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REPORT #E13-256

Review of ACE Model for High Efficiency TVs Initiative

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MEMORANDUM

March 15, 2012

To: Christina Steinhoff, NEEA

From: Matthew Koson

Cc: Steve Phourides

Re: Review of ACE Model for High Efficiency TVs Initiative

NEEA asked Evergreen Economics to review the data used in its ACE model for televisions per an electronic mail correspondence dated December 6, 2011. Evergreen was asked to focus on five items:

- The validity of the Navitas analysis using DisplaySearch data;
- NEEA's application of the DisplaySearch data, historical market share trends, and program logic to forecast the market share;
- NEEA's application of DisplaySearch data to forecast and estimate the Naturally Occurring Baseline Market Share;
- NEEA's use of DisplaySearch data to forecast an increase in screen sizes through 2015;
- NEEA's incremental first-cost estimates by ENERGY STAR tier.

This memorandum discusses Evergreen's review of the data and its application supplements our memorandum submitted on December 29, 2011 regarding "Market Size and Maximum Market Share for Televisions."

Validity of Navitas analysis using DisplaySearch data

Evergreen reviewed the Navitas December 19, 2011 memorandum titled "NEEA Television Initiative Market Share Forecast Methodology." Evergreen also reviewed the spreadsheet referenced throughout the report that computes Market Share by ENERGY STAR tier.

The methodology described in the memorandum and implemented in the spreadsheet is sound. Navitas explains, step by step, the process undertaken to transform data describing television sales by brand, size, and technology into projected market share for each



ENERGY STAR tier. Evergreen reviewed the assumptions and calculations, and found them to be reasonable. Furthermore, we found no errors in the spreadsheet.

In the “Assumptions” section of the Navitas memorandum, the author states an assumed figure of the U.S. making up 94 percent of the North American market. As stated in our earlier memorandum, Evergreen noted that the Lawrence Berkeley National Laboratory (LBNL) reports that the U.S. accounts for 89 percent of LCD televisions.¹ The LBNL report also states that DisplaySearch recommends the 89 percent figure.

Evergreen Economics recommends that NEEA consider using the 89 percent figure to determine the portion of North American sales attributable to the U.S. NEEA should work with Navitas to discuss the possible explanations for the discrepancy between the two data sources.

NEEA’s application of the DisplaySearch data, historical market share trends, and program logic to forecast the market share

Although Navitas has used DisplaySearch data appropriately to estimate market share, NEEA is currently using actual market share data, which generally exceeds Navitas by a modest amount. We are unsure of the reason for this discrepancy but note that estimation often produces approximate results.

Evergreen Economics recommends that NEEA continue use its actual market share data.

NEEA’s application of DisplaySearch data to forecast and estimate the Naturally Occurring Baseline Market Share

The NEEA Television ACE model utilizes actual Northwest sales data and initial DisplaySearch projections to determine the Naturally Occurring Baseline Market Share.

For years 2010-2012, NEEA uses DisplaySearch pre-and-post intervention market share projections, and sales data to adjust the baseline for each tier. The baseline is adjusted in such a way as to maintain the ratio of projected to actual market share. For all subsequent years, the model NEEA extrapolates data points based on a set of assumptions derived from Q4 2008 DisplaySearch data and allows the NOBMS to reach 100 percent of Market Share by 2015 (or within five years of transformation for tiers with a NOBMS starting in 2010 or 2011).

¹ Park, Won Young, Amol Phadke, Nihar Shar, Virginie Letschert. “TV Energy Consumption Trends and Energy-Efficiency Improvement Options”. Ernest Orlando Lawrence Berkeley National Laboratory, Environmental Energy Technologies Division, International Energy Studies Group. July 1, 2011. Page 17.



As part of this task, Evergreen reviewed the model and supporting datasets. Evergreen found that both the data and model to be implemented in a reasonable manner with no obvious computational or logical errors. Given the data limitations, we believe NEEA's use of 2008 DisplaySearch data to represent a pre-intervention baseline and 2011 projections coupled with actual sales data to adjust the baseline, to be an appropriate course of action. Evergreen finds the methodology used in the TVs ACE model to be a completely reasonable and appropriate manner in which to update the NOBMS.

Evergreen Economics recommends that NEEA continue use actual Northwest sales data coupled with DisplaySearch historic projections to forecast the Naturally Occurring Baseline Market Share.

NEEA's use of DisplaySearch data to forecast an increase in screen sizes through 2015

NEEA's model uses DisplaySearch data to forecast average television screen sizes. Starting with modified Q3 2011 data, the model assumes that the size of sets sold in the Northwest will increase through 2015 by interpolating data points based on a 2011 start-point and 2015 end-point estimated by Navitas. The model assumes that the market will transform at a linear growth rate within each tier such that screen size mixes will be equal for all tiers by 2015.

Evergreen reviewed the model and associated DisplaySearch data spreadsheets and did not find any computational errors. Moreover, we believe that estimates and assumptions made by NEEA are fitting and sensible given the data constraints.

To confirm the validity of NEEA's figures, Evergreen also conducted secondary research on screen sizes forecasts. LBNL research² indicates that during the study period in question, TVs with a screen size greater than or equal to 40 inches are expected to increase as proportion of total sets sold with the largest gains being achieved by sets in the 40 to 46 inch range. This corroborates NEEA's forecast trend for an increase in the average television screen size.

Evergreen Economics recommends NEEA continue to use DisplaySearch data to forecast television screen sizes.

NEEA's incremental first-cost estimates by ENERGY STAR tier

² Park, et al. 2011. Page 18.



Navitas developed the incremental cost model that NEEA will use for inputs in its Televisions ACE model. The model uses Backlight (BLU) unit costs and screen size data with technical characteristics of TVs to compute first-cost estimates by energy tier. Backlight unit costs are derived from DisplaySearch's Cost Model Reports that forecast global costs on a quarterly basis. The data is formatted in such a way so as to have one unique BLUType based on the light source and power saving mode of the television for each 6th Power Plan (6PP) size bin. Additional DisplaySearch and LBNL findings are used to establish a correlation between television technology and energy efficiency tier. The incremental cost is then simply computed as the difference between the energy efficient TV and its associated baseline cost using the 6PP bins.

In evaluating the validity of NEEA's incremental first-cost estimates, Evergreen reviewed the December 30, 2011 Navitas memorandum titled "NEEA Television Initiative Incremental Cost Methodology Report" in addition to all spreadsheets associated with this report. We reviewed the text and calculations, and found both the assumptions and calculations to be sound. The decreasing price of efficient televisions over time is not a mathematical error and reflects declining cost trends observed for other energy efficiency measures. Evergreen thoroughly examined the DisplaySearch data and Navitas model and found no computational errors.

As we are not technical component experts in the area of televisions, Evergreen is unable to comment conclusively on the specific, multiple BLU components that were used to estimate energy-related television price changes over the study period. That said, we were able to locate findings published by LBNL³ that corroborate Navitas' selection of BLUs as the key component on which to base first-cost estimates. The report suggests that it is difficult to estimate improvement potential and incremental costs for panel technology, and instead suggests using optical components (i.e. BLUs).

Evergreen Economics recommends that NEEA continue to use Navitas' analysis and DisplaySearch data to compute incremental first-cost estimates by ENERGY STAR tiers.

³ Park, et al. 2011. Page 44.