

How Many Kilowatts are in a Negawatt? Verifying "Ex Post" Estimates of Utility Conservation Impacts at the Regional Level

The objective consideration of conservation policy under restructuring is proving to be a difficult task. One of the greatest obstacles has been the persistent uncertainty among utility planners regarding the true resource- effectiveness and costeffectiveness of conservation relative

These figures indicate that larger utilities tend to report greater ...

State	Utility	Sales	Conscrvation			
		(GWh)			1 st	
			(GWh)	(%)	Year	
California	Los Angeles Dept. of Water&Power	14,829	175.7	1.2	1980	
Camorana	Pacific Gas & Electric	45,760	2,959.7	6.5	1976	
	Sacramento Municipal Utility Dist.	4,733	238.7	5.0	1982	
	San Diego Gas & Electric	9,415	375.0	3.4	1978	
	Southern California Edison	46,721	7,751.3	16.6	1977	
Connecticut	Connecticut Light & Power	11,754	814.5	6.9	1982	
	United Illuminating	3,396	107.7	3.2	1986	
Maine	Bangor Hydro-Electric	1,053	8.3	0.8	1985	
	Central Maine Power	6,377	272.9	4.3	1985	
	Maine Public Service	298	2.3	0.8	1989	
Massachusetts	Boston Edison	8,883	242.1	2.7	1987	
	Commonwealth Electric	1,358	110.8	8.2	1989	
	Eastern Edison	1,433	36.0	2.5	1988	
	Massachusetts Electric	9,594	481.9	5.0	1987	
	Western Massachusetts Electric	2,233	137.8	6.2	1982	
New Hampshire	Concord Electric	231	0.5	0.2	1991	
	Public Service of New Hampshire	3,930	0.1	0.0	1993	
New Jersey	Jersey Central Power & Light	10,163	136.8	1.3	1982	
	Public Service Electric & Gas	27,174	50.1	0.2	1989	
	Rockland Electric.	724	14.0	1.9	1989	
New York	Central Hudson Gas & Electric	2,799	77.5	2.8	1989	
	Consolidated Edison	25,118	1,358	5.4	1987	
	Long Island Lighting	8,257	547.6	6.6	1987	
	New York State Electric & Gas	6,247	289.1	4.6	1989	
	Niagara Mohawk	22,927	520.0	2.3	1990	
	Orange & Rockland	1,896	65.7	3.5	1988	
	Rochester Gas & Electric	3,881	115.1	3.0	1990	
Pennsylvania	Duquesne Light	8,537	0	0.0	_	
	Metropolitan Edison	6,459	143.1	2.2	1984	
	Pennsylvania Electric	7,996	238.6	3.0	1984	
	Pennsylvania Power	2,043	1.6	0.1	1993	
	Pennsylvania Power & Light	18,633	17.6	0.1	1989	
	Philadelphia Electric	21,337	21.5	0.1	1986	
	West Penn Power	10,637	232.0	2.2	1984	
Rhode Island	Blackstone Valley Electric	895	28.0	3.1	1988	
	Narragansett Electric	2,849	160.0	5.6	1987	
	Newport Electric	220	4.2	1.9	1989	
Vermont	Central Vermont Public Service	1,139	19.2	1.7	1991	
	Green Mountain Power	1,123	16.6	1.5	1991	

Variable	Coeff.	S.E.	T-Stat.	
electricity price	-0.078	0.011	-6.8	
natural gas price	-0.033	0.010	-3.3	
fuel oil price	-0.026	0.006	-4.0	
coal price	-0.015	0.005	-3.0	
mfg. employment	0.280	0.022	12.7	
non-mfg. employment	0.260	0.049	5.3	
heating deg. days	0.014	0.009	1.6	
cooling deg. days * time	0.029	0.003	11.1	
conservation	-0.994	0.281	-3.5	
SCE conservation	-0.261	0.452	-0.6	
utility dummies		See text		

Early estimation attempts with individual utilities revealed that there was insufficient variation in the data series to produce reliable coefficient estimates for each utility taken separately. To increase the statistical power of the analysis, ...

Finally, since no incentives are offered, it becomes more difficult to attribute customer investment decisions to the utility programs as opposed to other influences.

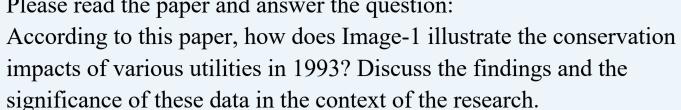
	Program Type	1993 Conservation Impacts (Annualized)					
Utility (C&I Sales)		GWh	% of Sales	% of Impacts			
Pacific Gas & Electric	Incentives	1,886	4.1%	63 %			
(45,760 GWh)	Services	940	2.1%	31%			
	Other	187	0.4%	6%			
	Total	3,013	6.6%	100%			
San Diego Gas & Electric	Incentives	251	2.7%	65%			
(9,415 GWh)	Services	97	1.0%	25%			
	Other	37	0.4%	10%			
	Total	385	4.1%	100%			
Southern California Edison	Incentives	1,728	3.7%	22%			
(46,721 GWh)	Services	6,006	12.9%	75 %			
	Other	240	0.5%	3 %			
	Total	7,974	17.1%	100%			
Sacramento	Incentives	153	3.2%	58%			
(4,733 GWh)	Services	104	2.2%	40%			
	Other	6	0.1%	2%			
	Total	262	5.5%	100%			
Los Angeles	Incentives	78.0	0.5%	50%			
(14,829 GWh)	Services	79.1	0.5%	50%			
	Other	0	0.0%	0%			
	Total	157	1.1%	100%			

Study	Sample	Sector	Period .	Elasticity				
				Elec.	Gas	Oil	Coal	Fuels
Longva et al. 1988	Norway 1970s	primary ind.	LR	-0.39				0.42
		energy-intensive ind.	LR	-0.71			100	-0.10
		other manufacturing	LR	-0.57				-0.06
		services & transport	LR	-0.64				0.16
Hasnanick & Kyser 1995	USA 1958-85	manufacturing	LR	-0.19	-			-0.13
Sutherland 1983	USA	commercial	LR	-0.75	-0.25	-	-	
	1974-80	industrial	LR	-1.20	0.03			-
Hall 1986	USA 1960-79	industrial	LR	-0.14	0.20	-0.15	0.09	•
Considine 1989	USA 1970-85	industrial	LR	-0.39	0.33	-0.04	0.09	
		commercial	SR	-0.04		-0.002		
Murray et al.	Virginia, USA 1958-73	industrial	SR	-0.29		0.09	-	-
1978		commercial	LR	-0.47		0.07	-	-
		industrial	LR	-0.21	-	-0.04		
Woodland 1993	NSW Australia 1977-85	industrial	LR	-1.11	-0.2	-0.29	-0.16	-
National Energy Board 1989		commercial	SR	-0.13	-0.00	0.01	-	
	Canada	industrial	SR	-0.11	0.02	-0.01	-	-
		commercial	LR	-0.46	0.04	0.05		
		industrial	LR	-0.45	0.12	-0.06		
Energy, Mines Resources Canada 1990		commercial	SR	-0.06	0.05	0.02		
	Canada	industrial	SR	-0.09	0.03	0.01	-	-
		commercial	LR	-0.36	0.24	-0.00	-	
		industrial	LR	-0.49	0.11	0.01	-	-
This study	USA 1970-93	commercial & industrial	SR	-0.078	-0.033	-0.026	-0.015	

According to California regulators, SCE's reported impacts for service programs have always been viewed with skepticism during regulatory reviews, although its impacts for other types of conservation programs have not. In California, service program impacts have historically been viewed as unverifiable, so utilities have been largely ineligible for incentive payments related to service program expenditures. Regulators in California acknowledge that they believe SCE's reported conservation impacts overstate the actual savings achieved by their programs and have communicated this skepticism to the utility. But, according to the rate regulation ...

## <paper>

Please read the paper and answer the question:



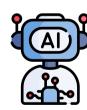




According to the paper, 'In 1993, the 39 companies in the sample accounted for 19% of total C&I electricity sales nationwide and 40% of all utility conservation program impacts, including residential impacts (Energy Information Administration 1995).' The table in Image-1 provides detailed data on the 1993 C&I sales and C&I conservation program impacts for various utilities. This image shows the sales in GWh and conservation impacts both in GWh and as a percentage of sales. For example, California utilities such as Southern California Edison reported high sales and high conservation percentages, which is a significant outlier. These data illustrate the varying levels of conservation achievements across utilities, underlining the study's aim to verify the effectiveness and accuracy of reported conservation impacts. Larger utilities tend to report greater conservation impacts relative to sales, and this detail supports the analysis presented in the paper.

Analyze the importance of Image-3 in comparing the study's findings with previous empirical research on electricity price elasticities.





According to the paper, 'The regression diagnostics offered little guidance on improving the structure of the model. The addition of a dummy variable for the years 1971-1973 did little to improve the residuals in subsequent years. Adding a set of dummy variables to account for each unstable period did not seem reasonable.' Image-3 presents a comparative analysis of electricity cross-price elasticity studies. This table showcases various studies, their sample sectors, and reported elasticities for electricity, natural gas, oil, and coal across different regions and time periods. The study's own findings, -0.078 for short-run own-price elasticity of electricity, align closely with prior research, confirming its place within established literature. The context provided by other studies helps to validate the paper's conclusions regarding the robustness of its econometric model and the effectiveness of conservation programs.