Blinded by the Light: Why Are We in the Dark about How Many CFLs are Out There?

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Abstract

How can lighting programs accurately measure program effects when our estimates of national compact fluorescent light (CFL) bulb sales are outdated? In this paper, we present evidence that commonly used estimates for national sales of CFLs are no longer accurate, explore how the national CFL market is changing, and examine why a nationally coordinated data collection effort is prudent. This paper stems from work we have done for one of the largest residential lighting programs in the nation, in which we estimate baseline CFL sales by creating a non-program comparison area using national CFL sales data minus sales from states with active programs.

A Changing Market

In recent years, most lighting programs have estimated that national CFL sales are in the ballpark of 30 to 35 million annually. Recently, new evidence suggests that CFL sales in the past year are closer to 100 million or more. Many signs point to a changed—even a supercharged—CFL market. Increased support for CFLs after the West Coast energy crisis in 2001, California Title 24 Building Energy Efficiency Standards requiring efficient lighting in buildings, lower-priced CFLs, and increased European interest in CFLs may have significantly changed the U.S. market. Awareness of global warming and climate change has also increased in recent years, and in 2006, the Academy Award-winning documentary, *An Inconvenient Truth*, with former Vice President Al Gore, helped to bring these issues into the dialog of popular culture. Now CFLs have become the poster child for consumer action to reduce energy use and slow climate change. Furthermore, Wal-Mart, the largest retailer in the country, has announced a commitment to improve the environment that includes a sales goal of 100 million CFLs from its stores during the next year.[1]

[1] Fishman, Charles. 2006. "How Many Lightbulbs Does it Take to Change the World? One. And You're Looking at It." *Fast Company*. September.

The legislative climate for CFLs is also changing. In the U.S., several states, including California,[2] Connecticut,[3,4] and New Jersey[5] have proposed legislation or investigations to ban incandescents from at least some end-uses. Some lighting manufacturers perceive these legislative proposals seriously enough to launch their own public relations campaigns. Philips Lighting has teamed with the Natural Resources Defense Council, the Alliance to Save Energy, and the American Council for an Energy Efficient Economy and others to form the Lighting Efficiency Coalition and encourage lighting efficiency standards that eventually will lead to the phasing out of standard incandescent bulbs.[6] To counter an outright ban on incandescent lighting, GE Lighting has announced that it is developing an incandescent technology that is twice as efficient as a current standard incandescent bulb.[7]

Internationally, bans on incandescent bulbs also have support. Australia announced plans to ban incandescents by 2009 or 2010.[8] Legislation to phase out incandescents has also been discussed in Europe[9] and South Africa.[10]

Of course, in the U.S., utility- and government-sponsored lighting programs have been instrumental in supporting the development of the CFL industry by offering incentives to reduce the cost of CFLs to consumers and raise consumer awareness. Sustained program support has encouraged manufacturers to produce more and better products and retailers to stock CFLs on their shelves. This influence has affected sales, not only in program areas, but nationwide. These efforts are supported across the U.S. by the ENERGY STAR® program, sponsored by the U.S. Department of Energy and the Environmental Protection Agency. The ENERGY STAR program provides an efficiency label for qualifying lighting products and supports the CFL industry through communication efforts with manufacturers, retailers and program sponsors, and through consumer awareness campaigns such as the annual fall *Change a Light*, *Change the World* campaign. These government- and utility-sponsored

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[2] California Legislature. 2007. Assembly Member Levine. An act to amend Section 25402.5 of the Public Resources Code, relating to energy. Assembly Bill No. 722. February 22. http://www.leginfo.ca.gov/pub/07-08/bill/asm/ab_0701-0750/ab_722_bill_20070222_introduced.pdf. Accessed 3-27-07. Proposed legislation to ban the sale of incandescent lamps in the state after January 1, 2012.

[3] O'Rourke, Jim. 2007. "Legislators Call for Phase-Out of Incandescent Light Bulbs to Conserve Energy." Press Release. February 5. http://www.cga.ct.gov/hdo/032/pr032-07.html. Accessed 3-27-07.

[4] State of Connecticut. 2007. Representatives O'Rourke, Mushinsky, Urban, & Wright. An Act Concerning Inefficient Incandescent Lamps. Proposed Bill No. 6550, LCO No.2120. January Session. http://www.cga.ct.gov/2007/TOB/h/pdf/2007HB-06550-R00-HB.pdf. Accessed 3-27-07.Proposed legislation to study the availability of energy efficient lamps at competitive prices, create a list of inefficient incandescent lamps and ban the sale of inefficient incandescent lamps.

[5] State of New Jersey. 2007. Chatzidakis, L. and L. Stender. Assembly, No. 3983. February 22. http://www.njleg.state.nj.us/2006/Bills/A4000/3983_I1.PDF. Accessed 3-27-07. Proposed legislation to replace all incandescents with CFLs in state buildings and would require a public education and awareness campaign to inform businesses and consumers about the benefits of CFLs.

[6] Alliance to Save Energy. 2007. "Alliance Calls for Only Energy-Efficient Lighting in U.S. Market by 2016, Joins Coalition Dedicated to Achieving Goal." News Release. Washington, D.C. March 14. http://www.ase.org/content/news/detail/3644. Accessed 3-29-07.

[7] General Electric. 2007. "GE Announces Advancement in Incandescent Technology; New High-Efficiency Lamps Targeted for Market by 2010." Press Release. February 23. http://www.ge.com/pr/display.php?highlight=true&id=1841&keyword=. Accessed 3-29-07.

[8] Turnbull, M. 2007. "World First! Australia Slashes Greenhouse Gases From Inefficient Lighting." Media Release, Australian Minister for the Environment and Water Resources. February 20. http://www.environment.gov.au/minister/env/2007/pubs/mr20feb07.pdf. Accessed 3-29-07.

[9] International Energy Agency. 2007. "Announcing a Joint International Energy Agency, European Commission JRC and CEN-Star Trend Analysis Workshop On: CFL Quality and Strategies to Phase-Out Incandescent Lamps." Announcement. http://www.iea.org/Textbase/work/2007/cfl/announcement.pdf. Accessed 3-29-07.

[10] Hendricks, L.B. 2006. Minerals and Energy Budget Vote Speech by Minister LB Hendricks, National Assembly. South African Government Information. May 25. http://www.info.gov.za/speeches/2006/06052516451001.htm. 2006. Accessed 3-29-07

programs have been so essential to the market for CFLs that many manufacturers and retailers say they would not produce and sell CFLs if these programs did not exist.

Sources of Sales Estimates

Today there is no single reliable source for CFL sales data nationwide by state, but there are clear indications that there has been a rapid increase in CFL sales in recent years. (Figure 1) As we noted earlier, from 2000 to 2004, CFL sales were relatively flat, ranging from 30 to 35 million units annually. For many years, one of the most reliable sources of information about CFL sales has been the *California Lamp Report*,[11] conducted as part of the California Residential Market Share Tracking project, which has tracked the market penetration of products since 1999. Recently, several indicators suggest that CFL sales data collected by the California effort no longer accurately reflect national sales. Beginning in 2003, retailers in the home improvement sector have not provided Itron with sales data, so all data from these retailers are estimated based on the proportion of sales they were responsible for in 2002. However, since that time, Home Depot and Lowe's have rapidly expanded, opening many more stores across the country and exerting considerable influence over consumer purchase patterns for lighting. Also, estimates from the *California Lamp Report* are derived from point-of-sales systems and do not include sales from smaller "mom and pop" retailers without electronic sales systems, club warehouses, or bargain stores.

With our research focus on Massachusetts, omission of sales data from these types of retailers indicated that a large portion of Massachusetts sales were not accounted for. According to a 2006 Massachusetts consumer survey on lighting,[12] 54% of consumers buying CFLs buy them from home improvement stores, whereas in 1998 only 19% of CFL users bought them there. In addition, 17% buy some or all of them from hardware stores, 13% buy from bargain stores (a category not included in the Itron sample), 25% buy from mass merchandisers, and 9% buy from price clubs/warehouses (also not included in the Itron sample), 11% buy from food stores, and 6% buy from drug stores. [13]

A variety of other sources suggest that in 2005, sales of CFLs increased to around 100 million units. A September 2006 *Fast Company* article about CFLs and Wal-Mart estimates that in 2005, national CFL sales were 100 million. This estimate of 100 million was verified as "about right" by both Wal-Mart and General Electric (Wal-Mart's supplier, and the largest light bulb manufacturer in the U.S.—with the resources and ability to acquire accurate market data).[14] Other manufacturers and the Department of Energy have given ballpark estimates of 100 million for 2006. Department of Commerce (DOC) estimates of CFL imports were 93 million in 2004, 102 million in 2005, and 185 million in 2006. The DOC estimates that first quarter 2007 CFL imports are already at 77 million units; [15] at this rate, by the end of 2007, CFL imports may be in the range of 300 to 350 million units.. Inference from a Home Depot ad suggests that particular retail chain sold about 37 million CFLs in 2006.[16]

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[11] Itron, Inc. 2006. *California Lamp Report: California Residential Efficiency Market Share Tracking: Lamps 2005*. Southern California Edison. May 15.

[12] Nexus Market Research (NMR), Inc. 2007. "Telephone Survey Results for Market Progress and Evaluation Report (MPER) 2006 Massachusetts ENERGY STAR Lighting Program." Submitted to National Grid, Cape Light Compact, NSTAR Electric Company, Western Massachusetts Electric Company, Unitil. Draft March 20.

[13] These numbers add up to more than 100% because of multiple responses.

[14] Fishman, Charles. 2006. (Fast Company) Personal communication. October 9.

[15] Department of Commerce, U.S. Imports of Selected Merchandise. Imports discharge lamps, (excluding ultraviolet) fluorescent screw-in 2004-2007. This estimate includes imports that for all uses, including commercial applications.

[16] Home Depot advertisement. 2007. *Boston Globe*. January 8. The ad says "the energy saved by the compact fluorescent lightbulbs we've sold could light the homes in Washington, DC for three and a half years." Based on estimates of CFL savings listed on EPA's website and the number of homes in Washington, DC from the U.S. Census, that would amount to 37 million CFLs.

Another source, a representative from a CFL manufacturer in China, claims that his factory alone shipped 12 million CFLs per month, or 144 million CFLs per year, to the U.S in the past year.[17] Another manufacturer estimated that 2007 U.S. CFL imports from China (96% of CFLs imported in 2006 are from China) will be 300 million.

A coalition backed by Yahoo! and Nielsen launched an on-line CFL sales tracking system, 18Seconds.org[18] in February 2007, along with contributors that include Wal-Mart.[19] The site is a clearinghouse for CFL sales, with data from participating retailers collected by Nielsen and reported nationwide by state. The effort should be applauded in its effort to tally—practically in real-time—sales of CFLs and the resulting energy savings and emissions reductions from their use. During the first quarter of 2007, the site counted over 23 million CFLs sold in the U.S.; projecting the same sales rate for the remainder of the year would yield an estimate of about 93 million CFLs for 2007. But the site falls short of its goal of tracking all CFL sales, and the absence of some significant sales data from the count means the site may actually harm, rather than help, the very programs that have fostered the development of the CFL market. An obvious red flag: Arkansas, a state with no history of utility- or state-sponsored CFL programs, ranks first in the nation for CFL sales per capita on 18Seconds.org. Massachusetts, arguably one of the most progressive states in a region that has supported CFL programs for well over a decade, ranks 48th in the nation out of 49.

CFL sales from home improvement stores (i.e., Home Depot and Lowe's), a rapidly expanding sector which has exerted considerable influence over consumer purchases of CFLs, are not tracked in the 18Seconds.org data; Home Depot alone accounts for 31% of the mentions by Massachusetts consumers of where they buy CFLs.[20] Additionally, the 18Seconds site tracks sales only from retailers with point-of-sale (POS) cash register systems, but independently owned and smaller "mom-and-pop" retailers—a category that includes many local hardware stores—do not have these systems are omitted from the tracking. As part of its other research activities, Nielsen has a consumer panel that already tracks purchases by sales receipts; this panel data potentially could bridge the gap between the reporting retailers and those who choose not to or can not participate in the POS data collection effort.

The U.S. Department of Commerce also tracks imports of CFLs to the U.S. The estimates presented here include only screw-in CFLs, not pin-based models. Furthermore, the estimate assumes that all CFLs imported to the U.S. are intended for domestic use. Also, when dealing with import data, the products include those for residential as well as both small and large commercial use. Retail sales data reflect products intended primarily for residential and light commercial use, as larger users likely make purchases through distribution centers; import data do not distinguish between products that will be sold through retail channels and those distributed by other means; they also do not provide us with information about the regional differences in where the products are being sold and used.

[17] Granda, Chris. 2006. Personal communication. May 2006. Reference to his trip to a CFL manufacturing facility in China.
[18] 18Seconds.org. 2007. http://www.18seconds.org "It takes 18 seconds to change a light."
[19] Yahoo! 2007. "Public-Private Partnership Unveils Nationwide Campaign to Raise Awareness About Global Warming and Rally Americans to Help Make a Change." Press Release. Business Wire. February 20. http://yhoo.client.shareholder.com/press/ReleaseDetail.cfm?ReleaseID=230540. Accessed 4-11-07.
[20] Nexus Market Research (NMR), Inc. 2007. "Telephone Survey Results for Market Progress and Evaluation Report (MPER) 2006 Massachusetts ENERGY STAR Lighting Program." Submitted to National Grid, Cape Light Compact, NSTAR Electric Company, Western Massachusetts Electric Company, Unitil. Draft March 20.

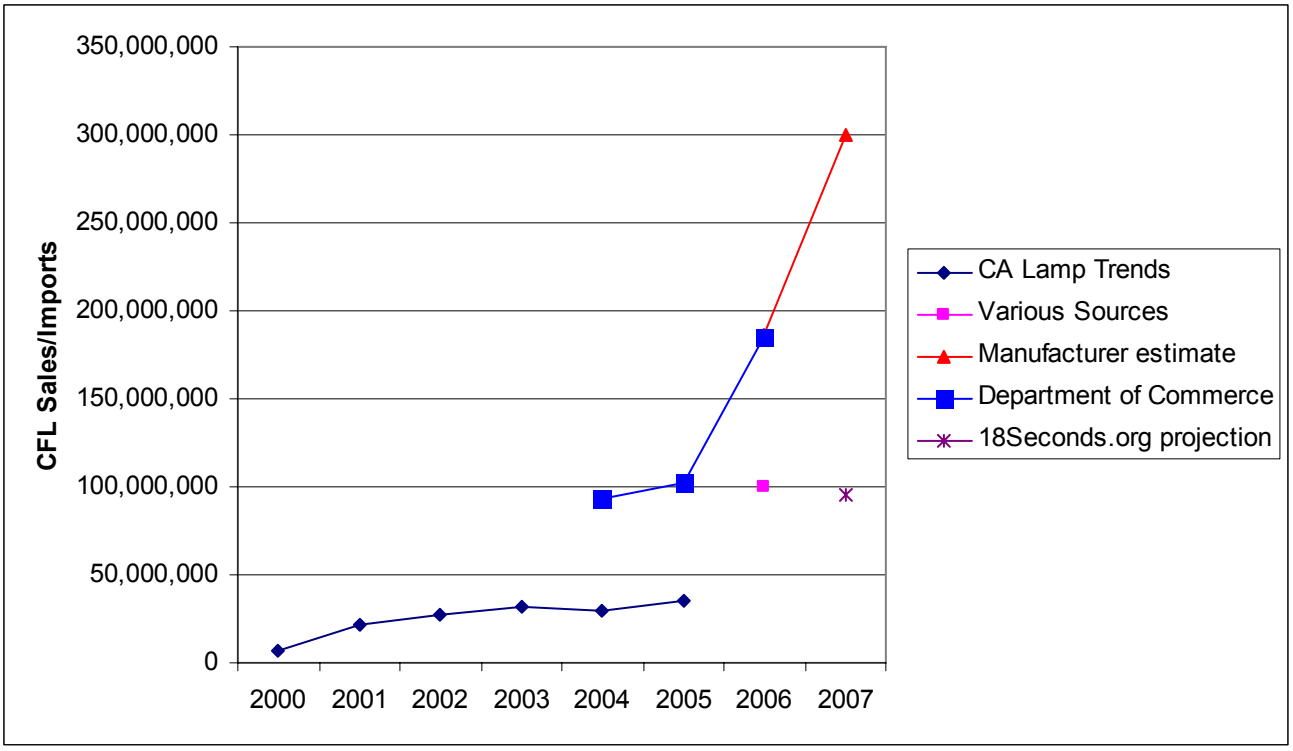

Figure 1: Annual Estimates of U.S. CFL Sales/Imports

Another potential source of information about CFL sales could be the ENERGY STAR program. Partners to the ENERGY STAR program are asked to provide documentation of their sales of ENERGY STAR-qualifying products, but to date, there has never been consistent Partner reporting, possibly because of concerns about confidentiality and the perceived burden of providing documentation. Encouragingly, however—partly in response to program sponsors' requests—DOE recently asked that the Consortium for Energy Efficiency (CEE) and its members submit a "data specification," similar to a technical specification, which would serve as the basis for negotiating shipment and sales reporting requirements from manufacturers and retailers. For CFLs, Table 1 shows some of the key data characteristics requested by CEE on behalf of its members.[21]

[21] Nevius, Monica (Consortium of Energy Efficiency). 2007. Memorandum to Richard Karney of U.S. Department of Energy. "CEE Members' Prioritized ENERGY STAR Market Penetration Data Tracking Needs." April 11.

Table 1: Elements in CEE's Request to DOE on CFL Shipment and Sales Data Reporting

At a minimum, the following data are needed for both sales and shipments of CFLs:
• Counts of individual screw-in CFL bulbs and of individual screw-in medium-base and candelabra-base incandescent bulbs sold or shipped, at the level of geographic specificity, frequency of data collection, and frequency of reporting described above in the General Requirements. (Reporting individual data for sales or shipments of individual bulbs would eliminate member concerns about undercounting of bulbs sold in multi-packs.)
• The above counts broken down by wattage category. For CFLs, the wattage categories are: ≤ 7 ≥15 and <20 >7 and <10 ≥20 and <25 ≥10 and <15 ≥25 • For incandescent bulbs, the wattage categories needed are: <25 100 25 125 40 150 60 30-70-100 (three-way) 75 50-100-150 (three-way) • Ideally, members would like the wattage information reported by state, but if this is not possible, wattage breakdowns at the national level would do.
If possible, members also desire the following items, in order of priority:
• Counts of individual ENERGY STAR-qualified CFL sales and shipments, by state and zip code.
• For CFL sales and shipments (both ENERGY STAR-qualified and not), means of manufacturer-rated lifetime, by the wattage categories mentioned above, at the national level.
• Counts of individual CFL sales and shipments (both ENERGY STAR-qualified CFLs and those that are not) broken down by lamp and reflector type at the state level. These types are: Bare, Covered, Globes, and Reflectors. Within Reflectors, the data need to be broken down further by reflector type (R-20, R-30, R-40 and PAR38).
• At the national level, counts of individual CFL sales and shipments (both ENERGY STAR-qualified CFLs and those that are not) broken down by base type (screw-in medium base, candelabra-base, or GU-24) and color temperature category. The color temperature categorization should match that of the final version of the new ENERGY STAR CFL specification.
• If possible, sales and shipments of halogen bulbs.

Lighting Program Attribution

A key regulatory requirement of utility-based CFL programs is demonstrating that the products distributed through the programs are producing the desired outcomes, namely energy savings (resource acquisition) and/or progress toward sustainable markets for CFLs (market transformation). Attribution of program effects of CFL programs goes beyond counting how many products receive incentives to account for ways the programs are influencing the CFL market.

The energy-efficient lighting community might be able to take some credit for these market shifts if only they could document that these sales are actually occurring. In Massachusetts, we have analyzed the 2005 Massachusetts ENERGY STAR Lighting Program impacts, using both documented estimates and anecdotal estimates of national sales; we are repeating the analysis for 2006. We estimate program effects by creating a baseline estimate of national CFL sales and comparing it to CFL sales that occurred for the state. We make the national baseline estimate by isolating CFL sales from states or regions with large-scale active programs from CFL sales for the rest of the country. Several other

regions with active lighting programs, including the Northwest,[22,23,24] Wisconsin,[25] Vermont,[26] and New York[27] have estimated program effects using an approach that is similar to this one.

Baseline CFL Sales

Starting with the 2005 national sales estimate of CFLs from the *California Lamp Report* and adjusting for missing data from some of the key retailers, we estimate that of the 42 million CFLs sold in the country, almost 22 million were sold in areas of the country with large-scale, active lighting programs. (Table 2)

Table 2: CFL Sales Estimates in Selected Areas with Large-Scale, Active Lighting Programs

	2000	2001	2002	2003	2004	2005
Total Sales						
Massachusetts	429,600	1,173,600	1,772,400	3,096,983	4,716,966	6,336,949
California	1,393,200	6,892,800	5,355,600	5,506,800	6,162,000	7,233,600
Connecticut						2,391,795 to 3,882,522
Maine						597,949 to 970,630
New Hampshire						266,853 to 433,173
New Jersey						1,405,268 to 2,281,125
Northwest		6,735,865	3,938,551	3,861,767	5,062,322	6,832,478
Wisconsin			1,317,162	1,271,373	1,366,431	1,239,255 to 2,011,641
Vermont					271,170	271,170 to 479,214
U.S.	8,155,200	26,493,600	32,494,800	38,331,600	35,158,800	42,172,800

Removing program area sales from national sales, we estimate that 2005 baseline sales range from 0.140 to 0.186 CFLs per household, for total baseline CFL sales of 342,145 to 455,673 in Massachusetts. Baseline sales are defined as the number of CFLs that would have been sold in the absence of program sales. The lower 2005 estimate assumes fewer total CFL sales in program areas and the higher 2005 estimate assumes greater total CFL sales in program areas, with national sales constant.

[22] ECONorthwest. 2002. "*ENERGY STAR* Residential Lighting, Market Progress Evaluation Report, No.1." Northwest Energy Efficiency Alliance. June 20.
[23] ECONorthwest. 2004. "*ENERGY STAR* Residential Lighting, Market Progress Evaluation Report, No.2." Northwest Energy Efficiency Alliance. August 16.
[24] Harris, Jeff. 2006. (Northwest Energy Efficiency Alliance). Personal communication. October.
[25] Glacier Consulting Group, LLC and Ralph Prahl Associates. 2006. "FY04/05 Net-to-Gross Savings Adjustments for CFLs Rewarded Through the ENERGY STAR Products Program." January 11.
[26] KEMA, Inc. 2005. "Final Report: Phase 2 Evaluation of the Efficiency Vermont Residential Programs." Vermont Department of Public Service. December.
[27] New York State Energy Research and Development Authority (NYSERDA). 2007. "New York Energy $mart Program Evaluation and Status Report."

Table 3 shows national baseline sales in 2000 of 6.4 million CFLs, or 78% of all CFL sales in 2000. Annual baseline sales peaked in 2003, with 0.21 CFLs per household. In 2005, the national baseline sales estimate ranges from 15.5 million to 20.7 million CFLs, or 37% to 49% of all CFL sales.

Table 3: Annual Baseline CFL Sales (2000 to 2005)

	2000	2001	2002	2003	2004	2005 lower	2005 higher
Annual Baseline	0.061	0.062	0.175	0.207	0.093	0.186	0.140
Massachusetts	147,027	152,142	426,460	504,815	227,157	455,673	342,145
California	694,863	716,415	2,052,449	2,457,104	1,116,668	2,251,883	1,690,840
Connecticut						246,417	185,024
Maine						100,916	75,774
New Hampshire						92,521	69,470
New Jersey						584,839	439,170
Northwest	280,790	459,689	850,007	1,023,687	682,169	889,038	667,539
Vermont	15,021	24,682	44,613	53,166	36,013	46,316	34,777
Wisconsin	130,727	212,163	394,670	474,242	313,529	413,147	310,214
United States	6,568,236	10,728,445	19,776,694	23,814,310	15,857,680	20,678,232	15,526,380
Program Area	1,291,236	2,108,310	3,893,407	4,690,433	3,110,569	5,080,750	3,814,913
Non-Program Area	5,277,000	8,620,135	15,883,287	19,123,877	12,747,111	15,597,483	11,711,467

Net-to-Gross

We calculated net-to-gross program effects as the ratio of total CFL sales minus baseline sales to program sales. Where data were not available, we made some assumptions about total sales for Connecticut, Maine, New Hampshire, New Jersey, and Vermont. We have market-level data, but no program data, for California and the Northwest.

By assuming a range of CFL sales in other program areas, we can also see how the net-to-gross ratio varies. The net-to-gross estimate for Massachusetts ranges from 1.80 to 1.84, which means that CFL sales attributable to the program (directly and indirectly) ranges from 5,881,276 units to 5,994,804 units. This range is well beyond the direct sales of 3.3 million CFLs shipped directly through the program.

Adjusted Assumptions for National Sales

To explore the implications for baseline and net-to-gross estimates if national sales are much higher than the Itron estimates, we re-worked the 2005 baseline estimates assuming national sales of 100 million CFLs and then projected out to the end of 2007 and used an estimate of 300 million CFLs. In the exercise using the 100 million CFL sales estimate for 2005, we allowed the estimates of program sales and total sales by state/region to remain unchanged, except for California, since that is the only state whose estimates rely on the method used to produce national numbers; only the national sales estimate, the California estimate, and the resulting non-program estimates change. The resulting estimate for California is 17.2 million CFLs sold in 2005—much more in keeping with the level of sales reported in other active states than the 7.2 million derived from the Itron estimates. To illustrate, the old estimate of CFLs sold per household in California was 0.6, whereas the new estimate is 1.4—about the same as in the Pacific Northwest.

As Table 4 shows, the reworked 2005 baseline sales per household range from 0.758 to 0.711, with total retail CFL sales about 6.3 million in Massachusetts. This results in a net-to-gross estimate of

1.37 to 1.41, a narrow range that continues to support our assertion that Massachusetts estimates are not particularly sensitive to changes in non-program sales estimates.

In the next exercise, we projected out to the end of 2007 and assumed that national CFL sales will increase to 300 million. We assume that sales increase proportionately in all areas based on the adjusted 2005 100 million sales estimates. As Table 4 shows, the resulting estimate of 2007 baseline sales per household range from 2.134 to 2.274, with total retail CFL sales about 19 million in Massachusetts. The net-to-gross estimate now is between 4.12 and 4.22. However, preliminary estimates show that Massachusetts sales have not increased that much; if this is the case and also true in other program states, we would assume that sales are shifting to non-program states. This would suggest that market transformation is occurring and it will have implications for the need for continued support in active program areas—at least if market transformation is the goal; CFL programs would likely continue to be cost-effective for purposes of resource acquisition.

Table 4: Comparison of Baseline Sales and Net-to-Gross Ratio Using Various CFL Sales Estimates

	Itron Estimate		**100 Million Estimate**		**300 Million Estimate**	
	2005 Lower	**2005 Higher**	**2005 Lower**	**2005 Higher**	**2007 Lower**	**2007 Higher**
Annual Baseline	0.186	0.140	0.758	0.711	2.134	2.274
Massachusetts	6,336,949	6,336,949	6,336,949	6,336,949	19,010,847	19,010,847
California	7,233,600	7,233,600	17,152,288	17,152,288	51,456,863	51,456,863
Connecticut	2,391,79	3,882,522	2,391,795	3,882,522	7,175,386	11,647,565
Maine	597,949	970,630	597,949	970,630	1,793,847	2,911,891
New Hampshire	266,853	433,173	266,853	433,173	800,558	1,299,519
New Jersey	1,405,268	2,281,125	1,405,268	2,281,125	4,215,805	6,843,375
Northwest	6,832,478	6,832,478	6,832,478	6,832,478	20,497,434	20,497,434
Vermont	271,170	479,214	271,170	479,214	813,510	1,437,643
Wisconsin	1,239,255	2,011,641	1,239,255	2,011,641	3,717,765	6,034,924
United States	42,172,800	42,172,800	100,000,000	100,000,000	300,000,000	300,000,000
Program Area	26,575,317	30,461,333	36,494,005	40,380,020	109,482,015	121,140,061
Non-Program Area	15,597,483	11,711,467	63,505,995	59,619,980	190,517,985	178,859,939
MA Net-to-Gross Ratio	1.80	1.84	1.37	1.41	4.12	4.22
MA Total Program Impact	5,881,276	5,994,804	4,481,652	4,595,180	13,444,957	13,785,541

Conclusions

Across the country it is becoming more important than ever to understand the full market effects of lighting programs and how they contribute to reduced energy demand and reductions in greenhouse gases. In the Northeast, defensible documentation of lighting program effects may soon be used in plans to take credit for reductions in power plant global warming pollutants under the Regional Greenhouse Gas Initiative (RGGI) and as an electricity demand reduction resource for the Forward Capacity Market (FCM) with ISO New England. Utilities and program sponsors across the country are spending millions (Massachusetts alone spent $10 million in 2005) to promote CFLs and make the energy-efficient lighting market viable. Therefore it would seem to be in the interests of manufacturers and retailers to provide the data that could help program sponsors evaluate the success of these efforts. We conclude that it is time for all lighting program supporters to work with the lighting manufacturers to create a national sales reporting system. Being able to accurately demonstrate program effects will create a stronger and more sustainable CFL market.

References

18Seconds.org. 2007. http://www.18seconds.org "It takes 18 seconds to change a light."

Alliance to Save Energy. 2007. "Alliance Calls for Only Energy-Efficient Lighting in U.S. Market by 2016, Joins Coalition Dedicated to Achieving Goal." News Release. Washington, D.C. March 14. http://www.ase.org/content/news/detail/3644. Accessed 3-29-07.

California Legislature. 2007. Assembly Member Levine. An act to amend Section 25402.5 of the Public Resources Code, relating to energy. Assembly Bill No. 722. February 22. http://www.leginfo.ca.gov/pub/07-08/bill/asm/ab_0701-0750/ab_722_bill_20070222_introduced.pdf. Accessed 3-27-07. Proposed legislation to ban the sale of incandescent lamps in the state after January 1, 2012.

Department of Commerce, U.S. Imports of Selected Merchandise. Imports discharge lamps, (excluding ultraviolet) fluorescent screw-in 2004-2006. This estimate includes imports that for all uses, including commercial applications.

ECONorthwest. 2002. "*ENERGY STAR* Residential Lighting, Market Progress Evaluation Report, No.1." Northwest Energy Efficiency Alliance. June 20.

ECONorthwest. 2004. "*ENERGY STAR* Residential Lighting, Market Progress Evaluation Report, No.2." Northwest Energy Efficiency Alliance. August 16.

Fishman, Charles. 2006. "How Many Lightbulbs Does it Take to Change the World? One. And You're Looking at It." *Fast Company*. September.

Fishman, Charles. 2006. (*Fast Company*) Personal communication. October 9.

General Electric. 2007. "GE Announces Advancement in Incandescent Technology; New High-Efficiency Lamps Targeted for Market by 2010." Press Release. February 23. http://www.ge.com/pr/display.php?highlight=true&id=1841&keyword=. Accessed 3-29-07.

Glacier Consulting Group, LLC and Ralph Prahl Associates. 2006. "FY04/05 Net-to-Gross Savings Adjustments for CFLs Rewarded Through the ENERGY STAR Products Program." January 11.

Granda, Chris. 2006. Personal communication. May 2006. Reference to his trip to a CFL manufacturing facility in China.

Harris, Jeff. 2006. (Northwest Energy Efficiency Alliance). Personal communication. October.

Hendricks, L.B. 2006. Minerals and Energy Budget Vote Speech by Minister LB Hendricks, National Assembly. South African Government Information. May 25. http://www.info.gov.za/speeches/2006/06052516451001.htm. 2006. Accessed 3-29-07

Home Depot advertisement. 2007. *Boston Globe*. January 8. The ad says "the energy saved by the compact fluorescent lightbulbs we've sold could light the homes in Washington, DC for three

and a half years." Based on estimates of CFL savings listed on EPA's website and the number of homes in Washington, DC from the U.S. Census, that would amount to 37 million CFLs.

International Energy Agency. 2007. "Announcing a Joint International Energy Agency, European Commission JRC and CEN-Star Trend Analysis Workshop On: CFL Quality and Strategies to Phase-Out Incandescent Lamps." Announcement. http://www.iea.org/Textbase/work/2007/cfl/announcement.pdf. Accessed 3-29-07.

Itron, Inc. 2006. *California Lamp Report: California Residential Efficiency Market Share Tracking: Lamps 2005*. Southern California Edison. May 15.

KEMA, Inc. 2005. "Final Report: Phase 2 Evaluation of the Efficiency Vermont Residential Programs." Vermont Department of Public Service. December.

Nevius, Monica (Consortium of Energy Efficiency). 2007. Memorandum to Richard Karney of U.S. Department of Energy. "CEE Members' Prioritized ENERGY STAR Market Penetration Data Tracking Needs." March 23.

New Hampshire Public Utilities Commission (NHPUC). 2005. 2005 Year End Report: Core New Hampshire Program Highlights, Summary. NHPUC Docket No. DE 03-169.

New Jersey Board of Public Utilities, Office of Clean Energy. 2006. New Jersey's Clean Energy Program 2005 Annual Report.

New York State Energy Research and Development Authority (NYSERDA). 2007. "New York Energy $mart Program Evaluation and Status Report

Nexus Market Research (NMR), Inc. 2007. "Telephone Survey Results for Market Progress and Evaluation Report (MPER) 2006 Massachusetts ENERGY STAR Lighting Program." Submitted to National Grid, Cape Light Compact, NSTAR Electric Company, Western Massachusetts Electric Company, Unitil. Draft March 20.

O'Rourke, Jim. 2007. "Legislators Call for Phase-Out of Incandescent Light Bulbs to Conserve Energy." Press Release. February 5. http://www.cga.ct.gov/hdo/032/pr032-07.html. Accessed 3-27-07.

Pratt, Jeff. 2006. Connecticut ECMB Residential Program Update-Sector Snapshot. Presentation May 9.

Shel Feldman Management Consulting, Glacier Consulting Group, LLC; and Ralph Prahl & Associates. 2004. "ENERGY STAR-Labeled Products Program: CFL Impact Reporting, Focus on Energy Public Benefits Evaluation." May 17.

State of Connecticut. 2007. Representatives O'Rourke, Mushinsky, Urban, & Wright. An Act Concerning Inefficient Incandescent Lamps. Proposed Bill No. 6550, LCO No.2120. January Session. http://www.cga.ct.gov/2007/TOB/h/pdf/2007HB-06550-R00-HB.pdf. Accessed 3-27-07.Proposed legislation to study the availability of energy efficient lamps at competitive prices, create a list of inefficient incandescent lamps and ban the sale of inefficient incandescent lamps.

State of Maine Public Utilities Commission. 2006. Process/Impact Evaluation Efficiency Maine Residential Lighting Program, Request for Proposals. September 8.

State of New Jersey. 2007. Chatzidakis, L. and L. Stender. Assembly, No. 3983. February 22. http://www.njleg.state.nj.us/2006/Bills/A4000/3983_I1.PDF. Accessed 3-27-07. Proposed legislation to replace all incandescents with CFLs in state buildings and would require a public education and awareness campaign to inform businesses and consumers about the benefits of CFLs.

Turnbull, M. 2007. "World First! Australia Slashes Greenhouse Gases From Inefficient Lighting." Media Release, Australian Minister for the Environment and Water Resources. February 20. http://www.environment.gov.au/minister/env/2007/pubs/mr20feb07.pdf. Accessed 3-29-07.

Yahoo! 2007. "Public-Private Partnership Unveils Nationwide Campaign to Raise Awareness About Global Warming and Rally Americans to Help Make a Change." Press Release. Business Wire. February 20. http://yhoo.client.shareholder.com/press/ReleaseDetail.cfm?ReleaseID=230540. Accessed 4-11-07.