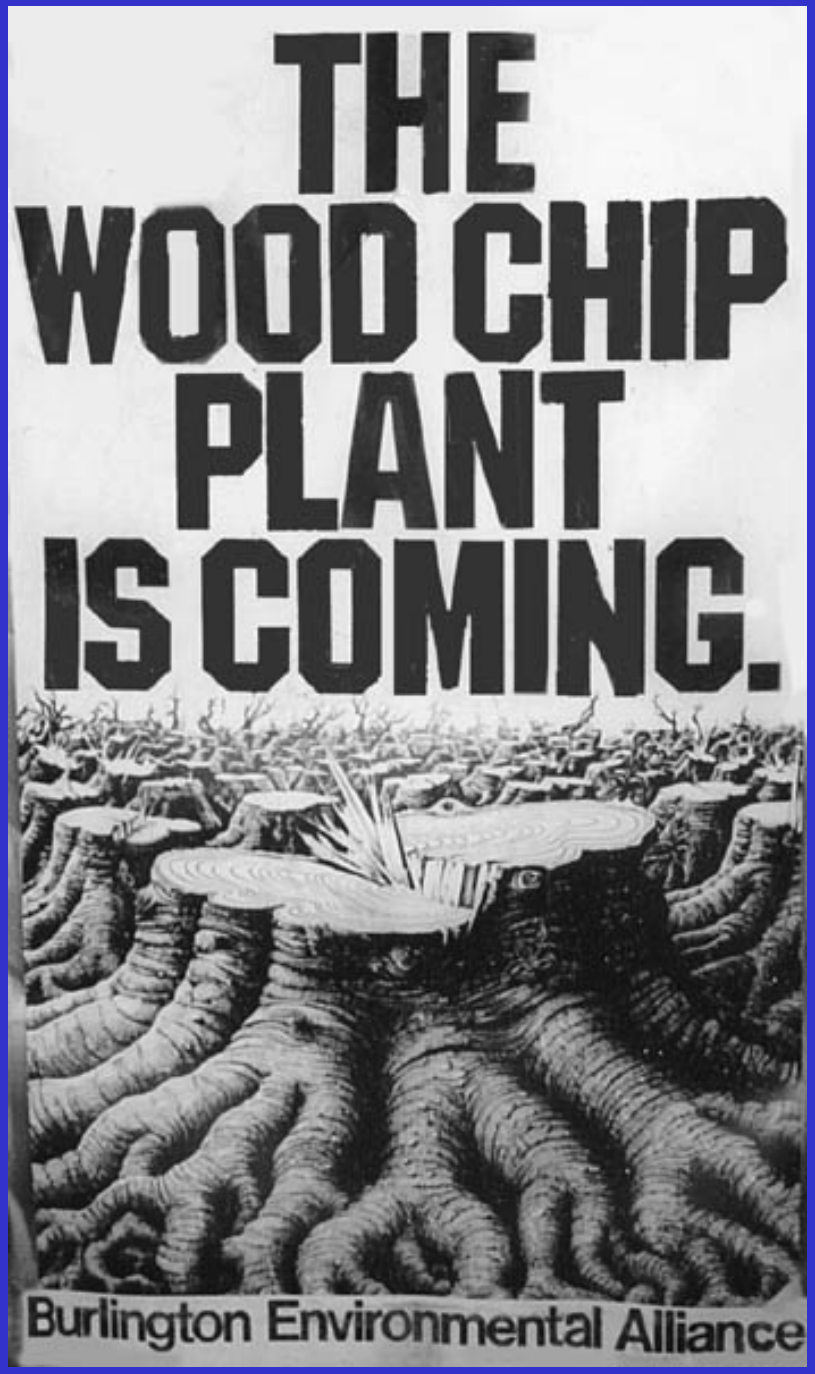
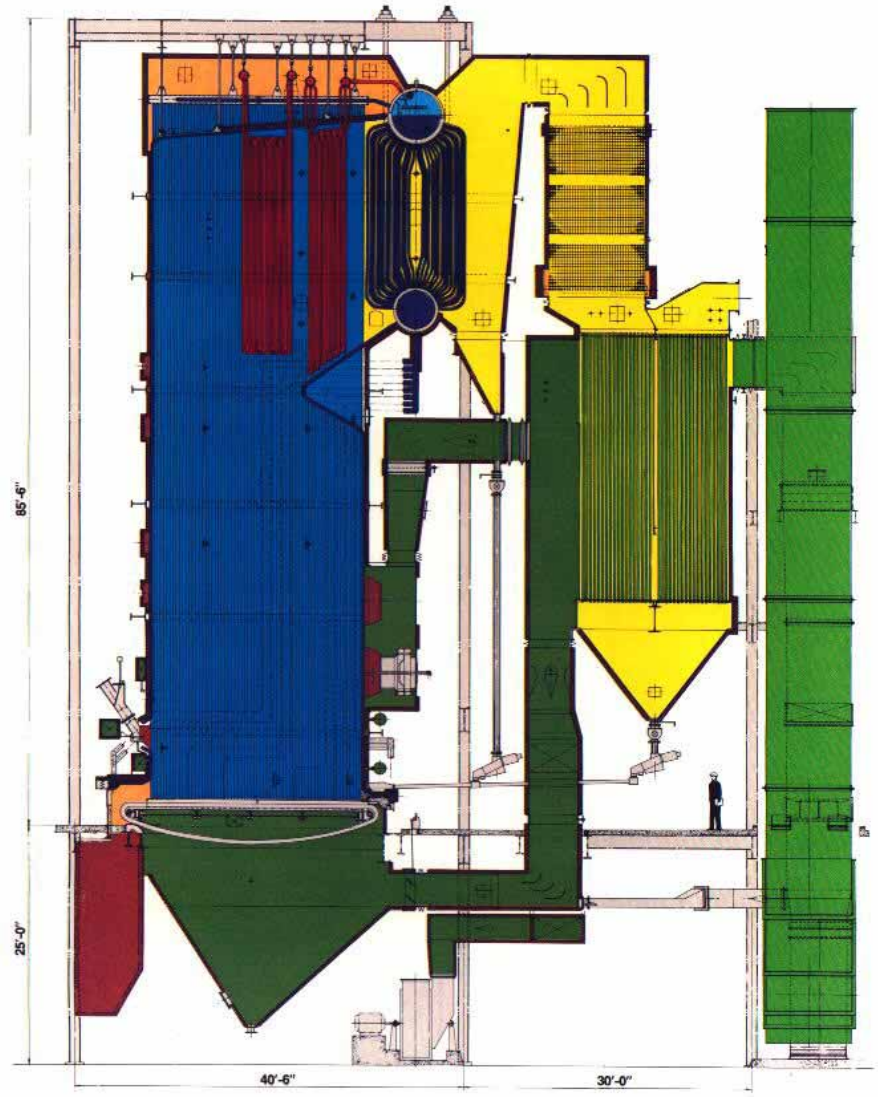
McNeil Generating Station

Bioenergy & Wood Products
Denver Colorado March 15, 2006
John M. Irving, P.E. Burlington Electric Department


THE
WOOD CHIP
PLANT
IS COMING.
Burlington Environmental Alliance



ZURN a step ahead of tomorrow

ZURN INDUSTRIES, INC.
ENERGY DIV.
1422 EAST AVE.
ERIE, PA, U.S.A. 16503-1592
PHONE: 814/452-6421

For: Burlington Electric Department
Burlington, Vermont

Rating	480,000 lbs/hr
Fuel	Wood/No. 2 Oil/Future Pulverized Coal
Design Pressure	1,500 PSIG
Steam Temperature	950° F

91N84


MCNEIL
3/11/2002 09:31

Economic Benefits

- Since startup in 1984, McNeil Station has contributed the following to the local area through February 2006:

• Payroll	$ 40,648,315
• Property Taxes	$ 19,896,343
• Sales Taxes	$ 894,972
• Rail Transportation	$ 24,420,031
• Local Contractors	$ 5,778,494
• Wood Fuel Purchases	$ 103,090,045
• Total	$ 194,728,200

- This does not include the $67,000,000 to build the McNeil Station much of which was spent locally

Employment Benefits

• Powerplant Jobs	34
• Home Office Support Jobs	4
• Forest Management Jobs	4
• Harvesting and Processing	36
• Wood Transportation	35
• Support Services	11
• Train Transportation	6
Total	130

Wastewood Disposal Benefits

- Local Residents bring 2,000-3,000 tons/year of yard trimmings
- Local Businesses bring 3,000-4,000 tons/year of clean shipping pallets
- Clean energy usage eliminates $85/ton land-filling costs and creates power for 5,000 homes

Electrical Reliability Benefits

- Burlington lights stayed on in Great Northeast Blackout!
- Burlington lights stayed on in 1998 Ice Storm!
- Vermont unaffected with loss of 250 MW transmission line from New York in 2000!
- Provides power price stability in spite of fluctuating market costs!

New Technology

- Biomass Gasification allows more efficient energy from biomass
- Expanded Fuel Potential

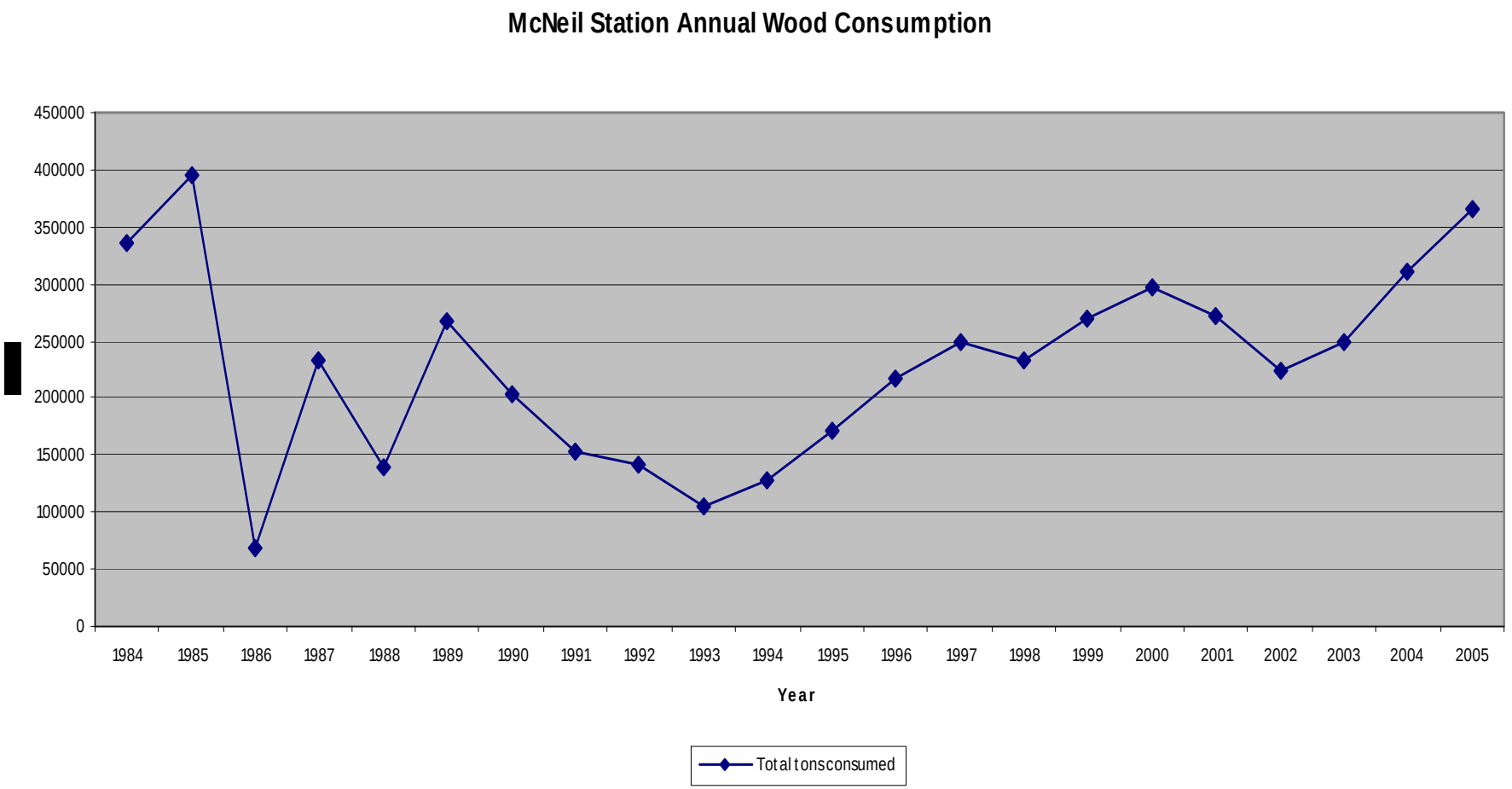
Agricultural Benefits

- Energy Plantation at McNeil can grow trees in 3 years, not 40!
- First Harvest in November 2000.
- Annual yield 5 times native forest stands.
- New Hybrids can effectively utilize lands now fallow
- Great potential for switchgrass, bagasse and many other waste fuels!

Challenges and Changes Over 22 Years

- Wood Supply and Cost
- Contractual Changes
- Renewable Energy Credits
- Regulatory Changes

Annual Wood Consumption



Average Wood Costs

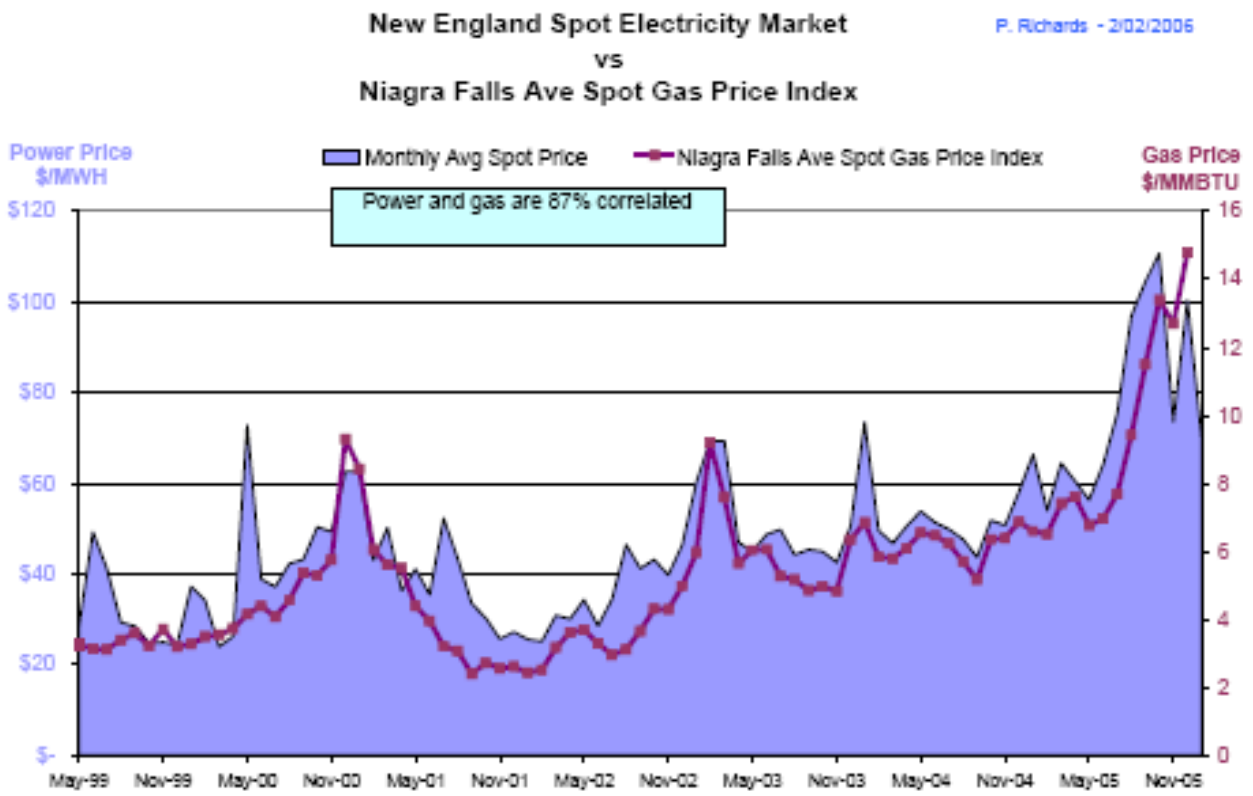
Contractual Changes

- 1984
  - Some Plants Owned by Electric Utilities
  - Most plants were privately owned with long term PURPA contracts at high prices
- 2006
  - With Deregulation, most utilities in New England can't own generation
  - No current incentives from PURPA to build biomass plants

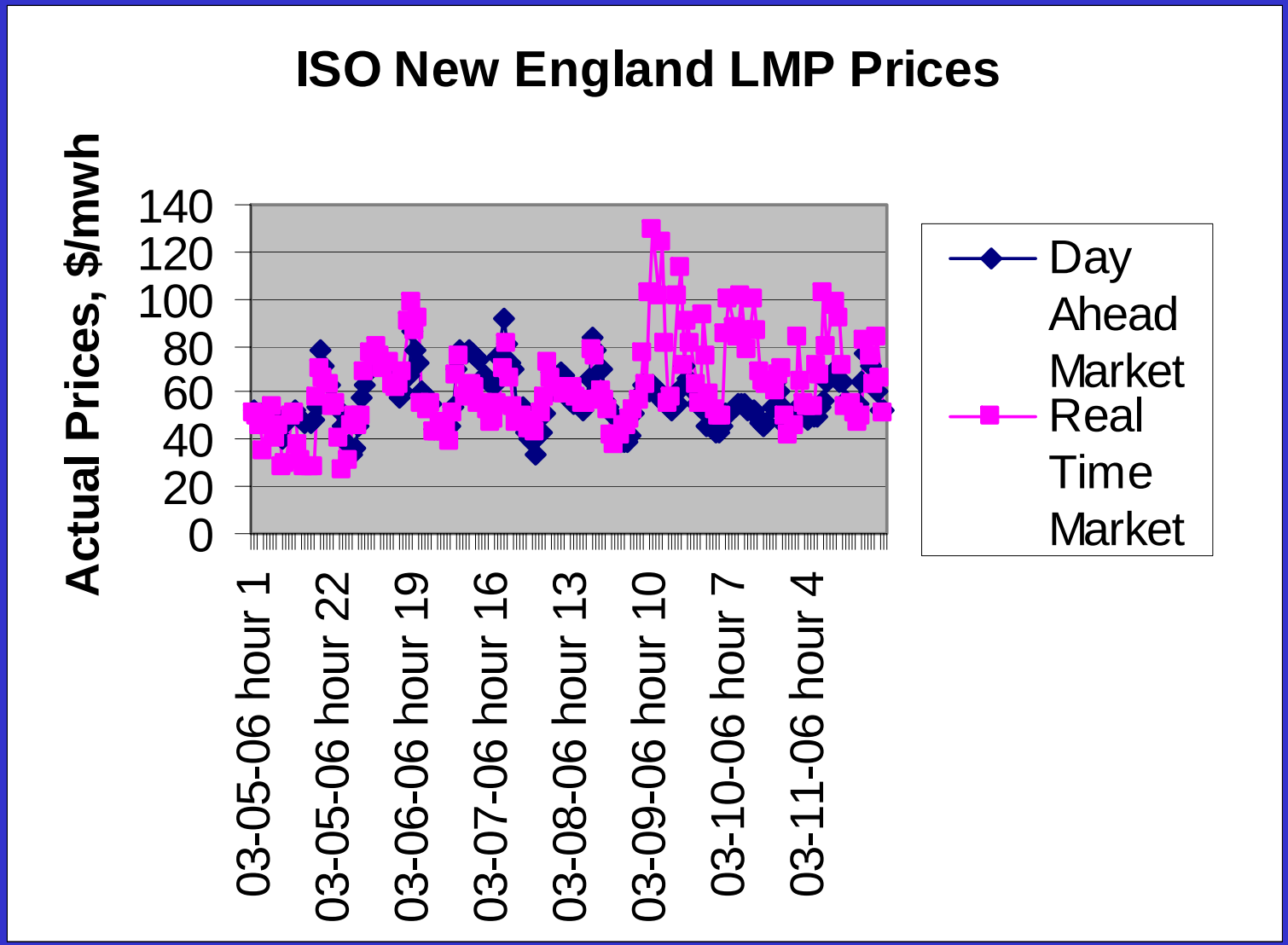
Contractual Changes

- Most biomass plants built today are designed to sell RECs to High Value RPS Market
- Most biomass plants today are Merchant Plants selling energy to wholesale market

New England LMP vs. Gas



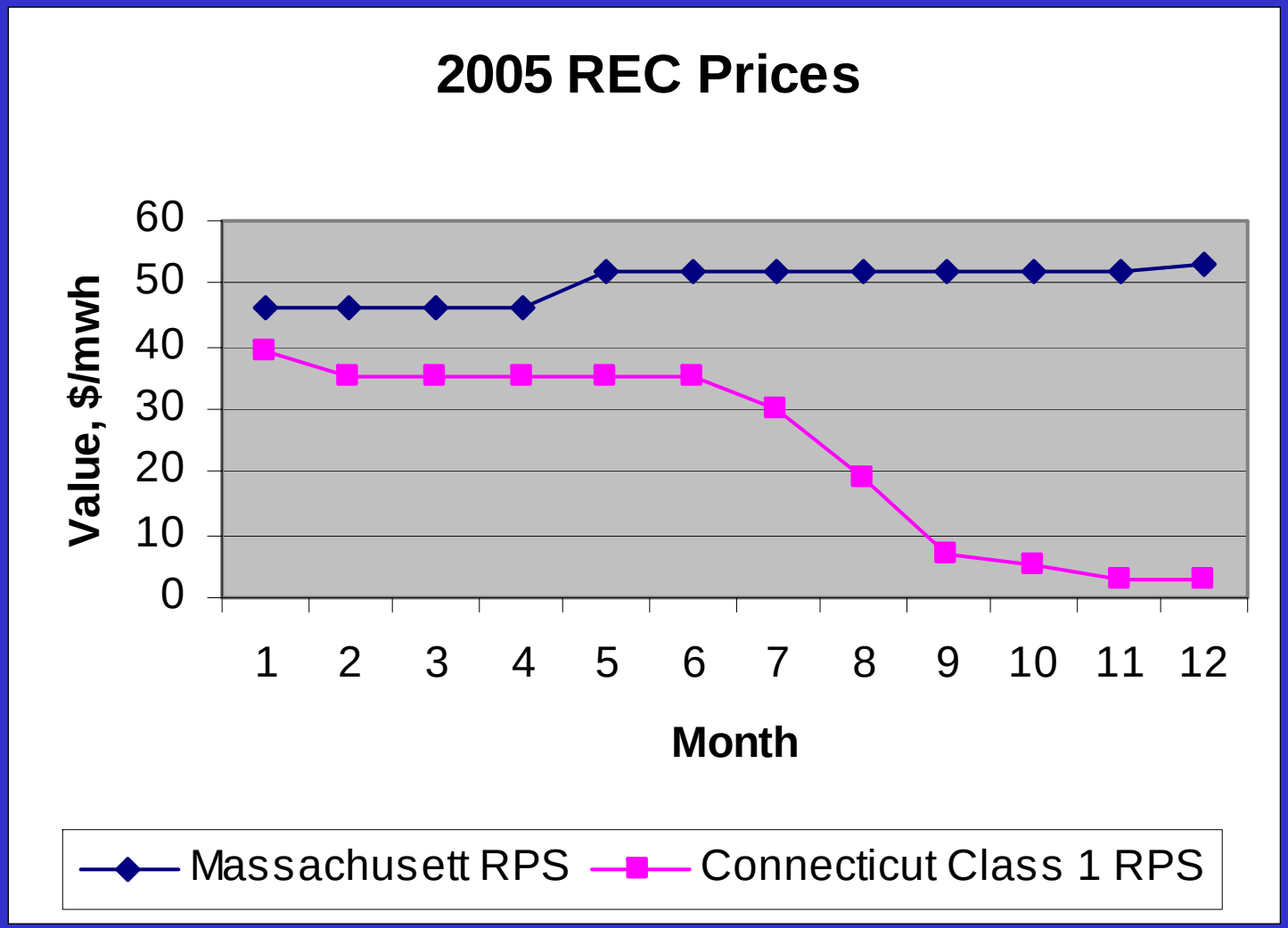
Hourly Price Fluctuations



Renewable Energy Credit Requirements for New England

Year	Mass	Connecticut Cl. 1	R. Island	New Hampshire (proposed)	Million RECs total
2006	2.5%	2.0%	n/a	n/a	1.9
2007	3.0%	3.5%	3.0%	0%	3.2
2008	3.5%	5.0%	3.5%	3.5%	4.1
2009	4.0%	6.0%	4.0%	4.0%	4.9
2010	5.0%	7.0%	4.5%	4.5%	5.8
2011	6.0%	8.0%	5.5%	5.0%	6.9

REC Price Fluctuations



Regulatory Changes

- 22 Years ago, plants received air permits when constructed that remained relatively unchanged for the life of the plant
- Plants now get new “Title V Permit” every 5 years with possibility of tighter limits
- Many plants voluntarily lower emissions to comply with RPS markets

Lessons Learned

- Technology
  - Boiler Grate Design
  - Char Reinjection System
  - Pile Reclaimer Design
  - Fuel Flexibility
- Siting- Closer to Wood Supply
  - Lower Fuel Costs
  - Less Complaints
  - Easier Permitting
  - Lower Property Taxes