Evaluation of the CECONY's Targeted Demand Side Management (DSM) Program

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Large DSM Program Based on T&D Investment Deferral

Con Edison City of New York (CECONY's) Targeted DSM Program is designed to defer the need for transmission and distribution upgrades in specific networks.

- 80 percent of the load in New York City must be served by in-City generation
  - Limited potential for generation imports
  - Generating costs exceed the state average by 25 percent (or more) – higher value for DG, DR and EE
  - 2004 forecast – peak loads expected to grow > 500MW 2005-2008
- 150MW of targeted firm EE/DG in areas of NYC with localized T&D constraints

The Targeted DSM Program Deferred T&D Investments

- Over $60 million of T&D projects have been deferred for at least 5 years due to targeted DSM
- Delivered DSM is based on verified installations
- Deferral will be for much longer than originally anticipated due to the recession

T&D Project Deferral Description	Cost (000's)
Transfer 30MW	$10,600
Increase 69kV Supply Rating	$15,000
Install Permanent Transformer Cooling	$500
Install Additional Transformer & 138kV Supply	$29,000
Install Additional Substation Transformer	$7,000
Total	**$62,100**

Basic Program Design

- RFP issued for each phase of program (4 phases to date)
  - Phases driven by new assessments of network load reduction needs
  - Each RFP requests specific kW reductions in each of several years
- Bidder provides cost per kW reduced
- ConEd-Vendor contract holds vendors' feet to the fire
  - Substantial liquidated damages (LDs) Load reductions must be in place prior to summer
  - Vendors must guarantee reduction for entire period (if retention problem, must fix or add new installations)
- All installations verified by independent M&V contractor

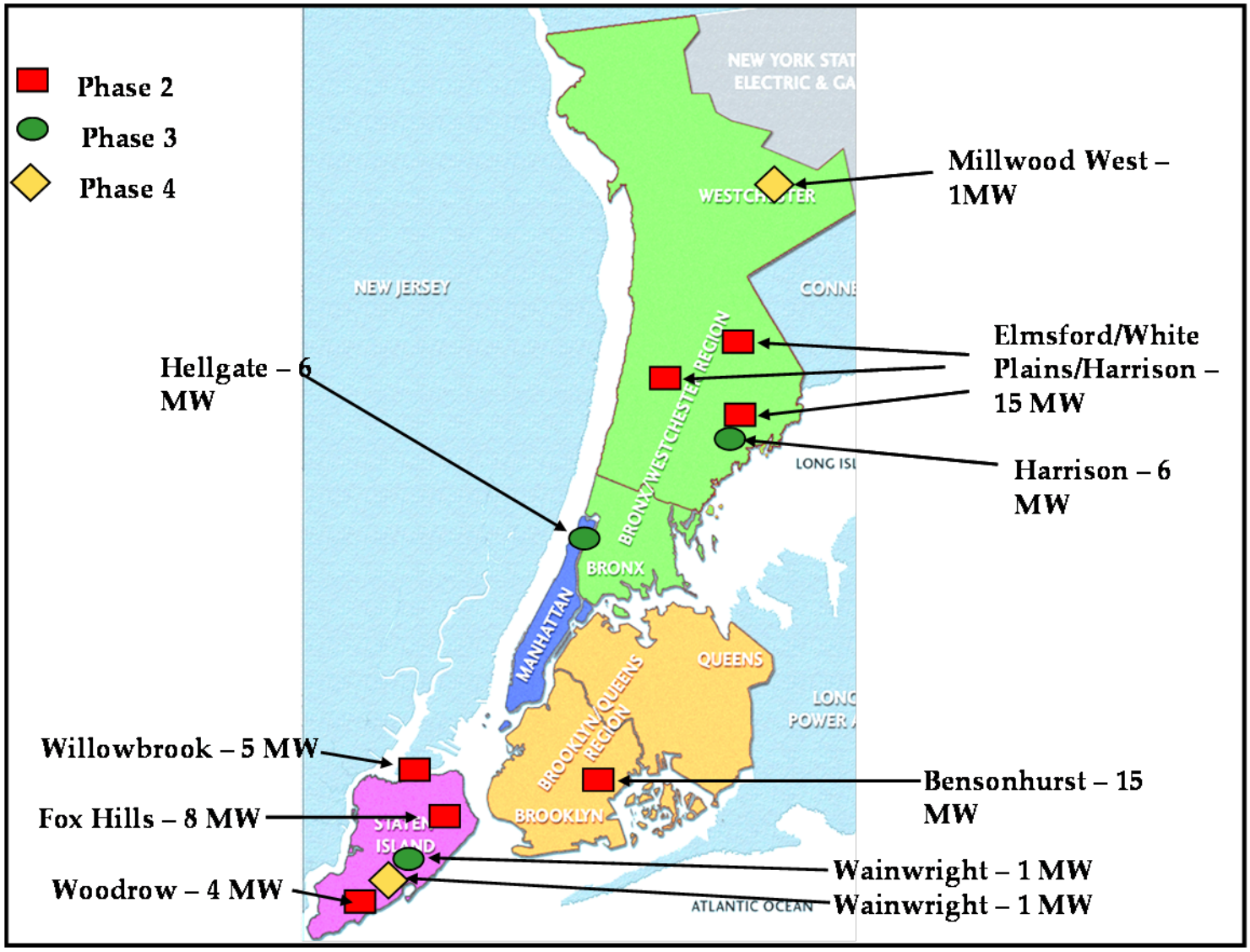
T&D Deferrals Included a Range of Projects

Load Area	T&D Project Deferral Description	Peak Interval	Orig. Cost (000's)	DSM (MW)
White Plains/Elmsford. No. 2/Harrison	Transfer 30MW - White Plains to Rockview	Day	$10,600	15
Avenue A	Increase 69kV Supply Rating	Day	$15,000	7
E. 40th Street No. 1/2: Murray Hill	Install 20MVAR Capacitor Bank	Day	$1,500	5
E. 63rd No. 1	Transfer Hunter to East 75th Street	Day	$15,000	3
E. 29th St.	Transfer 30MW - Madison Square to E. 36th	Day	$6,000	2
E. 63rd No. 2	Transfer 30MW - Roosevelt to E. 63rd St	Day	$1,000	3
Harrison	Install Permanent Transformer Cooling	Day	$500	6
East 13th St	Extend Transmission Lines to Astoria East	Day	$180,000	67
Millwood West	Replace 13kV bus & Add Transformer Cooling	Evening	$500	1
Fox Hills	Install Permanent Transformer Cooling	Evening	$500	8
Willowbrook	Transfer 6 MW - Willowbrook to Fresh Kills	Evening	$1,000	5
Woodrow	Install 3rd Transformer & 138kV Supply	Evening	$29,000	4
Bensonhurst No. 2	Install 5th Substation Transformer	Evening	$7,000	14
Hellgate	Transfer Randal/Wards Isle - 42MW to Bruckner	Evening	$5,500	6
Wainwright	Transfer 6 MW to Woodrow Substation	Evening	$1,200	2
		Totals	$274,300	148

4 Vendors to Deliver 148MW of Firm DSM in 15 areas

Load Area	Phase	Peak Interval	Vendor	Contracted DSM (kW)	2008 (kW)	2009 (kW)	2010 (kW)	2011 (kW)	2012 (kW)
Fox Hills	2	Evening	FLC	8,000		4,000	2,000	2,000	
Willowbrook	2	Evening	FLC	5,000	2,000	1,000	1,000	1,000	
Woodrow	2	Evening	FLC	4,000	4,000				
W Plains/Elmsford 2./Harrison	2	Day	PES	15,000	2,000	6,000	4,000	3,000	
Bensonhurst No. 2	2	Evening	QCS	14,000	3,000	4,000	4,000	3,000	
Avenue A	3	Day	CPL	7,000		4,000	2,000	1,000	
E. 40th St No. 1/2: Murray Hill	3	Day	CPL	5,000				5,000	
E. 63rd No. 1	3	Day	CPL	3,000			1,000	2,000	
E. 29th St.	3	Day	CPL	2,000				2,000	
E. 63rd No. 2	3	Day	CPL	3,000				3,000	
Wainwright	3	Evening	FLC	1,000			1,000		
Harrison	3	Day	PES	6,000	1,000	2,000	2,000	1,000	
Hellgate	3	Evening	QCS	6,000			4,000	2,000	
Wainwright	4	Evening	FLC	1,000					1,000
E. 13th St	4	Day	PES	67,000			46,000	10,000	11,000
Millwood West	4	Evening	QCS	1,000				1,000	
			Totals	**148,000**	**12,000**	**21,000**	**67,000**	**36,000**	**12,000**

Load Areas Targeted for T&D Deferral (Non-Manhattan)



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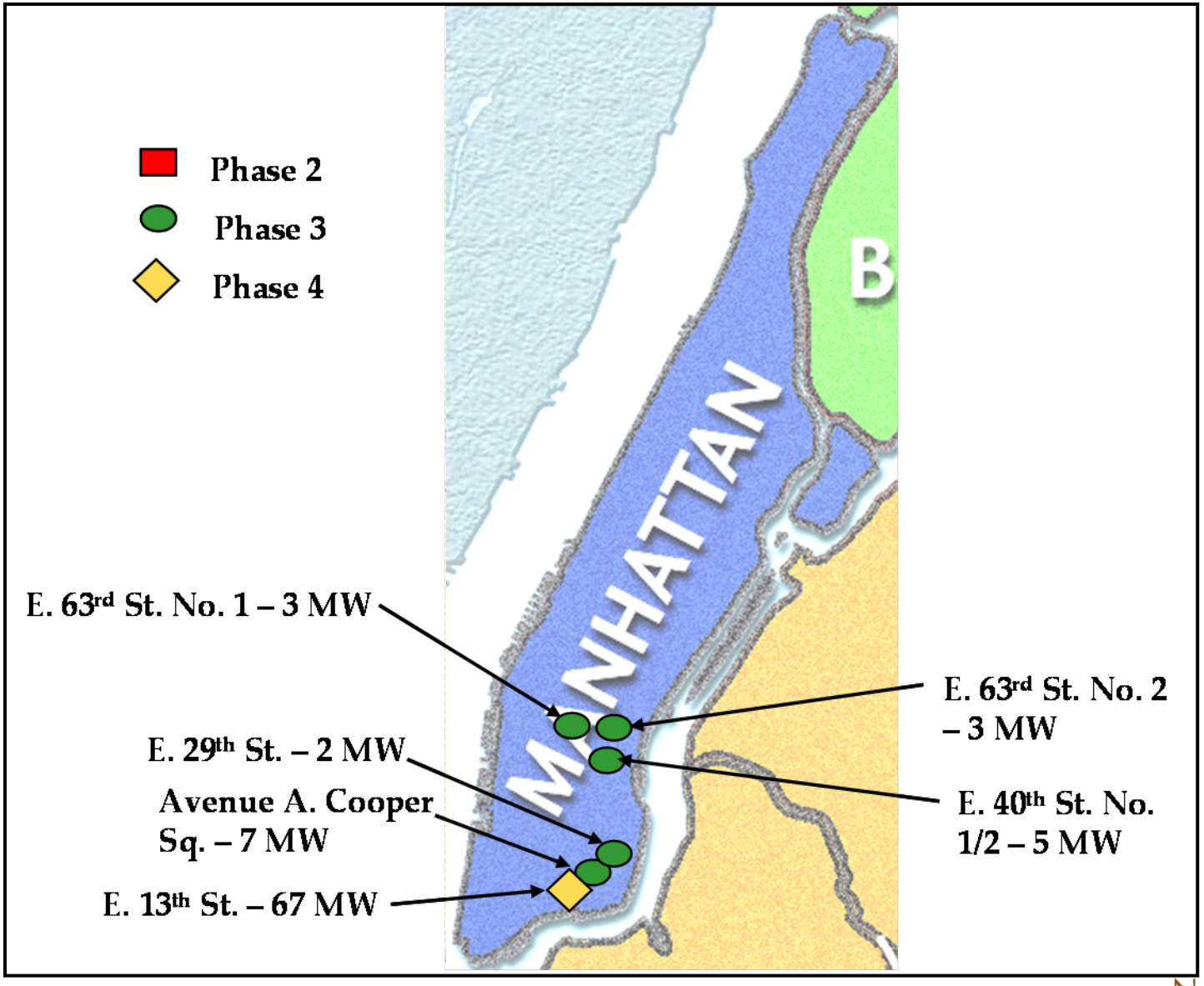
Load Areas Targeted for T&D Deferral (Manhattan)



Lighting Accounts for Nearly All Savings to Date

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- Residential: 100% CFLs
- Commercial: almost 100% lighting, majority CFLs or linear fluorescents, etc.

Phase	Contractor	Total Load Reduction (kW)	Fluorescent Fixture	High Efficiency Fluorescent Lamps	High Efficiency Lamp and Ballast	LED Exit Sign	Lower Wattage Exit Sign	Lower Wattage Fluorescent Fixture	Screw-in CFL with Replacement Restraint
2	Free Lighting	2,200	0	0	0	0	0	0	2,200
2	Free Lighting	4,428	0	0	0	0	0	0	4,428
2	Free Lighting	3,124	0	0	0	0	0	0	3,124
2	Free Lighting	631	0	0	0	0	0	0	631
2	PES	2,168	1	237	275	21	0	566	975
2	QCS	3,399	0	0	0	0	0	0	3,399
2	QCS	3,955	0	0	0	0	0	0	3,955
3	PES	1,831	0.05	149	247	15	0	460	857
3	QCS	605	0	0	0	0	0	0	605
		22,340	**1**	**386**	**523**	**36**	**0**	**1,026**	**20,174**

Evaluation Defined Values for key savings parameters:

Adjustment Factors[1]	Residential	Commercial
Coincidence Factor	19%	67%
Retention/Turnover	1%	1%
Rebound/Snapback	7%	0%
Spillover	1%	4%
Free Ridership	11%	3%

The 19% and 67% CF's represent the amount of installed DSM that is firm (i.e., the load reduction at the time of the load area or substation peak)

Key finding: Residential load reduction at peak were over estimated

Economic Value Varies Significantly by Network

Load Area	T&D Project Deferral Description	Peak Interval	Original Cost (000's)	DSM (MW)	Benefit to Cost Ratio
White Plains/Elmsford No. 2/Harrison	Transfer 30MW - White Plains to Rockview	Day	$10,600	15	1.4
Avenue A	Increase 69kV Supply Rating	Day	$15,000	7	1.8
E. 40th St. No. 1/2: Murray	Install 20MVAR Capacitor Bank	Day	$1,500	5	1.7
E. 63rd No. 1	Transfer Hunter to East 75th Street	Day	$15,000	3	2.1
E. 29th St.	Transfer 30MW - Madison Square to E. 36th	Day	$6,000	2	2.1
E. 63rd No. 2	Transfer 30MW - Roosevelt to E. 63rd St	Day	$1,000	3	1.1
Harrison	Install Permanent Transformer Cooling	Day	$500	6	0.9
East 13th St	Extend Transmission Lines to Astoria East	Day	$180,000	67	1.9
Millwood West	Replace 13kV bus & Add Transformer Cooling	Evening	$500	1	0.5
Fox Hills	Install Permanent Transformer Cooling	Evening	$500	8	0.5
Willowbrook	Transfer 6 MW - Willowbrook to Fresh Kills	Evening	$1,000	5	0.5
Woodrow	Install 3rd Transformer & 138kV Supply	Evening	$29,000	4	1.4
Bensonhurst No. 2	Install 5th Substation Transformer	Evening	$7,000	14	0.5
Hellgate	Transfer Randalls/Wards Isle-42 MW to Bruckner	Evening	$5,500	6	0.6
Wainwright	Transfer 6 MW to Woodrow Substation	Evening	$1,200	2	0.6

Program Results Are Cost-effective and Will Improve

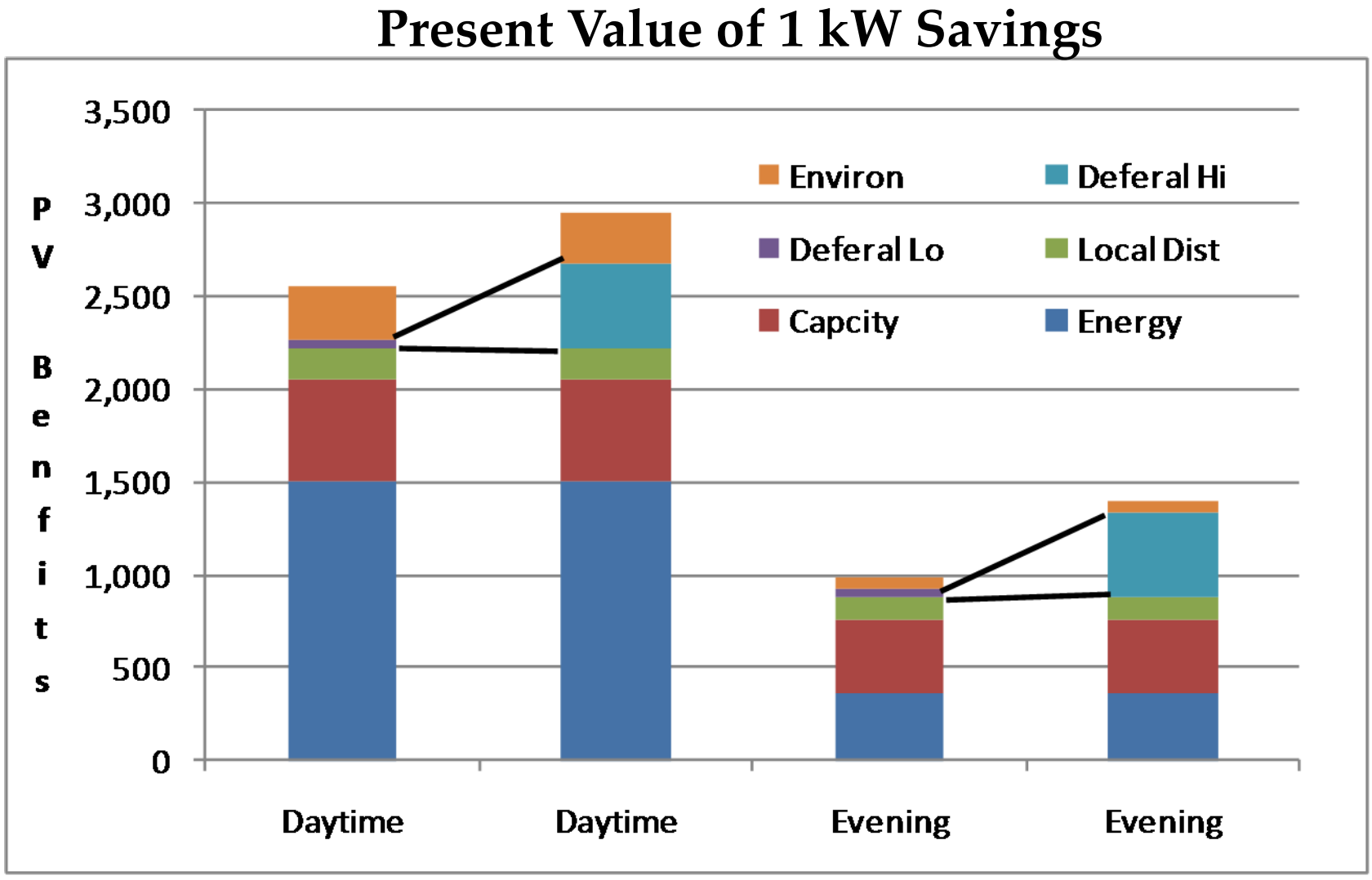
Load Area Type	Actual Load Reduction Achieved	Actual Benefit to Cost Achieved	Total Contracted Load Reduction	Total Program Benefit to Cost
Evening Peaking	15 MW	0.79	40 MW	0.61
Daytime Peaking	15 MW	1.40	108 MW	1.71
Total	**30 MW**	**1.14**	**148 MW**	**1.45**

- Evening Peaking networks are residential
- Residential networks not being costs effective due to:
  - Low coincident demand reductions,
  - High costs,
  - Free riders
  - Large number of bulbs per household

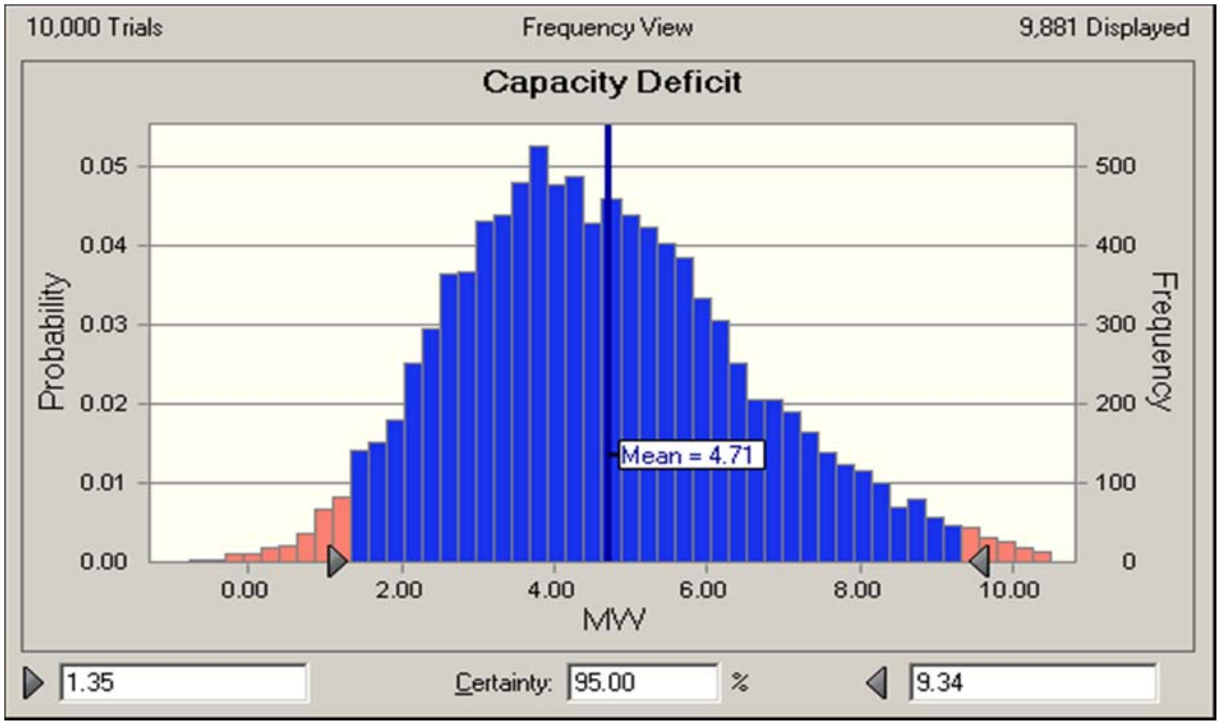
Benefits Arise From Multiple Factors

Program Costs and Benefits	Commercial (000s)	Residential (000s)	Total NPV (000s)	Percent (Total Program)
Program Benefits:				
Demand Savings	$29,911	$336	$30,247	14.1%
Energy Savings	$100,706	$11,284	$111,989	52.1%
Environmental	$9,525	$1,063	$10,589	4.9%
Loss Savings	$10,090	$913	$11,003	5.1%
Distribution Benefits	$13,803	$1,318	$15,120	7.0%
Transmission & Substation Benefits	$30,412	$5,457	$35,868	16.7%
Total Benefits	**$194,446**	**$20,371**	**$214,817**	**100.0%**
Program Costs:				
Vendor Payments	$90,112	$29,875	$119,987	81.0%
Utility Incentives	$6,758	$688	$7,446	5.0%
Customer Costs	$6,676	$0	$6,676	4.5%
Program Planning and Administration	$933	$356	$1,289	0.9%
Measurement & Verification	$6,881	$2,623	$9,504	6.4%
Evaluation and Market Research	$2,401	$915	$3,316	2.2%
Total Cost	**$113,762**	**$34,456**	**$148,218**	**100.0%**

T&D Deferral Can Add Substantial Benefits



Hedge Value Should also be Quantified



- Probability of capacity deficit can be calculated considering uncertainty in:
  - Load growth
  - Ability to deliver the DSM in the targeted area
  - Actual DSM load reductions

Customers Like the Program

- Customer satisfaction was quite high. On a scale of 1-10 (10 = highest)
  - Average: 8.5 for each sector; median: 10.0 residential, 9.0 commercial
  - More than 90% of residential participants would recommend program
  - Most likely due to "the deal" being so good (inexpensive retrofit)

Evaluation Conclusions

- The targeted program has and likely to continue to be cost-effective, but the value has declined compared to prior Con Edison estimates.
- Overall Total Resource Cost (TRC) results indicate the program will achieve a composite B/C ratio of about 1.5.
  - However, the program is not cost-effective for residential areas.
  - Projects in commercial areas are cost-effective due to greater hours of use and much higher coincidence factors
- The need date for several projects has been deferred by lower load growth, reducing the value of the program to about a 1.3 B/C ratio
- Virtually all DSM measures have been lighting, which has created lost opportunities (Vendors have focused on "low-hanging" fruit)
- Targeted DSM can provided substantial T&D investment deferrals without impacting reliability