2016



# Outline

- What is woody biomass?
  - Biomass generally
  - Woody biomass
  - Renewable woody biomass in California
- How does woody biomass make energy?
  - Energy types
  - Technologies
  - California biomass power programs
- Resources

# What is biomass?



# What is woody biomass?



“solid organic material derived from trees”

<http://www.pelletheat.org/assets/docs/industry-data/infoguides43284.pdf>

# Renewable biomass in California



“...[material] produced through photosynthesis consisting of plant materials and agricultural, industrial, and municipal wastes and residues.”

<http://www.energy.ca.gov/biomass/biomass.html>

# Woody biomass in Humboldt County



# Woody biomass in Humboldt County



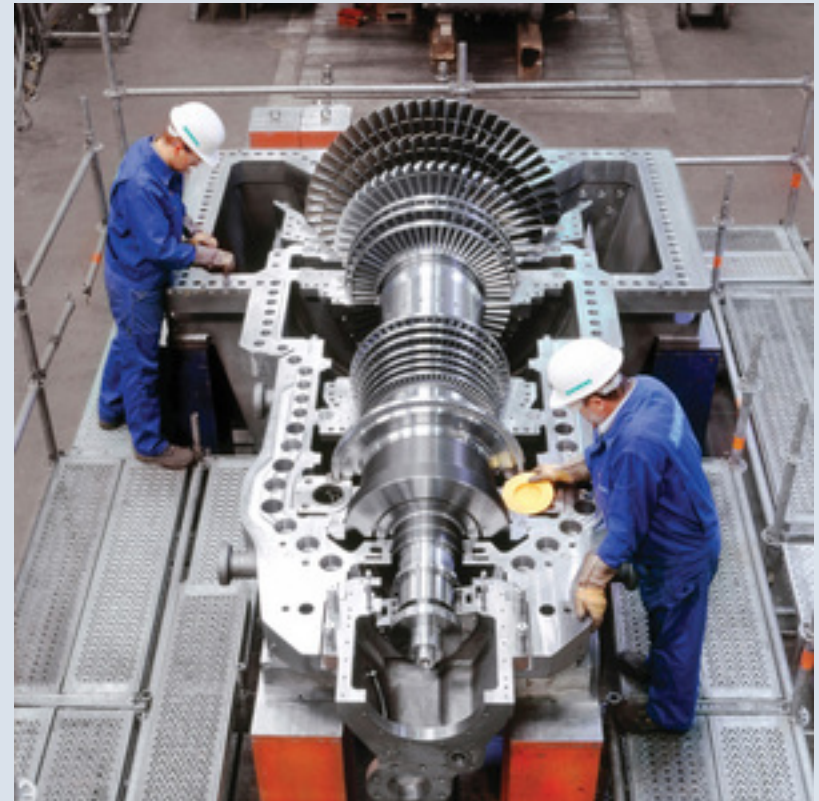
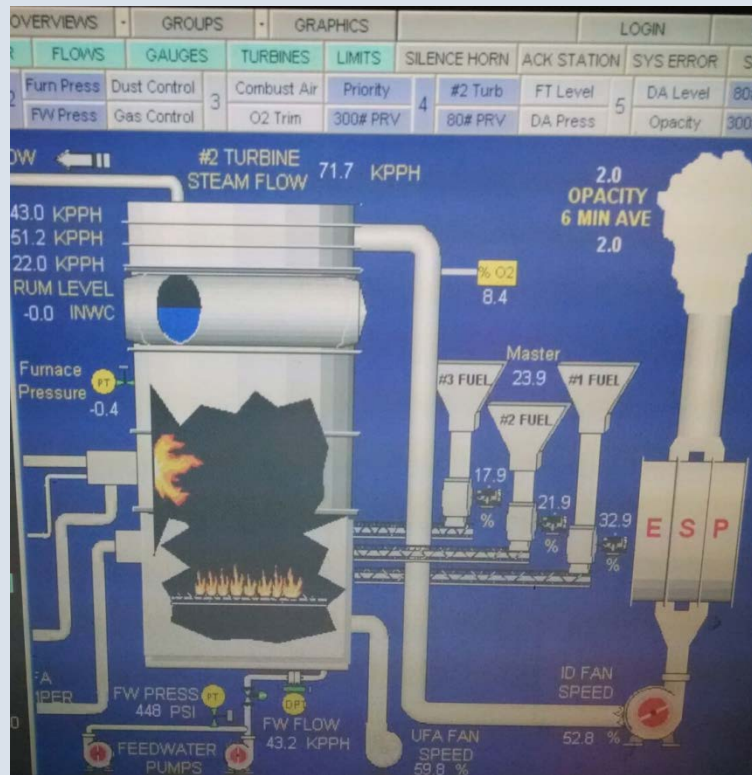
# How does biomass make energy?

- Thermal/Heat
- Electricity – differs by size and technology
  - Existing facilities
  - BioMAT, <1 MW net metering
- Transport fuels (biofuels)
  - Drop-in diesel
  - Jet fuel
- Synthetic Natural Gas





# Direct combustion to steam turbine



# Gasification to generator set



West Biofuels syngas, Ankur syngas, and West Biofuels biofuel gasifiers

# Organic Rankine Cycle



# California Programs supporting Biomass Power

- Renewables Portfolio Standard
- Bioenergy Renewable Auction Mechanism
- Bioenergy Market Adjusting Tariff / SB1122
- Net Energy Metering
- Remote Net Energy Metering
- Self Generation Incentive Program
- Bioenergy Action Plan
- Governor Brown's Tree Mortality Emergency Proclamation

# Biomass Resources

[UC Woody Biomass Utilization](#)

[Sierra Nevada Conservancy Bioenergy](#)

[California Statewide Wood Energy Team](#)

[Redwood Forest Foundation](#)

[California Energy Commission Biomass](#)

[UC Davis Biomass Collaborative](#)

[California Public Utility Commission Renewables Portfolio Standard](#)

[Wood Education and Resource Center](#)

[Bioenergy Association of California](#)

[California Biomass Energy Alliance](#)

[Biomass Energy Resource Center](#)

[Pellet Fuels Institute](#)

[Biomass Thermal Energy Council](#)

# Thank you!

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