

# Wood Bioenergy

Challenges and Opportunities on the North Coast

Peter Tittmann, UC Berkeley

# University of California Woody Biomass Utilization Program

John Shelly – UC Berkeley and UC  
Cooperative Extension  
jshelly@berkeley.edu

Peter Tittmann – UC Berkeley Center for  
Forest  
pwt@berkeley.edu

Program Funded in part through a Cooperative  
Agreement with the USDA Forest Service

# Program Designed to Encourage the Wise Use of Woody Biomass in CA through...

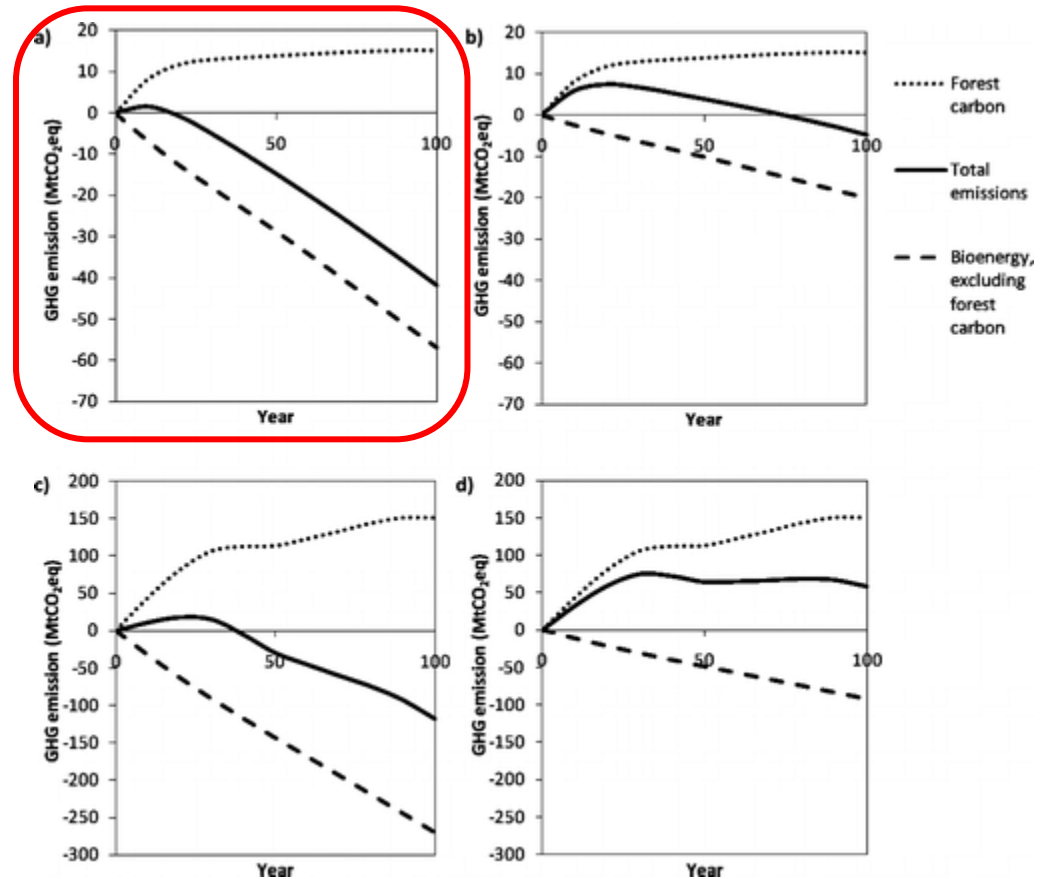
- Research and Education
  - Promote the understanding of challenges and opportunities of woody biomass as a resource
  - Viable utilization technologies
- Outreach
  - Conferences and workshops
  - Publication and distribution of technical information
- Technical assistance

# Wood residues: disposal problem or energy feedstock?

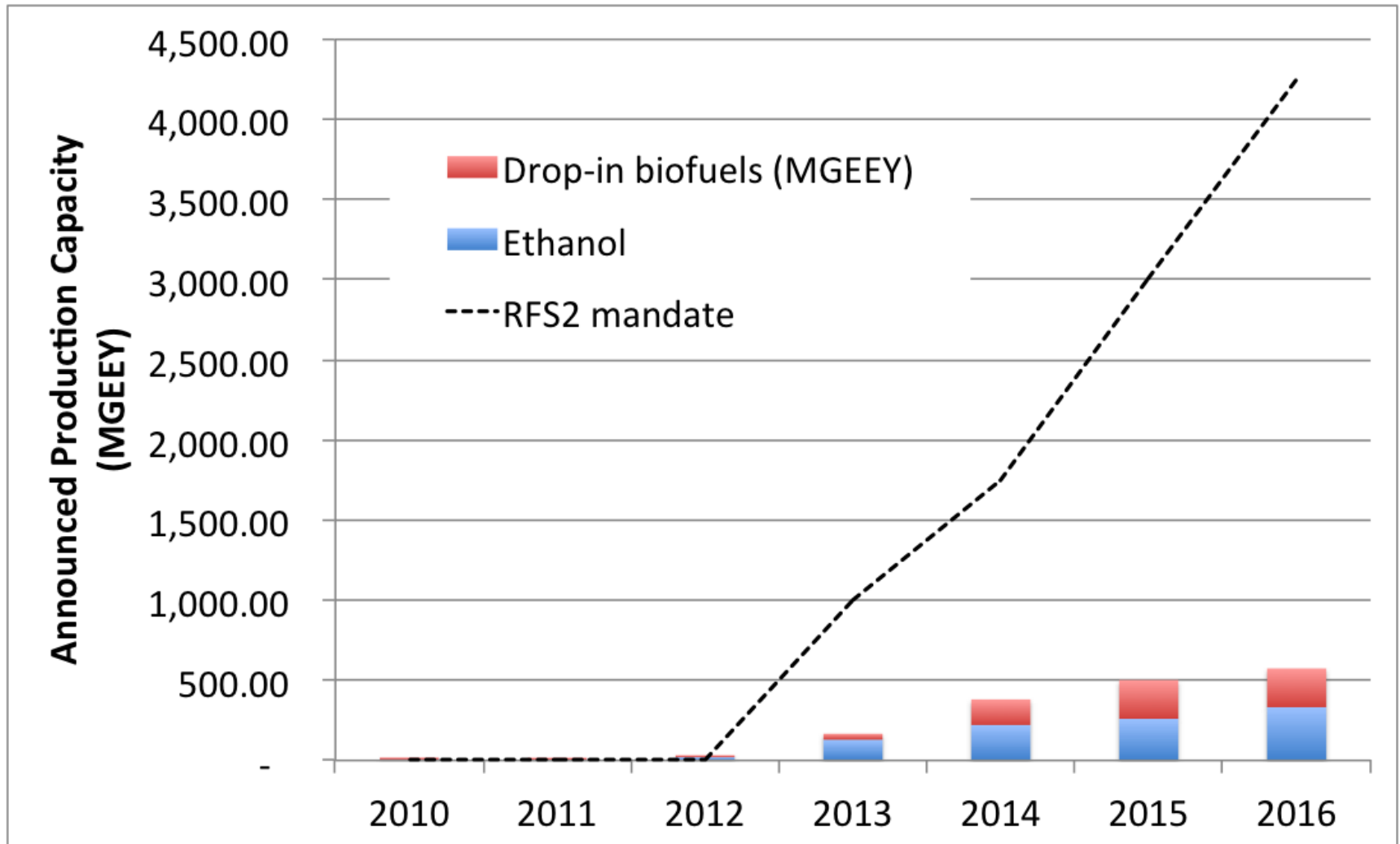


# Why wood bioenergy?

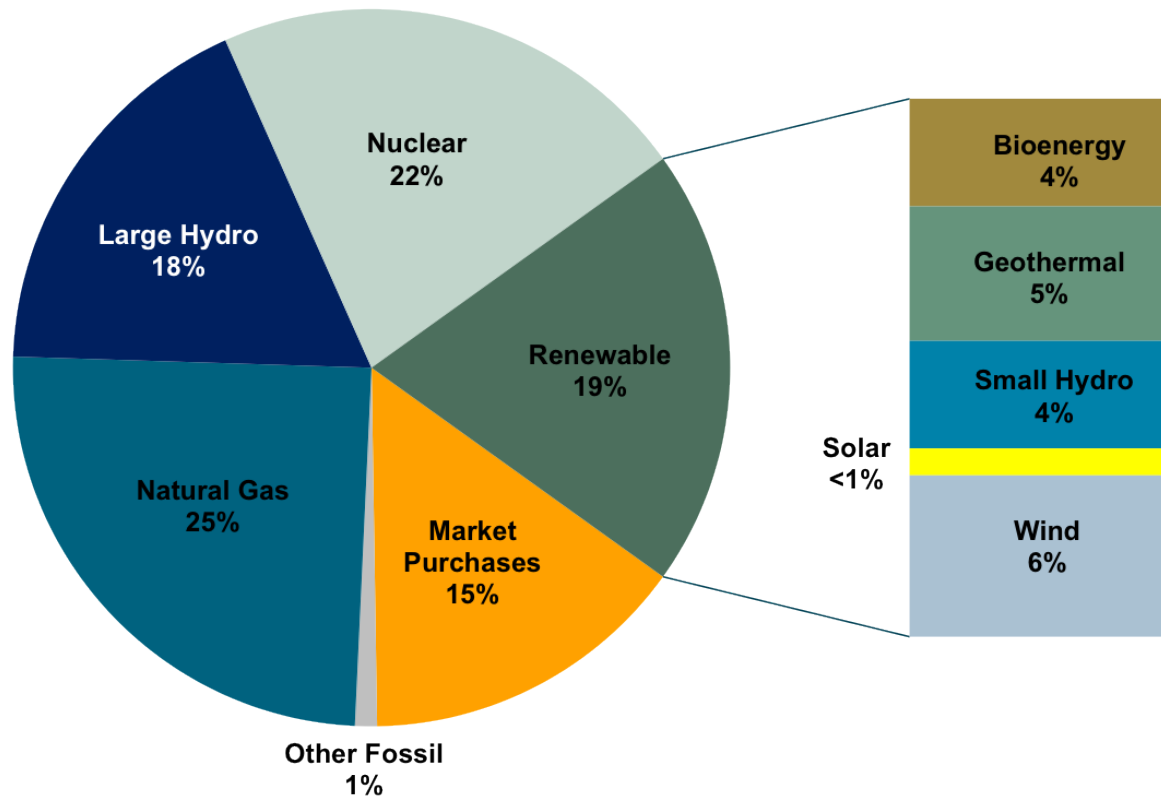
Cumulative GHG emissions from continuous biomass harvest for bioenergy production: (a) pellets produced from residues, displacing coal (20% cofiring), (b) ethanol produced from residues, displacing gasoline (E85 fuel), (c) pellets produced from standing trees, displacing coal (20% cofiring), and (d) ethanol produced from standing trees, displacing gasoline (E85 fuel). Positive values indicate an increase in GHG emissions to the atmosphere.



# US EPA Renewable fuel standards



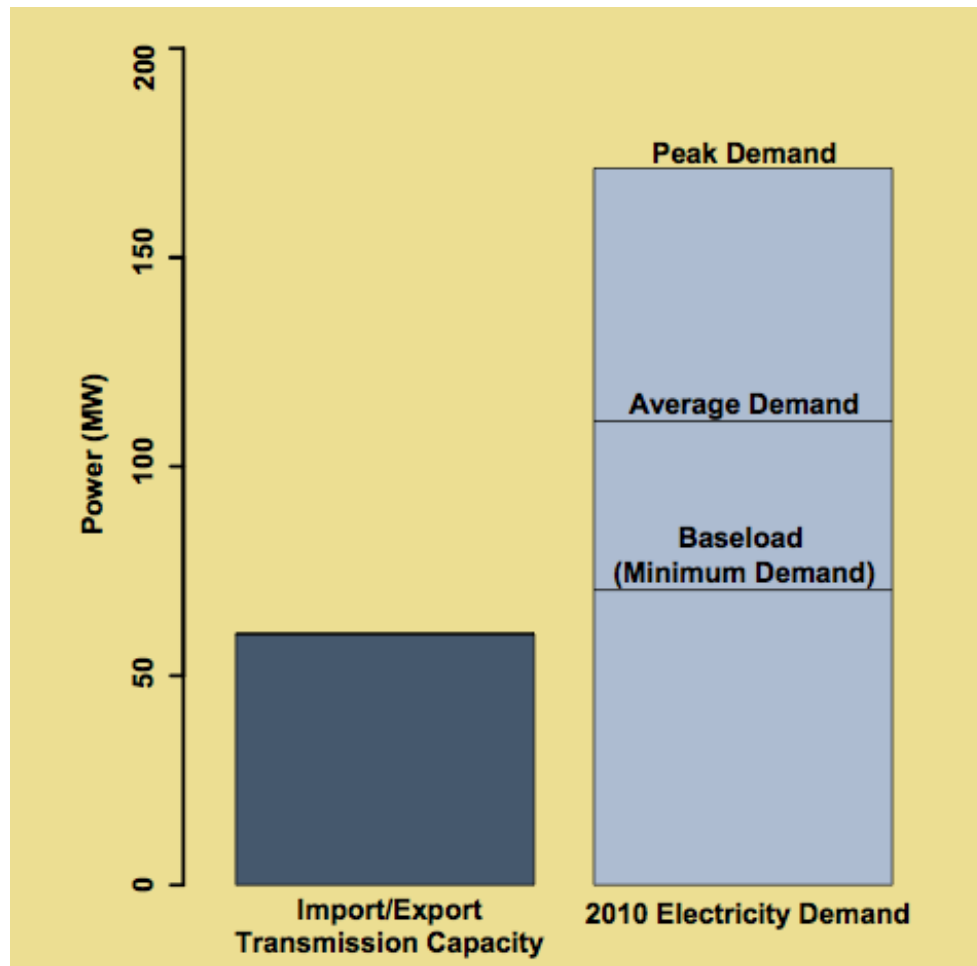
# California energy mix



Renewables Portfolio Standard target is 33% by 2020.

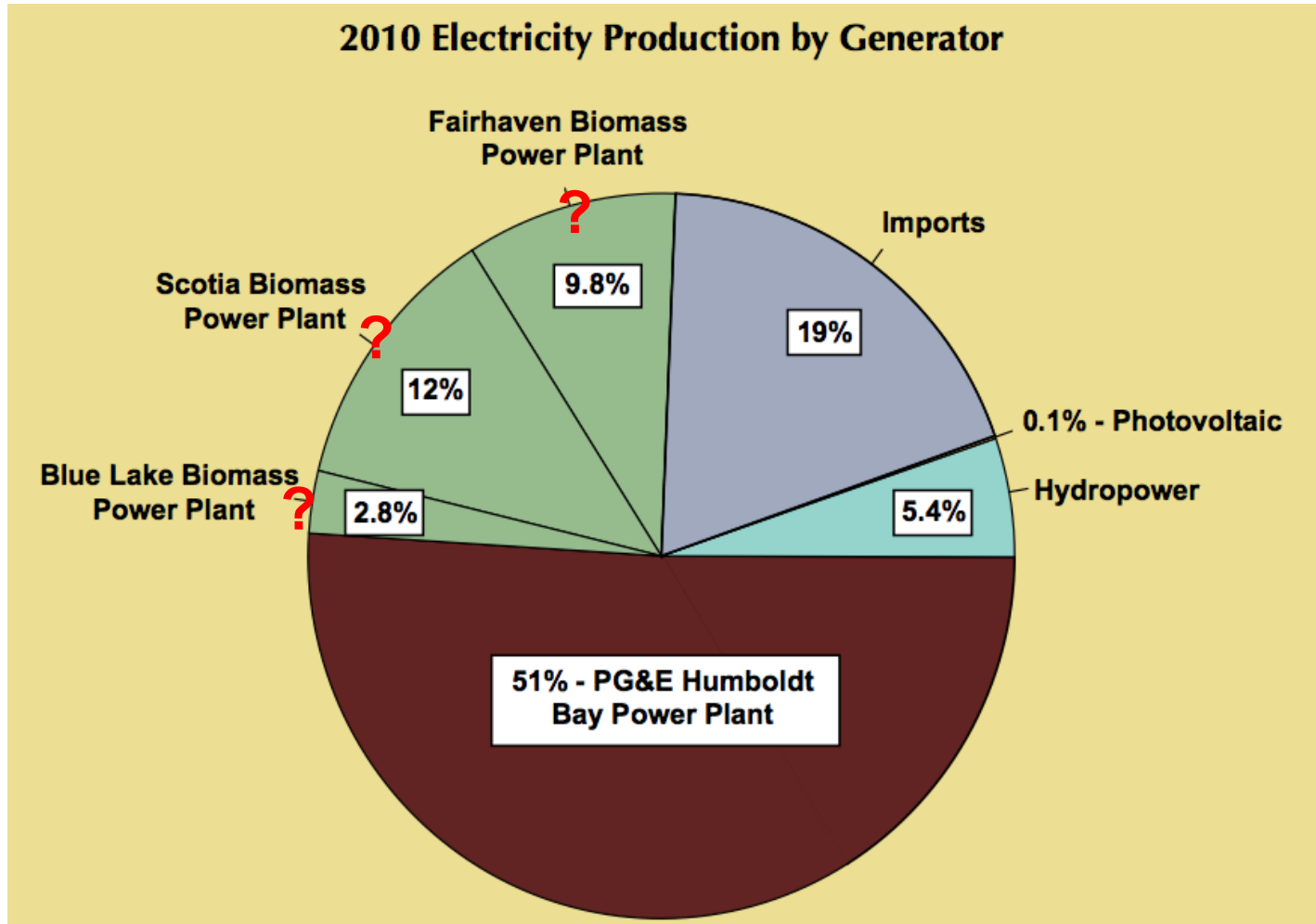
Source: Pacific Gas and Electric

# The Humboldt Island

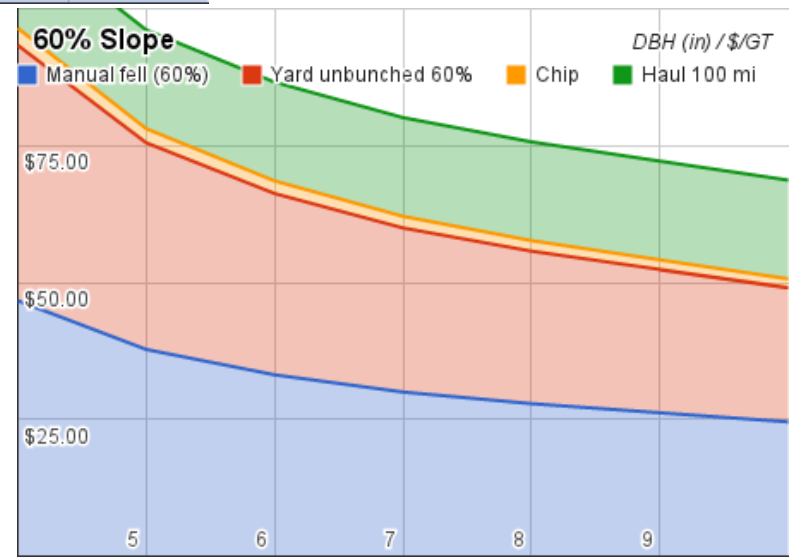
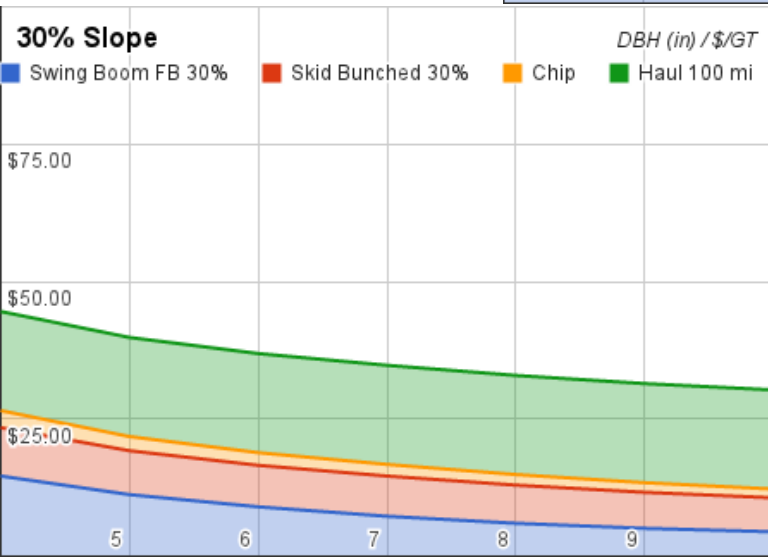
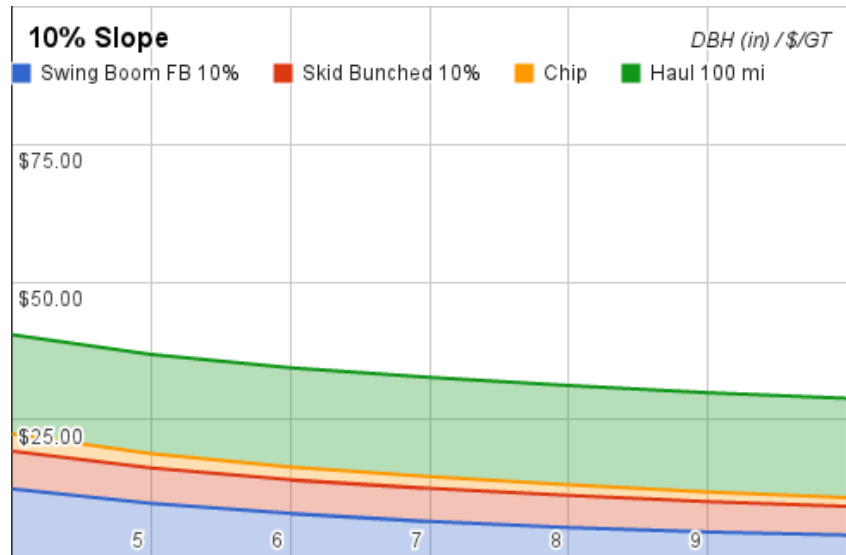




# Humboldt energy sources



# Challenges: harvest cost



# Opportunities: Harvesting cost

- Automation
- Bioenergy crop production



# Challenge: Conversion costs

B. M. JENKINS

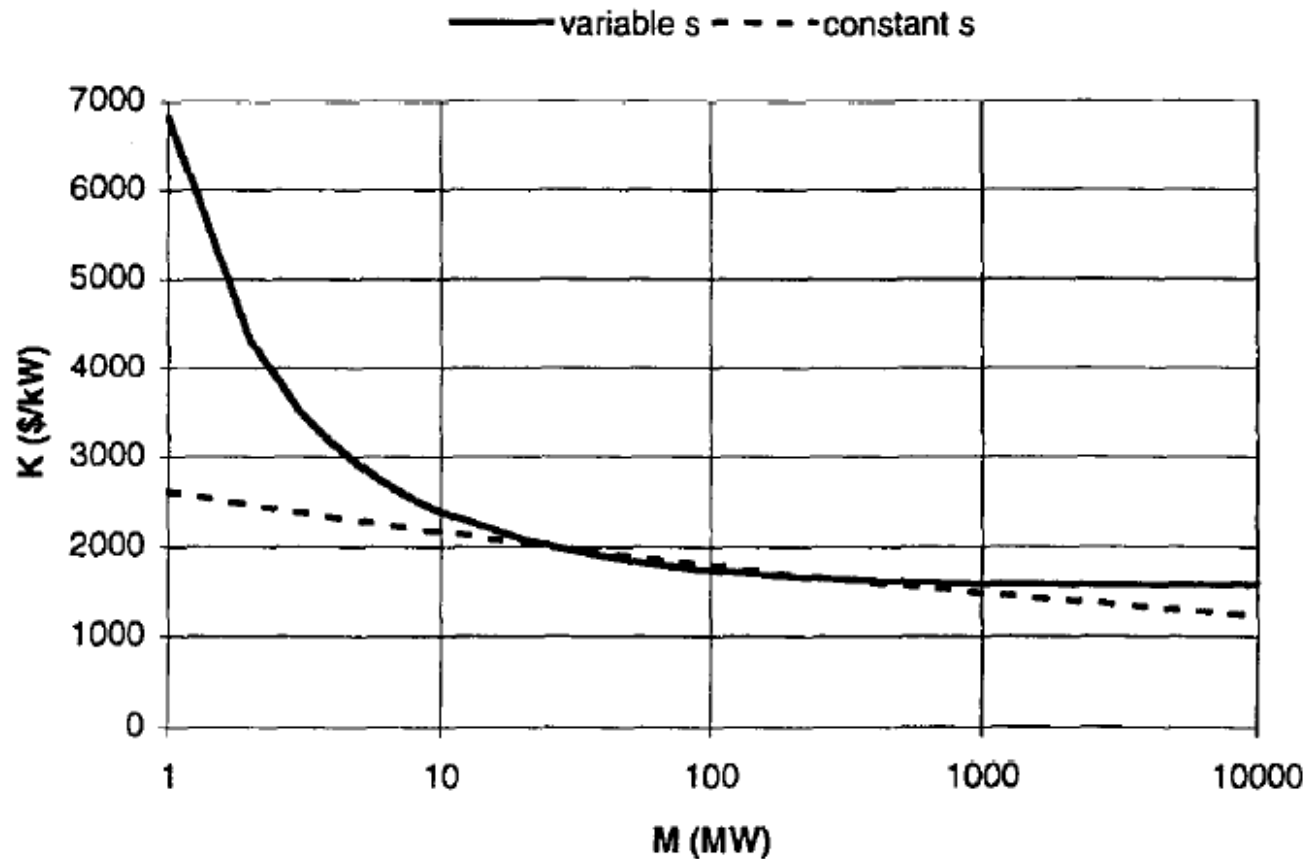
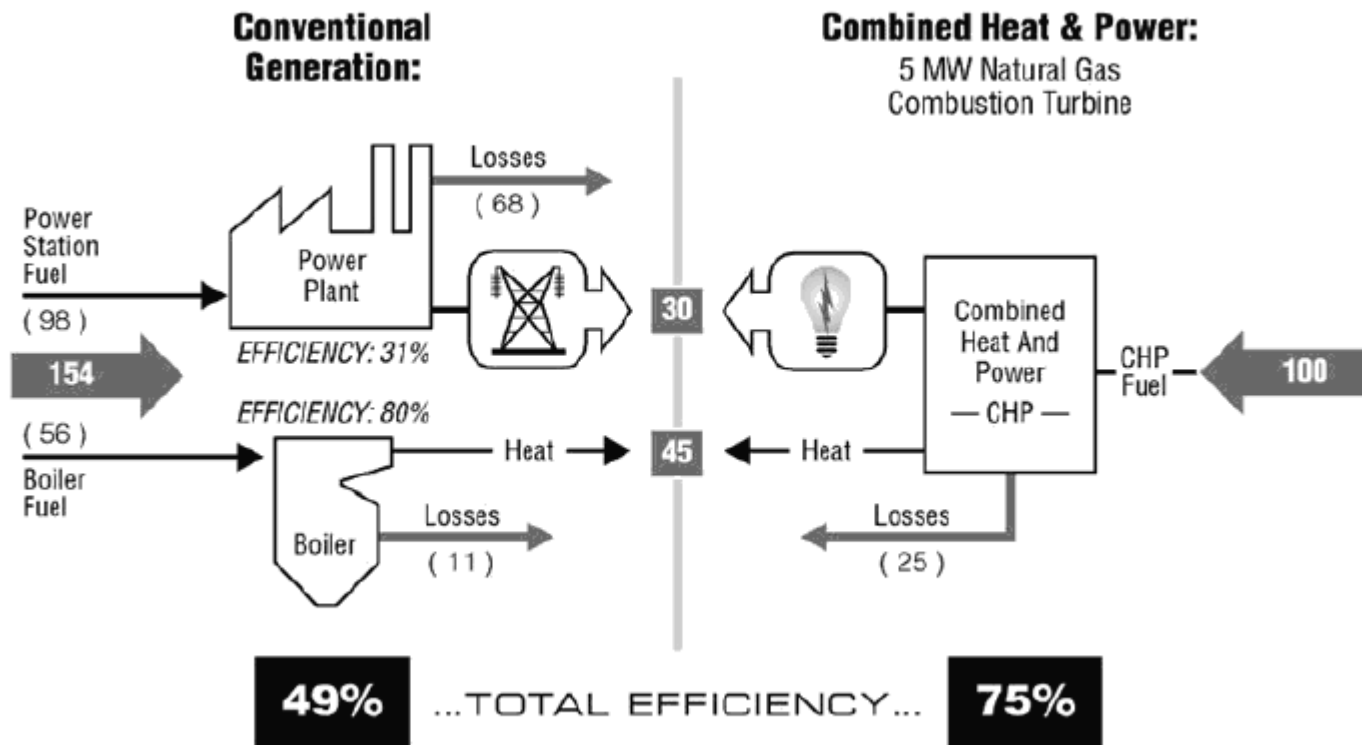


Fig. 3. Unit capital cost,  $K$ , under constant and variable  $s$  scaling, reference conditions.

# Opportunity: Heat

Figure 1: Combined Heat and Power Efficiency



Source: ICF International, Inc.

# Opportunity: SB 1122

## Feed-in-Tarriff

- Market Adjusted Pricing (offset economics of small scale)
  - Still undecided (\$90/MWH ?)
- 250MW
  - 50MW forest biomass
  - 110MW from wastewater/MSW/food waste
  - 90MW from dairy/ag

# Opportunity: Colocation



# Challenge: Procurement pricing

PGE 2013 YDT pricing

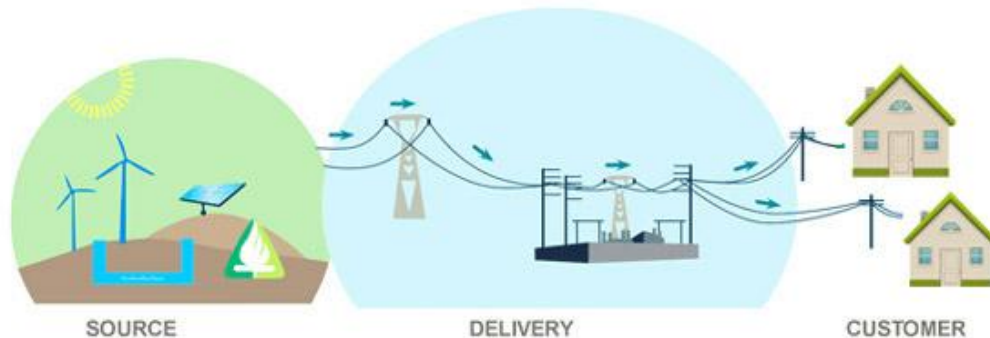
- \$43/MWH

Levelized cost of production for 1-3MW

- \$80-150/MWH



# Opportunity: Community Choice Aggregation



**MCE** buying and building energy supplies

**PG&E** delivering energy, repairing lines, and serving customers

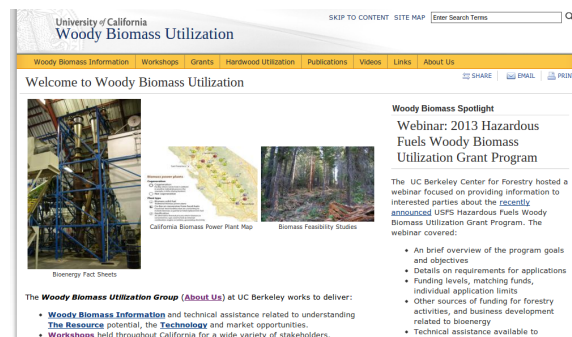
**YOU** benefitting from cleaner energy, stable costs, and local control

Original Illustration by Kiki La Porta, [www.descomstudios.com](http://www.descomstudios.com)

| Residential Electric Fees                  | MCE Light Green                   | PG&E                              | Cost Difference         |
|--|-----------------------------------|-----------------------------------|-------------------------|
| Generation                                 | \$37.26                           | \$38.21                           | <b>(\$0.95) savings</b> |
| Transmission, Distribution & Other Charges | \$51.45                           | \$51.45                           | \$0.00                  |
| PG&E Exit Fees                             | \$4.80                            | -                                 | \$4.80                  |
| <b>Total Cost</b>                          | <b>\$93.51</b><br>(50% Renewable) | <b>\$89.66</b><br>(20% Renewable) | <b>\$3.85</b>           |

# UC Woody Biomass Utilization Website

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



Recent Bioenergy Conference – Dec 14, 2012

<http://ucanr.edu/community/bioenergy>

Series of Utilization Information Factsheets

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



796

be  
pro