CALIFORNIA'S BIOENERGY INDUSTRY

Agriculture Advisory Committee for Air Quality
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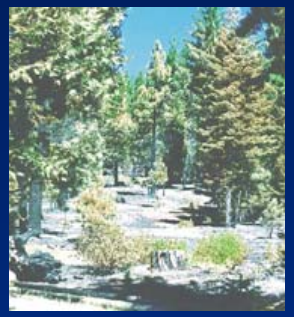
CA has 35 Operating BioEnergy Plants

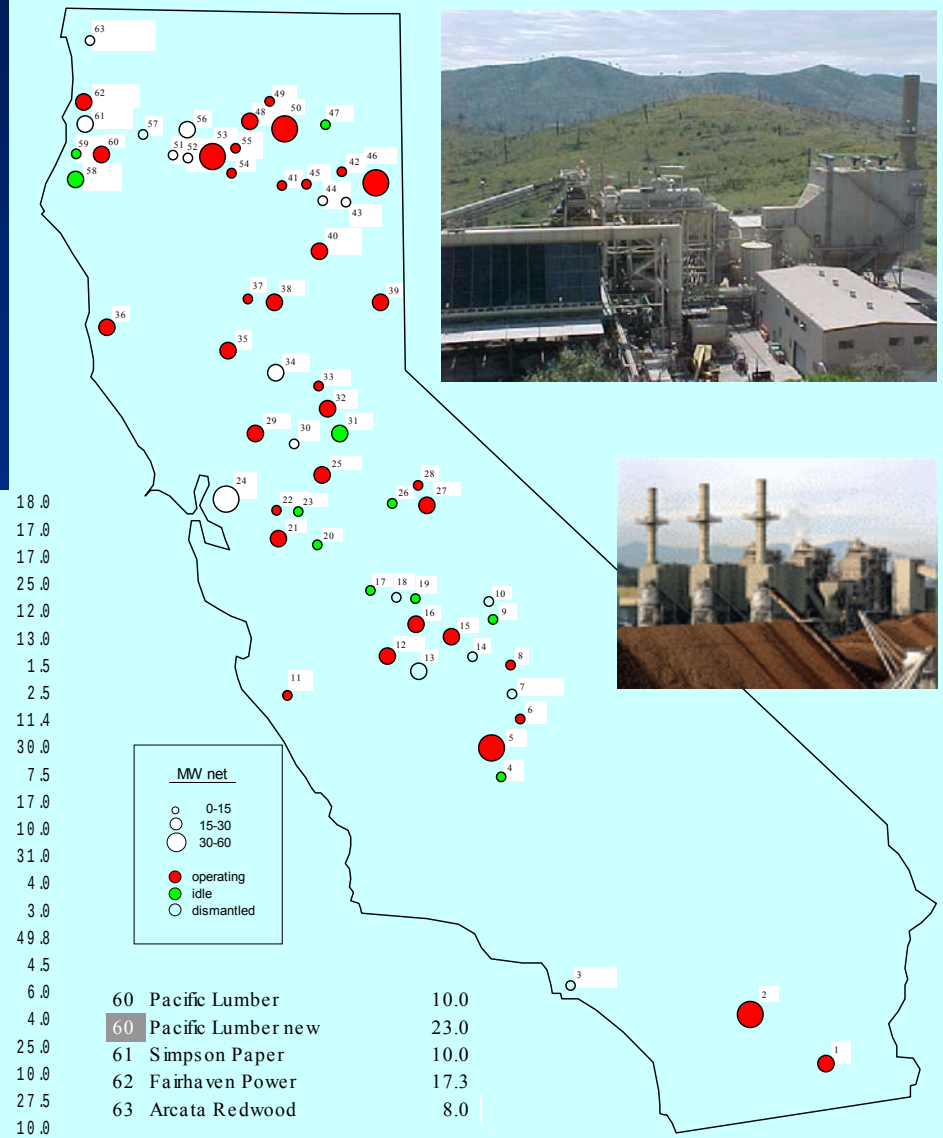
- Range in size from 5 to 50 MW
- Produce 1.5% of CA's power
- Use a variety of urban, forest, and agricultural wood residues
- 14 Use orchard/vineyard wood waste

California Biomass Power Plants in 2002

	Project	Net MW
1	Primary Power/Brawley	15.0
2	Colmac Energy	47.0
3	Proctor & Gamble	13.5
4	Apex Orchard	5.5
5	Delano/AES	27.0
5	Delano/AES unit 2	21.0
6	Sierra Forest Products	9.3
7	Lindsay Olive	2.2
8	Dinuba Energy	11.5
9	Auberry Energy	7.5
10	North Fork Energy	8.0
11	Soledad Energy	13.5
12	Mendota Biomass/AES	25.0
13	Agrico Cogen	25.0
14	Sanger (biomass ◇ feed)	0.0
15	Rio Bravo Fresno	25.0
16	EPI Madera	25.0
17	SJVEP--El Nido	10.2
18	SJVEP--Chowchilla I	9.9
19	SJVEP--Chowchilla II	10.8
20	Redwood Food Pkg	4.5
21	Tracy Biomass	19.5
22	Diamond Walnut	4.5
23	California Cedar Products	0.8
24	Gaylord Antioch	30.0
25	Capitol Power, Ione	18.0
26	Fiberboard, Standard	3.0
27	Chinese Station	22.0
28	Sierra Pacific Sonora	7.0
29	Woodland Biomass NRG	25.0
30	Blue Diamond Growers	9.5
31	Martell Cogen	18.0
31	Martell Cogen reconditioned	10.0
32	Rio Bravo Rocklin	25.0
33	Sierra Pacific Lincoln	8.0
34	EF Feather River	16.5
35	Wadham Energy	26.5
36	Georgia Pacific	15.0
37	Koppers	5.5
38	Pacific Oroville Power	18.0
39	Sierra Pac. Loyalton	17.0
40	Sierra Pacific Quincy	17.0
40	Sierra Pacific Quincy new	25.0
41	Collins Pine	12.0
42	Sierra Pac. Susanville	13.0
43	Lassen College	1.5
44	Jeld Wen Industries	2.5
45	Covanta Westwood	11.4
46	Honey Lake Power	30.0
47	Big Valley Lumber	7.5
48	Sierra Pacific Burney	17.0
49	Covanta Burney	10.0
50	Burney Forest Products	31.0
51	Roseburg Lumber	4.0
52	Paul Bunyan	3.0
53	Wheelabrator Shasta	49.8
53	Wheelabrator Shasta unit 2	4.5
54	Wheelabrator Hudson	6.0
55	Sierra Pacific Anderson	4.0
56	Redding Power Delmarva	25.0
57	Sierra Pacific Hayfork	10.0
58	LP Samoa	27.5
59	Blue Lake	10.0
60	Pacific Lumber	10.0
60	Pacific Lumber new	23.0
61	Simpson Paper	10.0
62	Fairhaven Power	17.3
63	Arcata Redwood	8.0



Thinned Forest Survived Fire



Source: Green Power Institute 2002

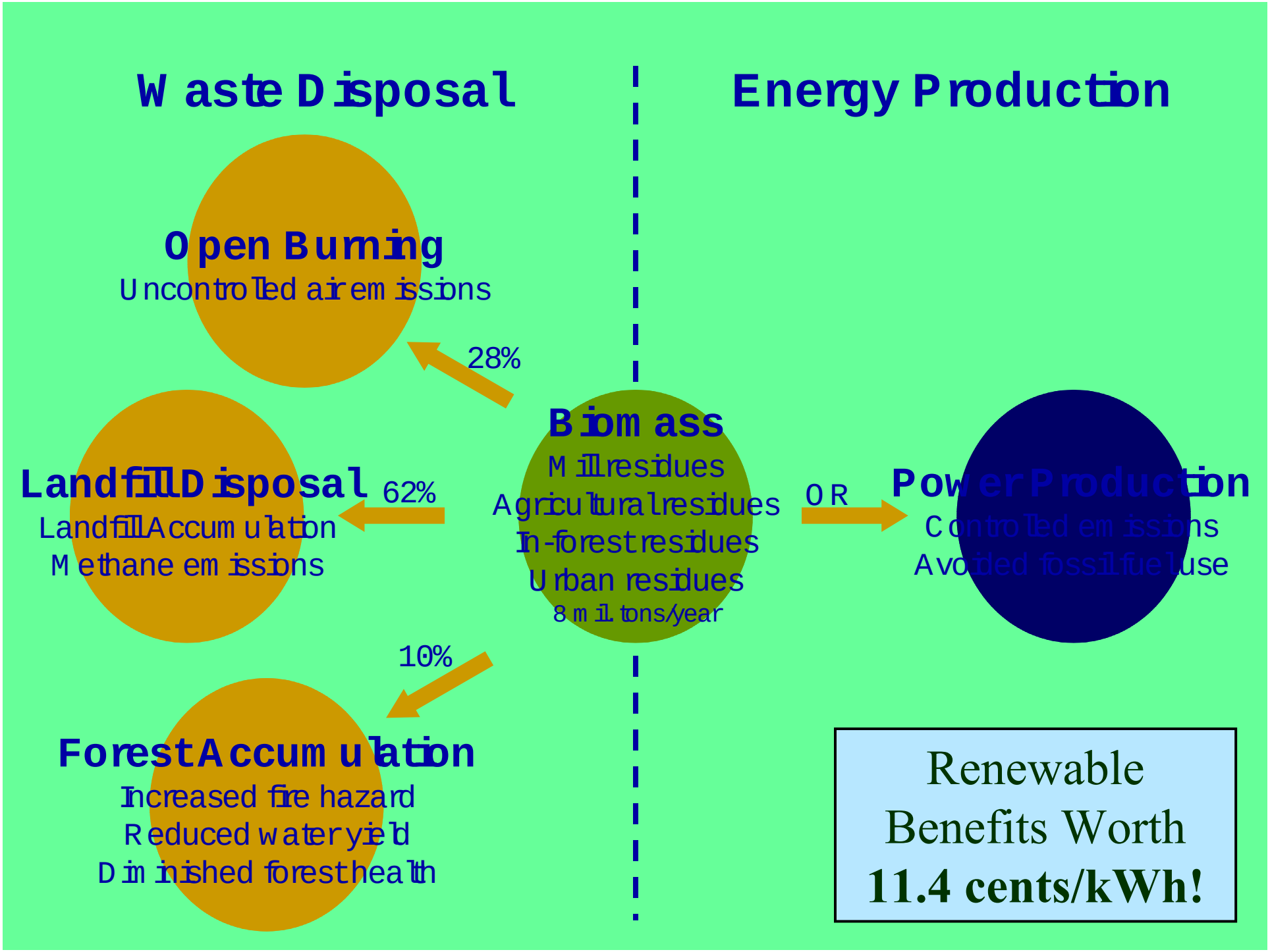
End Product

BioEnergy Plants Burn Wood in Modern Boilers and Make:

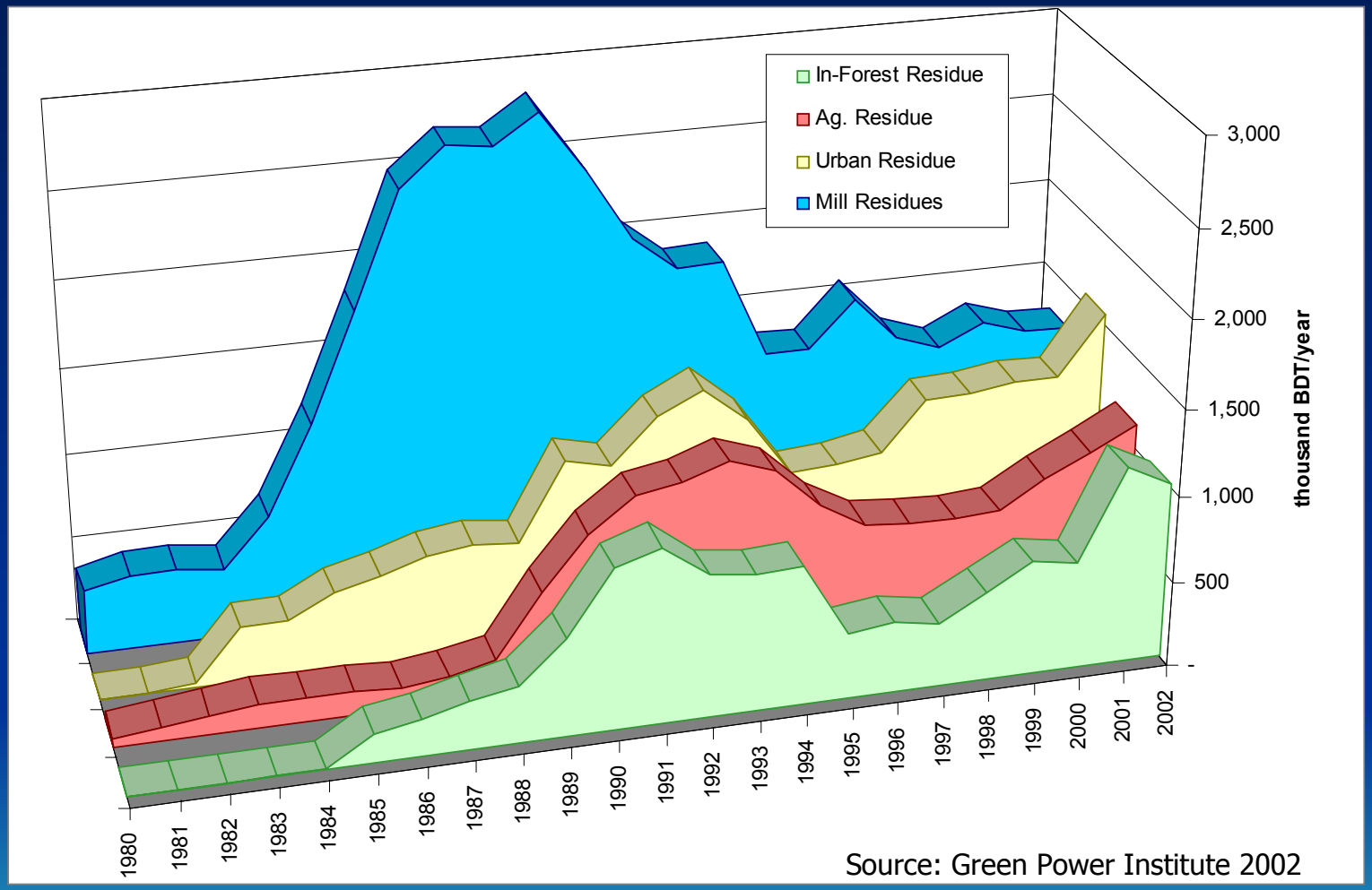
- Steam
- Electricity
- Ash
- Minimal Air Emissions

Environmental Benefits of Biomass Energy Production

- Avoidance of fossil fuel use
- Avoidance of landfill disposal of biomass residues
- Avoidance of open burning of agricultural and forestry residues
- Improved management of forests and watersheds
- Reduction of greenhouse gas emissions

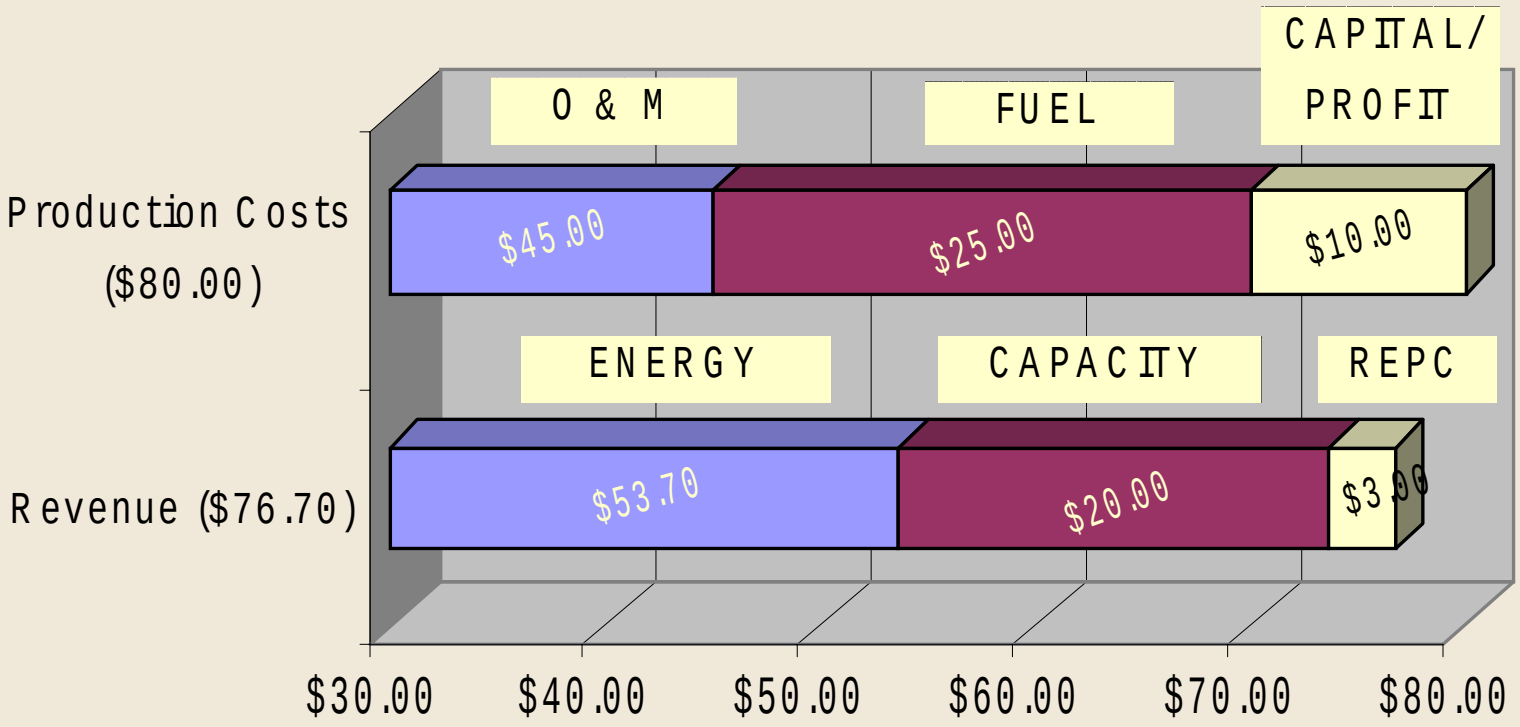

Waste Disposal
Energy Production
Open Burning
Uncontrolled air emissions
28%
Landfill Disposal
Landfill Accumulation
Methane emissions
62%
Biomass
Mill residues
Agricultural residues
In-forest residues
Urban residues
8 mil. tons/year
OR
Power Production
Controlled emissions
Avoided fossil fuel use
10%
Forest Accumulation
Increased fire hazard
Reduced water yield
Diminished forest health
Renewable
Benefits Worth
11.4 cents/kWh!

California Biomass Fuels Market by Category

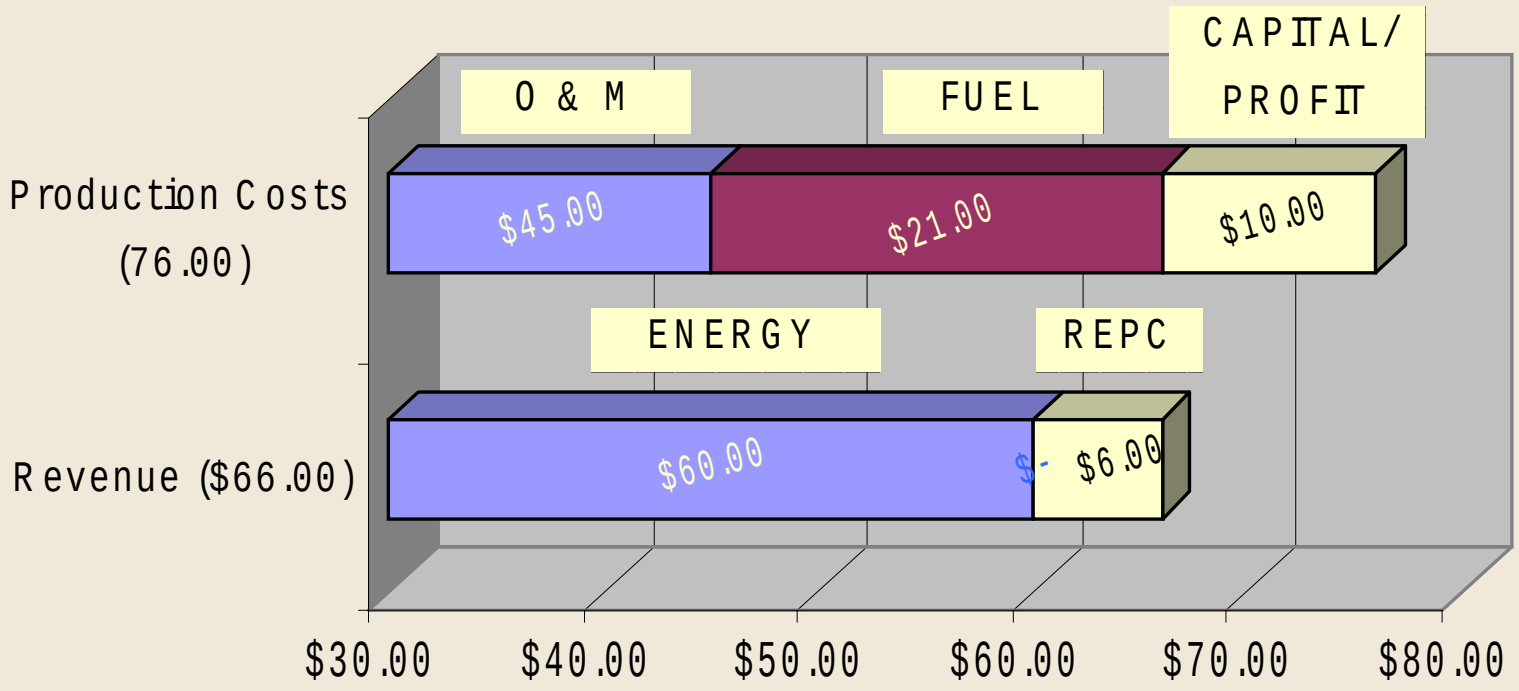


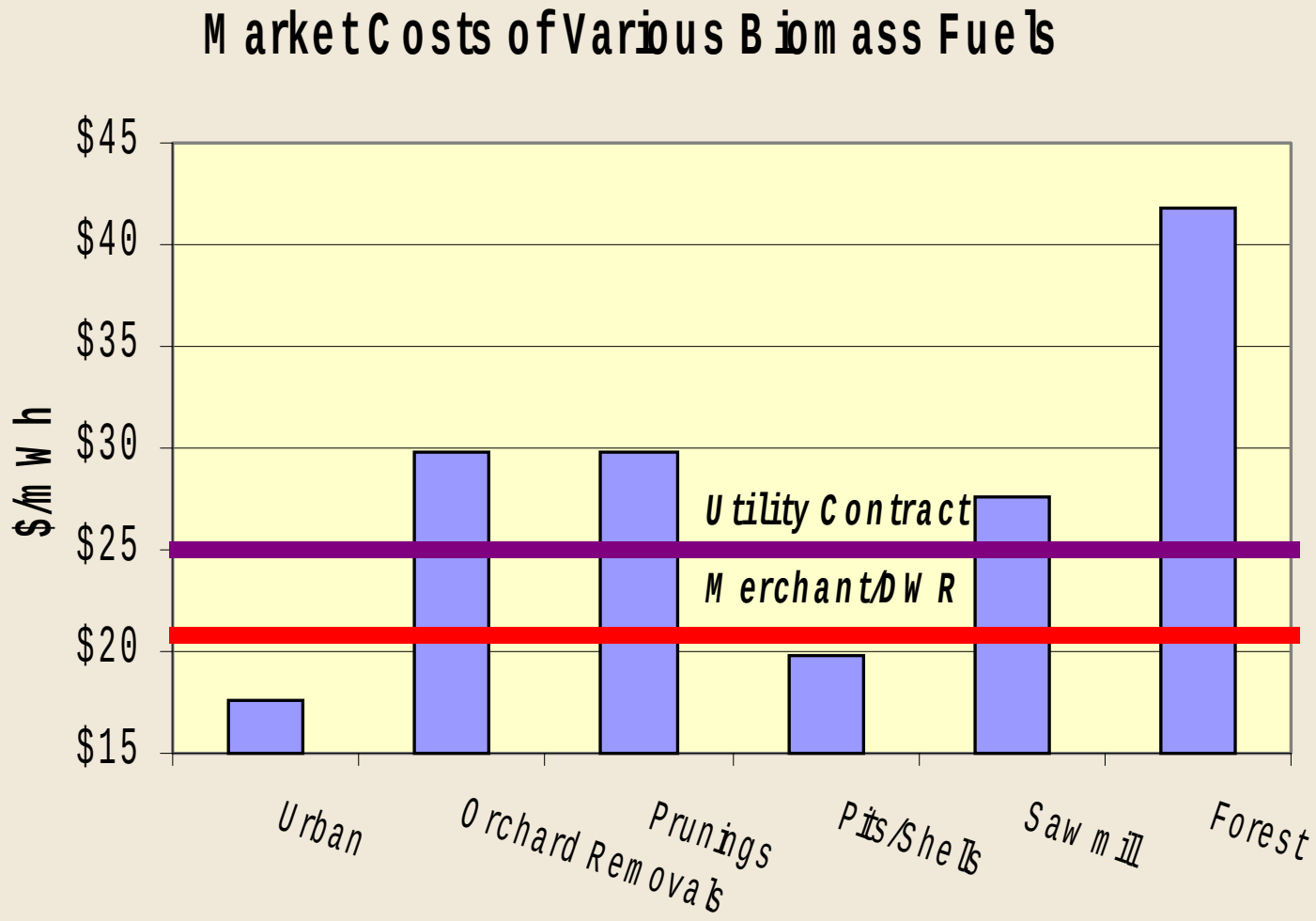
Source: Green Power Institute 2002

Production Costs vs. Revenues for a Typical Valley Biomass Plant (Utility Contract)



Production Costs vs. Revenues for a Typical Valley Biomass Plant (Merchant/DWR)




Market Costs of Various Biomass Fuels
$45
$40
$35
$30
$25
$20
$15
$/MWh
Utility Contract
Merchant/DWR
Urban
Orchard Removals
Prunings
Pits/Shells
Sawmill
Forest

Spring of 2003

- 26 Plants With Long-term Utility Contracts
  - Negotiated 5-year fixed price deals for 5.37 cents/kWh
  - Utilities continue to pay back money owed over time
- 3 Plants With Short-term (3-5 yr.) Contracts
- 6 Merchant Plants
  - 3 with 180-day contracts, terminate June 30
  - CPUC proceedings on RPS
  - Summer spot market?