

# Biopower Project Development in California



**Field Trip to SPI Lincoln**

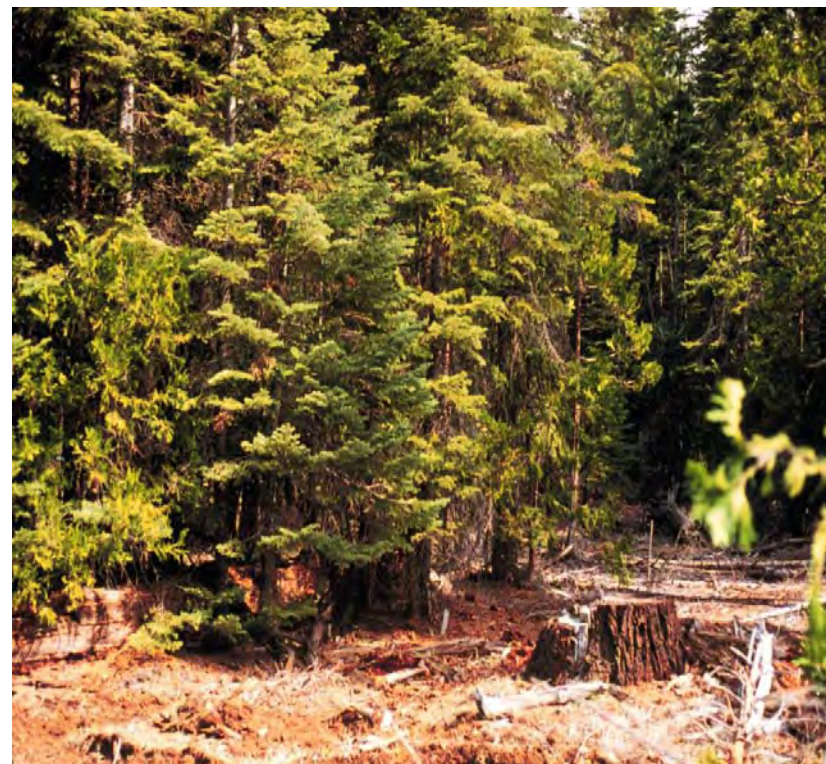
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# What is Biomass?

- **Biomass** – any solid, nonhazardous, cellulosic material derived from: forest-related resources, solid wood wastes, agricultural wastes, and plants grown exclusively as a fuel.\*

\*based on the definition of biomass in the 2005 Energy Act



# Woody Biomass Utilization

A variety of value-added end uses have evolved over time – Some are commercially proven and some are still in the RD & D Phases

- Lumber products, composite panels, pulp
- Soil amendment/landscape cover
- Densified fuel pellets
- Post and Poles
- Animal Bedding
- Landfill cover
- Biomass power
- Liquid fuels (ethanol, syn-diesel)

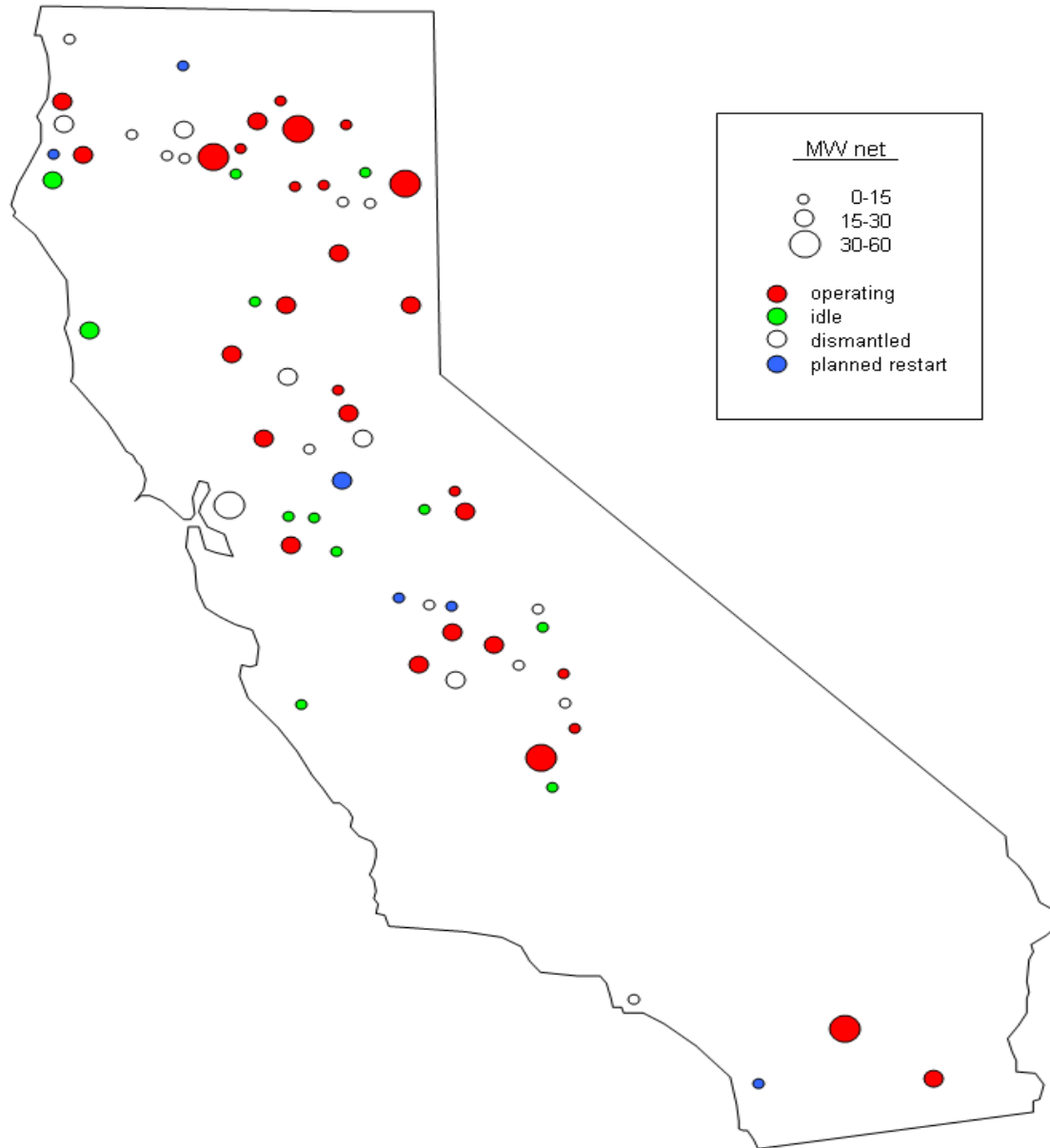
# California Experience

- Initial plants developed in response to air quality issues.
- Renewable energy incentives of 1970's and 1980's caused renewed interest and development:
  - PURPA
  - State and federal tax credits

# California Experience - More

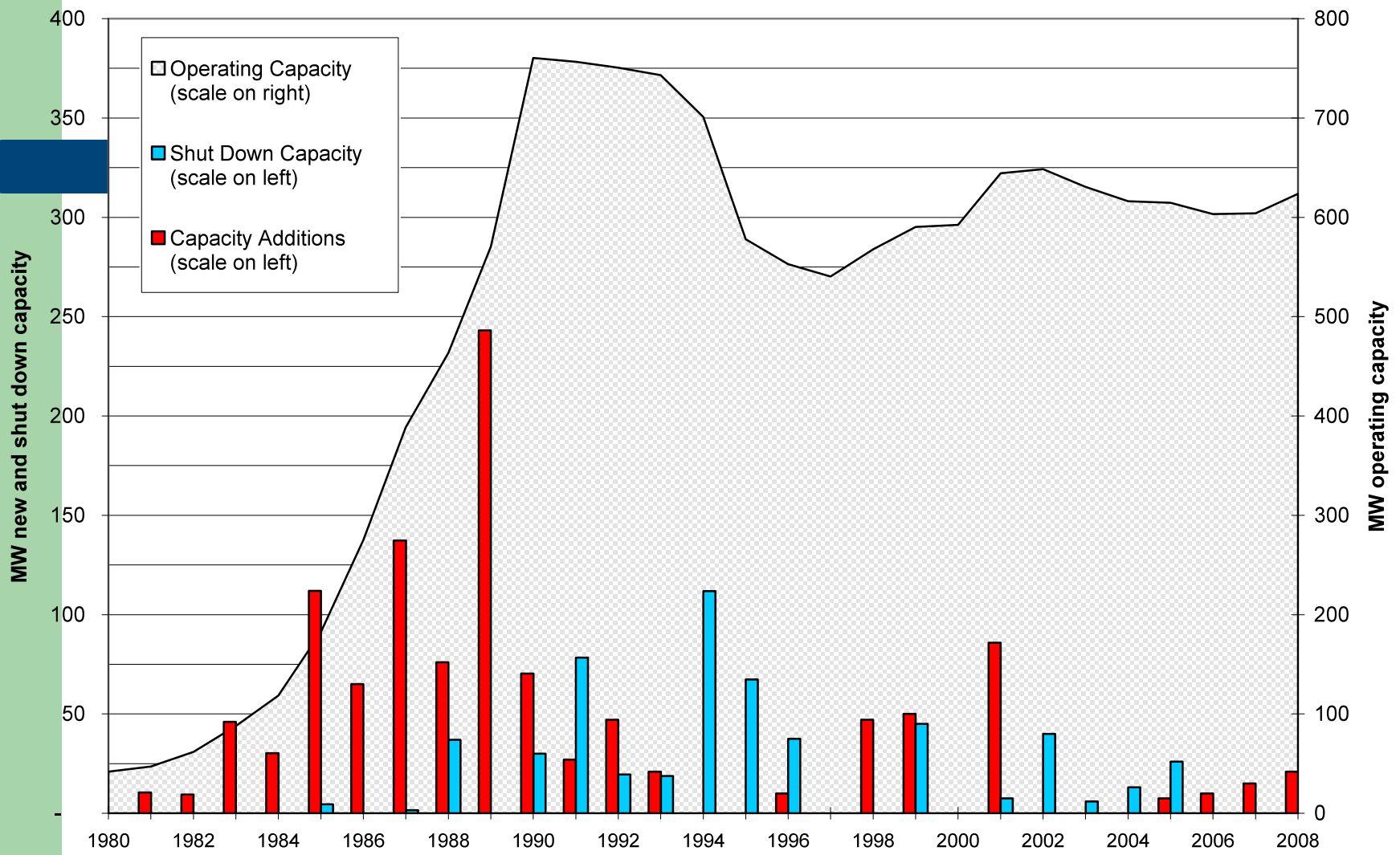
- Approximately 32 plants operational.
- Produce almost 550 MW.
- Consume around 10,000,000 GT/year:
  - 20% forest biomass
  - 30% agricultural biomass
  - 40% urban biomass
  - 10% forest products manufacturing residuals
- Generate revenue based upon a variety of power sales agreements.

## California Biomass Power plants 2008



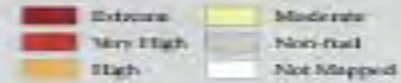
Map  
Provided  
by Green  
Power  
Institute

## California Biomass Power Capacity



Data Provided by Green Power Institute

# FIRE THREAT



CDP-FRAP has developed a series of related fire threat maps based on the combination of potential fire fuel loads (fuelbeds) and exposure (fire flow class) to create a 6 class index. For risk assessment, zones that are not mapped (white) such as open water, agricultural lands, and dry wetlands from the map should be excluded. Large agricultural areas receive a moderate fire threat classification to account for fires caused by commercial operations and farm-related structures. For a detailed description of these data and methods please visit <http://www.cdpr.ca.gov>.

## CALIFORNIA BIOMASS ENERGY FACILITIES

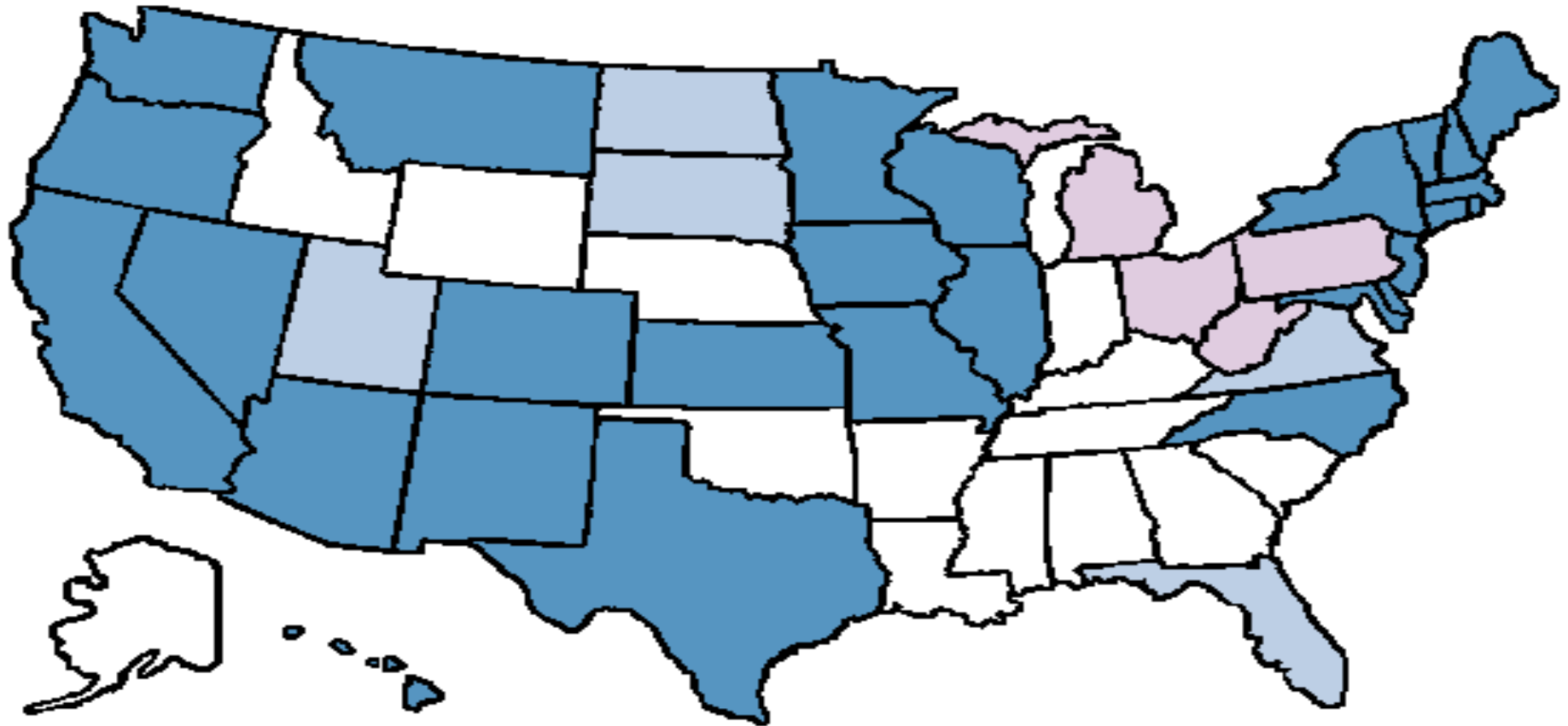
Location	#Facilities	Mt/DW
Anderson	1	50
Big Valley	1	7
Burney	1	60.0
Clare	1	5
Chico State	1	25
Chicochilla	1	10
Delano	1	50
Del Oro	1	11.2
El Nido	1	10
Freshwater	1	17.0
Fresno	1	35
Linden	1	5
Lodi/Elk	1	40
Madras	1	25
Mecca	1	47
Modesto	1	15
Oroville	1	18
Quincy	1	12.5
Stockton	1	25
Scotts	1	10
Sonoma	1	25.0
Stockton	1	64.0
Terra Bella	1	25.0
Tracy	1	18.0
Wendell	1	30
Westwood	1	12
Williams	1	20
Woodland	1	25
<b>TOTAL</b>	<b>31</b>	<b>661.6</b>



Source: State of California, FRAP (Map); California Forestry Association (Oct. 2005)



# Renewable Portfolio Standards

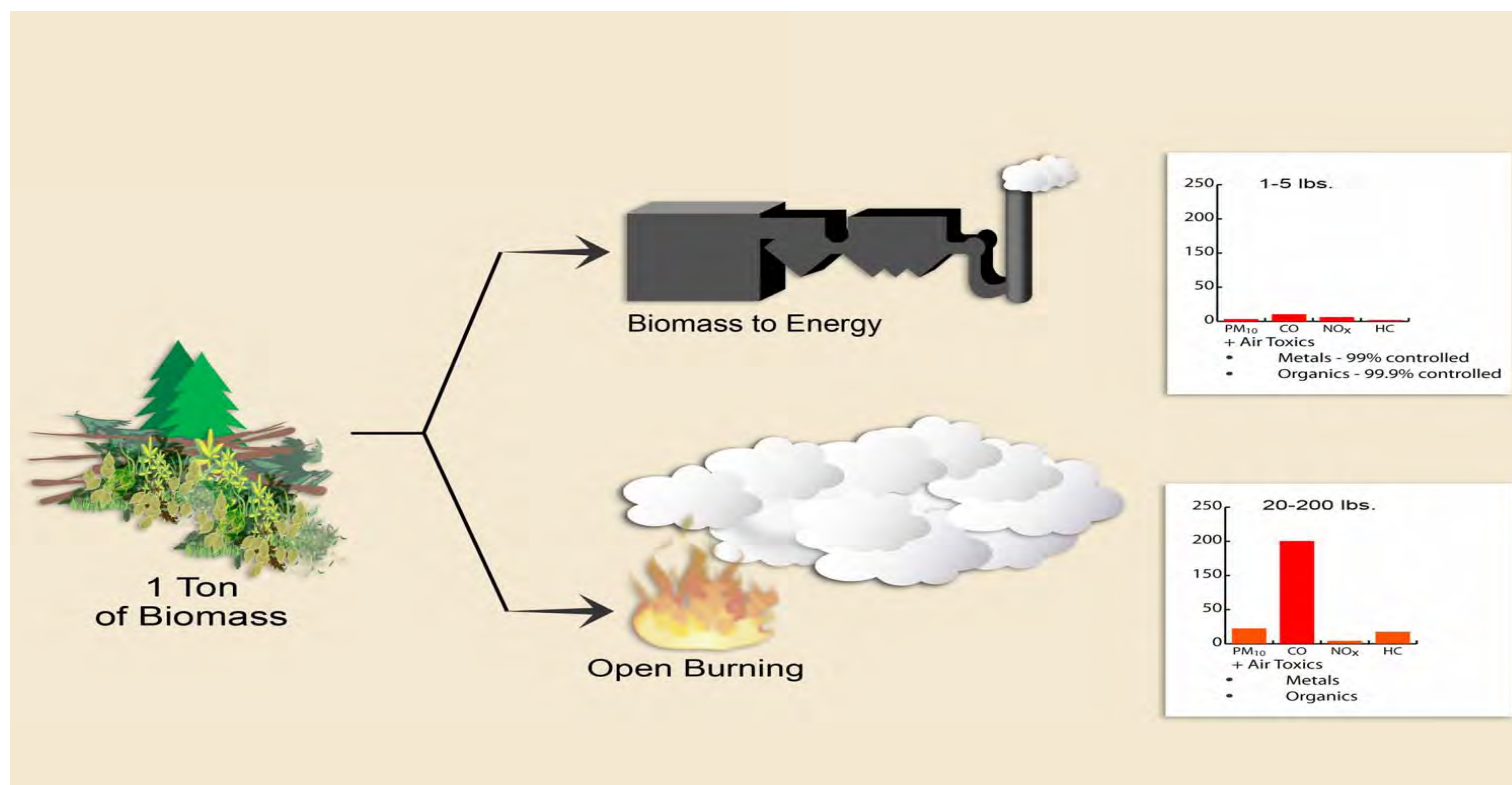


- Renewable Portfolio Standard
- Alternative Energy Portfolio Standard
- Renewable or Alternative Energy Goal

# Advantages of Biomass When Compared to Wind and Solar Energy

- Provides baseload renewable energy (24/7) on a cost effective basis.
- Has numerous societal benefits:
  - Supports hazardous fuels reduction and healthy forests
  - Provides employment (4.9 jobs/MW)
  - Greenhouse gas reduction displacing fossil fuels
  - Reduces waste material destined for landfills
  - Net improvement in air quality

# Improving Air Quality



# Carbon “Neutral”

- Biomass absorbs carbon dioxide during growth of wood and green materials, and emits it during conversion
- It recycles the carbon and does not add to the greenhouse effect
- It displaces fossil fuel



# New Influencing Factors Effecting Biomass Plants (existing+planned)

- Growing waste disposal issues/opportunities.
- Renewable energy gov't mandates/incentives.
- New financial and owner groups looking for renewable energy business deals.
- Fossil fuel pricing – abrupt current and future price increases.
- Acceleration in the development of new biomass to energy conversion technologies.
- Greenhouse gas reduction opportunities.



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