

## **APPENDIX H. USER INSTRUCTIONS FOR NIA SPREADSHEET**

### **TABLE OF CONTENTS**

H.1	INTRODUCTION .....	1
H.2	USER INSTRUCTIONS FOR NIA SPREADSHEET.....	1

### **LIST OF TABLES**

Table H.2.1	Description of Tabs in the NIA Spreadsheet .....	1
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## APPENDIX H: USER INSTRUCTIONS FOR NIA SPREADSHEET

### H.1 INTRODUCTION

The results obtained in this analysis can be examined and reproduced using the Microsoft Excel® spreadsheet available on the U.S. Department of Energy Building Technologies website at: [http://www.eere.energy.gov/buildings/appliance\\_standards/commercial\\_products.html](http://www.eere.energy.gov/buildings/appliance_standards/commercial_products.html).

The spreadsheet is called “CRE\_NIA\_FR\_11-19-2008.xls” and it enables the user to perform NES analyses of up to 15 equipment classes of commercial refrigeration equipment. To execute the spreadsheet requires Microsoft Excel® 2003 or a later version.

### H.2 USER INSTRUCTIONS FOR NIA SPREADSHEET

The NIA spreadsheet performs calculations to forecast the change in national energy use and net present value due to an energy efficiency standard for Commercial Refrigeration Equipment. The energy use and associated costs for a given standard are determined first by calculating the shipments and then calculating the energy use and costs for commercial refrigeration equipment shipped under that standard. The differences between the standards and base cases can then be compared and the overall energy savings and present values determined. The NIA spreadsheet or workbook consists of the following worksheets (Table H.2.1). Some detailed worksheets are hidden for ease in examining final results quickly, but can be retrieved by using the command tab Format, Worksheets, Unhide.

**Table H.2.1 Description of Tabs in the NIA Spreadsheet**

Shipments-Weighted Data (Hidden)	The Shipments-Weighted Data sheet contains calculated tables of both input data and results from the spreadsheet.
Analysis Flow	Figure that illustrates the calculations performed by the NIA spreadsheet.
Summary of Results	The summary of results contains user input selections and, for the selected equipment class, a mapping of Efficiency Levels from the Lifecycle Cost Analysis to Trial Standard Levels Summary table, Shipments graph, Cumulative Energy Savings and NPV graph, and an Annual Non-Discounted Savings Trend plot, which also contains a plot of discounted net savings by year.
Savings Summary (Hidden)	A bookkeeping table used to store the results of the shipments and energy savings calculations for an individual equipment class and up to seven efficiency levels (e.g., Levels 2–8).

Details_Save (Hidden)	An accounting worksheet used to tally the energy and cost savings year by year for an individual equipment class and standard level. The energy and cost savings in a single year are the difference between the base case energy use and costs for that year and the standard case energy use and costs in the same year.
Details_Stock (Hidden)	A worksheet that keeps track of all surviving stock of commercial refrigeration equipment in an equipment class from the start year forward. Stock is updated for each year.
Initial Stock Details (Hidden)	A worksheet that keeps track of all surviving stock of commercial refrigeration equipment in an equipment class from 2006 to the start year of the forecast. Stock is updated for each year.
Shares Output 1, Shares Output 2, Shares Output 3, Shares Output 4 (Hidden)	Four worksheets that estimate percentage distribution shipments by efficiency level and year of all equipment classes of commercial refrigeration equipment from the start year of the forecast forward. Each worksheet applies to a different type of business (supermarkets, convenience and specialty stores, convenience stores with gas pumps, and large multi-line retailers).
Shares Processing (Hidden)	Worksheet that performs the detailed calculations based on annualized cost to estimate market shares of an equipment class of commercial refrigeration equipment by efficiency level in a business type based on risk preferences of purchasers for a baseline market condition and up to seven candidate standard levels.
Input (Hidden)	Worksheet that performs detailed calculations by risk preference class to estimate annualized cost for a newly purchased unit of an equipment class of commercial refrigeration equipment by efficiency level in a business type.
CRE Cost List	Contains input data on installed cost (total price), repair and maintenance cost, and annual electricity cost for units of commercial refrigeration equipment, calculated by the LCC model by equipment class, business type, and efficiency level at U.S. average prices and market conditions.
Details_Ship (Hidden)	Calculates total shipments by efficiency level for an equipment class by year, given a candidate standard. Also contains market weighted-average percentages of shipments by efficiency level of each equipment class of new commercial refrigeration equipment for

	baseline market conditions and up to seven candidate standard levels. Percentages are reported for each year from the start year forward.
Initial Shipments Detail (Hidden)	Calculates total shipments by efficiency level and market weighted-average percentages of shipments by efficiency level of each equipment class of new commercial refrigeration equipment for baseline market conditions and up to seven candidate standard levels. Values are reported for each year from 2006 to the start year of the forecast.
Shipments_Summary	Contains estimates of shipments of an equipment class of commercial refrigeration equipment by efficiency level and year, given a candidate standard level. Also contains estimates of total shipments of each equipment class by year for each candidate standard level.
Base Product Market Share Calcd	Worksheet performs calculations to estimate total market shipments by equipment class and year in the base case.
Product Shares (Hidden)	Contains percentages of overall commercial refrigeration equipment shipments (linear feet) by equipment class. Populated from Summary of Results.
Economic Trends	A worksheet that contains historical and projected economic values as well as shipments data.
ARI (Hidden)	Contains data and calculations to estimate historical market shares of commercial refrigeration equipment by equipment class.
Equipment Parameters	A worksheet that contains the economic, energy, and size parameters for commercial refrigeration equipment and other equipment parameters used to project survival and calibrate the model.
Labels	This is used as an interface between user inputs and the rest of the worksheets – do not modify this sheet

Basic instructions for operating the NIA spreadsheet are as follows:

1. Once the NIA spreadsheet file has been downloaded from the Web, open the file using Excel. You will be confronted with a dialog box as the file opens. You DO want to Enable Macros (Select “Yes” when this option is presented.) At the bottom, click on the tab for the worksheet, Summary of Results.
2. Use Excel’s View/Zoom commands at the top menu bar to change the size of the display to make it fit your monitor.
3. The user can change the model parameters listed in the gray box labeled “User defined inputs.” The parameters are:

- a. Equipment class: To change the value, select the menu box. A drop-down list appears. Select the desired equipment class. Many of the potential classes have no shipments, i.e., they are not “real.” If the user selects one these classes, the first row in the summary of results will show up as zeroes; the cells will turn red and will be cross-hatched out.
  - b. Efficiency Level: Selects the efficiency level used in the non-discounted annual net impacts figure. Must be less than or equal to the Max Tech level. If a higher standard level than Max Tech is selected, no results will be available for the levels above Max Tech.
  - c. Max Tech: To change the value, select the Max Tech box. A drop-down menu pops up. Select the desired type of maximum technologically feasible efficiency level (Usually Level 8). The Max Tech should be selected for the equipment class that was analyzed in the LCC analysis. If a Max Tech level is selected that is beyond the Max Tech level identified in the LCC analysis, the model will produce impacts for the (extra) incorrect efficiency levels, but they will not be valid.
  - d. Rate of Growth of the CRE Market: A drop-down menu formerly specified multipliers on the default rates of growth in grocery store floor space, which is used to forecast the sales of new units of display space. Only 1.0 was used in the Final Rule. Because shipments are introduced directly to Econ Trends, this option has been disabled.
  - e. Growth in Energy Prices: To the change value, select the Growth in Energy Prices box. A drop-down menu pops up. Select the desired Growth level (Constant, Reference, Low, or High). The scenarios refer to EIA projected rates from AEO 2008.
  - f. Standard First Year: This is the first year in which the standard will take effect. This should be set to 2012 for the Final Rule.
  - g. Discount Rate: To the change value, select the Discount Rate box. A drop-down menu pops up. Select the desired Discount Rate.
4. Once the user parameters have been reset the model must be re-run. To re-run the model for single equipment option, press the “Update Values” button. Note: The output values are not correctly updated until the “Update Values” button is pressed. To run all cases, press the “Run All Cases” button. The National Impact Summary and Sales-Weighted Data Sheets are only updated when the “Run All Cases” button is used. This takes a few minutes. They are not updated by “Update Values.”
  5. If a new set of LCC results has been loaded into the CRE Cost List and Equipment Parameters sheets, it will be necessary to recalculate the baseline equipment shipment shares by efficiency level in sheets Output1–Output4. To do this, press the “Shares

Processing” button. The shares automatically update (this process takes about 2 minutes), but it will not be necessary to update again unless LCC input data change.

6. Tabular results are presented to the right of the “User defined inputs” box for the base efficiency level (Level 1) and the Level 2 through Level 8 efficiency levels. The model also translates the efficiency levels into results at corresponding trial standard levels, which are indicated in the table. Tabular results are summarized as: (1) cumulative shipments, (2) percentage change in total shipments as efficiency level increases (currently, this does not change), (3) present value of national equipment cost savings in billions of dollars, (4) present value of national operating cost savings in billions of dollars, (5) national net present value in billions of dollars, and (6) cumulative national energy savings in quadrillion Btus. Energy savings results for all standards cases energy savings are tabulated for two periods: 2012 to 2042, and 2010 to 2062. Net present value results are tabulated for 2012–2062.

Graphical results are presented for the main tabular results. Two charts are provided for the given model parameters: (1) shipments forecasts for the base case and all standards cases and (2) national energy savings and net present values for all the standards cases.

For a given set of user defined parameters, the user can also view the annual trend in the non-discounted net impacts for an individual trial standard level. To view an efficiency level, select Efficiency Level, and then select a standard level from the drop-down list. The annual purchase savings and operating cost savings are not discounted values. However, the net savings values in each year are shown as discounted values.