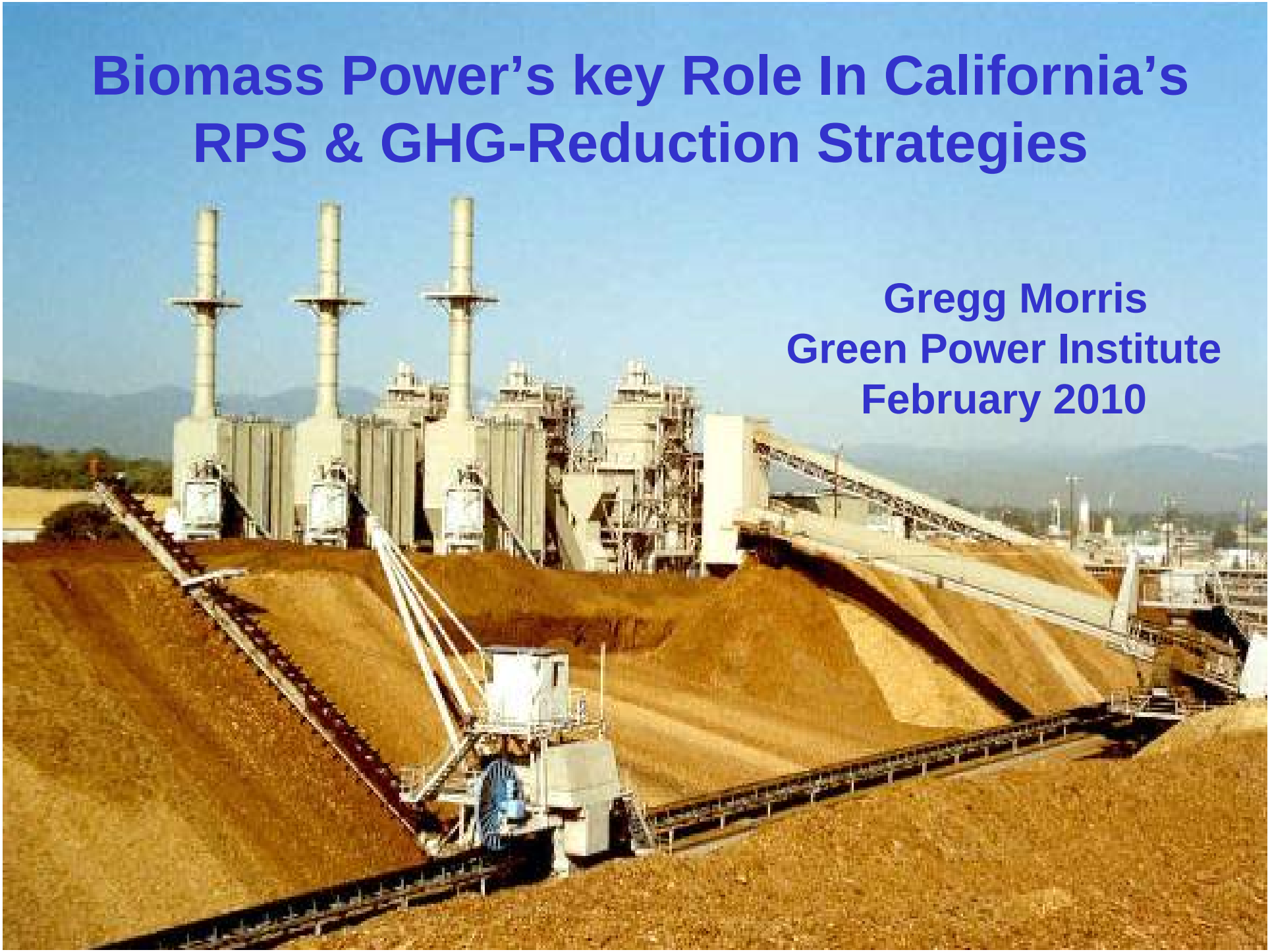
Biomass Power's key Role In California's RPS & GHG-Reduction Strategies



Gregg Morris
Green Power Institute
February 2010

California RPS 2002

IOUs: 13.5 % renewable in 2002

Statewide: ~ 10 % renewable

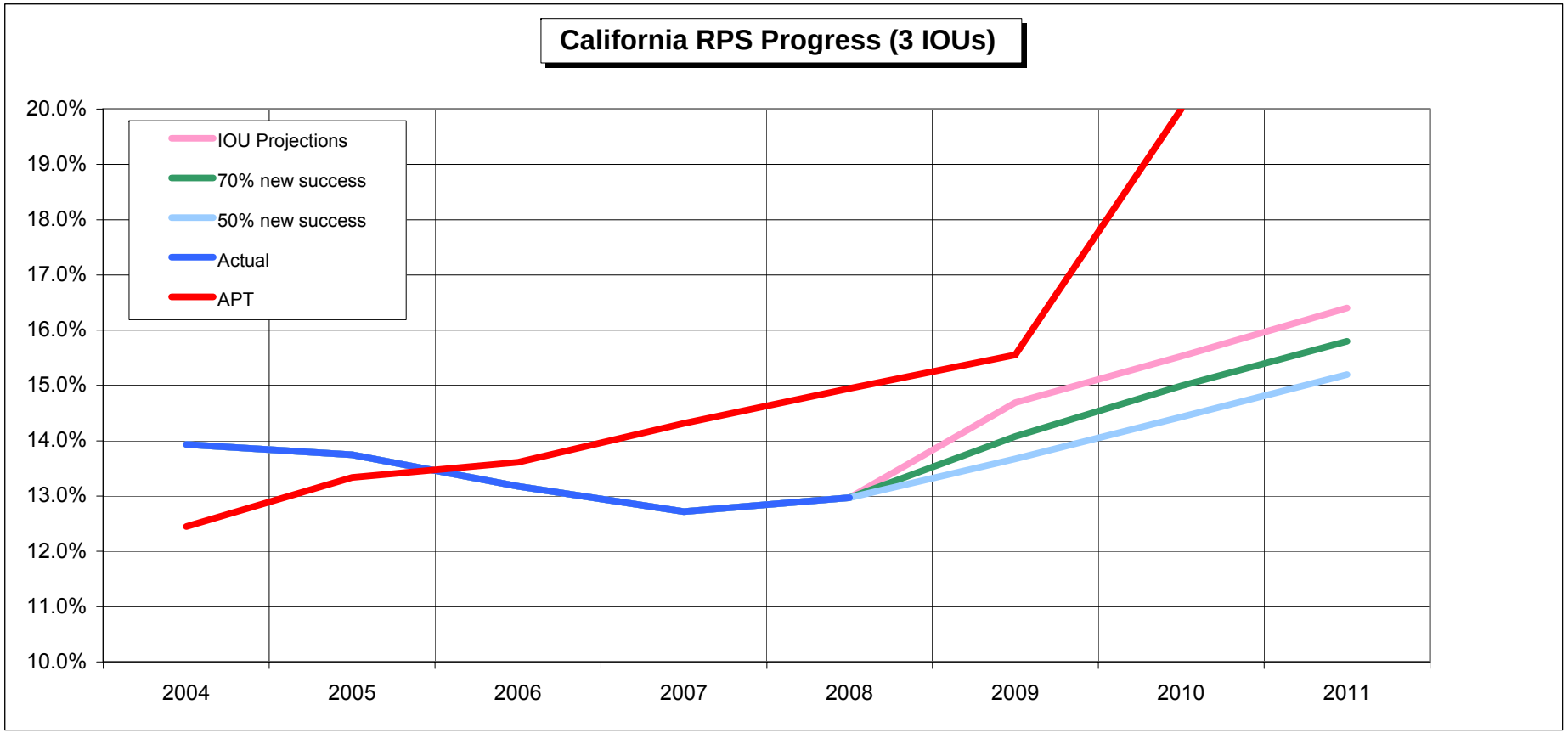
(most of renewables in CA went to IOUs)

RPS Mandates

20 % statewide by 2010

33% statewide by 2020

Renewable Production to Triple


California RPS Progress (3 IOUs)
20.0%
19.0%
18.0%
17.0%
16.0%
15.0%
14.0%
13.0%
12.0%
11.0%
10.0%
IOU Projections
70% new success
50% new success
Actual
APT
2004
2005
2006
2007
2008
2009
2010
2011

Executive Order S-06-06

Maintain bioenergy at 20% of RPS portfolio

Biomass and the RPS

22% in 2003 → 19% in 2008

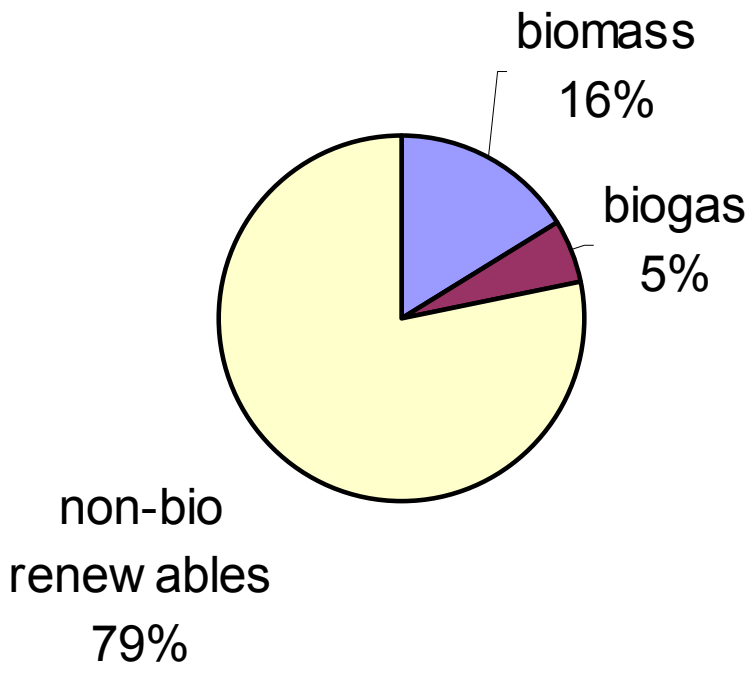
Renewables 03 – 08

Mandate: 43%

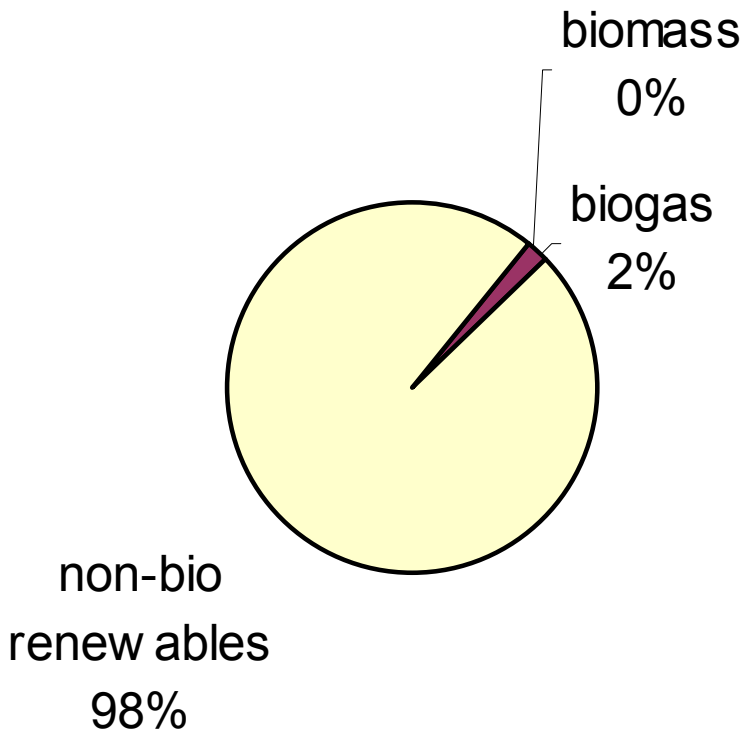
Actual: 3.4%

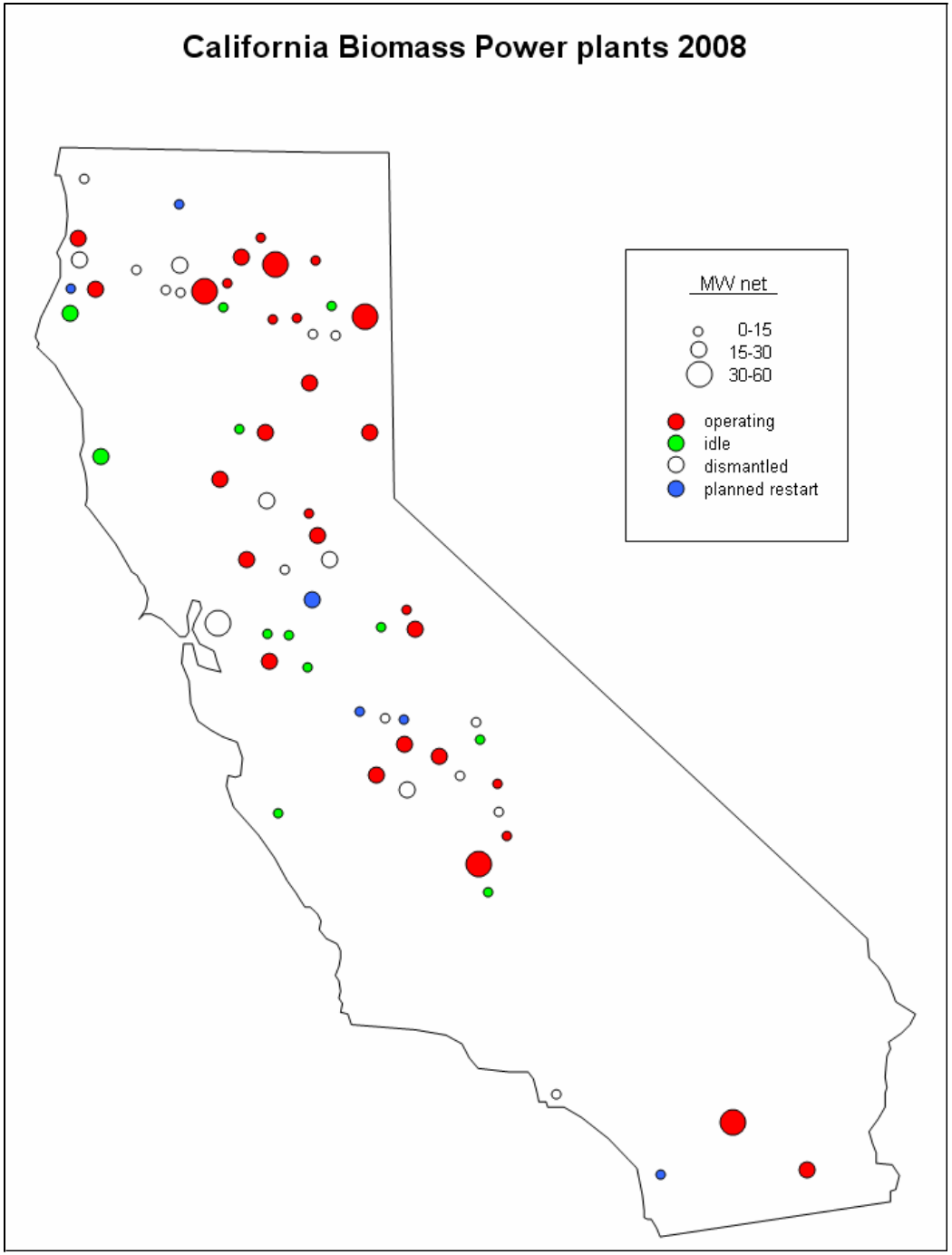
Biomass would be 14%

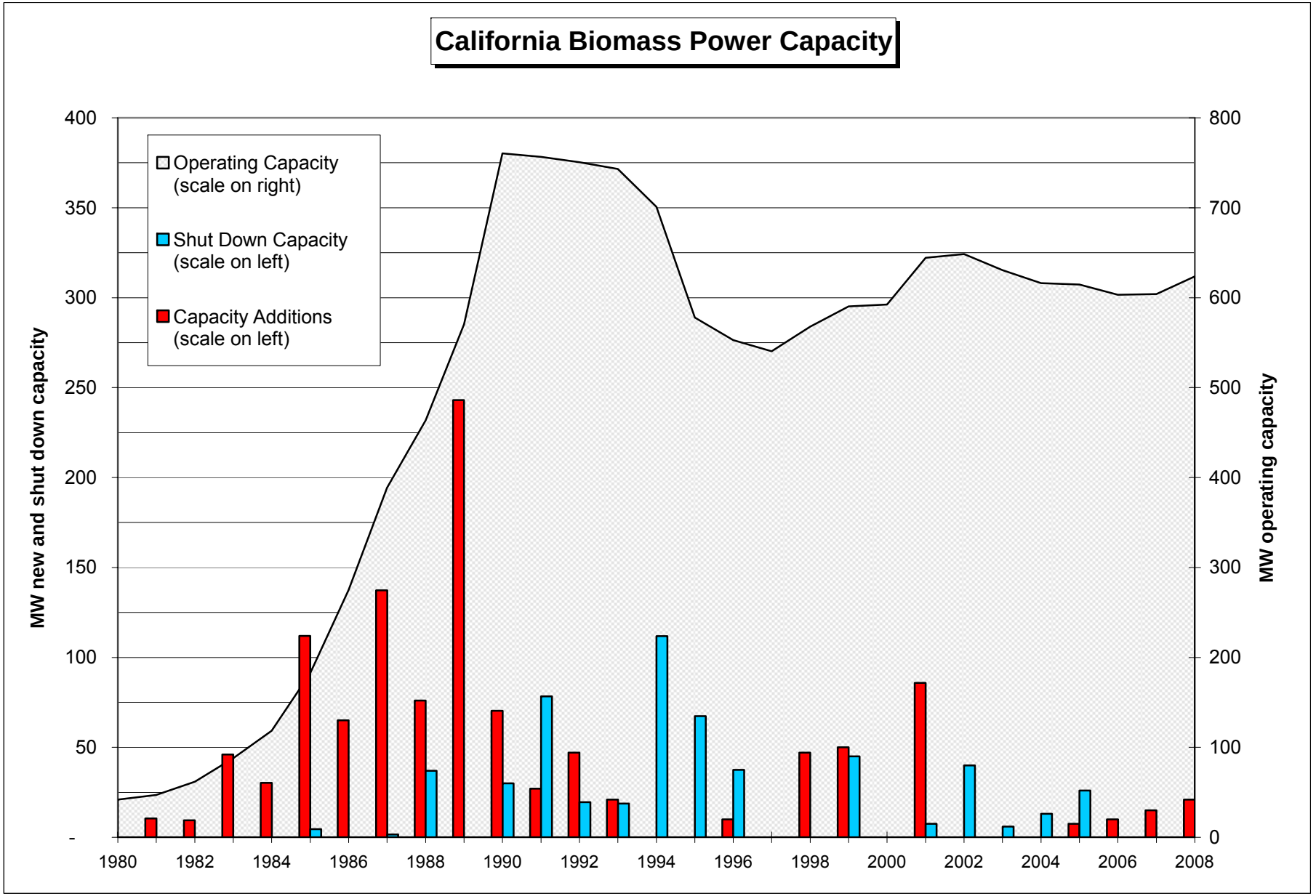
CA IOUs, Renewable Portfolio 2006



CA IOUs, Projected New Renewables 2006 – 2013




California Biomass Power plants 2008
MW net
0-15
15-30
30-60
operating
idle
dismantled
planned restart


California Biomass Power Capacity
Operating Capacity (scale on right)
Shut Down Capacity (scale on left)
Capacity Additions (scale on left)
MW new and shut down capacity
MW operating capacity
400
350
300
250
200
150
100
50
-
800
700
600
500
400
300
200
100
0
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008

The Essential Dilemma

Biomass Energy is expensive to produce.

Not producing energy from biomass is expensive, in terms of the health and environmental costs of alternative disposal of the fuel.

Renewables, RECs, & GHGs

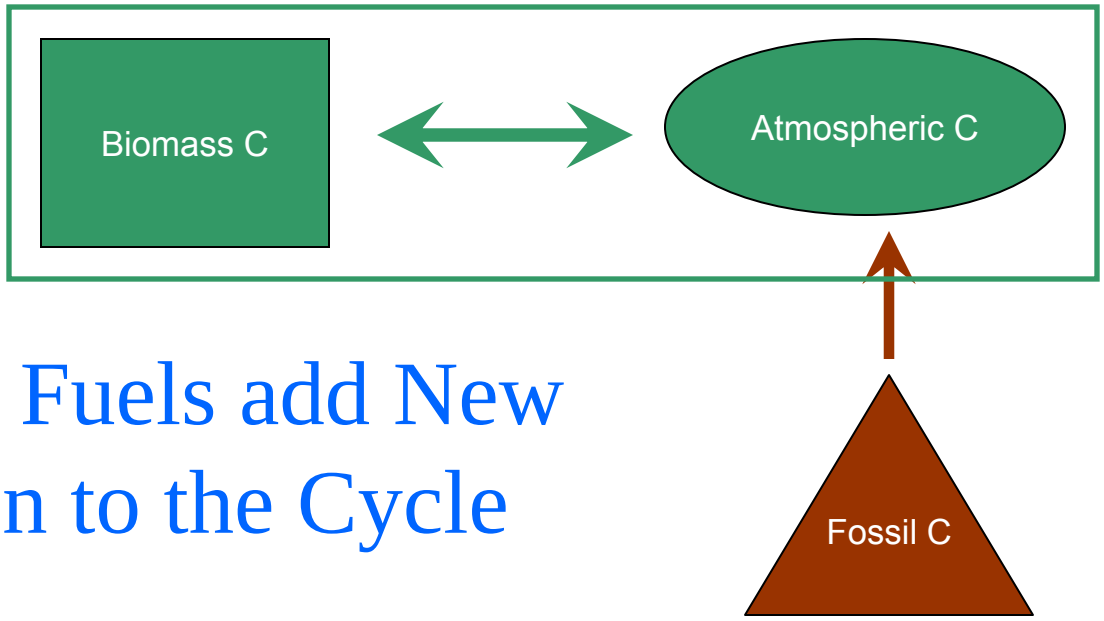
All Renewables are Carbon Neutral.

RECs contain the attribute of avoided fossil fuel use.

Renewables do not need allowances, and do not generate offsets based on avoided fossil fuel use outside of the REC.

GHGs and Biomass

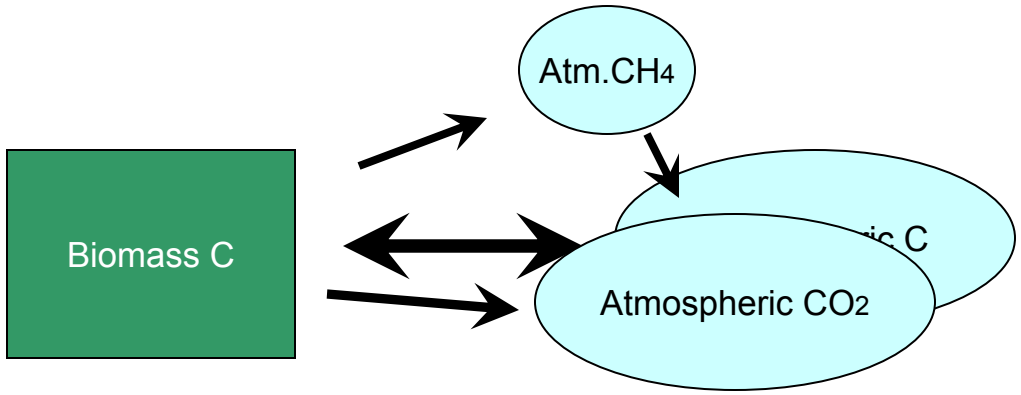
- Biomass is Carbon Neutral
  - Carbon stocks in the biosphere and atmosphere are already linked and in rapid exchange. No new carbon is being added to the system.

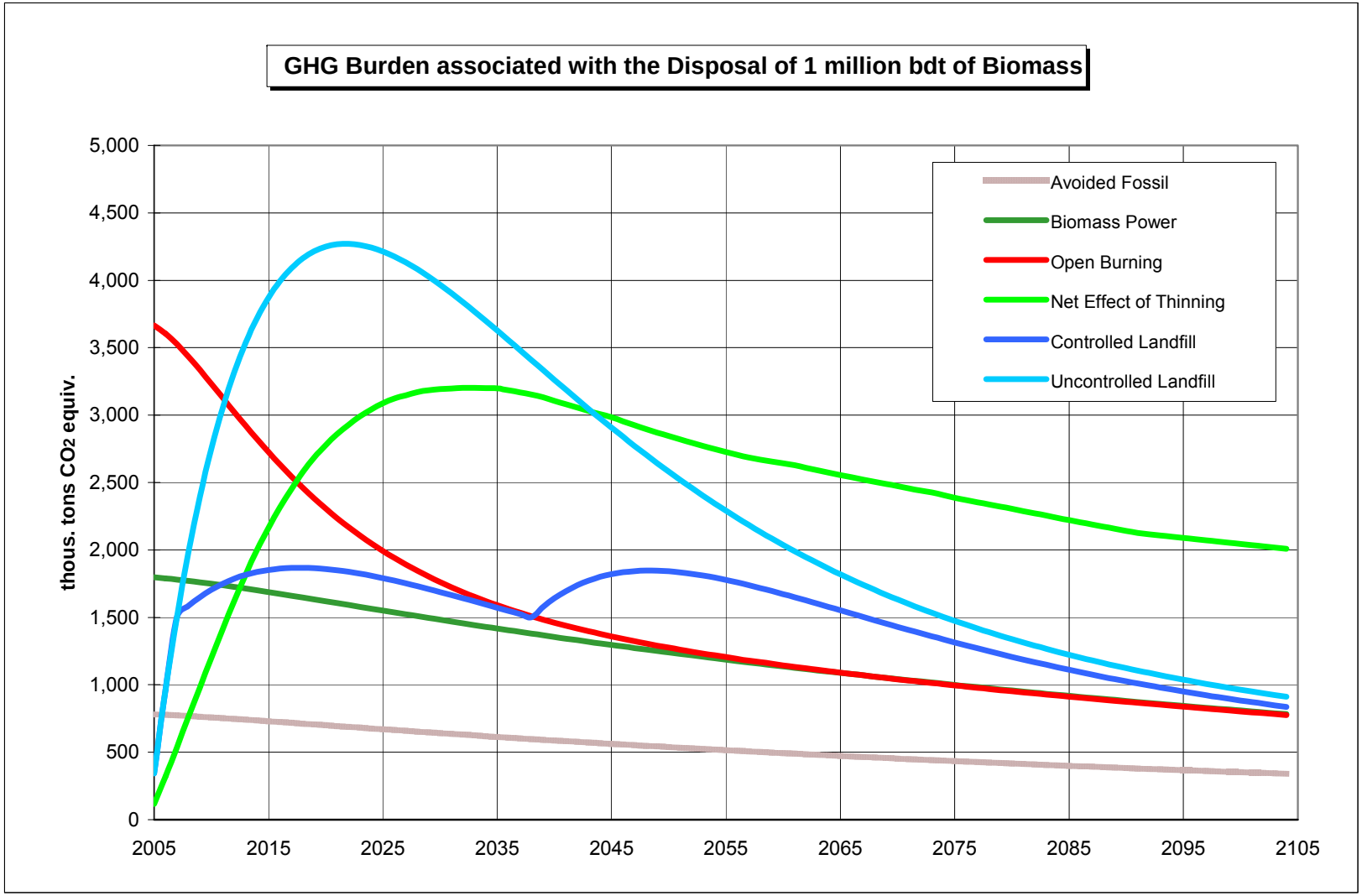


- Fossil Fuels add New Carbon to the Cycle

GHGs and Biomass

- It's More Complicated than that
  - Biomass stocks can grow or decline over time, either sequestering or releasing net carbon to the atmospheric stock.
  - Carbon can be emitted to the atmosphere in either oxidized (CO_2) or reduced (CH_4) form. Reduced is 25 times more potent as a greenhouse gas.

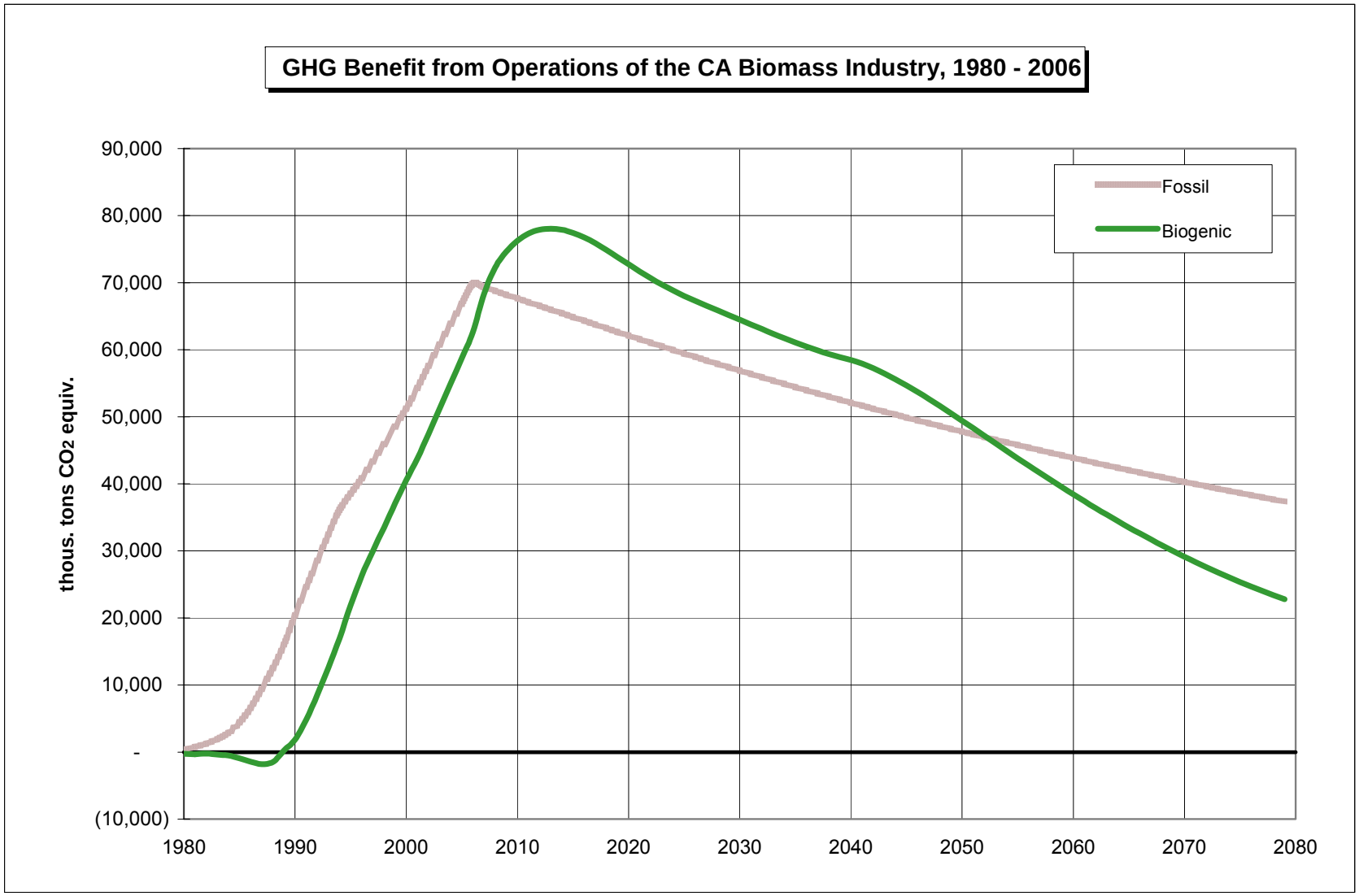



GHG Burden associated with the Disposal of 1 million bdt of Biomass
thous. tons CO2 equiv.
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2005
2015
2025
2035
2045
2055
2065
2075
2085
2095
2105
Avoided Fossil
Biomass Power
Open Burning
Net Effect of Thinning
Controlled Landfill
Uncontrolled Landfill

Greenhouse Gas Emissions Factors for Biomass and Biogas

(all factors expressed as equivalent year-1 emissions of CO_2 equivalents)

	ton/bdt	ton/bil.btu	ton/MWh
Biomass			
Net Reduction in Biogenic C			
Open Burning	0.62	36	0.62
Forest Accumulation	1.87	110	1.87
Uncontrolled Landfill	2.28	134	2.28
Controlled Landfill	0.27	16	0.27
Spreading	0.69	41	0.69
Composting	1.00	59	1.00
Kiln Boiler / Fireplaces	0.22	13	0.22
California Biomass Mix 2005	0.81	48	0.81
Avoided Fossil Fuel Use	0.80	47	0.80
Landfill Gas (LFG)			
Net Reduction in Biogenic C			
Uncontrolled Landfill		241	2.89
Controlled Landfill		22	0.26
Avoided Fossil Fuel Use		65	0.78
Dairy Manure			
Net Reduction in Biogenic C	2.88	180	8.64
Avoided Fossil Fuel Use	0.26	16	0.78


GHG Benefit from Operations of the CA Biomass Industry, 1980 - 2006
thous. tons CO2 equiv.
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
(10,000)
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
2080
Fossil
Biogenic

Next Steps - RPS

Implement program to achieve EO S-06-06 targets in the RPS program (bioenergy @ 20% of renewables).

- Continued support for existing facilities
- Bioenergy band within RPS
- General credit for bioenergy
- Targeted credits for specific biomass fuels (e.g. forest fuels, agricultural residues)

Next Steps - GHGs

Ensure that bioenergy is given proper treatment in the state's developing ghg programs

- California rules reserve the benefits beyond the REC for the generator
- The next big step is formulating the rules for ghg credits from biomass
- Credits tradable in robust market