The Impact Of The Renewable Energy Standard In Amendment 37 On Electric Rates In Colorado

Colorado Renewable Energy Society

Remarks of Ron Binz
Public Policy Consulting
September 9, 2004

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Energy and Telecom Policy

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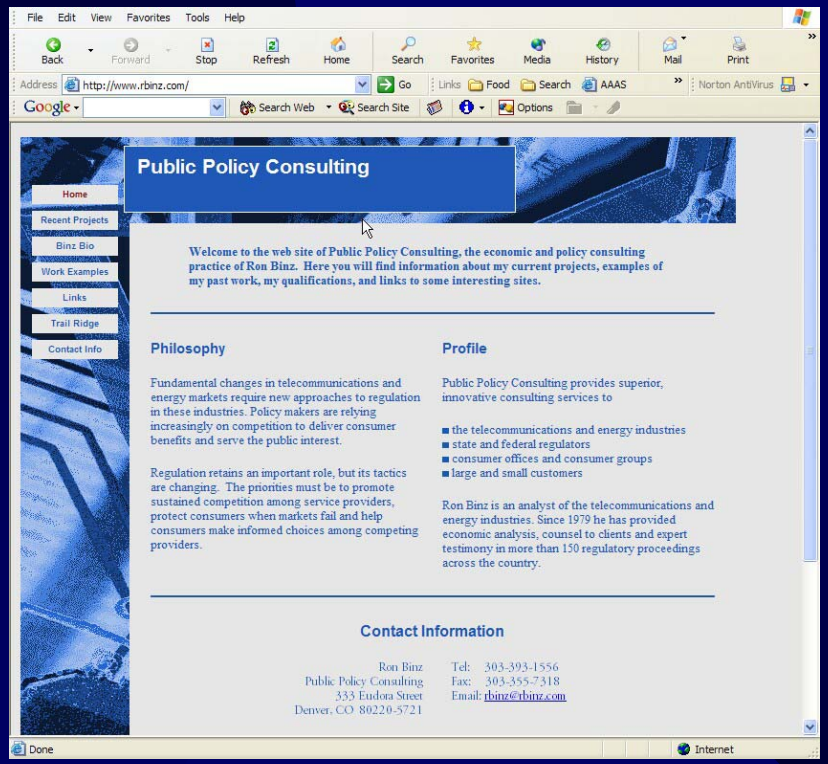

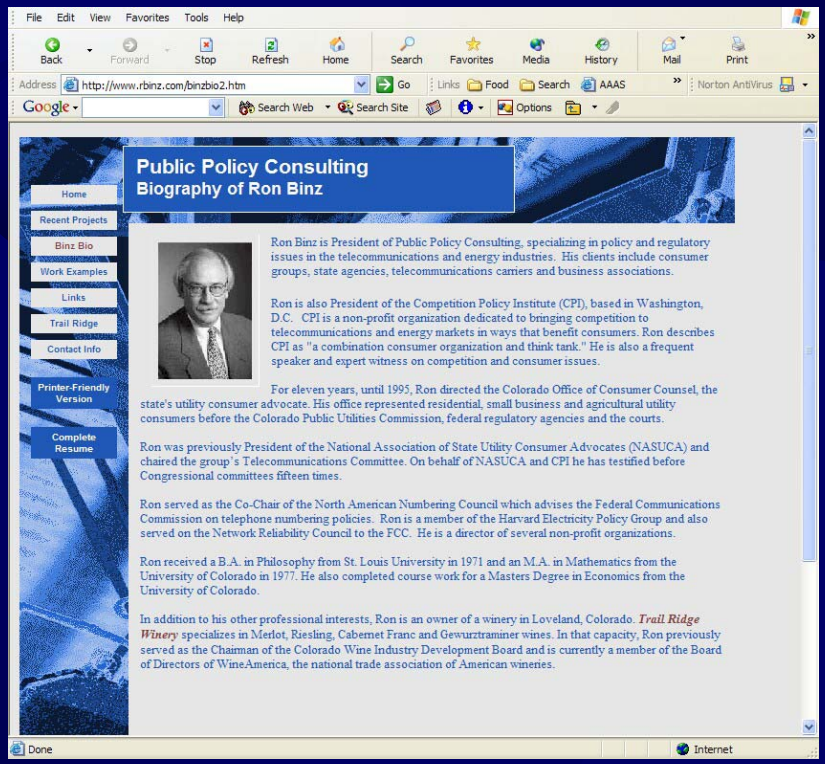

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2004 Colorado RES Report

- Available at www.rbinz.com/RES.htm

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The Colorado RES

- Applies to utilities with >40,000 customers
- Defines renewables
- Solar requirement in addition to general requirement
- REAs, Munis can self-certify (no solar requirement)
- Limits rate impact to 50¢ per month for residential customers

Benchmark Date	Renewable Energy Required (% of sales)	Solar Energy Required (% of sales)
2007	3%	0.12%
2011	6%	0.24%
2015	10%	0.40%

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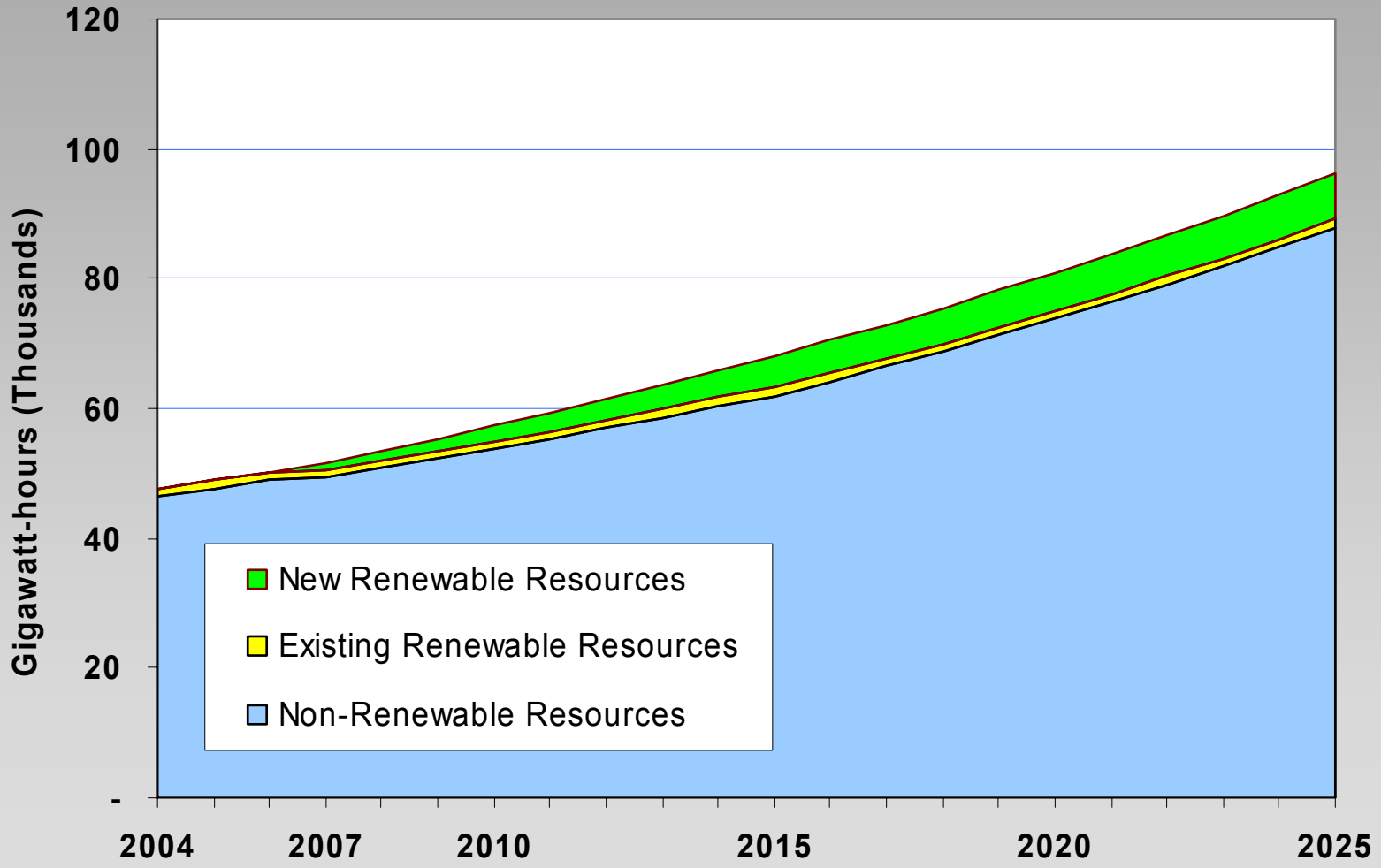
Renewable Resources Required by Initiative 37



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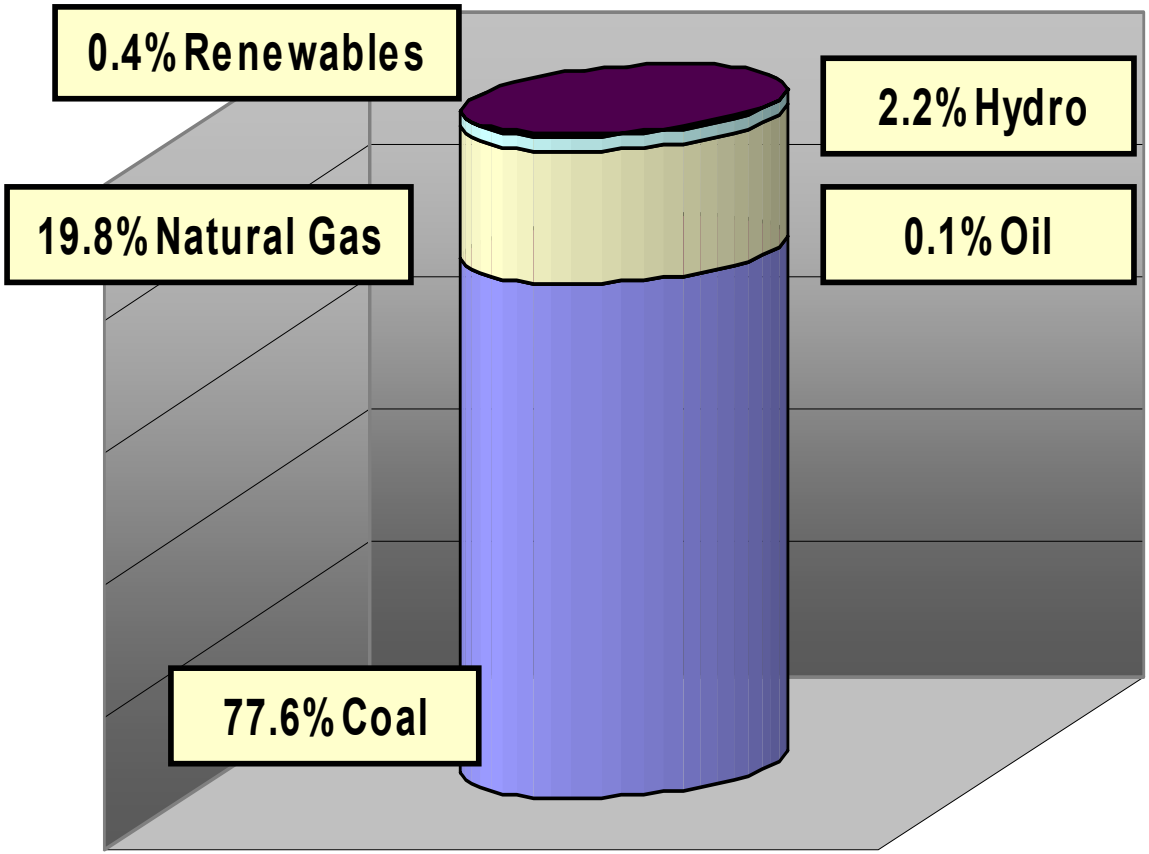
Colorado Electric Generation
By Fuel Type, 2002



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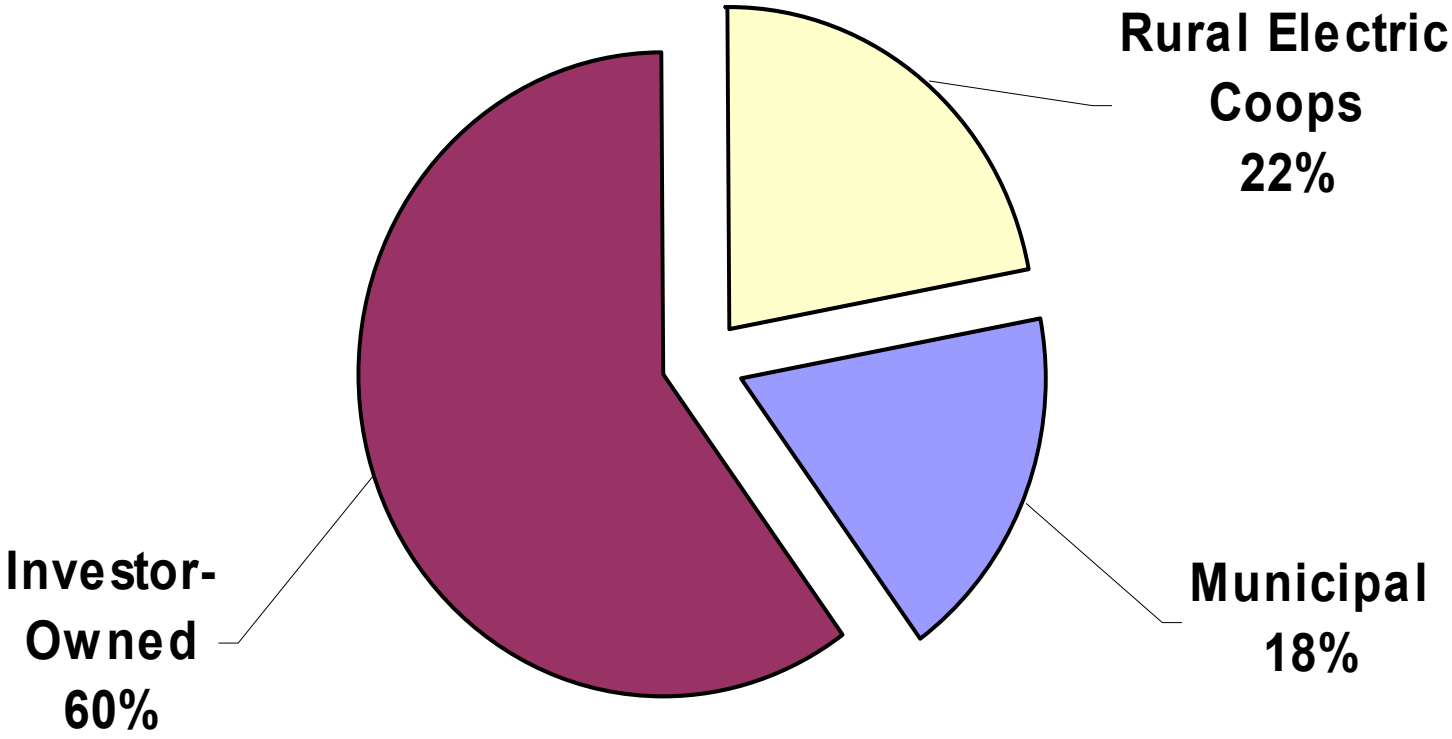
Colorado Retail Electricity Sales

Megawatthours by Industry Sector, 2002



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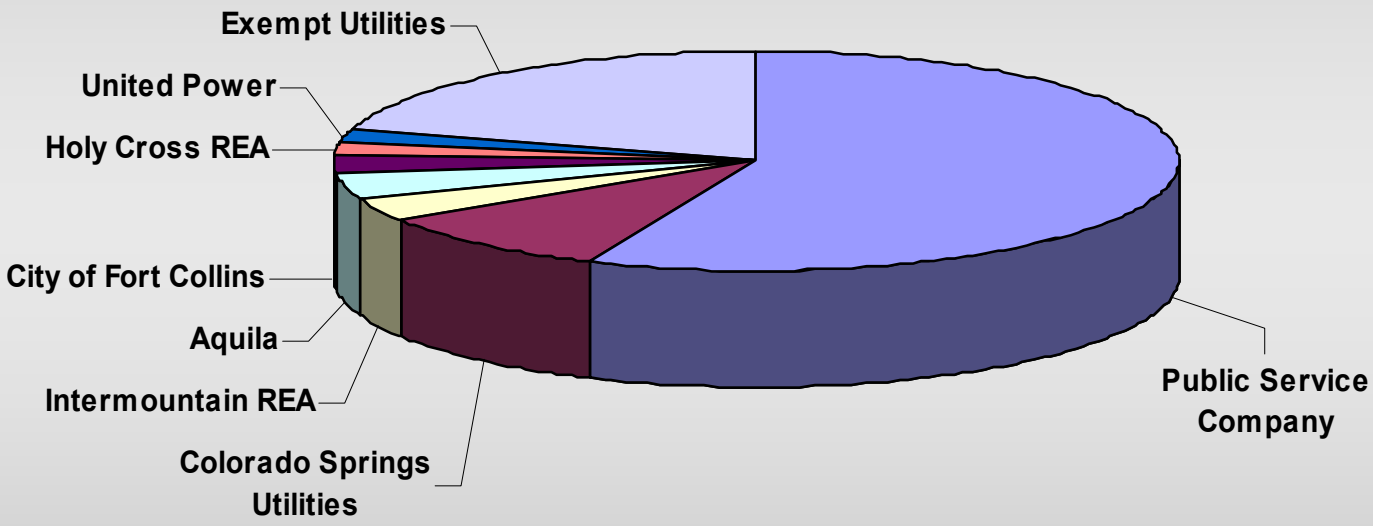
Utilities Subject to the Renewable Energy Standard in 2005 (by KWh sales)



The RES requirement will apply to 79% of Colorado electric power sales in 2005

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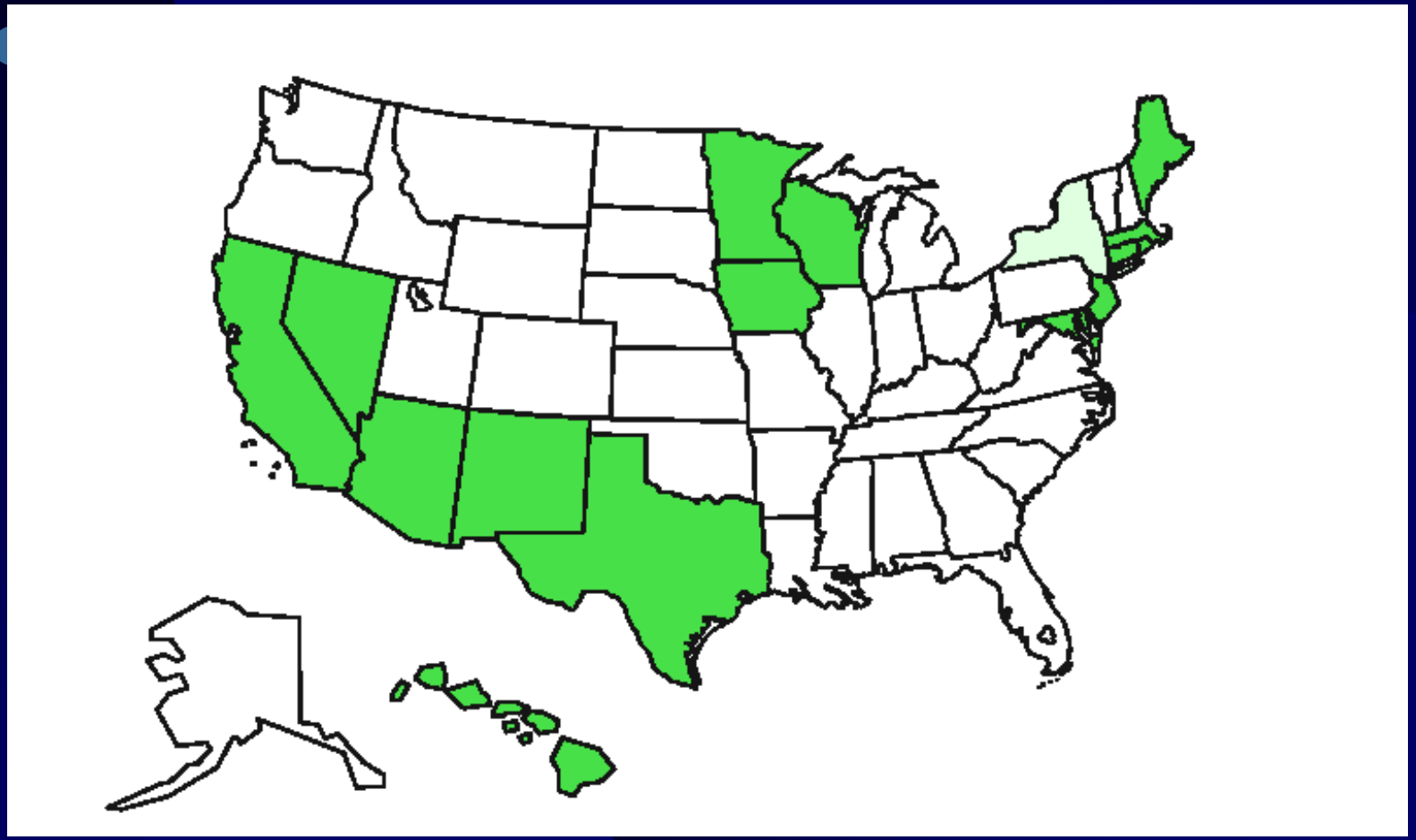
Renewable Standard in Other States



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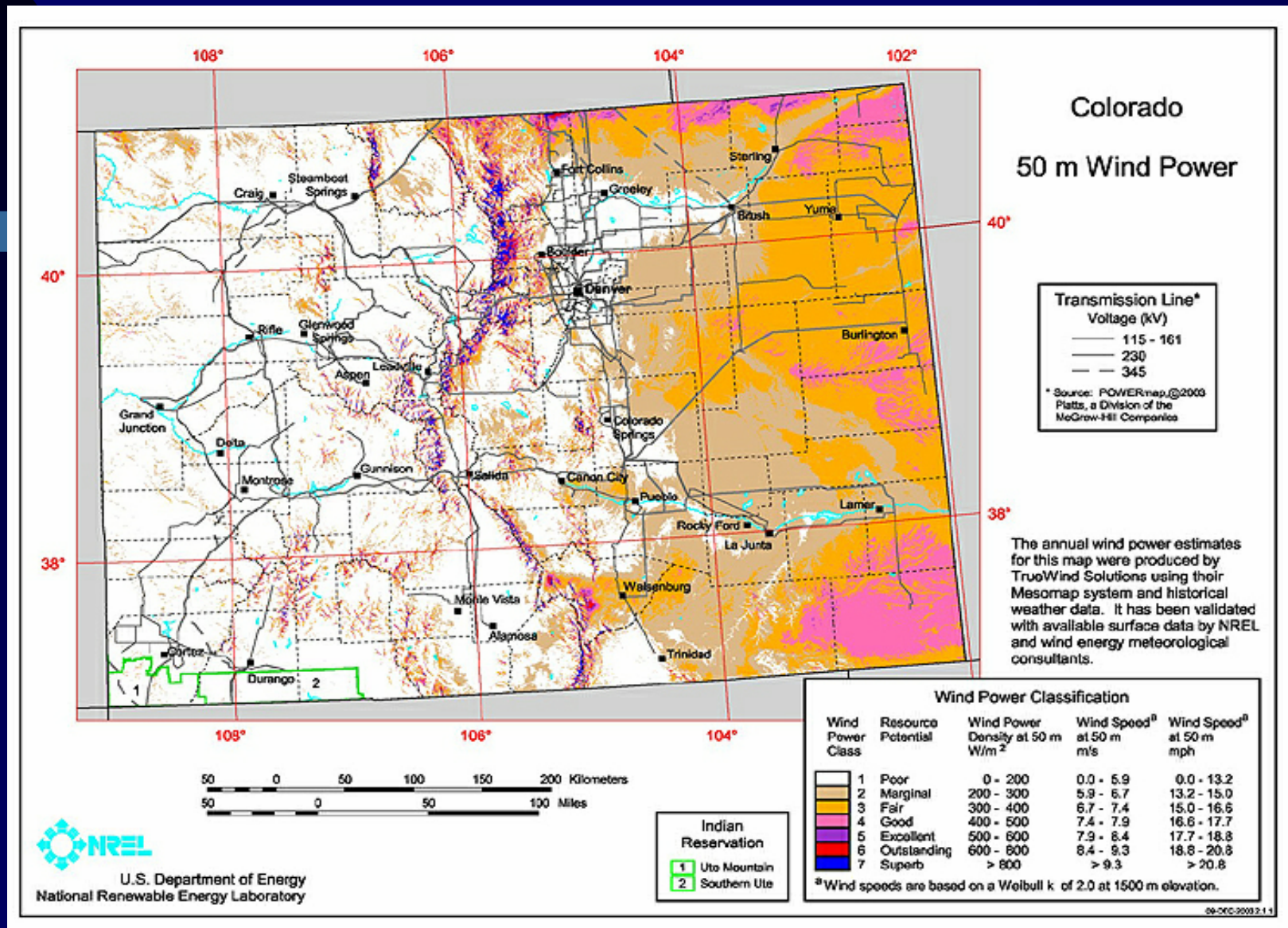
State	Adopted	Renewable Energy Standard
Arizona	1998	1% in 2005; 1.05% in 2006; 1.1%/year 2007 to 2012
California	2002	At least 1%/year; 20% by 2017
Connecticut	1998	10% by 2010
Hawaii	2004	10% in 2010; 15% in 2015; 20% in 2020
Iowa	1991	105 MWa, approximately 2% of 1999 sales
Maine	1999	30% of sales including high efficiency cogeneration
Maryland	2004	7% by 2017 from non-hydro and non-WTE renewables
Massachusetts	1997	4% new renewables on 7% base by 2009; 1%/year thereafter
Minnesota	2003	10% of 2015 sales
Nevada	2001	5% in 2003, increasing to 15% of retail sales by 2013
New Jersey	2001	4% by 2012
New Mexico	2002	10% of sales by 2011
New York	2004	PSC in process of setting standard
Pennsylvania	1998	Limited renewable requirements for one utility
Rhode Island	2004	3% in 2007; 4.5% in 2010; 8.5% in 2014; 17% in 2019
Texas	1999	2880 MW by 2009, approx 3% of sales
Wisconsin	1999	0.5% by 12/31/01, increasing to 2.2% by 12/31/11



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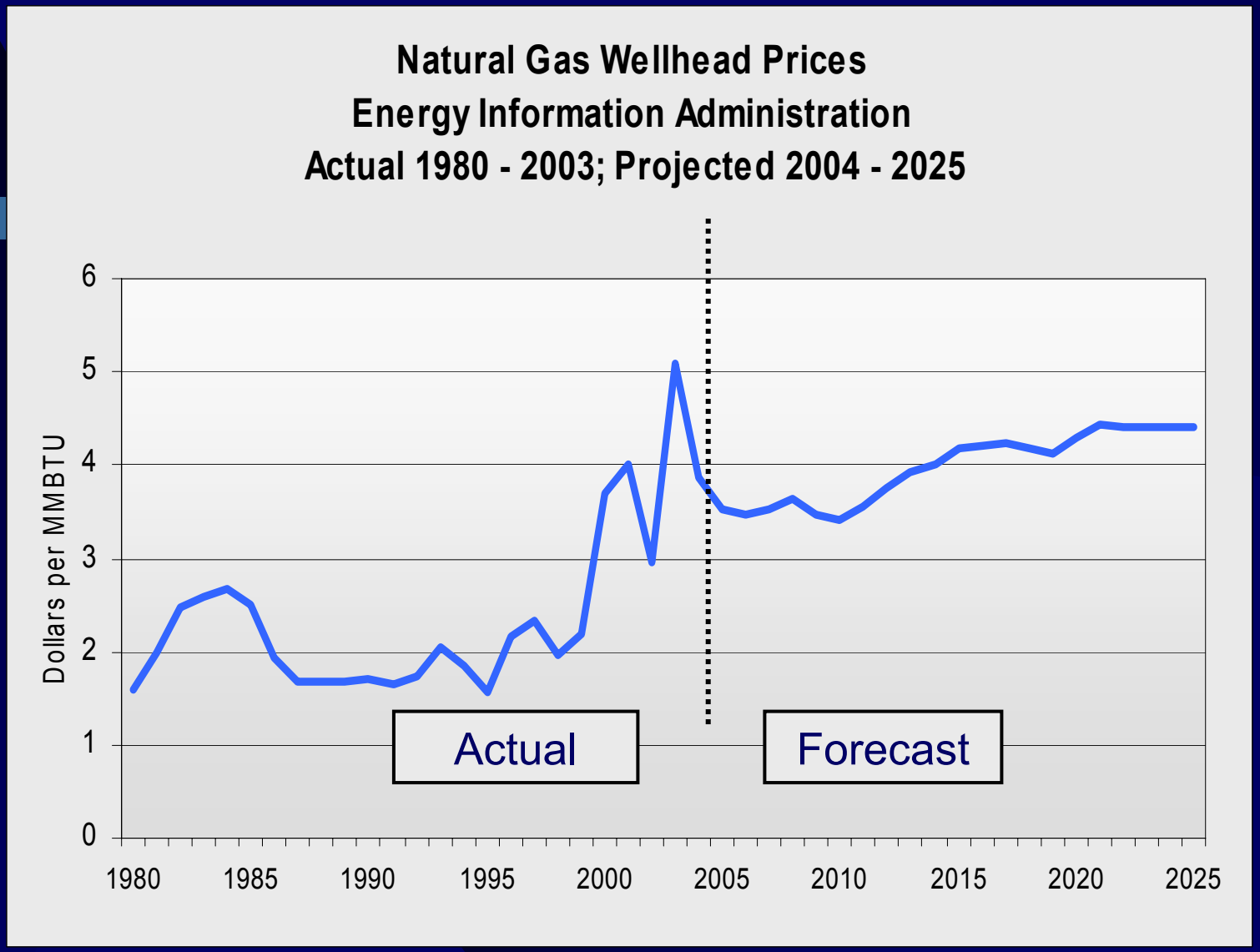

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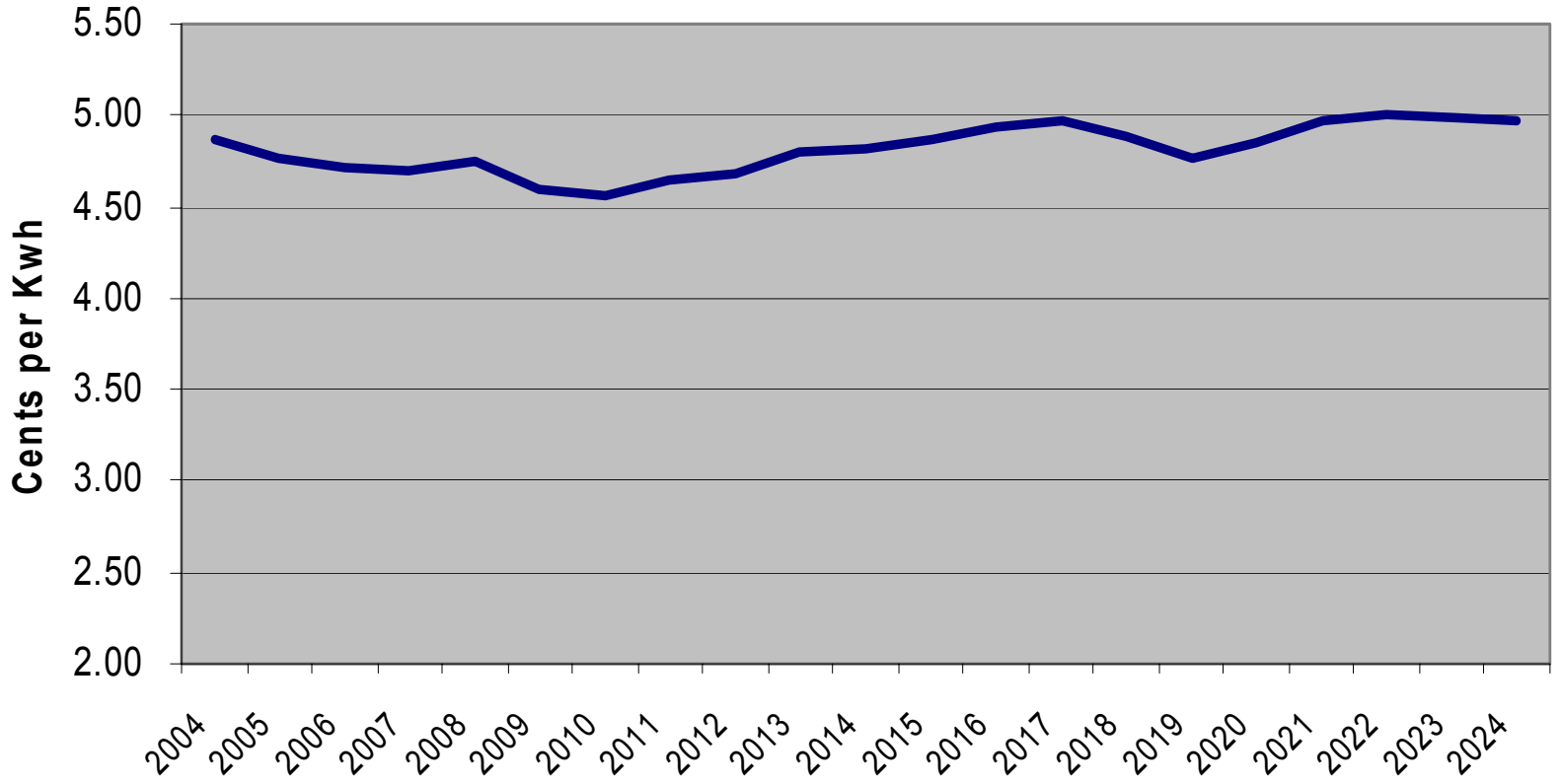
Generation Cost of Electricity in Colorado
Advanced Combined Cycle Plant (2004$)
Base Gas Cost Case



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EIA Costs of Fossil Generation

Costs	2010		2025	
	Advanced coal	Advanced combined cycle	Advanced coal	Advanced combined cycle
	-------2002 mills per kilowatt-hour-------			
Capital	33.77	12.46	33.62	12.33
Fixed	4.58	1.36	4.58	1.36
Variable	11.69	32.95	11.74	37.91
Incremental transmission	3.38	2.89	3.26	2.78
Total	**53.43**	**49.65**	**53.20**	**54.38**

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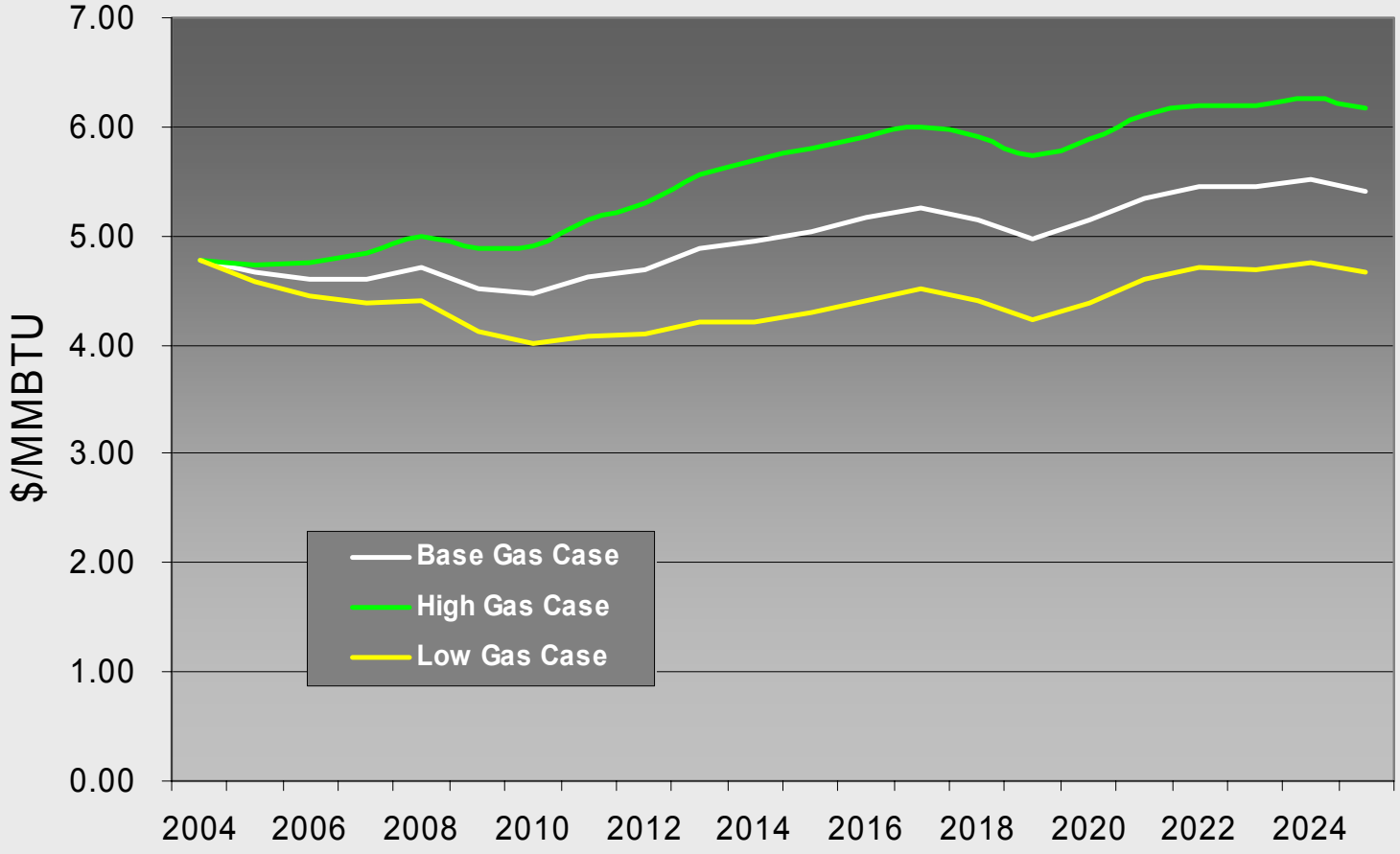
Natural Gas Price Scenarios

Delivered Prices 2004-2025, Mountain Region



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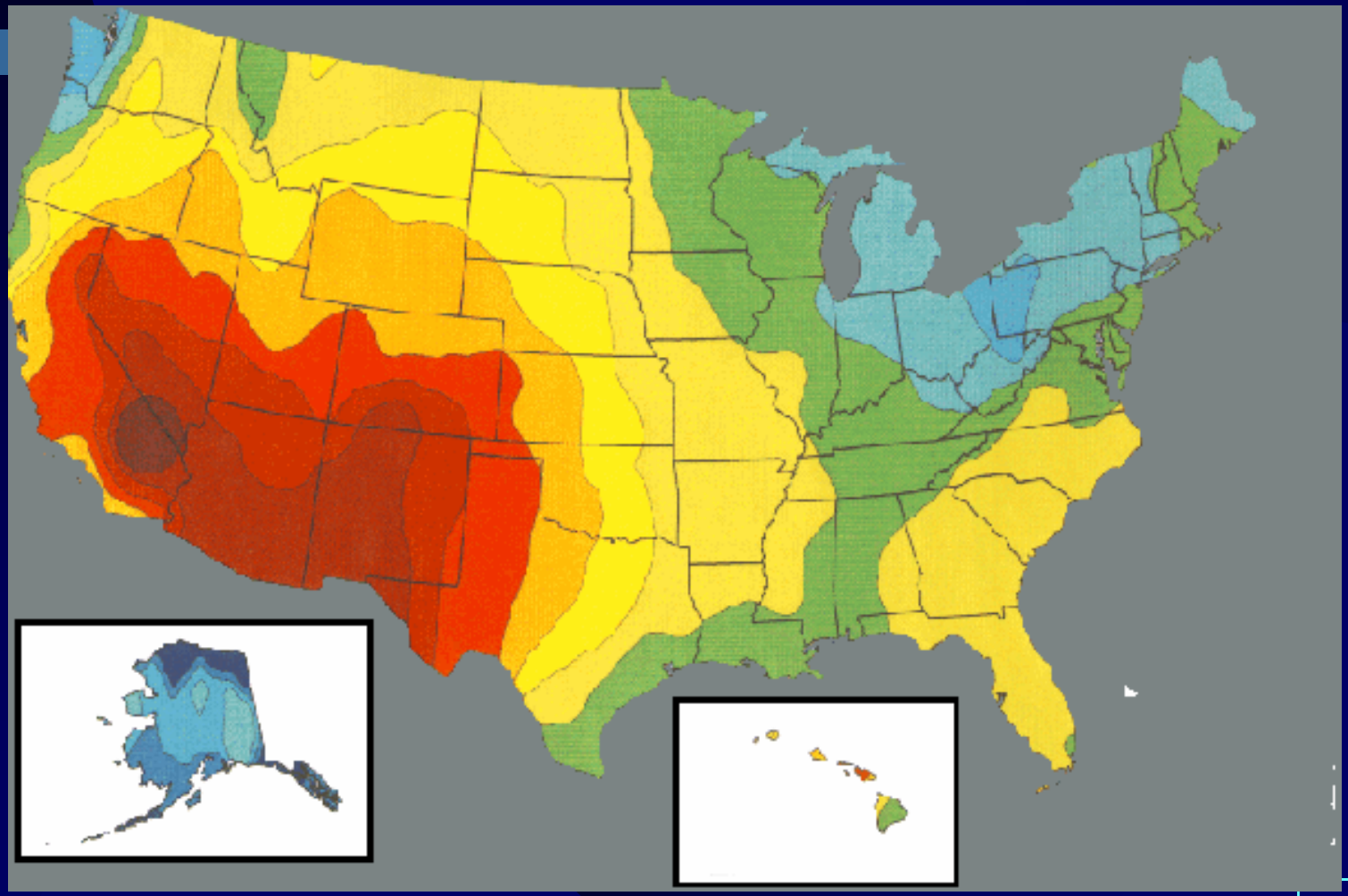
US Insolation Map



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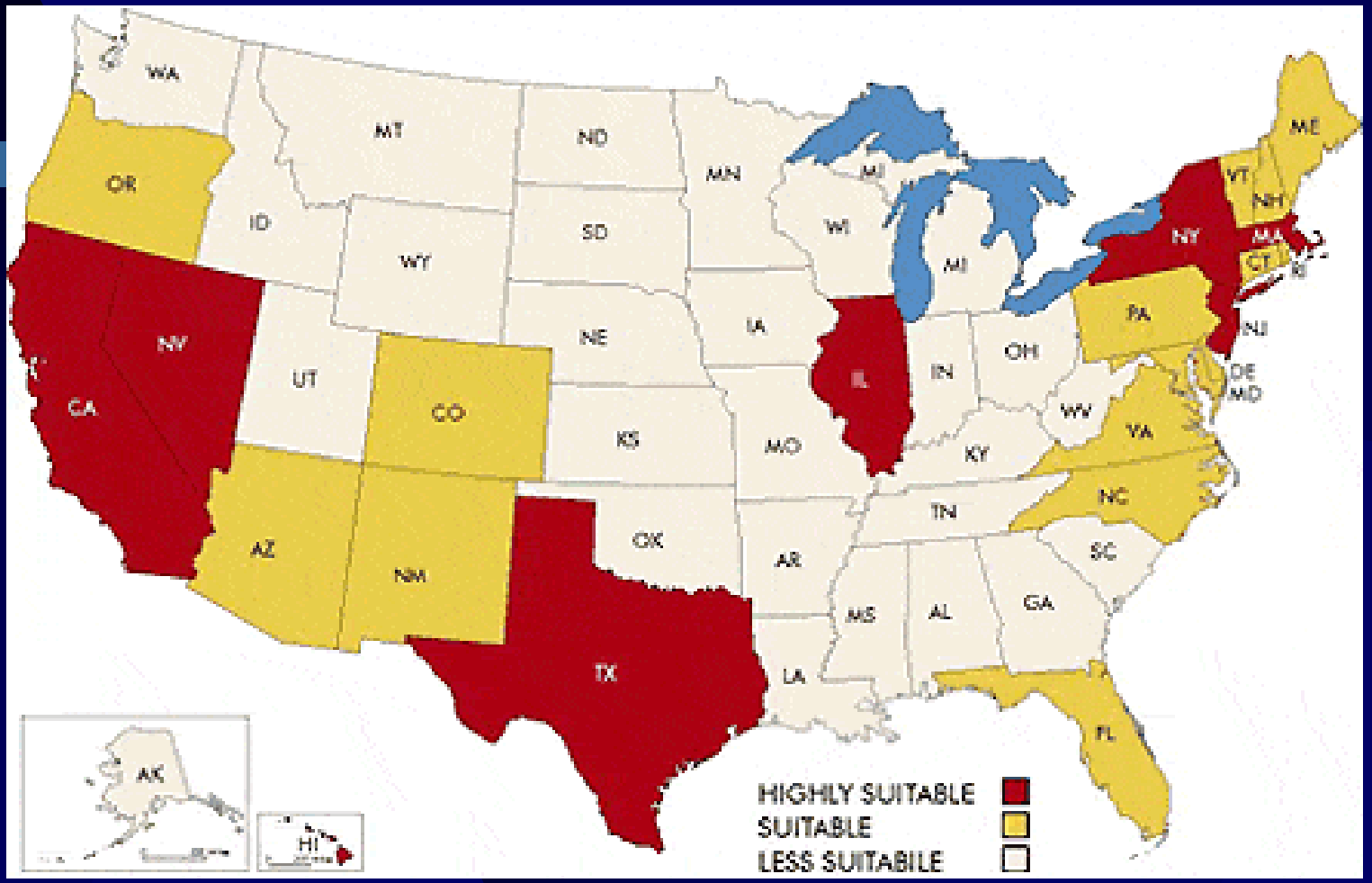

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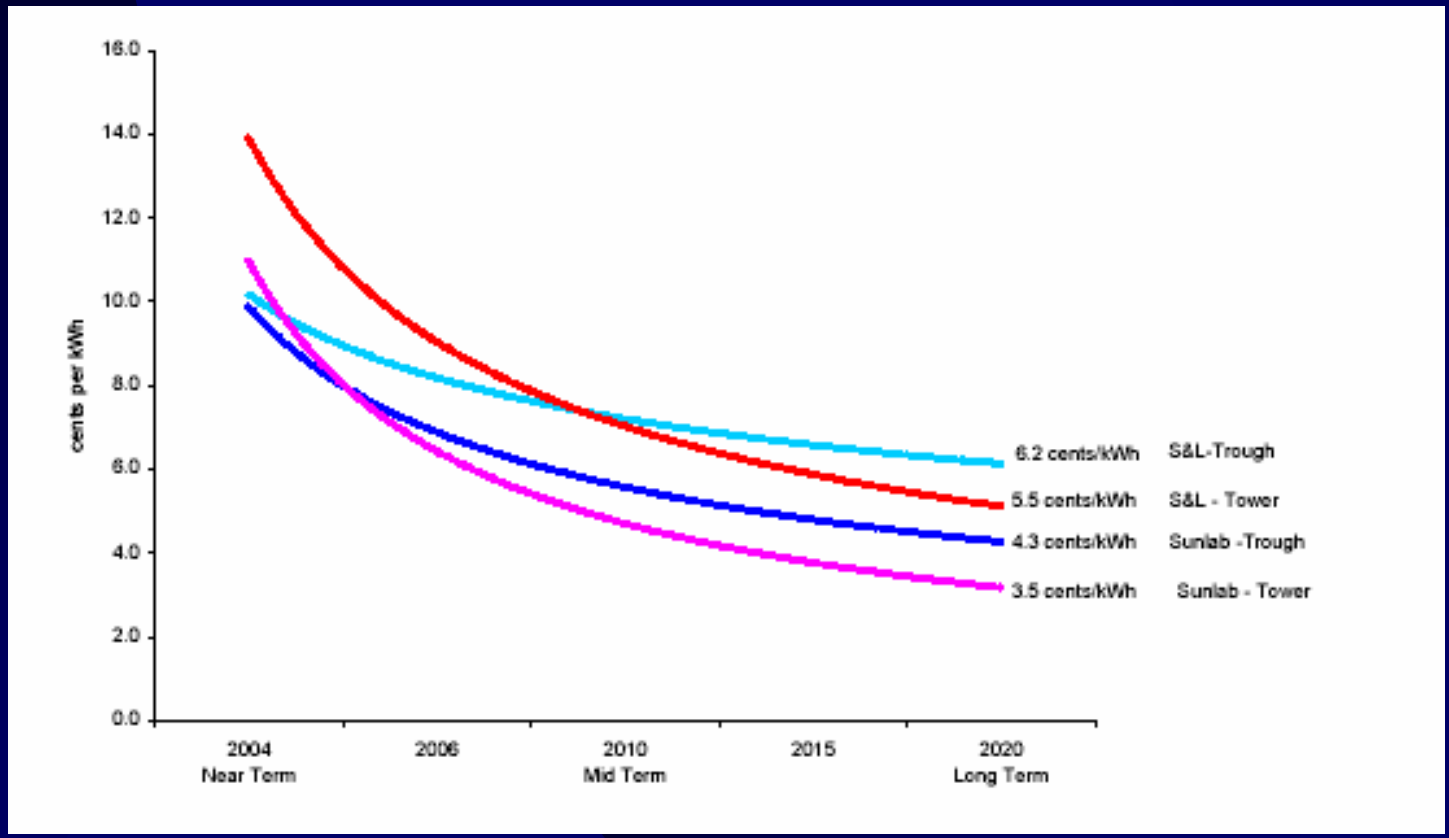
Cost of Central Station Solar
(Sargent and Lundy for NREL)



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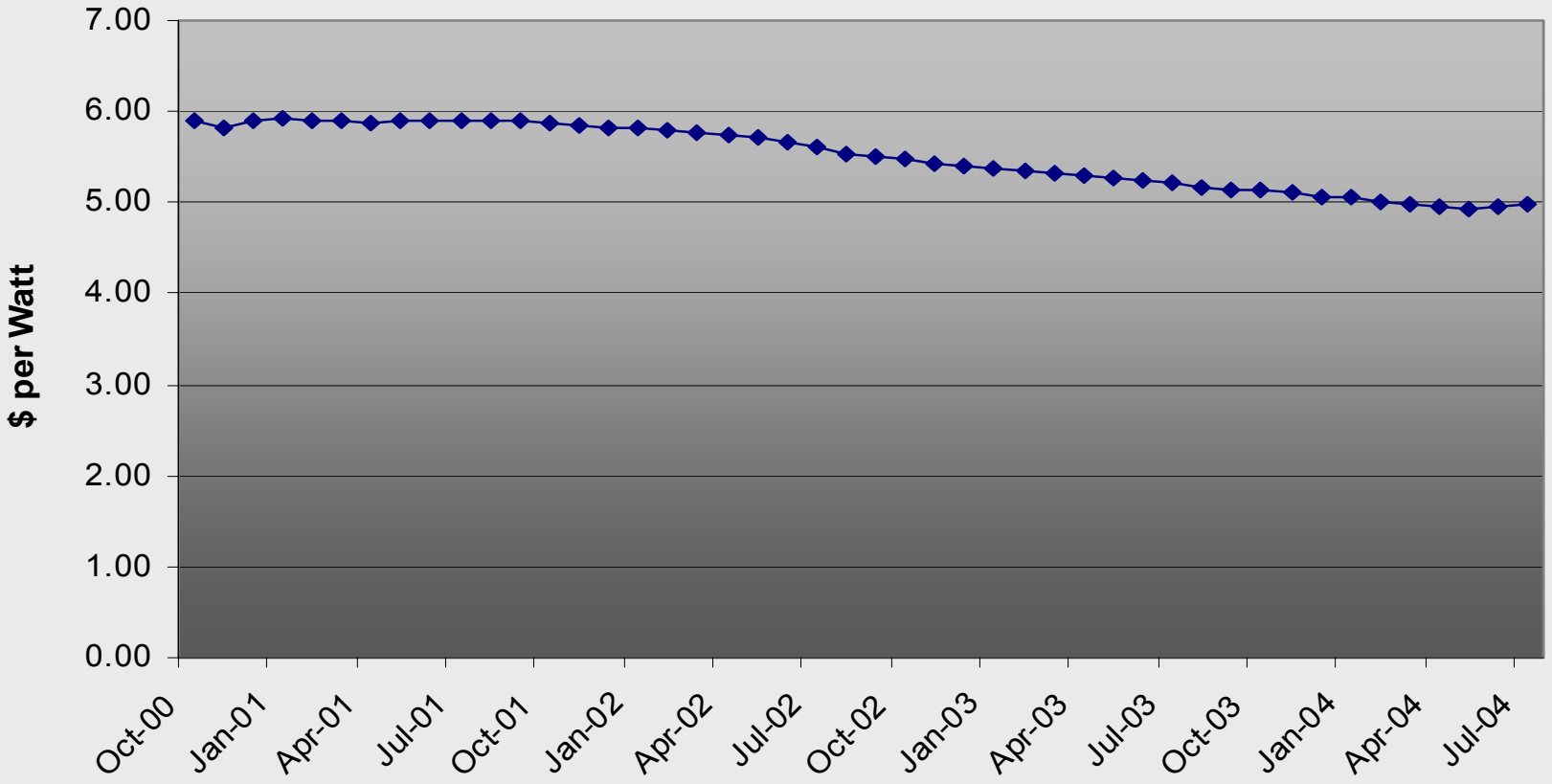
Market Price of Solar Modules
Survey of 230+ Vendors



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Colorado Retail Electric Rates, 2002

Sector	Residential Price/KWh	Commercial Price/KWh	Industrial Price/KWh
Total State	7.37	5.67	4.52
Investor-Owned Utilities	7.21	5.36	4.12
Municipal Utilities	6.63	5.76	4.55
Rural Cooperatives	8.19	7.06	5.23

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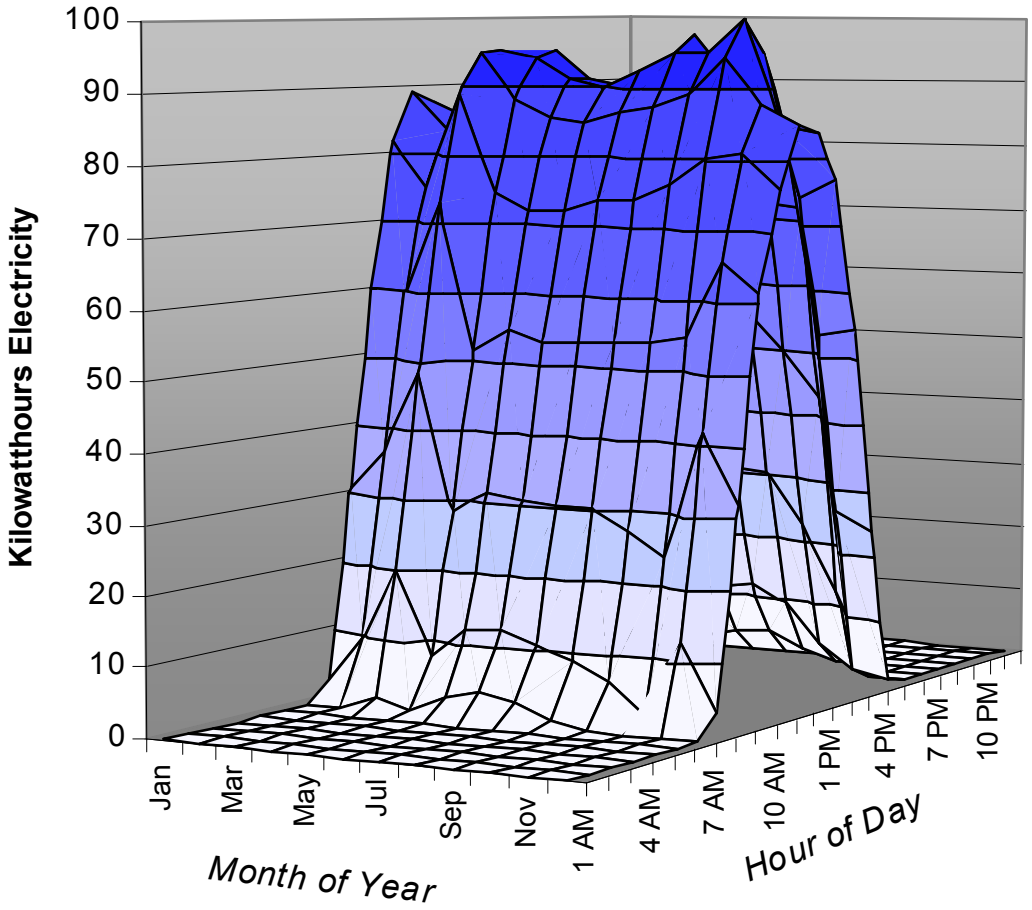
Photovoltaic Generation by Time of Day and Month of Year
Pueblo, Colorado -- Fixed Tilt System



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Scenarios used in Wind cost estimate

Scenario	Gas Price Assumption	PTC Assumption
Scenario 1A	Base Gas Cost	No PTC Extension
Scenario 1B	Base Gas Cost	PTC to 12/31/2006
Scenario 1C	Base Gas Cost	PTC to 12/31/2009
Scenario 2A	High Gas Cost	No PTC Extension
Scenario 2B	High Gas Cost	PTC to 12/31/2006
Scenario 2C	High Gas Cost	PTC to 12/31/2009
Scenario 3A	Low Gas Cost	No PTC Extension
Scenario 3B	Low Gas Cost	PTC to 12/31/2006
Scenario 3C	Low Gas Cost	PTC to 12/31/2009

Rate Impact of Colorado RPS for 2005-2024: Nine Scenarios

		Xcel Total 20 Year Effect		*Impact on Average Residential Monthly Bill*		
Scenario	**Senario Description**	Nominal	NPV	Overall	Range	
	Col A	Col B	Col C	Col D	Col E	Col F
1A	*Base Gas Case, No PTC*	390,461,630	147,905,158	0.36	0.44	0.03
1B	*Base Gas Case, PTC to 2006*	24,709,183	(1,944,066)	0.02	0.13	(0.19)
1C	*Base Gas Case, PTC to 2010*	(146,287,190)	(43,740,649)	(0.14)	0.04	(0.26)
2A	*High Gas Case, No PTC*	245,618,715	105,278,688	0.23	0.36	0.03
2B	*High Gas Case, PTC to 2006*	(120,133,732)	(44,570,536)	(0.11)	0.03	(0.21)
2C	*High Gas Case, PTC to 2010*	(291,130,104)	(86,367,119)	(0.27)	0.03	(0.45)
3A	*Low Gas Case, No PTC*	535,304,544	190,531,628	0.50	0.63	0.03
3B	*Low Gas Case, PTC to 2006*	169,552,097	40,682,404	0.16	0.32	(0.16)
3C	*Low Gas Case, PTC to 2010*	(1,444,275)	(1,114,180)	(0.00)	0.16	(0.16)

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Scenarios used in model

Scenario Probabilities		
Scenario 1A:	Base Gas, No PTC	5%
Scenario 1B:	Base Gas, PTC to 2006	35%
Scenario 1C:	Base Gas, PTC to 2010	10%
Scenario 2A:	High Gas, No PTC	3%
Scenario 2B:	High Gas, PTC to 2006	21%
Scenario 2C:	High Gas, PTC to 2010	6%
Scenario 3A:	Low Gas, No PTC	2%
Scenario 3B:	Low Gas, PTC to 2006	14%
Scenario 3C:	Low Gas, PTC to 2010	4%

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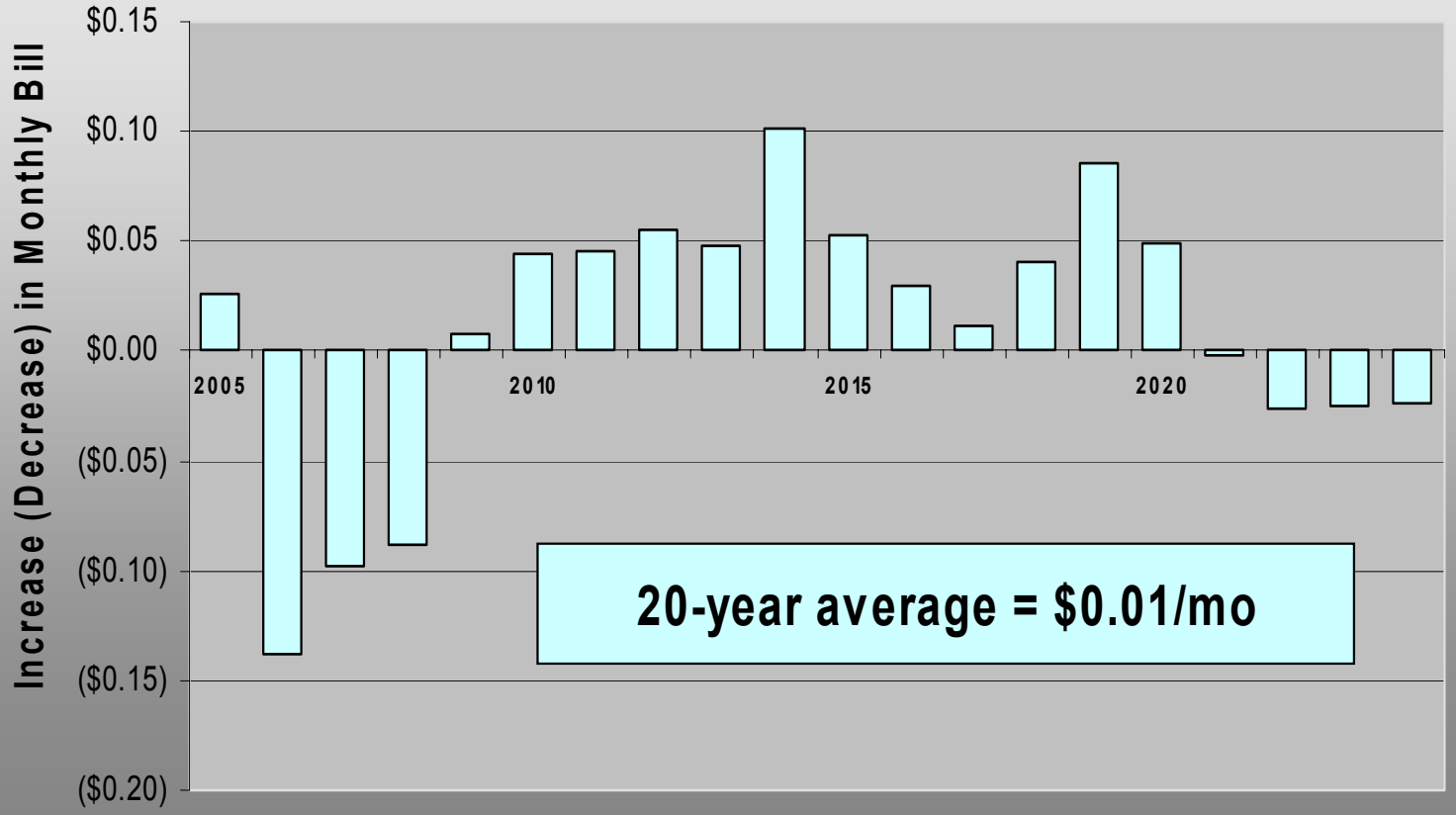
Xcel Energy -- Change in Average Residential Monthly Bill Due to Compliance with Amendment 37



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Impact of the Colorado Renewable Energy Standard Proposed in Amendment 37

Impact on 20-Year Utility Revenue Requirements, by Utility
Impact on Monthly Residential Bills, by Utility

Utility Name	*20-Year Impact on Total Retail Revenues*	Residential Monthly Bill Impact			*Notes*
		20 Year Average	*Max in Any Year*	*Min in Any Year*	
Public Service Company	12,600,861	0.01	0.15	(0.19)	A, B
City of Colorado Springs					
REC Strategy	29,730,597	0.14	0.28	0.11	C, J
Wind Purchase Strategy	(63,560,352)	(0.33)	(0.24)	(0.42)	D, J
Combination Strategy	(16,914,877)	(0.09)	0.02	(0.16)	E, J
Intermountain REA	(24,561,694)	(0.45)	(0.30)	(0.54)	F, J
Aquila	542,366	0.01	0.08	(0.22)	B, G
City of Fort Collins	-	-	-	-	H, J
Holy Cross Electric Association	(14,124,008)	(0.48)	(0.35)	(0.61)	F, J
United Power	5,587,924	0.21	0.40	0.15	I, C, J
City of Longmont	(2,864,165)	(0.09)	0.04	(0.15)	E, J
Mountain View Electric Association	3,752,289	0.20	0.39	0.15	I, C, J
La Plata Electric Association	6,088,597	0.15	0.29	0.11	I, C, J
Poudre Valley REA	4,733,765	0.22	0.41	0.16	I, C, J
Delta Montrose Electric Association	3,164,594	0.17	0.39	0.00	I, C, J
Yampa Valley Electric Association	(7,116,752)	(0.39)	(0.28)	(0.50)	F, J
City of Loveland	(1,889,240)	(0.14)	(0.06)	(0.21)	E, J
San Isabel Electric Association	56,656	0.10	0.10	0.00	I,C, J
Total State	**(14,028,808)**				

Notes:

A -- Uses Expected Value Assumptions for Natural Gas Prices and Status of Production Tax Credit

B -- Solar Requirement Met 50% Central Station, 50% Distributed Resources

C -- Assumes RES Met By Purchase of Renewable Energy Certificates (RECs)

D -- Assumes RES Met With Wind Purchases Beginning 2006

E -- Assumes Combination Strategy; 50% RECs, 50% Wind Purchases

F -- PSCo Full Requirements Customer; PSCo effect passed through wholesale rates

G -- PSCo Partial Requirements Customer; PSCo effect passed through wholesale rates

H -- Adheres to Own Renewable Energy Standard

I -- TriState Member; Options Limited by Power Purchase Agreement

J -- Assumes Self-Certification with No Solar Requirement

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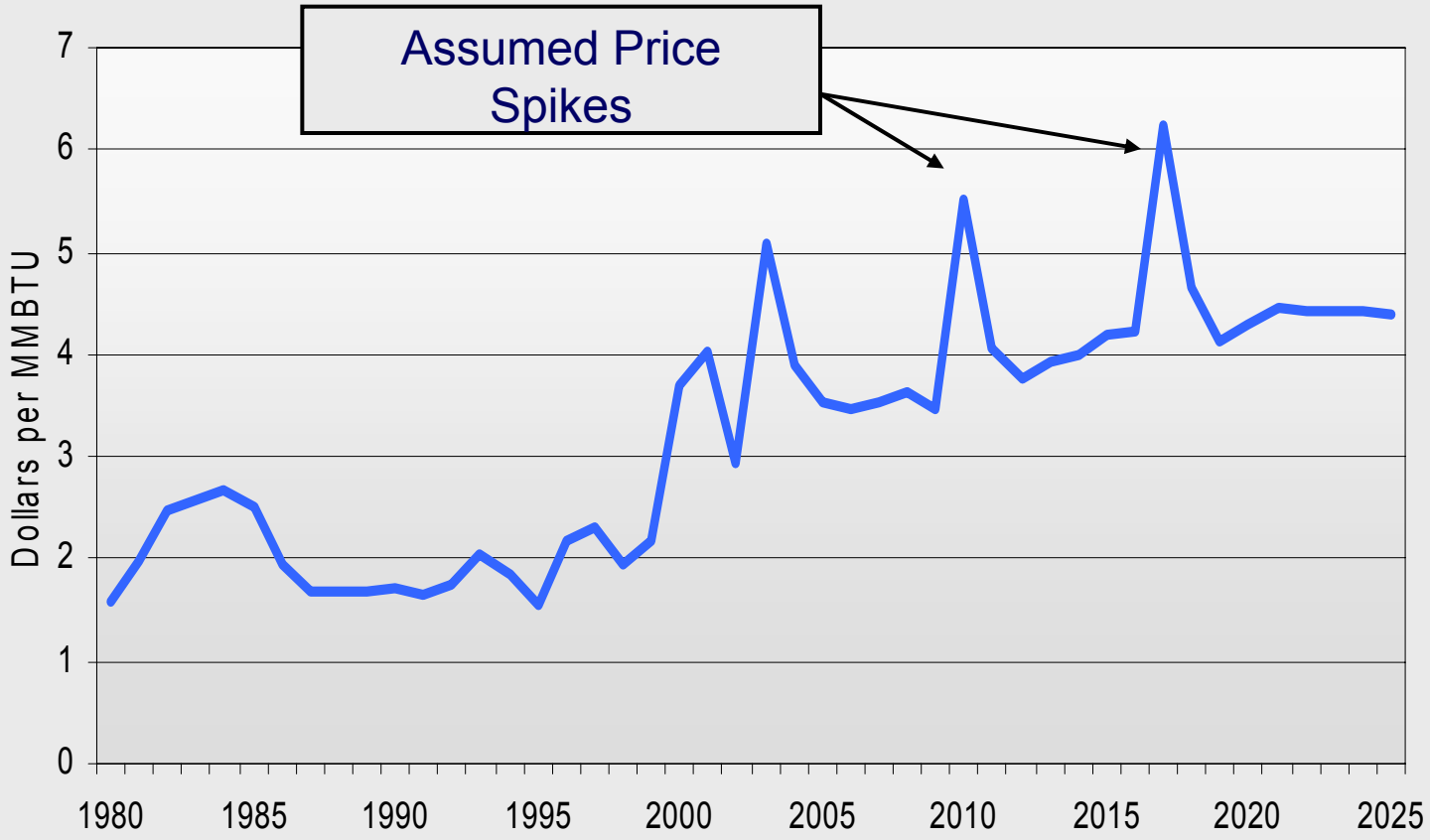
Natural Gas Wellhead Prices
Actual 1980 - 2003; Projected 2004 - 2025
AEO 2004 with Assumed Price Spikes



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Impact of RES on Consumptive Water Use

Impact of RES on Consumptive Water Use
RES Displacing Natural Gas Generation

Total Impact 2005-2024

MWh	Gallons Saved	Acre-Feet Saved
84,904,806	21,226,201,572	65,164

Average Annual Impact 2005-2024

MWh	Gallons Saved	Acre-Feet Saved
4,245,240	1,061,310,079	3,258

Impact of RES on Consumptive Water Use
RES Displacing Coal Generation

Total Impact 2005-2024

MWh	Gallons Saved	Acre-Feet Saved
84,904,806	41,603,355,080	127,722

Average Annual Impact 2005-2024

MWh	Gallons Saved	Acre-Feet Saved
4,245,240	2,080,167,754	6,386

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Conclusions

- RES will likely have minimal impact on rates;
- Varies by utility;
- Very unlikely to exceed 50¢ cap on residential rates;
- Wind savings offset solar costs
- Substantial air and water impacts
- Rural economic development impact

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The End

Thanks for the invitation.

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