

AMERICA'S ELECTRICITY FUTURE: WHAT DRIVES THE CHOICE AMONG TECHNOLOGIES?

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Presented by

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Outline

- I. What Do We Want?
- II. State Mandates and Federal Money
- III. Explicit Risk Management
- IV. Limits on Technologies
- V. Competitive Procurement
- VI. Competitiveness

I. What Do We Want?

A. Everything

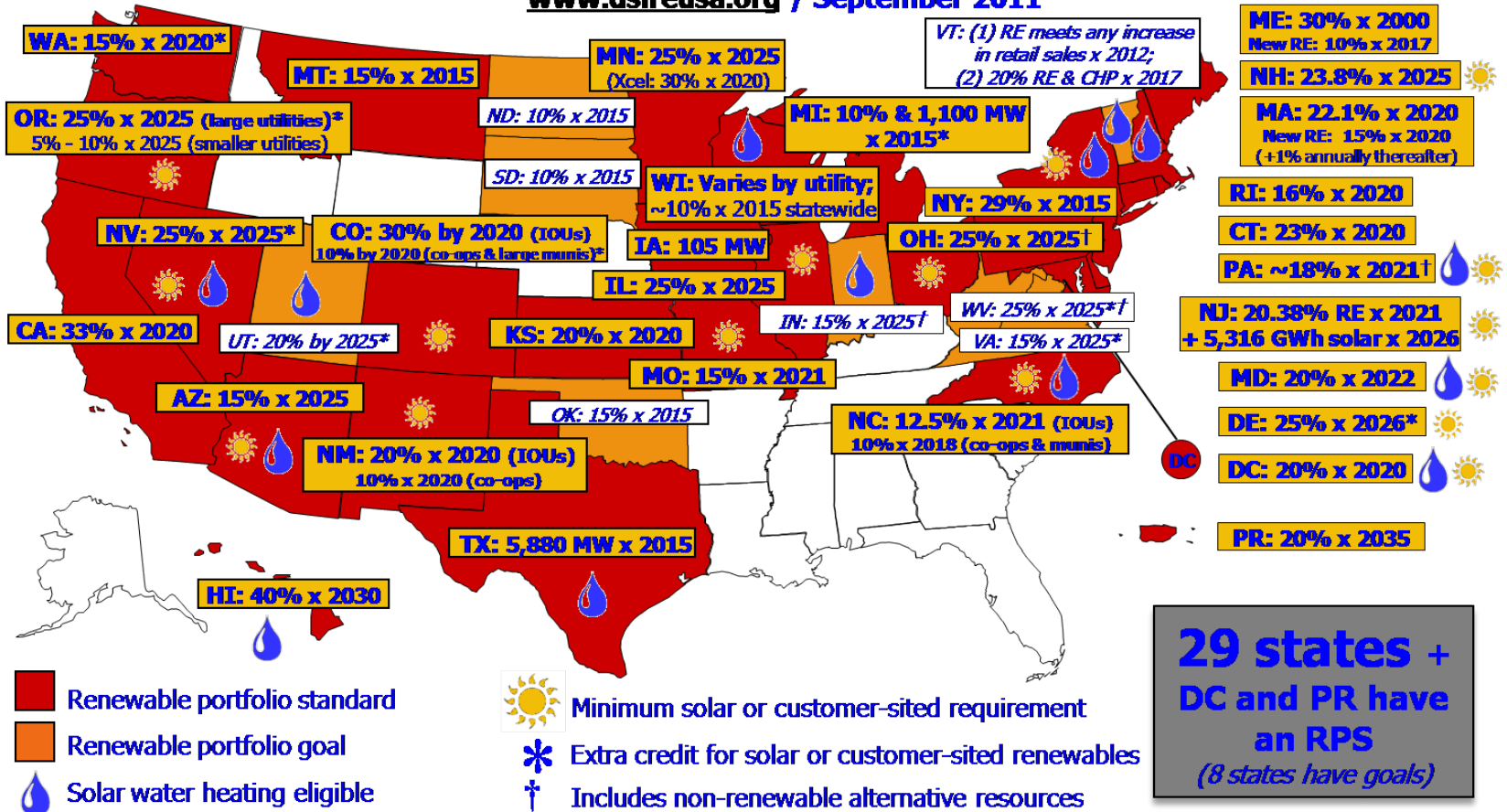
1. Low Cost
2. Low Risk
3. High Reliability
4. Superior Environmental Performance

B. “Unicorn” Portfolio

II. State Mandates and Federal Money

RPS Policies

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III. Explicit Risk Management

	Resource	10-year
East	CCCT F 2x1 (Utah North, Utah South)	1,222
	CCCT H 2x1 (Utah South)	475
	Coal Plant Turbine Upgrades	51
	Wind, WY, 35% Cap. Factor	142
	CHP - Biomass	10
	CHP - Reciprocating Engine	8
	DSM, Class 1, UT-Cool Keeper	11
	DSM, Class 1, Goshen-DLC-Irrigation	8
	DSM, Class 1, UT-Curtailment	53
	DSM, Class 1, UT-DLC-Residential	37
	DSM, Class 1, UT-DLC-Irrigation	11
	DSM, Class 1 Total	120
	DSM, Class 2, Goshen	14
	DSM, Class 2, UT	562
	DSM, Class 2, WY	55
	DSM, Class 2 Total	631
	Micro Solar - Water Heating	24
	FOT Mead Q3 HLH	44
	FOT Utah Q3 HLH	71
	FOT Mona-3 Q3 HLH	255
FOT Mona-4 Q3 HLH	8	

Resource Type	MW	Percent
Natural Gas	1,697	55.4%
Coal	51	1.7%
Wind	142	4.6%
CHP	18	0.6%
DSM	751	24.5%
Solar	24	0.8%
FOT	378	12.3%
Total	3,061	100.0%

Source: PacifiCorp's Preferred Portfolio, 2011 IRP, *Portfolio Evaluation Results Preferred Portfolio Selection*, February 14, 2011

III. Explicit Risk Management

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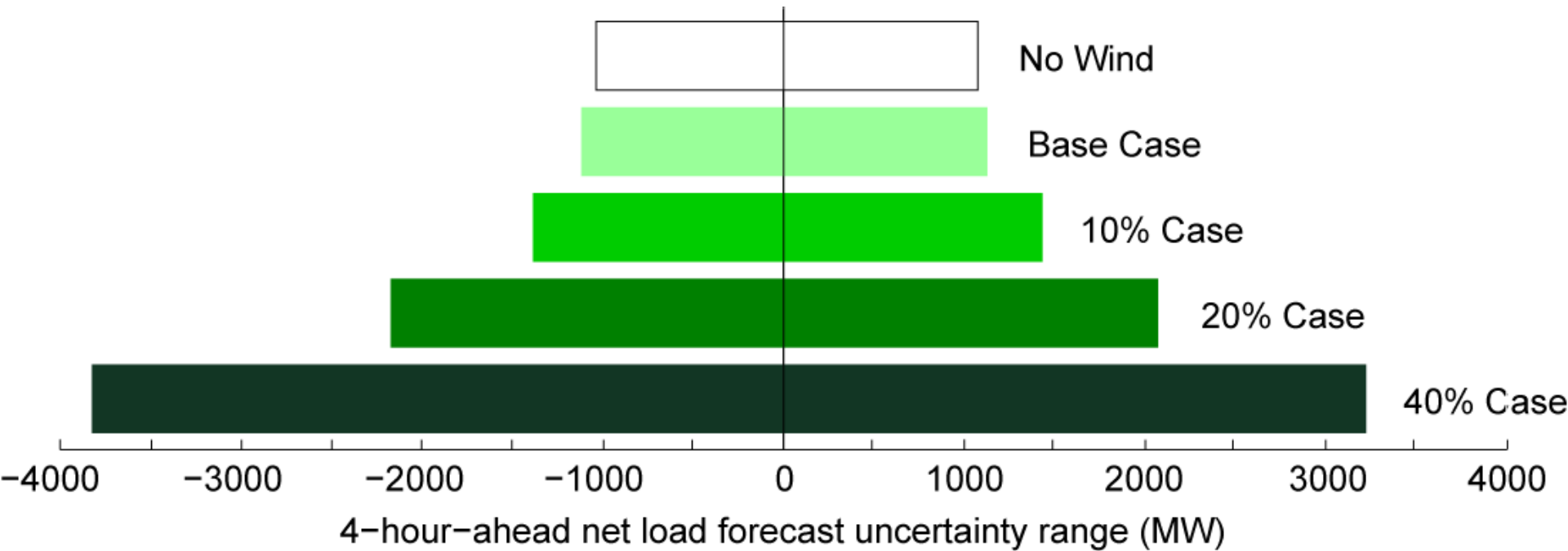
Table E-27
 Method: Extension
 Assumptions: + 20% Kemper Cost
 Strategic Preference: Excludes Fixed Price Offers

Natural Gas Price Forecast	CO2 Allowance Price			
	\$0	\$10	\$20	\$30
PSC Low	Bid 1	Bid 1	Bid 1	Bid 1
	-16.4%	-20.4%	-19.0%	-16.0%
Low	Kemper	Bid 1	Bid 1	Bid 1
	0.0%	-6.8%	-6.6%	-4.2%
Moderate	Kemper	Kemper	Kemper	Kemper
	-11.7%	-3.5%	-1.5%	-4.1%
Moderate w/ Volatility	Kemper	Kemper	Kemper	Kemper
	-17.7%	-10.2%	-8.8%	-9.3%
High	Kemper	Kemper	Kemper	Kemper
	-29.1%	-23.0%	-19.2%	-17.8%

Source: "Report of the Independent Evaluator in Docket No. 2009-UA-0014", Presented to the Mississippi Public Service Commission, Boston Pacific, January 25, 2010

IV. Limits on Technologies

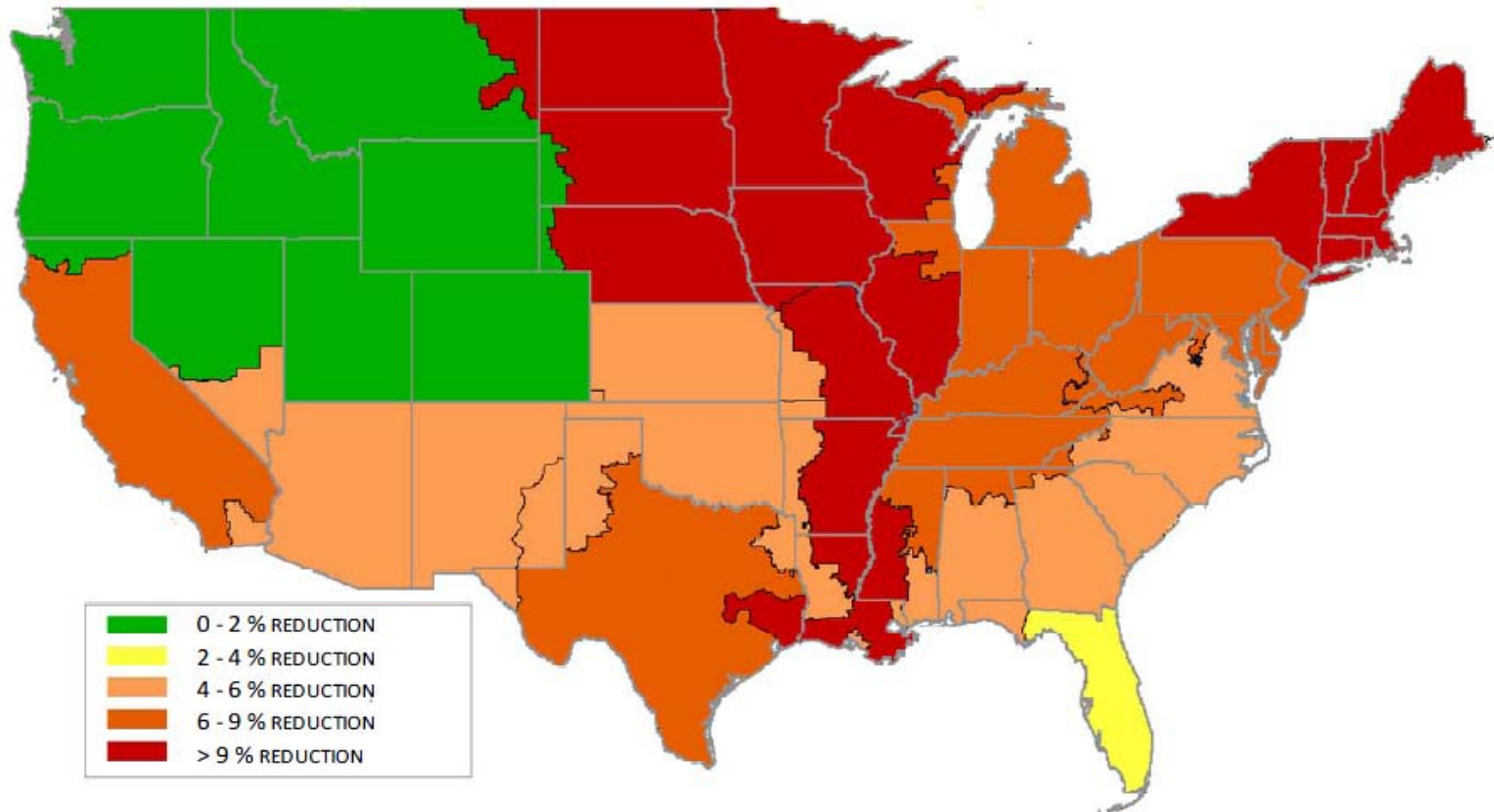
Southwest Power Pool's Net Load 4-hour-ahead Forecast Uncertainty by Wind Penetration Case



Source: "SPP WITF Wind Integration Study", SPP (prepared by Charles River Associates), January 2010

IV. Limits on Technologies

Figure 5: 2018 Reduction in Adjusted Potential Capacity Resources due to the Combined EPA Regulation Scenario



Source: “2010 Special Reliability Scenario Assessment: Resource Adequacy Impacts of Potential U.S. Environmental Regulations”, NERC, October 2010

V. Competitive Procurement

New Jersey BGS FP and CIEP Auction Results, 2007 – 2011

	2007	2008	2009	2010	2011
MW Procured	8,218	8,318	8,710	8,359	8,540
FP (Residential) Auction	5,263	5,297	5,832	5,513	5,273
CIEP (Commercial & Industrial) Auction	2,955	3,022	2,878	2,846	3,267
Number of Bidders Participating	20	22	17	17	17
Number of Winning Suppliers					
FP Auction	13	8	10	13	8
CIEP Auction	6	4	5	7	6
Tranche-Weighted Average Winning Prices					
FP Auction (\$/MWh)	\$ 99.42	\$ 113.28	\$ 104.03	\$ 96.07	\$ 95.28
CIEP Auction (\$/MW-Day)	\$ 128.18	\$ 107.63	\$ 205.20	\$ 173.11	\$ 117.63

VI. Competitiveness

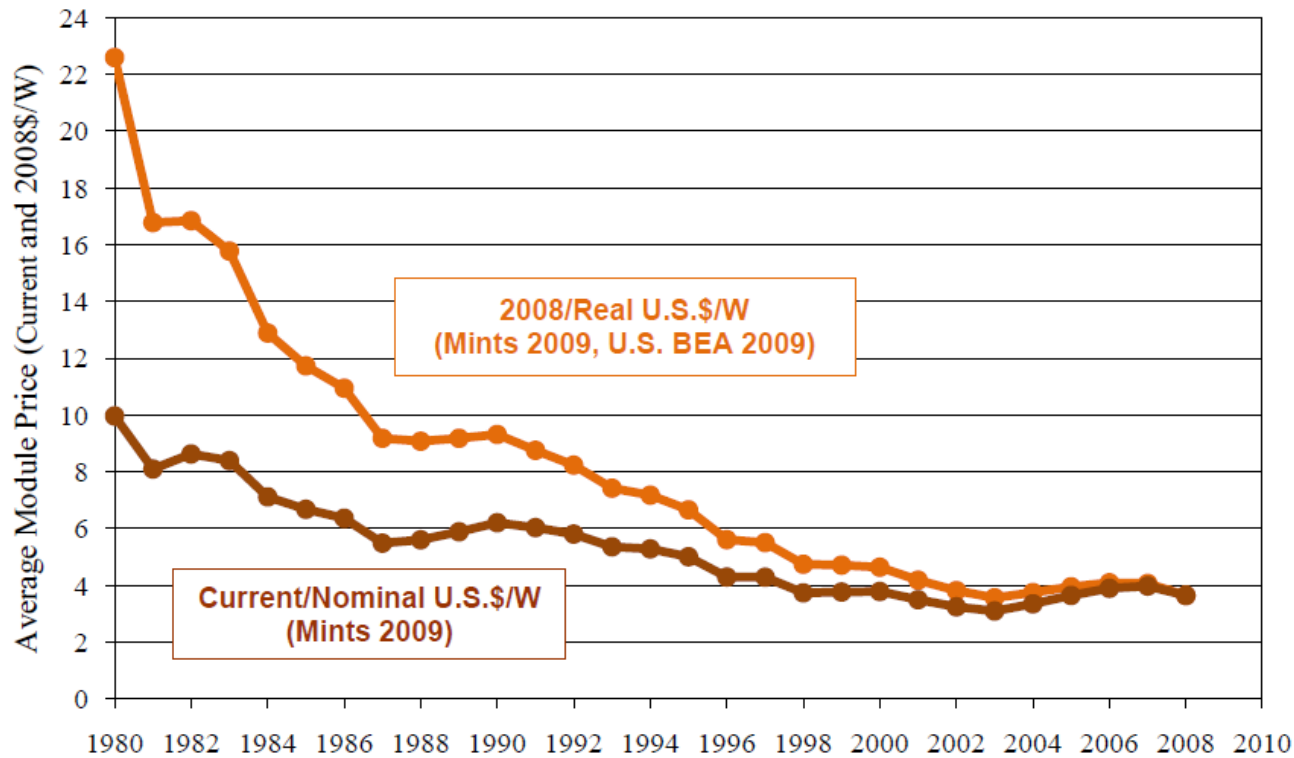
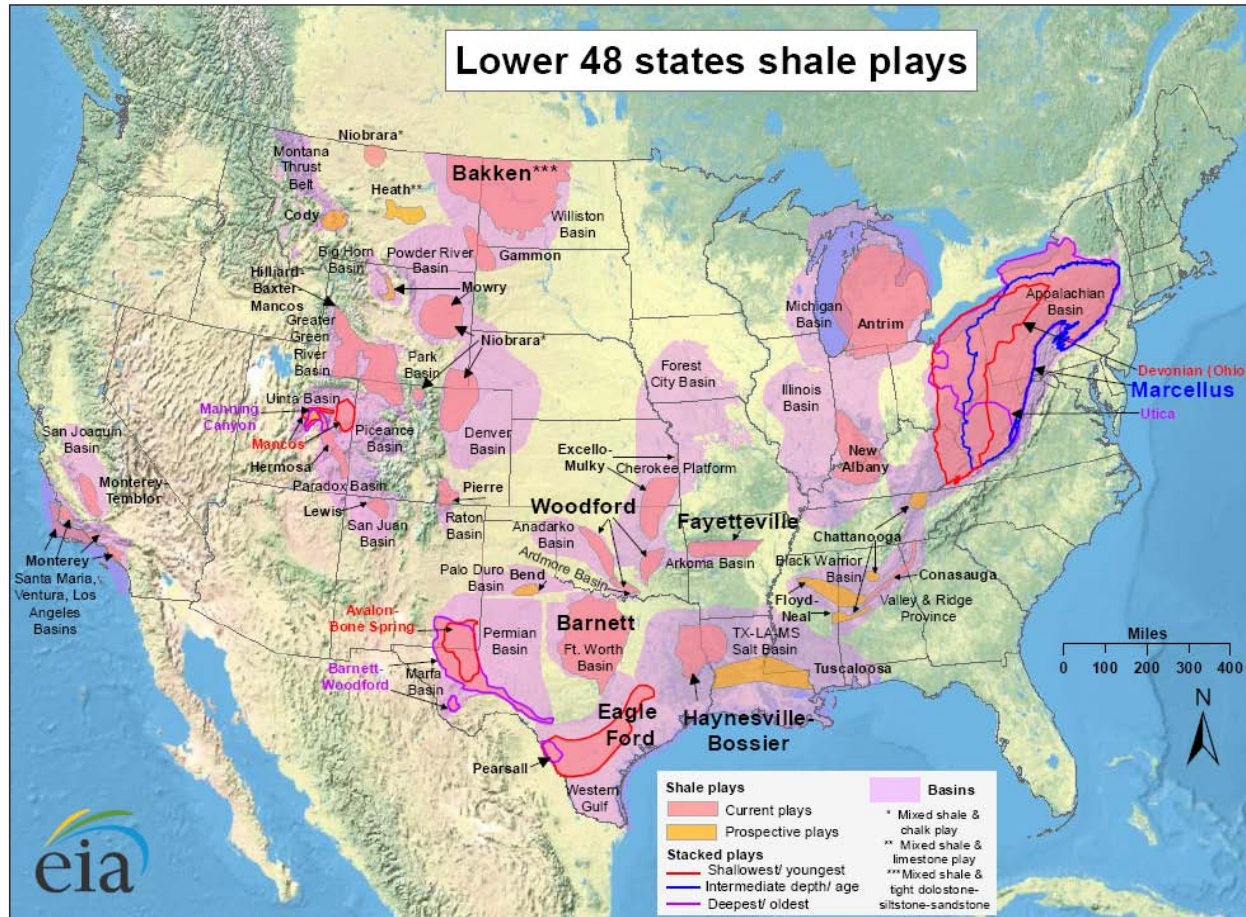


Figure 3.8. Global, average PV module prices, all PV technologies, 1980–2008
(Mints 2006, Mints 2009, U.S. Bureau of Economic Analysis 2009)^{38 39}

Source: “2008 Solar Technologies Market Report”, NREL, January 2010

VI. Competitiveness



Source: EIA U.S. Shale Plays Map, www.eia.gov/oil_gas/rpd/shale_gas.pdf, updated May 9, 2011

Bio for Craig R. Roach, Ph.D.

Craig Roach is the founder and President of Boston Pacific Company, Inc., a consulting and investment services firm in Washington, DC. He has thirty-five years of experience with investments in, policies for, and litigation concerning the electricity and natural gas businesses. Recently, Craig led the Boston Pacific teams advising State Commissions on major power resource decisions for technologies ranging from clean coal to wind. He also guides Boston Pacific's wide ranging work on auction and RFP design and monitoring. Craig is a nationally recognized expert as evidenced by his service as an expert witness throughout North America. Craig's previous positions include service as an economist at the U.S. Congressional Budget Office. Craig earned his Ph.D. in Economics from the University of Wisconsin and currently serves on the Advisory Board to its Department of Economics.

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