



Adventures in Attribution: Data Opportunism and Beyond

ACEEE National Market Transformation Symposium

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What you need to demonstrate program influence - 1

- **The Story or Program Theory**
 - Who are the program actors we're interested in?
 - What are they doing now and why?
 - How would the program change behavior?
- **Documentation of program output**
 - Marketing/Consumer Education: where, how much, who exposed
 - Participation: numbers and characteristics of participants and measures, timing, region
 - Efficiency levels v. typical practice
 - *Indicator of presence in the market*

What you need to demonstrate program influence - 2

- **Evidence of market change**
 - Market share: sales, prevalence of practices
 - Changes in codes and standards
 - Changes in distribution of energy consumption measures: EUIs, mpg
- **Evidence of program influence: usually a ‘weight of evidence’ approach. Are the facts consistent with the program theory?**
 - Cross sectional
 - Time Series
 - Self-reporting

US & VT clothes washer programs: presence in the market

	1998	2000	2002	2004
National Level				
Local Programs in Effect (approx)	12	50	70	100+
Energy Star Events & Other Federal Events	1997 – E Star Spec	Announce Min. Std	Double Your Savings	
Manufacturers w/ E Star Models	8	14	17	21
Number of E Star Models	18	35	84	125
E Star Market Share: Retail Partners	6.2%	9.3%	16.0	27.2
Vermont				
Program Market Share	24.8%	19.8%	23.1%	32.5%
E Star Market Share: Retail Partners	14.5%	22.6	34.0%	49.0%
E Star Market Share: Total	24.9%	27.3%	35.7%	49.6%

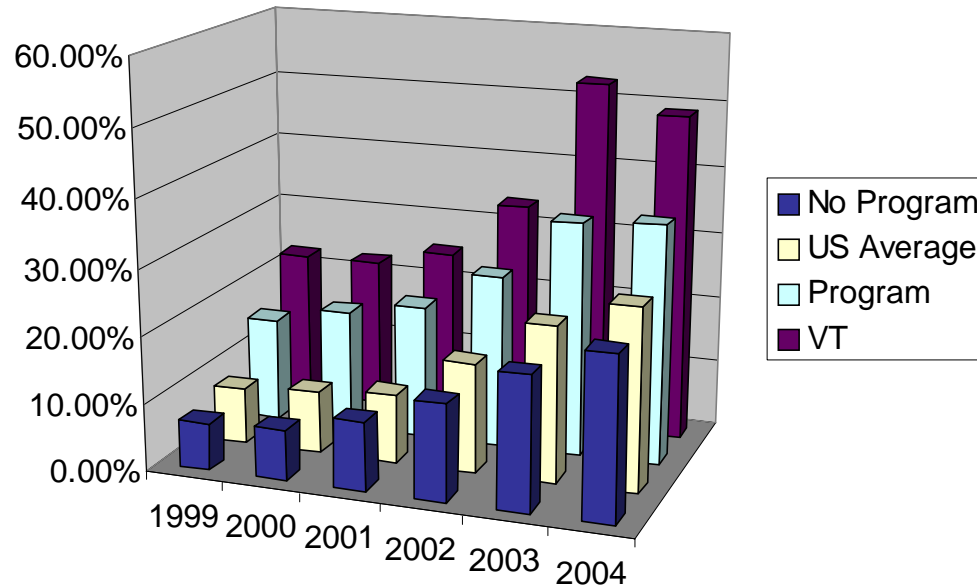
VT clothes washer programs: evidence of (waning) program influence

Year	Actual Market Share	Model Estimated Mkt. Share		% of E Star Sales Attributed to Program	
		No Program	No Program + No Cum. Effect	Program Only	Program + Cum Effect Variable
2001	22.6%	12.9%	n/a	34%	n/a
2003	52.6%	46.8%	43.4%	7%	26%
2004	48.9%	46.1%	43.4%	6%	12%

- **Results of cross-sectional modeling**

- Dependent variable: State level Energy Star CW market share
- Independent variables:
 - Program indicators
 - Customer Demographics & Energy Prices
 - Change indicator

VT clothes washer programs: What's happening to local program influence



- **Methods**

- 'No-program Area' market shares rising faster than market areas

- **Market conditions**

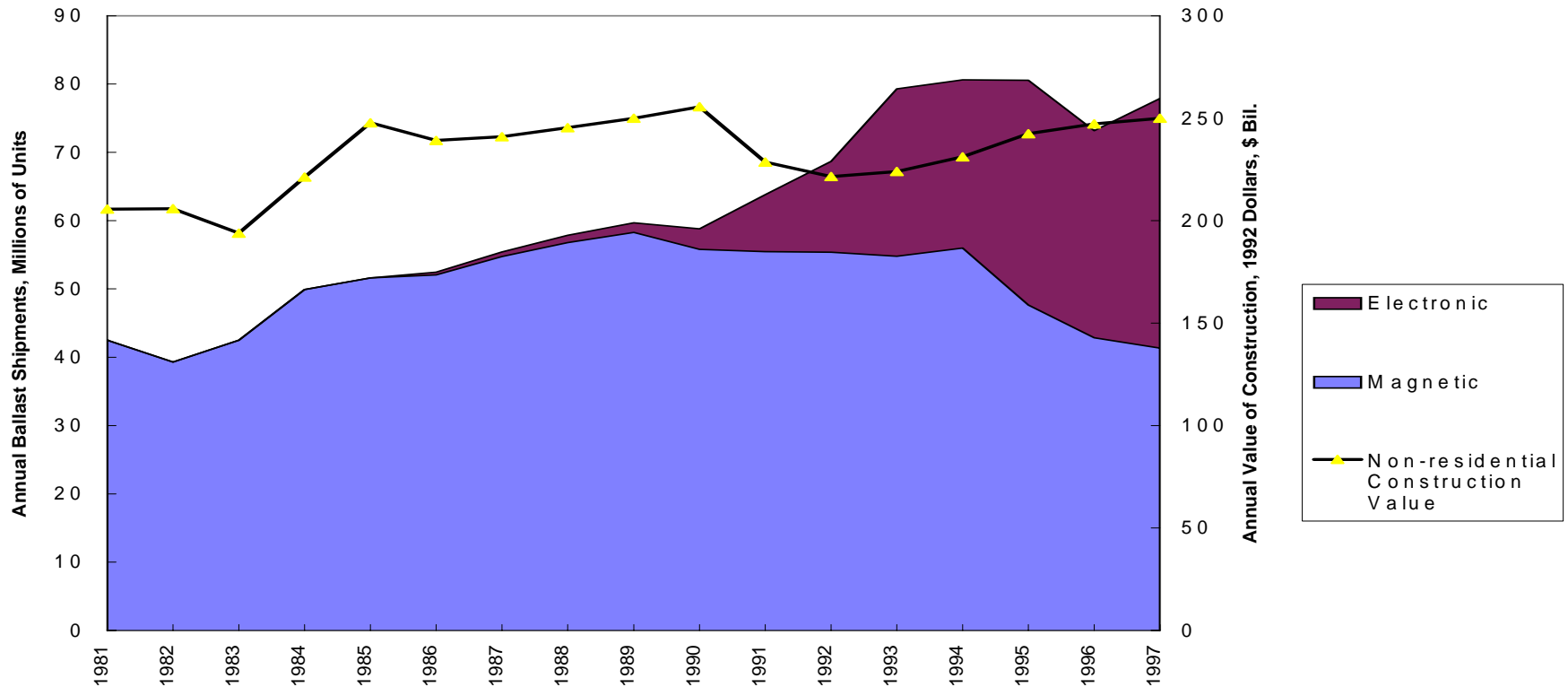
- Impending federal minimum standard changes
- Profitable product for manufacturers

- **Fair representation of local program effects?**

CA commercial lighting programs: presence in the market

	US EB Shipments mm Units	Sponsor Electronic Ballasts Rebated			US Utility Ballasts Rebated	
		mm Units	As %of Program Area EB Sales	As %of all US EB Shipments	mm Units	As %of US EB Shipments
1992	13.3	0.9	90%	7%	9.4	71%
1993	24.5	1.2	90%	5%	13.2	54%
1994	24.6	2.0	75%	8%	12.2	50%
1995	32.9	1.9	67%	6%	11.1	34%
1996	30.3	1.3	57%	4%	10.5	35%
Total	125.6	7.3	68%	6%	56.4	45%

CA Commercial Lighting Programs: evidence of change and program influence



R&D: LBL & CA utilities	Government Procurement	DSM Programs @ \$50m/yr	DSM Programs @ \$150m/year
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Programs Underway

General Challenges from C&I Programs

- **Little available market share data**
 - **Complex ‘measures’**
 - **Greater customer market segmentation**
 - **Multiple levels of supply chain with direct influence on project-level equipment selection and design**
 - **Multiple decision makers and criteria in one customer**
- **Generally greater reliance on ‘weight of evidence’ and self-reported approaches than in residential.**

Other Potential Approaches to Attribution or Baseline Development

- **Diffusion modeling**
- **Delphi or other expert judging**
- **Conjoint analysis of preferences for efficient substitutes for current products**

Lessons Learned: The Compleat Data Opportunist

- **Generate as detailed a story as possible**
 - Know the history of the program and its relatives
 - Know the history of the market and technology
 - Know what other programs are doing
- **Know the available data resources**
 - Sampling, contents, collection methods
 - Know what others have done
- **Design data collection to the attribution strategy or strategies**

Lessons Learned: Maximizing data opportunities

- **Quality of Indicators**
 - Accuracy, face validity, bias (lack of same)
- **Replicability (ability to support historical or time series analysis)**
 - Sample frame: captures full population, updated regularly, documented compilation
 - Sampling: keep it kosher and document it
- **Comparability (supports cross-sectional analysis)**
 - Same definitions as data collected elsewhere
 - Capitalize on channels to reach national markets

The Even Bigger Picture

- **Independent program influence?**
 - Many regional and national programs already coordinate operations, or are developed in explicit reference to each other (e.g.) codes & standards
 - How tease apart effects and why?
- **Good to have**
 - Sales data (yes, but what do we provide in return?)
 - On-site observations coupled to RECS & CBECS
 - National data and evaluation centers (Who would contribute to keeping it up and why?)