

STATUS UPDATE OF CALIFORNIA'S BIOMASS POWER SECTOR



Forest Vegetation
Management
Conference

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PRESENTATION OVERVIEW

- Brief history and overview of California's biomass power sector
- Governor's Oct 30, 2015 proclamation and its implications
- BioRAM I
- BioRAM II
- Current status
- SB 1122
- Observations
- Questions



ABBREVIATED HISTORY OF THE CALIFORNIA BIOMASS POWER SECTOR



- Forest products sector was an early adopter.
- Public Utilities Regulatory Policy Act of 1978 (Federal).
 - Market response – 60+ new biopower plants (approx. 900+ MW of generation capacity).
- Power contract buyouts.
- CA Renewable Portfolio Standard – 50% renewable by 2030.
- Currently 21 operating plants (approx. 560 MW of capacity).
- Senate Bill 1122.
- Gov's Proclamation
- SB 859



GOVERNOR'S EMERGENCY PROCLAMATION (OCT 2015)

8. The California Public Utilities Commission shall utilize its authority to extend contracts on existing forest bioenergy facilities receiving feedstock from high hazard zones.
9. The California Public Utilities Commission shall take expedited action to ensure that contracts for new forest bioenergy facilities that receive feedstock from high hazard zones can be executed within six months, including initiation of a targeted renewable auction mechanism and consideration of adjustments to the BioMat Program defined pursuant to Public Utilities Code section 399.20. No later than six months after the BioMat program begins, the California Public Utilities Commission shall evaluate the need for revisions to the program to facilitate contracts for forest bioenergy facilities.

RESPONSE TO GOVERNOR'S EMERGENCY PROCLAMATION

- CA Legislature Response:
 - Senate Bill 859 is signed by the Governor in Sept 2016.
- CA PUC response:
 - Directed investor owned utilities (PG&E, SCE, SDG+E) and publicly owned utilities (SMUD, LADWP, IID, MID, etc.) to procure power from facilities that source forest biomass using the Renewable Auction Mechanism.
 - BioRAM only applies to IOU's and POU's with at least 100,000 customers.
 - Target allocation is at least 180 MW.
 - Applies only to biomass power plants on line before June 1, 2013.



BIORAM I AND BIORAM II DETAILS

- Power Purchase Agreements are a minimum of five years duration targeting 180 MW (minimum).
- BioRAM I fuel requirements:
 - 2016: 40% from HHZ
 - 2017: 50% from HHZ
 - 2018: 60% from HHZ
 - 2019 and out: 80% from HHZ
- BioRAM II fuel Requirements:
 - 80% from “sustainable” forest management with at least 60% from HHZ.
- Fuel tracking protocols require plants to report quarterly to the IOU’s.
- If plants do not meet minimum fuel sourcing requirements then either the PPA is terminated or the energy price drops to \$89.23/MWh.





BIORAM I AND II FACILITIES

FACILITY	SCALE (MW)	ANNUAL FEEDSTOCK USAGE (BDT/YEAR)	OPERATION DATE
Pacific Ultrapower Chinese Station	18	160,000	3/1/2017
Rio Bravo Fresno Biomass	24	200,000	1/2/2017
Rio Bravo Rocklin Biomass	24	200,000	1/2/2017
Burney Forest Power	29	232,000	10/1/2017
Wheelabrator (BioRam II)	34	300,000	12/1/2017
Greenleaf Power / Honey Lake	24	200,000	1/1/2017
Totals	153	1,292,000	



BIORAM I AND II FACILITY FUEL MANAGERS

FACILITY	Fuel Manager	Email address	Phone
Pacific Ultrapower Chinese Station	Dennis Serpa	dserpa@chinesestation.net	209.984.4660
Rio Bravo Fresno Biomass	Hector Lara	hlara@rbfresno.com	559.264.4575
Rio Bravo Rocklin Biomass	Eric Olsen	eolsen@rbrocklin.com	916.645.3383
Burney Forest Power	Tom Hickman	thickman@burneyforest power.com	530.335.5023
Wheelabrator (BioRam II)	Gordon Bauer	gbauer@wtienergy.com	530.339.7626
Greenleaf Power / Honey Lake	Mark Shaffer	mshaffer@greenleaf-power.com	530.254.6161

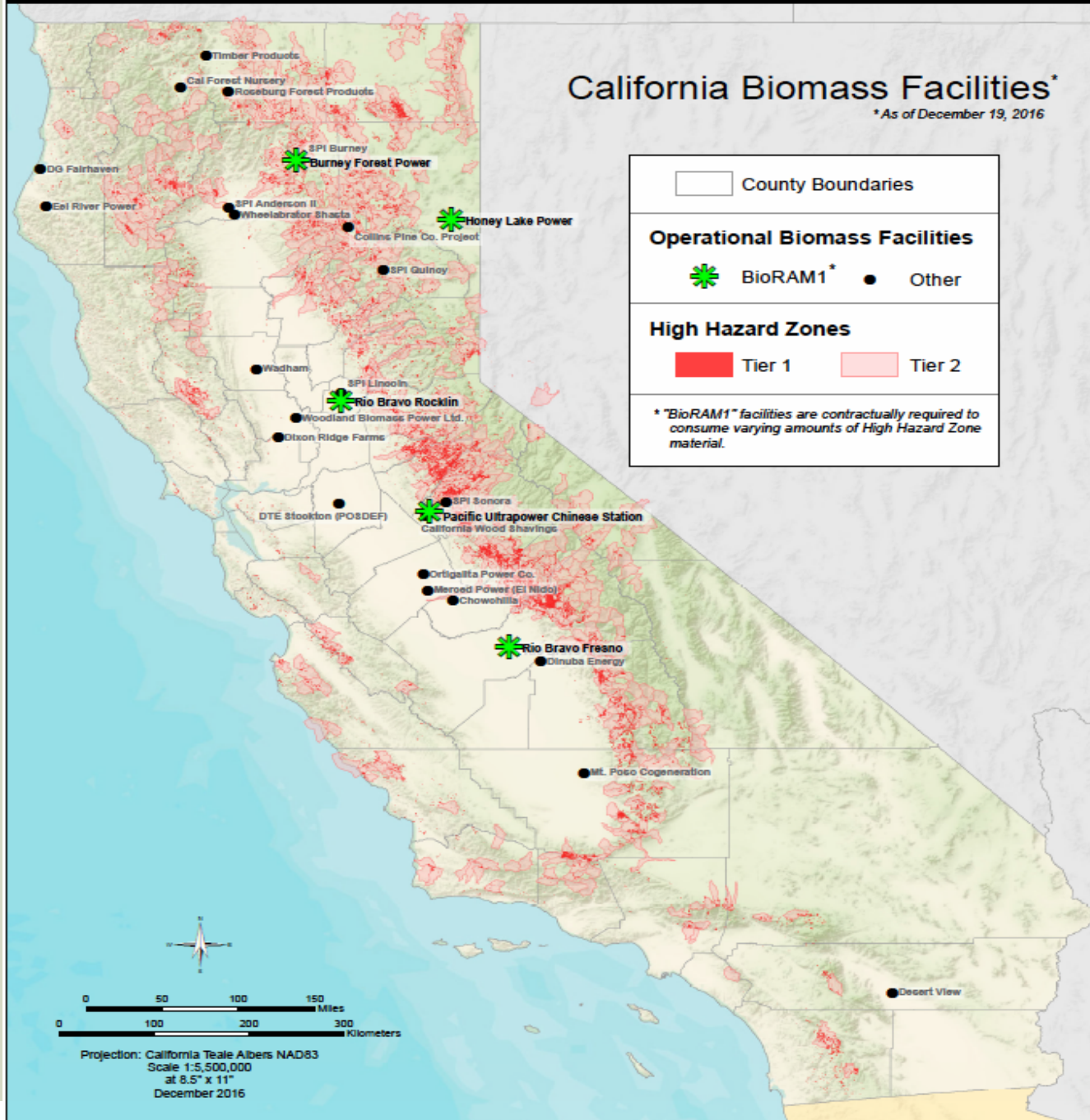
CURRENT OPERATING FACILITIES

- 21 biomass plants in commercial service – about 540 MW capacity.
- Utilize a blend of urban, ag and forest feedstocks. Urban feedstock is the low price leader, then ag, with forest biomass as the highest priced.
- Power Purchase Agreements for many of these facilities term out by 2020.
- Six existing plants have PPAs extended due to Governor Brown's October 30 Proclamation and SB 859.
- 15 idle plants with about 260 MW capacity.
- Most recent entry is SPI Anderson at 31 MW.



California Biomass Facilities*

*As of December 19, 2016



SB 1122 BIOENERGY MARKET ADJUSTING TARIFF (BIOMAT)

- Signed into law Sept 2012.
- Bioenergy specific carve out for 250 MW of small-scale (3 MW or less) distributed generation.
 - Urban sourced – 110 MW
 - Dairy and other Ag sourced – 90 MW
 - Forest sourced – 50 MW
- Designed to address waste diversion and air emissions reduction goals of the CA Energy Commission, CalRecycle, CA Air Resources Board and the State's Bioenergy Action Plan.
- Administered by the CA Public Utilities Commission.
- Initial BioMAT auction likely to take place starting February 2016.

SENATE BILL 1122 FEEDSTOCK REQUIREMENTS FOR FOREST BIOMASS

- At least 80% sourced as byproducts of “Sustainable Forest Management”
 - Sustainable Forest Management as designated by CPUC
 - Verified by third party
- Other 20% of feedstock:
 - Byproducts of agricultural operations
 - Clean urban wood waste
- Annual Reporting to the CPUC
 - Volume by feedstock type





Phoenix Energy 500 kWh Gasification Unit at
Merced, CA



COMMUNITY-SCALE BIOPOWER FACILITY EXAMPLE – NORTH FORK COMMUNITY POWER

- 2 MW project being considered at North Fork, California.
- New plant construction cost = \$10 to \$12 million.
- Will consume about 46 BDT/day (approx. 1BDT/MWh burn rate).
- Biomass transported approx. 30 - 40 miles (one way).
- Most feedstock in the early years will be cull logs from drought and beetle kill clean up/restoration.
- Commercial operations should commence Q2 2017.
- Average electrical energy economic production cost:
~ \$0.15 - \$0.17/kWh



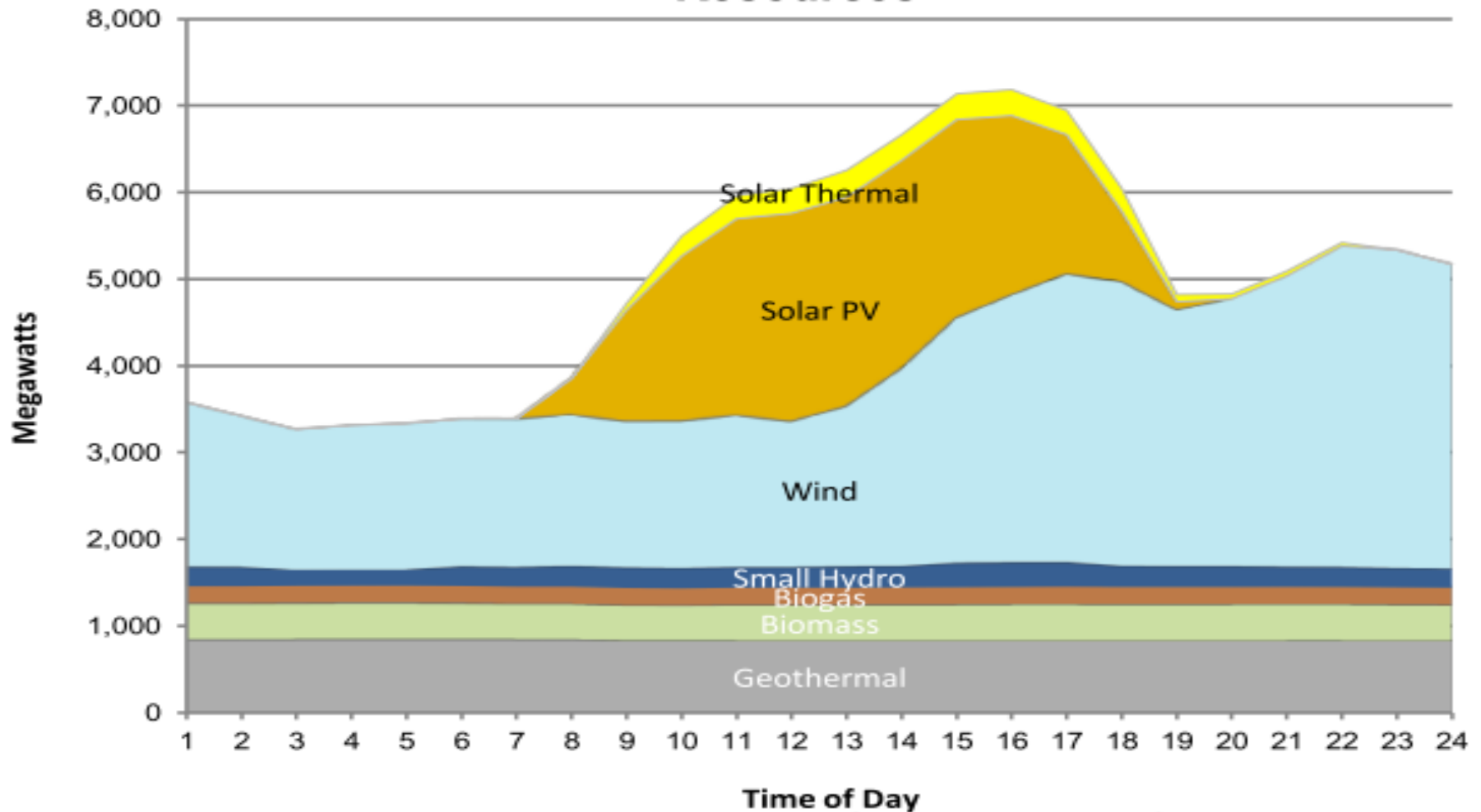
SB 1122 PROJECTS IN EARLY PHASE DEVELOPMENT

Facility	Scale (MW)	Annual Feedstock Usage (BDT/Year)	Location
North Fork Community Power	2	16,000	North Fork
CHIPS Value-Added Product Yard	3	24,000	Wilseyville
Burney Hat Creek Bioenergy	3	24,000	Burney
Crescent Mills Wood Utilization Campus	3	24,000	Crescent Mills
Collins Pine	3	24,000	Chester
Camptonville Community Partnership	3	24,000	Camptonville
Nevada County Bioenergy	3	24,000	Grass Valley
Mariposa Biomass Project	2	16,000	Mariposa
Totals	22	176,000	

THE LONG-TERM FUTURE OF BIOMASS POWER PLANTS IN CALIFORNIA DEPENDS ON ...

- Relative price of natural gas and power.
- Environmental issues:
 - Air emissions – particulate, black carbon, etc.
 - Carbon accounting
- Technological innovation – biomass plants as dispatch-able assets. Maybe power storage?
- KEY - Monetization of societal and ratepayer benefits:
 - e.g., AB 590

Hourly Average Breakdown of Renewable Resources



This graph shows the production of various types of renewable generation across the day.

Source: [HTTP://content.caiso.com](http://content.caiso.com)
September 17, 2013

ADDITIONAL RESOURCES

Tree Mortality Viewer

<http://egis.fire.ca.gov/TreeMortalityViewer/>

Statewide Wood Energy Team

<http://ucanr.edu/sites/swet/>

Placer Co Air Pollution Control District

<http://www.placer.ca.gov/departments/air/apcdbiomass>

CA Biomass Energy Alliance

<http://www.calbiomass.org/>

Bioenergy Association of California

<http://www.bioenergyca.org/>

UC Division of Ag and Natural Resources

<http://ucanr.edu/sites/WoodyBiomass/>

QUESTIONS or HECKLING REMARKS?



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