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NAVIGANT CONSULTING

Itron

Memorandum

Date: September 20, 2011

To: Jennifer Hinman; ICC Energy Division

CC: David Nichols; ComEd

From: Navigant Evaluation Team

RE: Staff Data Request JLH 2.01 and 2.02: Updated ComEd PY1 and PY2 Impacts with PY3 Residential Lighting HOU Estimates

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This memorandum presents the revised PY1 and PY2 energy (MWh) impacts for three of ComEd's Residential energy efficiency programs and one Small Commercial energy efficient program that include CFL lighting components. These revised energy impacts are being provided in response to Staff Data Request JLH-2 (Docket No. 10-0520) which requested updating PY1 and PY2 impacts based on the HOU findings presented in the "ComEd Res Lighting HOU Memo".[1] The four ComEd programs for which the energy impacts have been revised include:

- The Residential Energy Star Lighting Program,
- The All-Electric Efficiency Upgrade Program,
- The All-Electric Single Family Home Energy Performance Tune-Up Program, and
- The Small C&I Intro Kit Program.

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[1] Navigant Consulting, 2011. Memorandum, *Re: Lighting Logger Study Results – Version 2*. Presented to David Nichols and ComEd Residential Lighting Interested Parties. Presented by Navigant Consulting Evaluation Team. Prepared by Amy Buege and Jeremy Eddy, Itron. May 27, 2011 ("ComEd Res Lighting HOU Memo")

A portion of the bulbs distributed through the Small C&I Intro Kit Program were reportedly installed in residential locations and thus overall program impacts have been updated to reflect the updated residential HOU estimate.

Pursuant to ICC Staff Data Request JLH 2.01- JLH 2.03 (dated 9/12/11), Navigant revised a number of tables to include an updated gross input parameter of 2.74 hours of use per CFL installed. The PY1 and PY2 reports used 2.34 hours per CFL. The longer estimated hours of use per CFL installed results in higher kWh savings for CFLs. In PY1 and PY2 CFL gross energy impacts (kWh) were calculated based on the following algorithm:

*Gross kWh/unit = Delta Watts * HOU/day (2.34) * days/year * In-service Rate / 1000*

The PY1 and PY2 impacts presented in this memo were updated to reflect the revised residential HOU estimate (2.74) that resulted from the PY3 Residential Lighting metering study (documented in the "ComEd Res Lighting HOU Memo"). The revised gross energy impacts (kWh) algorithm therefore becomes:

*Gross kWh/unit = Delta Watts * HOU/day (**2.74**) * days/year * In-service Rate / 1000*

PY2 Revised Tables

JLH 2.01 (a) – Revised Table E-2 (from the "PY2 EM&V Summary Report"[2])

The table below presents the revised Table E-2 from the PY2 EM&V Summary Report. As this table shows the Portfolio Total with Carryover Ex Post Net MWh impacts increased by 5% from 472,132 MWh to 497,848 MWh based on the revised HOU estimate.

[2] Docket No. 10-0520, *Summary Report*, filed March 4, 2011. Navigant Consulting, 2010. *Energy Efficiency / Demand Response Plan: Plan Year 2 (6/1/2008-5/31/2009) Evaluation Report: Summary Report.* Submitted to Commonwealth Edison Company. Presented by Navigant Consulting, Itron, Opinion Dynamics Corporation, and Michaels Engineering. Dec. 21, 2010 ("PY2 EM&V Summary Report")

REVISED Table E-2. Portfolio Year 2 Results – Ex Ante and Ex Post Savings

	Ex-Ante Gross (MWh)	Realization Rate	Ex-Post Gross (MWh)	Net-to-Gross Ratio	Ex-Post Net (MWh)
Residential ES Lighting	295,307	131%	386,422	0.58	225,882
Appliance Recycling	50,147	87%	43,788	0.75	32,624
All-Electric Efficiency Upgrade	3,094	73%	2,245	0.80	1,965
All-Electric SF Home Energy Performance Tune-Up	672	109%	732	0.88	646
Central Air Conditioning Efficiency Services	5,972	33%	1,964	1.00	1,964
Business Prescriptive	213,522	121%	259,093	0.74	191,896
Business Custom	26,805	85%	22,697	0.76	17,255
C&I Retro-Commissioning	7,847	91%	7,174	0.92	6,574
C&I New Construction	1,615	85%	1,368	0.59	803
ComEd Total	**604,981**	**113%**	**725,483**	**0.66**	**479,609**
PY1 CFL Carryover					
Residential Lighting	18,761	117%	21,969	0.69	15,190
Small C&I CFL Intro Kit	5,371	101%	5,443	0.56	3,049
Total PY1 Carryover	**24,132**		**27,412**		**18,239**
Portfolio Total w/ Carryover	**629,113**		**752,895**		**497,848**

JLH 2.01 (b) – Revised Table 4.1 (from the "PY2 EM&V Summary Report")

For the revised Table 4.1 for the Residential Energy Star Lighting Program only the Evaluation Verified and Evaluation TRM Verified MWh impact estimates were updated. No changes from the PY2 residential/non-residential installation split (90/10) were made to estimate the revised impacts below.

REVISED Table 4.1. PY2 Gross and Net Parameter and Savings Estimates

Gross and Net Parameter and Savings Estimates	Program Reported	Evaluation Verified		Evaluation TRM Verified
		PY2 Sales	PY1 Late Installs	
CFLs Distributed through the Program	8,343,233	8,284,376	442,870	8,284,376
Average Displaced Watts (Delta Watts)	41.4	49.2	49.6	49.6
Average Daily Hours of Use	2.34	3.48	2.74	3.48
Gross kWh Impact per unit	35.4	62.4	49.6	63
Gross kW Impact per unit	0.04	0.05	0.05	0.05
Total First-Year Gross MWh Savings	**295,307**	**517,275**	**21,969**	**522,192**
Total First-Year Gross MW Savings	**346**	**408**	**22**	**411**
Installation Rate*Leakage Rate	70%	74%	100%	74%
Peak-Load Coincidence Factor	0.081	0.136	0.054	0.16
Total Installed First-Year Gross MWh Savings	**206,715**	**380,764**	**21,969**	**386,422**
		402,733		
Total Installed First-Year Gross MW Savings	**242**	**301**	**22**	**304**
		323		
Total Installed First-Year Gross Peak MW Savings	**19.6**	**40.7**	**1.2**	**48.6**
		41.9		
Net-to-Gross Ratio (1-FR)	70%	58%	69%	58%
Total First-Year Net MWh Savings	**144,700**	**222,575**	**15,190**	**225,882**
		237,765		
Total First-Year Net MW Savings	**169**	**176**	**15.2**	**178**
		191		
Total First-Year Net Peak MW Savings	**13.7**	**23.8**	**0.8**	**28.4**
		24.6		

JLH 2.01 (c) – Revised Table 4.4 (from the "PY2 EM&V Summary Report")

For the revised Table 4.4 for the All-Electric Efficiency Upgrade program only the Ex Post Gross kWh, Gross Realization Rate and Ex Post Net kWh estimates were updated. The longer estimated hours of use per CFL installed results in higher kWh savings for CFLs. Water efficiency measures are not affected by the revised hours of use parameter. The overall gross realization for this program increased from 77% to 83% as a result increased HOU.

REVISED Table 4.2. PY2 All-Electric Efficiency Upgrade Gross and Net Energy Savings

Measure	Ex Ante Gross kWh	Ex Post Gross kWh	Gross kWh Realization Rate	Ex Post Net kWh	Net-to-Gross Ratio
13W CFL	52,021	58,372	112%	47,281	0.81
15W CFL	128,371	144,418	113%	116,978	0.81
20W CFL	762,011	856,046	112%	693,398	0.81
CFL (unspec.)	4,089	4,224	103%	3,422	0.81
Showerhead	1,015,146	710,602	70%	660,860	0.93
Kitchen aerator	410,319	262,604	64%	246,848	0.94
Bath aerator	325,952	208,609	64%	196,093	0.94
Total	**2,697,909**	**2,244,876**	**83%**	**1,964,879**	**0.88**

JLH 2.01 (d) – Revised Table 4.5 (from the "PY2 EM&V Summary Report")

For the revised Table 4.5 for the All Electric Home Energy Performance Tune-Up program only the Ex Post Gross kWh, Gross Realization Rate and Ex Post Net kWh estimates were updated. The revised calculations used only the updated interior operating hour number since the bulbs were directly installed to the interior of the home. The gross realization for this program increased from 119% to 121% as a result increased HOU.

REVISED Table 4.3. All Electric PY2 Home Energy Performance Tune-Up Program Impacts

	PY2 Goal	*Ex Ante* Impact	Ex-Post Result	Performance	
				Realization Rate	Net-to-Gross
Participants (#customers)	-	760	760	-	-
Gross Energy Impact (MWh)	671	605	732	121%	-
Gross Demand Impact (kW)	-	60.3	64.1	106%	-
Net Energy Impact (MWh)	399	514	646	-	0.88
Net Demand Impact (kW)	-	51.2	56.9	-	0.89

PY1 Revised Tables

JLH 2.02 (a) – Revised Table 2 (from the "PY1 EM&V Summary Report"[3])

The table below presents the revised Table 2 from the PY1 EM&V Summary Report. As this table shows the Portfolio Total Ex Post Net MWh impacts for PY1 increased by 6% from 163,726 MWh to 173,691 MWh based on the revised HOU estimate. The overall Gross Realization Rate increased from 0.89 to 0.95.

REVISED Table 4. Portfolio Year 1 Results – Ex Ante and Ex Post Savings

	Ex-Ante Gross (MWh)	Realization Rate	Ex-Post Gross (MWh)	Net-to-Gross Ratio	Ex-Post Net (MWh)
Residential ES Lighting	119,151	0.86	102,327	0.69	70,606
Appliance Recycling	21,570	0.73	15,698	0.73	11,478
All-Electric Efficiency Upgrade	2,568	0.96	2,464	0.80	1,971
Business Prescriptive	90,571	1.33	120,550	0.67	80,932
Business Custom	8,411	0.79	6,606	0.72	4,761
C&I Retro-Commissioning	1,509	0.90	1,363	0.80	1,090
Small C&I CFL Intro Kit	25,064	0.20	5,093	0.56	2,853
ComEd Total (MWh)	268,844	0.95	254,101	0.68	173,691

[3] Summit Blue Consulting, LLC, 2009. *Energy Efficiency / Demand Response Plan: Plan Year 1 (6/1/2008-5/31/2009) Evaluation Report: Summary Report.* Submitted to Commonwealth Edison Company. Presented by Summit Blue Consulting, Itron, Opinion Dynamics Corporation, and Michaels Engineering. Dec. 23, 2009 ("PY1 EM&V Summary Report")

JLH 2.02 (b) – Revised Table 10 (from the "PY1 EM&V Summary Report")

For the revised Table 10 only the Evaluation Verified MWh impact estimates were updated to reflect the revised residential HOU estimate (2.74). The resulting net MWh savings estimate increased from 60,789 MWh to 70,606 MWh based on this change. These impacts were estimated based on the PY1 assumption that all PY1 bulbs were installed in residential locations.

REVISED Table 5. PY1 Gross and Net Parameter and Savings Estimates

Gross and Net Parameter and Savings Estimates	Program Reported	Evaluation Verified		
	Overall	Coupon	Upstream	Overall
Program Bulb Sales	3,001,366	21,836	2,979,531	3,001,367
Average Displaced Watts (Delta Watts)	48.9	48.7		
Average Daily Hours of Use ‡	2.34	2.74		
Gross kWh Impact per unit	41.8	48.7		
Gross kW Impact per unit	0.05	0.05		
Installation Rate	95%	79%	70%	70%
Peak Load Coincidence Factor	0.081	0.081		
Total First-Year Gross MWh Savings	**119,151**	**102,237**		
Total First-Year Gross MW Savings	**139.5**	**102.9**		
Total First-Year Gross Peak MW Savings	**11.3**	**8.3**		
Net-to-Gross Ratio (1-FR)	80%	69%		
Total First-Year Net MWh Savings	**95,321**	**70,606**		
Total First-Year Net MW Savings	**111.6**	**71.2**		
Total First-Year Net Peak MW Savings	**9.0**	**5.8**		

JLH 2.02 (c) – Revised Table 13 (from the "PY1 EM&V Summary Report")

The gross realization rate for this program increased from 90% to 96% due to the increased HOU estimate.

REVISED Table 6. PY1 Gross and Net Savings Estimates

Gross and Net Parameter and Savings Estimates	Multifamily All-Electric Efficiency Upgrade
CFLs directly installed through the Program	19,428
Showerheads directly installed through the Program	3,786
Aerators directly installed through the Program	7,073
Water heater wraps directly installed through the Program	4
Program Tracking System MWh	2,568
Program Tracking System Coincident MW	*Not recorded*
Total First-Year Evaluation-Adjusted Gross MWh Savings	**2,464 MWh**
Gross Realization Rate (MWh)	**96%**
Total First-Year Evaluation-Adjusted Gross Coincident MW Savings	**0.20 MW**
Net-to-Gross Ratio (1-FR) ***(ComEd Program Assumption)***[4]	80%
Total First-Year Evaluation-Adjusted Net MWh Savings	**1,971 MWh**
Total First-Year Evaluation-Adjusted Net Coincident MW Savings	**0.16 MW**

[4] The PY1 evaluation did not estimate the net to gross ratio. The value of 80% is drawn from the program plan presented in ComEd's 2008-2010 Energy Efficiency and Demand Response Plan (November 15, 2007). Page D-2 of the ComEd plan provides a footnote stating the net to gross ratio of 80% is drawn from the California Energy Efficiency Policy Manual, version 2 (2003).

JLH 2.02 (d) – Revised Table 19 (from the "PY1 EM&V Summary Report")

The HOU estimate used for the Small C&I bulbs installed in residential locations was updated from 2.34 to 2.74 to calculate these revised PY1 impacts.

REVISED Table 7. PY1 Gross and Net Parameter and Savings Estimates

Gross and Net Parameter and Savings Estimates	Program Reported	Evaluation Verified	
	Small Business	Small Business	Residential
CFLs Distributed through the Program	104,160	73,593	30,567
Average Displaced Watts (Delta Watts)	62.9 watts	48.3 watts	
Average Daily Hours of Use	10.4	10.0	2.74
Gross kWh Impact per unit	239 kWh	176 kWh	48.3 kWh
Gross kW Impact per unit	0.06 kW	0.05 kW	
Installation Rate	90%	32%	
Energy Interactive Effects	1.12	1.12	1.00
Demand Interactive Effects	1.21	1.19	1.00
Peak Load Coincidence Factor	0.84	0.86	0.081
Total First-Year Gross MWh Savings	**25,064 MWh**	**5,093 MWh**	
Total First-Year Gross MW Savings	**7.1 MW**	**1.8 MW**	
Total First-Year Gross Peak MW Savings	**6.0 MW**	**1.2 MW**	
Net-to-Gross Ratio (1-FR)	80%	56%	
Total First-Year Net MWh Savings	**20,051 MWh**	**2,853 MWh**	
Total First-Year Net MW Savings	**5.7 MW**	**1.0 MW**	
Total First-Year Net Peak MW Savings	**4.8 MW**	**0.7 MW**	

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Memorandum

To: **David Baker, DCEO**

CC: **Jennifer Hinman, ICC**

From: **Jeff Erickson**

Date: **September 21, 2011**

Re: **DCEO PY2 Energy Impact Summary**

This memo is presents in one document the evaluation-verified impact results from your PY2 programs. The format follows that used in the PY1 Summary Report. The numbers presented below come from the final evaluation reports from each of your programs for PY2.

Energy efficiency resources are delivered to Ameren and ComEd customers through programs administered by the Illinois Department of Commerce and Economic Opportunity (DCEO). DCEO programs focused on low income customers in the residential sector and on public facilities (like schools and government buildings) in the business sector.

Table 1 shows that these special focus programs achieved 55,018 annual MWH of savings.

Table 1. Energy Impacts DCEO PY2 Programs

	Ex-Post Net (MWh)	Total Resource Cost Test
Ameren		
Residential Retrofit Weatherization	2,939	2.09
Residential Retrofit Home Improvement	205	0.38
Residential Energy Efficient Affordable Housing Construction	505	3.03
Lights for Learning	140	1.83
Public Sector Standard Incentives	9,174	1.27
Public Sector Custom Incentives	8,015	1.07
DCEO Programs Delivered to Ameren Customers TOTAL	20,978	
ComEd		
Residential Retrofit Weatherization	5,475	2.02
Residential Retrofit Home Improvement	461	0.65
Residential Energy Efficient Affordable Housing Construction	1,484	2.12
Lights for Learning	617	2.31
Public Sector Standard Incentives	20,045	1.80
Public Sector Custom Incentives	5,956	1.48
DCEO Programs Delivered to ComEd Customers TOTAL	34,038	
Total (ComEd Plus Ameren)		
Residential Retrofit Weatherization	8,414	
Residential Retrofit Home Improvement	666	
Residential Energy Efficient Affordable Housing Construction	1,989	
Lights for Learning	757	
Public Sector Standard Incentives	29,220	
Public Sector Custom Incentives	13,972	
DCEO Programs TOTAL	55,018	

All of the individual programs except Residential Retrofit Home Improvement were cost effective. The Residential Retrofit Home Improvement program TRC is between 0.38 and 0.65 showing that energy savings benefits are 38% to 65% of the total costs of the program.

Environmental benefits have been quantified for CO_2 reductions using a value of $0.013875 per kWh.