

**APPENDIX S. USER INSTRUCTIONS FOR SHIPMENTS AND NATIONAL ENERGY SAVINGS SPREADSHEET MODEL**

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## APPENDIX S. USER INSTRUCTIONS FOR SHIPMENTS AND NATIONAL ENERGY SAVINGS SPREADSHEET MODEL

### S.1 USER INSTRUCTIONS

The results obtained in this analysis can be examined and reproduced using the Microsoft Excel® spreadsheets accessible on the Internet from DOE's Furnace and Boiler Rulemaking page: [http://www.eere.energy.gov/buildings/appliance\\_standards/residential/furnaces\\_boilers.html](http://www.eere.energy.gov/buildings/appliance_standards/residential/furnaces_boilers.html). From that page, follow the links to the final rule and then to the Analytical Tools.

#### S.1.1 Startup

The spreadsheet called “NIA(Main)\_XX.xls” enables the user to perform National Impact Analysis (NIA) for trial standard levels for residential furnace and boilers, while spreadsheets called “NIA(Regional)\_XX.xls” enables the user to perform regional NIA for non-weatherized gas furnaces. NIA spreadsheets labeled “rebound” include the rebound effect as described in Chapter 10 and are used to generate the National Energy Savings (NES) results, while NIA spreadsheets without the “rebound” label do not include the rebound effect and are used to generate the National Present Value (NPV) results. Table S.1.1 lists all NIA spreadsheets used in this analysis.

**Table S.1.1 List of NIA Spreadsheets**

<b>Filename</b>	<b>Description</b>
<b><i>NIA Main Spreadsheets</i></b>	
NIA(Main).xls	Main Generates NPV results (Ch. 10)
NIA(Main)_rebound.xls	Main Generates NES results (Ch. 10)
<b><i>NIA Regional Spreadsheets (5000 HDD &amp; 6000 HDD) for Non-weatherized Gas Furnaces</i></b>	
NIA(Regional)_HDD5000.xls	Generates regional NPV results (HDD5000) (Ch. 10)
NIA(Regional)_HDD5000_rebound.xls	Generates regional NES results (HDD5000) (Ch. 10)
NIA(Regional)_HDD6000.xls	Generates regional NPV results (HDD6000) (Ch. 10)
NIA(Regional)_HDD6000_rebound.xls	Generates regional NES results (HDD6000) (Ch. 10)

To execute the spreadsheet, the Department assumes that the user has access to a PC with a hardware configuration capable of running Windows NT/2000/XP. To use the furnace and boiler NIA spreadsheets, the user requires Microsoft Excel® 2000 or later installed under the Windows operating system.

#### S.1.2 Description of National Impact Analysis Worksheets

The NIA spreadsheets perform calculations to forecast the change in national energy use and net present value of financial impacts due to a revised energy efficiency standard. The energy use and associated costs for a given standard are determined by first calculating the shipments and then

the energy use and costs for all furnace and boilers shipped under that standard. The differences between the standards and base case can then be compared and the overall energy savings and net present values determined. The NIA spreadsheets consist of the following worksheets:

<b>National Impacts Summary</b>	The National Impacts Summary sheet contains user input selections, source energy savings results matrix, net present value results matrix, a summary table for each product class and charts of national impacts for each product class.
<b>Shipments Summary</b>	The Shipments Summary sheet contains a tabular summary and chart of the annual shipments forecasts for each product class at each trial standard level.
<b>Flow Chart</b>	The Flow Chart sheet contains a diagram of the structure of the inputs and outputs used to derive the NIA.
<b>NIA Gas Furnace - NW</b>	The NIA Gas Furnace - NW sheet contains non-weatherized gas furnace data calculations for the base case and the shipments and stock energy savings and net present value at each trial standard level.
<b>NIA Gas Furnace - W</b>	The NIA Gas Furnace - W sheet contains weatherized gas furnace data calculations for the base case and the shipments and stock energy savings and net present value at each trial standard level.
<b>NIA Gas Furnace - MH</b>	The NIA Gas Furnace - MH sheet contains mobile home gas furnace data calculations for the base case and the shipments and stock energy savings and net present value at each trial standard level.
<b>NIA Oil Furnace</b>	The NIA Oil Furnace sheet contains oil furnace calculations for the base case and the shipments and stock energy savings and net present value at each trial standard level.
<b>NIA Gas Boiler</b>	The NIA Gas Boiler sheet contains gas boiler calculations for the base case and the shipments and stock energy savings and net present value at each trial standard level.
<b>NIA Oil Boiler</b>	The NIA Oil Boiler sheet contains oil boiler calculations for the base case and the shipments and stock energy savings and net present value at each trial standard level.
<b>Base Case Shipments</b>	The Base Case Shipments sheet contains data for shipments for each product class. It also includes calculations of replacements, conversions, efficiency upgrades, central gas heating retrofit for non-weatherized gas furnaces, percentage of shipments which are to existing homes for each product class, new housing, modeled new construction installations, modeled shipments -

sum of replacements, conversions and new housing and oil replacements less conversions for both furnaces and boilers.

<b>Change in Shipments</b>	The Change in Shipments sheet contains the projected change in shipments from standards for non-weatherized gas furnaces and for mobile home furnaces at trail standard efficiency levels.
<b>Regional Housing and Fuel Price</b>	The Regional Housing and Fuel Price sheet is included in the regional NIA spreadsheets only. It contains the housing and fuel price regional breakdown.
<b>New Housing Market Share</b>	The New Housing Market Share sheet contains new housing market shares data for single and multi-family homes and mobile homes.
<b>Market Share Model</b>	The Market Share Model sheet contains the calculations that determine the market share model elasticities.
<b>Historic Market Shares Data</b>	The Historic Market Shares Data sheet contains data of historic market shares in new homes.
<b>LCC Inputs</b>	The LCC Inputs sheet contains inputs from the LCC spreadsheet for each product class.
<b>Retirement Function</b>	The Retirement Function sheet calculates the lifetime distribution of furnaces and boilers.
<b>New Housing Forecast</b>	The New Housing Forecast sheet provides projected new housing construction completions and manufactured home placements.
<b>Fuel Prices Heat Rates</b>	The Fuel Prices and Heat Rates sheet contains projected energy price trends and heat rates.
<b>Market Shift Heating Load</b>	The Market Shift Heating Load sheet contains the heating load of houses that shifted away from gas due to new standards.
<b>Price Indices</b>	The Price Indices sheet contains equipment and energy price indices used in the determination of price elasticities for market share forecasts.
<b>Chart GF Shipments</b>	The Chart GF Shipments sheet contains a chart of gas furnace shipment components.
<b>Chart GF Market Share</b>	The Chart GF Market Share sheet contains a chart of fraction gas versus electric equipment for new households with central heating.

**Chart NWGF Financial Impacts**      The Chart NWGF Financial Impacts sheet contains charts of financial impacts at each trial standard level.

### **S.1.3 Basic Instructions for Operating the National Impact Analysis Spreadsheets**

Basic instructions for operating the NIA spreadsheets are as follows:

1. Once the NIA spreadsheet file has been downloaded from the Web, open the file using Excel® Click “Enable Macro” when prompted and then click on the tab for the worksheet National Impacts Summary.
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 parameters under the title “National Impacts Summary”. The default parameters are:
  - a. Discount Rate: Set to 7%. To change value, click on cell C5 and enter value (7% or 3%).
  - b. Current Year: Set to 2007. To change value, click on cell C6 and enter desired year.
  - c. Economic Growth: Set to Reference Case. To change value, use the drop-down arrow and select the desired level (Reference Case, Low Economic Growth or High Economic Growth).
  - d. Weatherized Gas Furnace Stainless Steel Heat Exchanger Cost Option: Set to “Low”. To change this value use the drop-down arrow and select the desired cost option (Low or High).
  - e. Gas Boiler Draft Inducer Cost Option: Set to “Low”. To change this value use the drop-down arrow and select the desired cost option (Low or High).
  - f. Regional Spreadsheets Region Selection: Set to “Cold States”. To change this value use the drop-down arrow and select the desired option (Cold States or Warm States).

The results are automatically updated and are reported in the source energy savings matrix, net present value matrix, summary table for each product class and charts of national impacts for each product class.