June 8, 2012

Tim Cole, Ph.D.
Executive Secretary, Energy Efficiency Board
West Wind Consulting
157 Whitney Street
Hartford, CT 06105

RE: CL&P Review of the Draft Connecticut Lighting Saturation Study.

Dear Mr. Cole:

The Connecticut Light and Power Company (CL&P) is pleased to submit these written comments with regard to a draft evaluation report: *Connecticut EISA Lighting Exploration: Stage 2 Results, Draft,* ("Study" or "2012 Study"), May 21, 2012, NMR Group, Inc. The draft Study was submitted to CL&P on May 24, 2012 with a request for comments to be provided by June 8, 2012.

The primary purpose of the Study was to explore the residential lighting market in Connecticut with a focus on the following objectives:

- Establishing levels of consumer awareness of various lighting options
- Understanding consumer reactions to the Energy Independence and Security Act (EISA)
- Determining the current rates of use and storage for various lighting technologies with consumers
- Identifying ways in which CL&P and UI can assist consumers in making more efficient lighting choices.

The Study relied upon a telephone survey of 551 households in Connecticut and additional onsite visits to a subset of 100 of these households in order to attempt to achieve the above objectives.

The survey results within the Study provide insight into factors that influence consumer lighting decisions. In particular, the information provided in the Study regarding consumer awareness of lighting options, reactions to EISA, and strategies to assist consumers (1st, 2nd and 4th bullet point above) are adequately addressed with the Study and will provide CL&P with useful information that will be considered in future program designs including the development of marketing and educational materials used in the Retail Products Program.

However, the information in the Study regarding the current rates of use and storage for various lighting technologies (3rd bullet point) is baffling and/or statistically insignificant. For these reasons, CL&P will limit its comments to this one section of the Study which relied upon the on-site visits to estimate the number and type of lighting technologies in homes in Connecticut. This section of the Study draws comparisons between current (2012) lighting saturation results

and a similar study conducted in 2009: *The Market for CFLs in Connecticut*, November 24, 2009, ("2009 Study"), Nexus Market Research[1].

The 2009 Study presumably utilized identical on-site surveys at a similar number of homes (95 versus 100 homes). However, despite the assumed identical methodology, similar sample sizes, and same research company for both the 2009 and 2012 Studies, the results of the two studies cannot be compared on a percent basis because 1) the samples sizes are insufficient to make any statistically strong conclusions; and 2) despite the assumption that methodologies used to count and track bulbs were similar, there appears to be unexplainable differences in the methodology and results between the two Studies.

In particular, CL&P requests NMR to address the following questions and concerns outlined below:

Bulbs per Home and Socket Density. The 2009 Study estimates 61.2 million total sockets or approximately 46 sockets per home. The 2012 Study estimates 80.5 million total sockets, or approximately 61 sockets per home. NMR suggests that the increase in sockets is due to larger average size homes in the 2012 Study[2]. However, it appears that the average size home in the 2012 study is actually significantly smaller: approximately 1800 square feet for the 2012 Study versus 2300 square feet for the 2009 Study.[3] If the results are normalized, the total socket saturation went from approximately 2 sockets per 100 square feet in 2009 to 3.3 sockets per square foot in 2012[4] – an unexplainable discrepancy which suggests that a large number of sockets in the 2009 Study may have been overlooked and/or that the 2012 study included additional types of lighting such as under cabinet lighting, night lights, low voltage lighting, or pin-based decorative lighting[5]. CL&P requests that NMR Inc. explain these discrepancies and state whether it is appropriate to compare results of the two Studies based on these inconsistencies.

Types and Locations of Bulbs. The 2009 Study estimated 0.9 million dimmable bulbs (less than one per home) and the 2012 Study estimated approximately 7 million dimmable bulbs[6]

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[1] CL&P believes that "Nexus Market Research" and "NMR Group Inc." are the same entity despite the different authors listed on the 2009 and 2012 Studies. Furthermore, CL&P's understanding is that consistent methodologies (i.e. counting socket types) were intended to be used for the on-site visits in both Studies in order to generate a meaningful comparison of socket saturation rates.

[2] Page 27 of the 2012 Study. NMR states that the number of sockets is "highly dependent on the size of the homes". CL&P interprets this to mean that larger homes have more sockets.

[3] The average size home was not reported in either Study. However, there were tables provided in each study which broke out the home sizes into ranges. CL&P estimated the approximate average size home in each study by using the midpoint of the ranges provided and calculating a weighted average.

[4] CL&P estimates that the national average is approximately 1.6 medium base sockets per 100 square feet. Source: http://www.energystar.gov/ia/products/downloads/CFL_Market_Profile.pdf and National Census Data. This number excludes pin based sockets, candelabra based sockets, tube based fixtures and appliance sockets (stove, refrigerator, etc.).

[5] It would be appropriate to remove these types of lighting products from the 2012 Study because it would not be feasible or cost effective to retrofit them with a CFL.

[6] CL&P believes that the 7 million estimate in the 2012 Study is a more accurate number based on the following: 1) http://neep.org/uploads/Summit/2010%20Presentations/NEEP%20Lighting_Swope.pdf estimates 12 percent dimmable sockets); 2) Dimmable replacements in the Home Energy Solutions Program represent approximately 13

(approximately 6 dimmable bulbs per home). It seems highly unlikely that the number of dimmable bulbs increased by this order of magnitude. In addition, the 2012 Study included an "other" category which includes empty sockets. The 2009 Study does not appear to account for empty sockets. In addition, it appears that NMR may have omitted many hard to find bulbs in the 2009 Study such as workshops, closets and exterior lights (see also previous bullet: Types and Locations of Bulbs) and/or included more non-standard bulbs in the 2012 study such as under cabinet lighting etc. which may help explain the difference in socket density between both Studies. CL&P requests that NMR Inc. explain these discrepancies between Studies.

Statistical Validity and Sample Size. For a study of this nature, a sample size of at least 350 homes is considered adequate to achieve 90% confidence at ±10 percent error[7]. For purposes of comparing socket penetration between two studies, even larger samples may be desired because errors between studies would be magnified. CL&P suggests that NMR Inc. provide an estimate of the confidence interval for the difference in socket saturation rates between both Studies. In addition, CL&P requests that NMR Inc. provide the coefficient of variation that was used to design the original sample size (100 homes), as well as the actual coefficient of variation based on the 2012 Study results.

Post Stratification of Variables. Because of the smaller sample sizes, post stratification[8] was used to correct for sample bias. In general, this is a reasonable statistical technique. However, it can lead to magnified sampling errors if the sub-samples are not of adequate size. For example, the 2012 Study sample included 3 households that were renter-occupied with a high school or diploma or less (3% of the sample). Because this demographic category represents a larger proportion of households in Connecticut, the three households were weighted by 518%. Therefore, if even one of these households was an outlier, that variance would be multiplied by a factor of 518 percent. CL&P requests that NMR Inc. provide an estimate of the study design effect and design factor resulting from the weighting.

CL&P appreciates the opportunity to provide these constructive comments.

Very Truly Yours,

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percent of bulbs installed. These two sources suggest that the 2009 Study grossly undercounted dimmable sockets.

[7] *Measuring the Success of CFL Energy Efficiency Programs,* http://www.megdalassociates.com/pubs/IEPEC_2005-095.pdf

[8] A statistical technique by which certain data points are given a higher weighting to reflect the actual population versus the sample population.