



**HVAC SAVINGS CALCULATOR USER GUIDE**  
**SMART \$AVER CUSTOM INCENTIVES**  
**CUSTOM-TO-GO**

**CONTENTS**

1. Getting Started .....	2
2. Measure Tool Description.....	2
2.1. Appropriate Use of the Tool.....	2
2.2. Applicable Types of HVAC Systems Covered by the Tool.....	4
3. Measure Tool Use .....	5
3.1. Select Your Service Territory .....	5
3.2. Project Creation or Open Existing .....	6
3.3. Project Saving .....	7
3.4. Project Inputs.....	9
3.5. Facility.....	11
3.6. HVAC (Existing).....	15
3.7. Plant (Existing).....	18
3.8. Operating Inputs .....	23
3.9. HVAC (Proposed) .....	24
3.10. Plant (Proposed) .....	25
3.11. Results .....	26
3.11.1. Invalid Input -- Savings Too Large.....	27
4. Tool Outputs – Notes and Error Messages .....	28
4.1. Invalid Input on Project Inputs Tab.....	28
4.2. Invalid Input on Facility Inputs Tab.....	28
4.3. Invalid Input entering Results Tab .....	30
5. Example Cases .....	31
5.1. Small Office with DX HVAC .....	31

## 1. GETTING STARTED

The current version of the Custom-To-Go HVAC Savings Calculator can be downloaded from <http://duke-energy.com/CustomToGo>. It is included in the Smart Saver Custom-To-Go tool suite, which contains a number of useful tools that can help you calculate savings and incentives for various energy saving measures.

The ZIP output file from the calculator must be submitted with the Smart Saver application (Step 1) in order to receive an incentive payment. For application submissions and questions about the application process, contact us at [CustomIncentives@duke-energy.com](mailto:CustomIncentives@duke-energy.com).

## 2. MEASURE TOOL DESCRIPTION

The HVAC Savings Calculator is a tool used to estimate savings due to the proposed installation of high-efficiency HVAC equipment. The calculator compares the baseline and proposed HVAC systems along with overall building characteristics to determine the annual demand (kW) and energy (kWh) savings.

### 2.1. Appropriate Use of the Tool

The HVAC Savings Calculator can be used for facilities with the characteristics shown in Table 1.

**Table 1: HVAC Savings Calculator Common Features**

Description	Measure Feature
States	<ul style="list-style-type: none"> <li>• Indiana</li> <li>• Kentucky</li> <li>• Ohio</li> <li>• North Carolina</li> <li>• South Carolina</li> </ul>
Building Types	<ul style="list-style-type: none"> <li>• Office Small</li> <li>• Office Large (high rise)</li> <li>• Retail (department store)</li> <li>• Manufacturing, General</li> <li>• Restaurant</li> <li>• Hospital (Inpatient)</li> <li>• Hotel</li> <li>• School (K-12)</li> <li>• College/University</li> </ul>
Operating Hours	Please note that the operating hours presented to the user will vary with the selection of the Building Type.

	<p><b>Office – Small, Large(High-Rise)</b></p> <ul style="list-style-type: none"> <li>• M-F 8am – 5pm</li> <li>• M-Sat 8am – 5pm</li> <li>• M-F 7am – 5pm, Sat 8am – noon</li> </ul> <p><b>Retail (department store)</b></p> <ul style="list-style-type: none"> <li>• M-Sat 8am – 5pm</li> <li>• M-Sun 8am – 5pm</li> <li>• M-Sun 24 hrs.</li> <li>• M-Sat 10am – 9pm</li> <li>• M-Sat 7am – 7pm, Sun&amp; Holidays 8am – 5pm</li> </ul> <p><b>Manufacturing</b></p> <ul style="list-style-type: none"> <li>• M-F 8am – 5pm</li> <li>• M-F 24 hrs.</li> <li>• M-Sun 24 hrs.</li> <li>• M-F 6am – 11pm</li> </ul> <p><b>Restaurant</b></p> <ul style="list-style-type: none"> <li>• M-Sun 24 hrs.</li> <li>• M-Sun 11am – 11pm</li> <li>• M-F 6am – 8pm, Sat-Sun 8am – 6pm</li> <li>• M-F 6am – 10pm, Sat 7am – 7pm, Sun 8am – 6pm</li> </ul> <p><b>Hospital (Inpatient)</b></p> <ul style="list-style-type: none"> <li>• M-F 8am-5pm</li> <li>• M-F 7am - 7pm</li> <li>• M-S 24 hrs.</li> <li>• M-F 6am – 8pm, Sat-Sun 8am – 6pm</li> <li>• M-F 4am – Midnight, Sat 7am – 8pm, Sun 7am – 7pm</li> </ul> <p><b>Hotel</b></p> <ul style="list-style-type: none"> <li>• M-Sun 8am – 5pm</li> <li>• M-Sun 24 hrs.</li> </ul> <p><b>School (K-12)</b></p> <ul style="list-style-type: none"> <li>• M-F 8am-5pm</li> <li>• M-F 7am - 5pm</li> <li>• M-F 8am - 3pm</li> </ul> <p><b>College/University</b></p> <ul style="list-style-type: none"> <li>• M-F 7am-7pm</li> <li>• M-Sat 8am - 5pm</li> <li>• M-F 7am - 7pm, Sat 9am – 3pm</li> <li>• M-F 8am – 9pm</li> </ul>
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## ***2.2. Applicable Types of HVAC Systems Covered by the Tool***

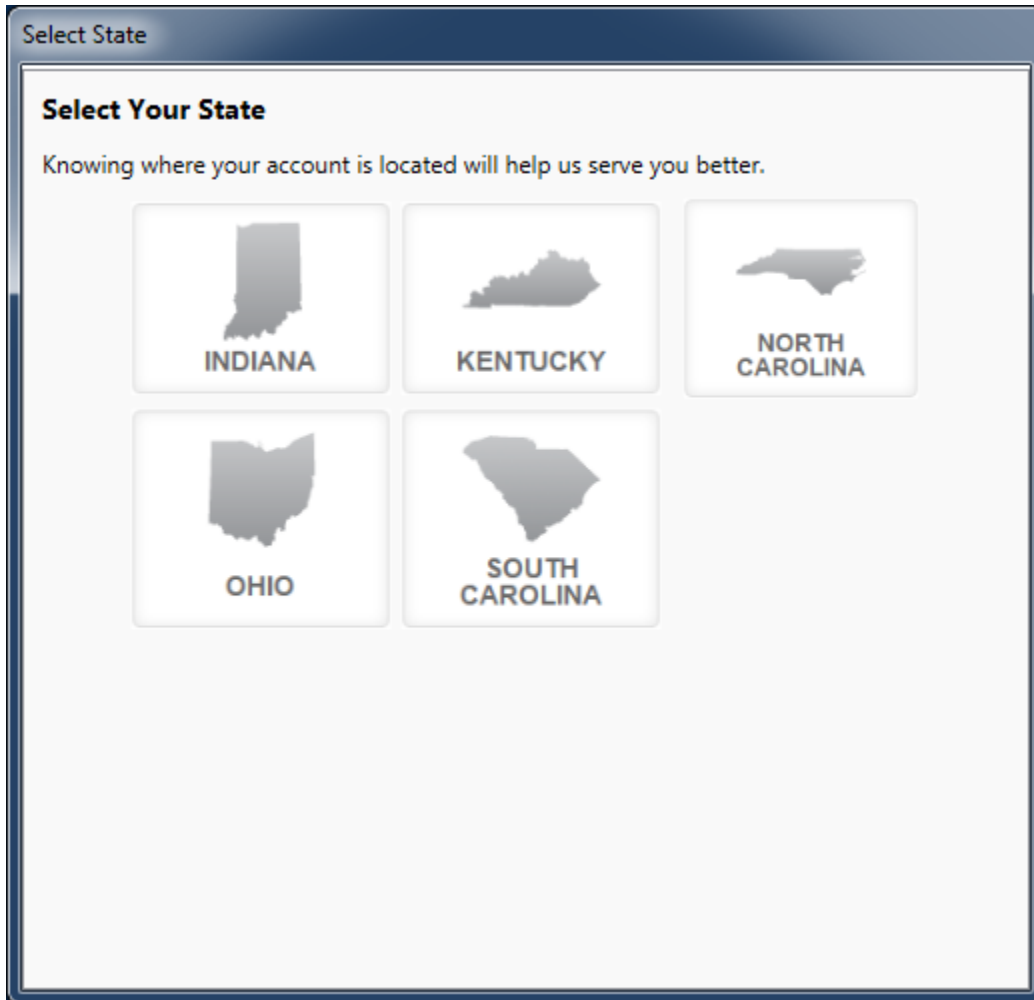
The HVAC Savings Calculator is designed to work with the following types of HVAC systems:

- Single Duct with Reheat CV (Constant Volume)
- Single Duct with Reheat VAV (Variable Air volume)
- Dual Duct CV (Constant Volume)
- Dual Duct VAV (Variable Air Volume)
- Multizone
- Single Zone CV (Constant Volume)
- Packages Terminal Air Conditioner (PTAC)
- Variable Refrigerant Flow (VRF)

### 3. MEASURE TOOL USE

#### 3.1. Select Your Service Territory

In order to properly load the correct utility program the user must first select the service territory associated with their account. To begin, select your state from the list presented in the *Select State* dialog box.



If the State of Indiana, Kentucky, or Ohio is selected the application will open the appropriate service territory version of the software.

If one of the Carolinas is selected the application needs a little more information. In these cases, a *Select Service Territory* dialog box will appear. Please either enter the service address zip code or select the Utility associated with the service account.

To return to the state selection dialog box click on the "Choose State" link.

Select Service Territory

[Choose State](#) » More Info Needed


We're going to need a little more information to customize your experience.

Enter Service Address Zip Code

5-Digit Zip

-OR-

Select a Service Territory by clicking on the utility name on the left



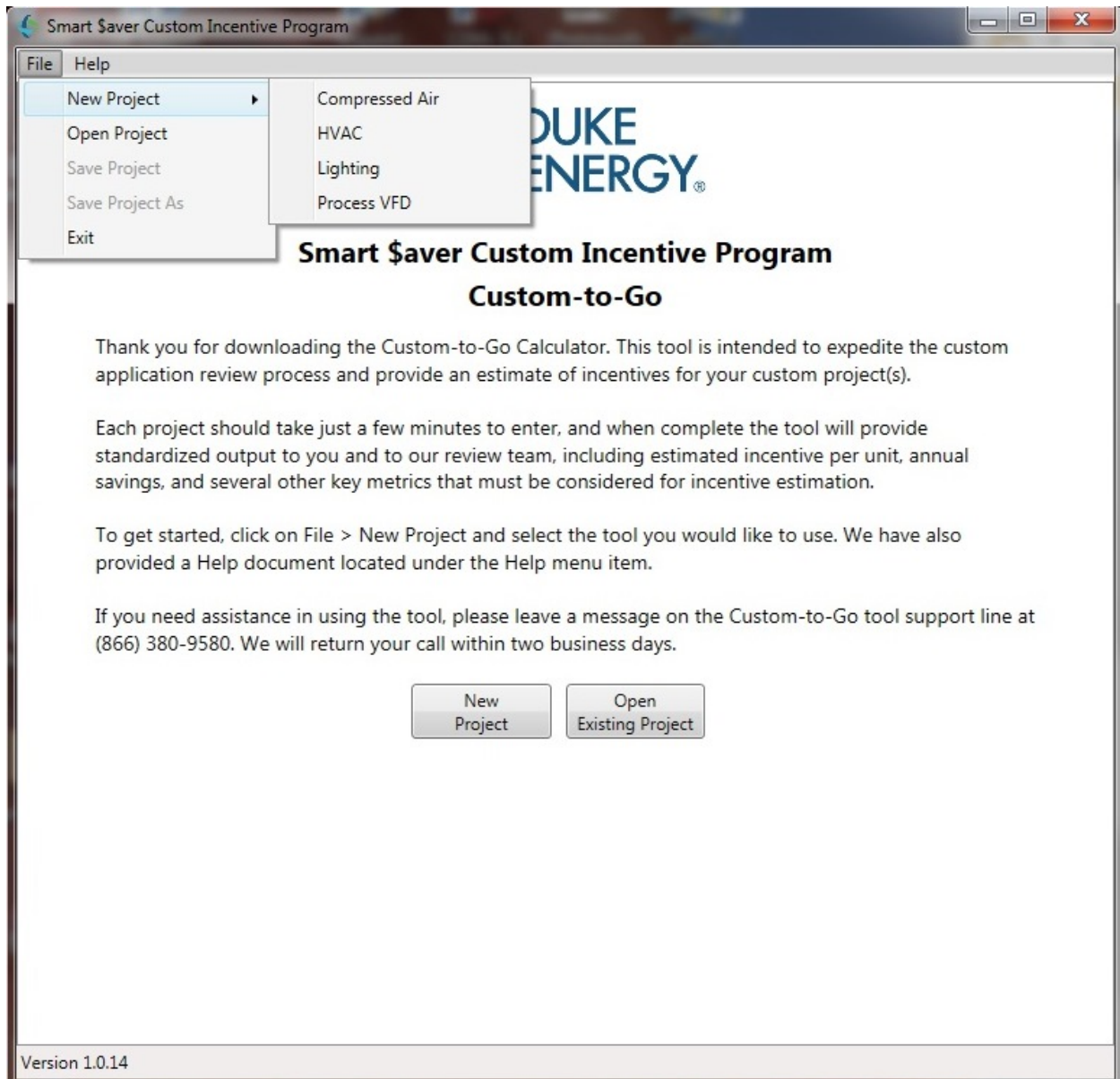
The map displays the states of North Carolina (NC) and South Carolina (SC). The service territories are color-coded: Duke Energy (blue) covers the western and central parts of NC, including Asheville, Charlotte, and Greensboro. Duke Energy Progress (green) covers the eastern and southern parts of NC and the northern part of SC, including Raleigh, Fayetteville, Greenville, Myrtle Beach, and Wilmington.

- Duke Energy
- Duke Energy Progress

### ***3.2. Project Creation or Open Existing***

Tool inputs are done either by selecting predefined dropdown options or entering text or numerical values as prompted by the tool.

To begin using the tool, select File→New Project from the menu and select the HVAC tool option. Or you may select an existing project from the File→Open Project selection.



The input window uses a tabbed display.

### **3.3. Project Saving**

Saving the project's input file is very similar to file saving in other windows based programs. The input files are saved with the file extension "ctg". For example the file Project01 will have the file name of Project01.ctg .

Select File→Save Project to save the project using the current name.

Select File →Save Project As to save the project with a new name.

Smart Saver Custom Incentive Program

File Help

- New Project
- Open Project
- Save Project
- Save Project As
- Exit

Facility HVAC (Existing) Plant (Existing)

HVAC (Proposed) Plant (Proposed) Results

**DUKE ENERGY**

**Smart Saver Custom Incentive Program**  
**Custom-to-Go**

**Project Summary**

<b>Total Estimated Incentives</b>	<b>\$0.00</b>	
<b>Estimated Annual Electric Bill Reduction</b>	<b>\$0.00</b>	
	<b>Demand (kW)</b>	<b>Energy Usage (kWh)</b>
Site Baseline	871.1	1,866,927
Proposed	871.1	1,866,927
Savings	0.0	0
Estimated Incentive	\$0.00	\$0.00

**Next Steps**

The data entry portion is now complete and estimates of annual savings and incentives are provided on the screen above. The next steps in securing a final incentive offer, prior to executing your project, are as follows:

1. When you click the "PDF Report" button below a detailed PDF report will be created for your records along with a ZIP file for use by Duke Energy personnel. Please e-mail a copy of the ZIP file to [CustomIncentives@duke-energy.com](mailto:CustomIncentives@duke-energy.com) with your application. Before closing this project, we recommend saving your data to a .CTG file, using the File menu, for future use.
2. If changes are desired at this time, you may edit, add or delete measures by clicking the "Back" button and making the desired updates.

<< Back PDF Report...

Version 1.0.15



### 3.4. Project Inputs

The first tab named “Project Inputs” pertains to facility information, such as customer name and address, building type, and whether or not this is a new construction project.

The screenshot shows a software window titled "Smart Saver Custom Incentive Program" with a menu bar (File, Help) and a tab labeled "HVAC". The main content area is divided into four sections: "Operating Inputs", "HVAC (Proposed)", "Plant (Proposed)", and "Results". The "Project Inputs" sub-tab is active under "Operating Inputs".

The "Project Inputs" section contains the following fields:

- Project Name: Demonstration Measure
- Duke Electric Account Number: 123-4567-43294
- Site Address: 123 4th Ave.
- City: Terre Haute, State: IN, Zip: 47807
- Nearest Weather Station: Terre Haute Hulman Regional A
- Federal Owned:
- New Construction:
- Project Type: Retrofit
- Average Billing Rate (\$/kWh): \$0.085, with an Override checkbox
- Incremental Cost: \$0.00

Navigation buttons "<< Back" and "Next >>" are located at the bottom right of the form area. The version number "Version 1.0.14" is displayed in the bottom left corner of the window.

**Table 2 – Project Inputs Table**

<b>Input Name</b>	<b>Description / Purpose</b>
Project Name	Enter a descriptive name for the HVAC project.
Duke Electric Account Number	Enter the customer’s Duke Energy electric account number.
Site Address	Enter the address of the facility.
City	Enter the city where the facility is located.
State	Select state from pull down.
Zip	Enter the ZIP code where the facility is located
Nearest Weather Station	Select the Weather Station nearest to the project from the pull down. The tool uses this weather data to construct its approximation of HVAC requirements so choosing the closest weather station will yield the most accurate results..
Federal Owned	Check this box if the facility is owned by a federal agency.
New Construction	Check this box if this is a new construction project.
Project Type	Select Retrofit or Capacity Expansion
Average Billing Rate (\$/kWh)	This displays the default billing rate based on location and building type. If you know the actual average billing rate for the customer, check the Override box and enter a new value.
Incremental Cost	<p>Costs exclude self-installation costs.</p> <p>For retrofit projects, the incremental cost is the total cost of the project.</p> <p>For new construction or where existing equipment is being replaced, then the incremental cost is the premium of the proposed high efficiency project over baseline.</p>

### 3.5. Facility

The second tab is used to enter the Facility characteristics.

The screenshot shows a software window titled "Smart Saver Custom Incentive Program" with a menu bar containing "File" and "Help". A tab labeled "HVAC" is active. The main content area is divided into four sections: "Operating Inputs", "HVAC (Proposed)", "Plant (Proposed)", and "Results". The "HVAC (Proposed)" section is further divided into "Facility", "HVAC (Existing)", and "Plant (Existing)". The "Facility" sub-section is highlighted with a blue header and contains the following input fields:

Facility Inputs	
Building Type	<input type="text"/>
Square Footage	<input type="text" value="0"/>
Number of Floors (above ground)	<input type="text" value="0"/>
Number of Floors (under ground)	<input type="text" value="0"/>
Operating Hours	<input type="text"/>
Default Number of Occupants	<input type="text" value="0"/>
Actual Number of Occupants	<input type="text" value="0"/>
Year of Construction	<input type="text" value="0"/>
Wall Insulation	<input type="text"/>
Window Type	<input type="text"/>
Lighting Types	<input type="text"/>

At the bottom right of the main content area, there are two buttons: "<< Back" and "Next >>". The bottom status bar of the window displays "Version 1.0.14".

Refer to table 3 below for input details.

**Table 3 – Facility Inputs**

Input Name	Description / Purpose
Building Type	Select from the following options: <ul style="list-style-type: none"> <li>• Office Small (less than 3 stories and 100,000 sq. ft.)</li> <li>• Office Large (high rise of 4+ stories or greater than 100,000 sq. ft. of conditioned space)</li> <li>• Retail (department store)</li> <li>• Manufacturing, General</li> <li>• Restaurant</li> <li>• Hospital (Inpatient)</li> <li>• Hotel</li> <li>• School (K-12)</li> <li>• College/University</li> </ul>
Square Footage	Enter square footage of the facility. Do not enter decimals (whole numbers only).
Number of Floors (above ground)	Enter the number of above ground floors
Number of Floors (underground)	Enter the number of floors below the ground level.
Operating Hours	Please note that the operating hours presented to the user will vary with the selection of the Building Type.  <b>Office – Small, Large(High-Rise)</b> <ul style="list-style-type: none"> <li>• M-F 8am – 5pm</li> <li>• M-Sat 8am – 5pm</li> <li>• M-F 7am – 5pm, Sat 8am – noon</li> </ul> <b>Retail (department store)</b> <ul style="list-style-type: none"> <li>• M-Sat 8am – 5pm</li> <li>• M-Sun 8am – 5pm</li> <li>• M-Sun 24 hrs.</li> <li>• M-Sat 10am – 9pm</li> <li>• M-Sat 7am – 7pm, Sun&amp; Holidays 8am – 5pm</li> </ul> <b>Manufacturing</b> <ul style="list-style-type: none"> <li>• M-F 8am – 5pm</li> <li>• M-F 24 hrs.</li> <li>• M-Sun 24 hrs.</li> <li>• M-F 6am – 11pm</li> </ul>

Input Name	Description / Purpose
	<p><b>Restaurant</b></p> <ul style="list-style-type: none"> <li>• M-Sun 24 hrs.</li> <li>• M-Sun 11am – 11pm</li> <li>• M-F 6am – 8pm, Sat-Sun 8am – 6pm</li> <li>• M-F 6am – 10pm, Sat 7am – 7pm, Sun 8am – 6pm</li> </ul> <p><b>Hospital (Inpatient)</b></p> <ul style="list-style-type: none"> <li>• M-F 8am-5pm</li> <li>• M-F 7am - 7pm</li> <li>• M-S 24 hrs.</li> <li>• M-F 6am – 8pm, Sat-Sun 8am – 6pm</li> <li>• M-F 4am – Midnight, Sat 7am – 8pm, Sun 7am – 7pm</li> </ul> <p><b>Hotel</b></p> <ul style="list-style-type: none"> <li>• M-Sun 8am – 5pm</li> <li>• M-Sun 24 hrs.</li> </ul> <p><b>School (K-12)</b></p> <ul style="list-style-type: none"> <li>• M-F 8am-5pm</li> <li>• M-F 7am - 5pm</li> <li>• M-F 8am - 3pm</li> </ul> <p><b>College/University</b></p> <ul style="list-style-type: none"> <li>• M-F 7am-7pm</li> <li>• M-Sat 8am - 5pm</li> <li>• M-F 7am - 7pm, Sat 9am – 3pm</li> <li>• M-F 8am – 9pm</li> </ul>
Default Number of Occupants	The program will display a default value in this field based upon the existing inputs.
Actual Number of Occupants	Enter the average number of people that occupies the building during building operating hours. Refer to default number of occupants if not known.
Year of Construction	Enter the year of construction.
Window Type	<p>Select from the following selections:</p> <ul style="list-style-type: none"> <li>• Single Pane</li> <li>• Double Pane</li> <li>• Triple Pane</li> <li>• Low E</li> </ul>
Lighting Types	<p>Select from the following selections:</p> <ul style="list-style-type: none"> <li>• Old (T12, HPS, magnetic ballasted fixtures, etc.)</li> <li>• Standard (T8, T5, metal halide, etc.)</li> </ul>

<b>Input Name</b>	<b>Description / Purpose</b>
	<ul style="list-style-type: none"><li data-bbox="641 268 1421 296">• High Efficiency (LED, induction, ceramic metal halide, etc.)</li></ul>

### 3.6. HVAC (Existing)

The third tab is used to enter the Existing HVAC system parameters.

The screenshot shows the 'Smart Saver Custom Incentive Program' window. At the top, there is a menu bar with 'File' and 'Help'. Below the menu bar is a tab labeled 'HVAC'. The main content area is divided into four sections: 'Operating Inputs', 'HVAC (Proposed)', 'Plant (Proposed)', and 'Results'. Under 'Operating Inputs', there are sub-sections for 'Project Inputs', 'Facility', 'HVAC (Existing)', and 'Plant (Existing)'. The 'HVAC (Existing)' sub-section is currently selected and highlighted in light blue. It contains the following parameters:

- HVAC Type: [Dropdown menu]
- HVAC Schedule: [Dropdown menu]
- Night Setback: [Dropdown menu]
- Thermostat Cooling Setpoint (Occupied): 0 °F
- Thermostat Heating Setpoint (Occupied): 0 °F
- Supply Air Temperature Strategy: [Dropdown menu]
- Cold Deck/SAT Setpoint: 0 °F
- Hot Deck/SAT Setpoint: 0 °F
- Outside Air: [Dropdown menu]
- Damper Position (Fraction of OA): 0 %
- Demand Control Ventilation: [Dropdown menu]
- Supply Fan Controls: [Dropdown menu]

At the bottom right of the main content area, there are two buttons: '<< Back' and 'Next >>'. The status bar at the bottom left of the window displays 'Version 1.0.14'.

Refer to Table 4 for input details:

**Table 4 – Facility Inputs**

<b>Input Name</b>	<b>Description/Purpose</b>
HVAC Type	Select existing HVAC type from the pull down: <ul style="list-style-type: none"> <li>• Single Duct with Reheat CV (single duct, constant volume, multiple zones with terminal reheats)</li> <li>• Single Duct with Reheat VAV (single duct, variable air volume, multiple zones with terminal reheats)</li> <li>• Dual Duct CV (dual duct, constant volume, multiple zones)</li> <li>• Dual Duct VAV (dual duct, variable air volume, multiple zones)</li> <li>• Multi-zone (multi-zone, constant volume, multiple zones)</li> <li>• Single Zone CV (constant volume, single zone)</li> <li>• Packaged Terminal Air Conditioner (PTAC) system</li> <li>• Variable Refrigerant Flow (VRF) system</li> </ul>
HVAC Schedule	Select the HVAC schedule closest to your operating schedule from the pull down. <ul style="list-style-type: none"> <li>○ On 24/7</li> <li>○ On 24/5 (M-F)</li> <li>○ On one hour before and after building operating hours</li> <li>○ On two hours before and after building operating hours</li> <li>○ Optimum start and Stop</li> </ul>
Night Setback	Select Yes or No if you are currently using a night setback mode.
Thermostat Cooling Setpoint (Occupied)	Temperature in Fahrenheit for the occupied cooling thermostat set point.
Thermostat Heating Setpoint (Occupied)	Temperature in Fahrenheit for the occupied heating thermostat set point.
Supply Air Temperature Strategy	Please select from: <ul style="list-style-type: none"> <li>• Fixed Set Point</li> <li>• Reset</li> </ul>



<b>Input Name</b>	<b>Description/Purpose</b>
Cold Deck/SAT Setpoint	Enter the supply air temperature or cold deck setpoint in Fahrenheit.
Hot Deck/SAT Setpoint	Enter the supply air temperature or hot deck setpoint in Fahrenheit..
Outside Air	<p>Please select the existing ventilation method from the following options:</p> <ul style="list-style-type: none"> <li>• Fixed minimum outside air</li> <li>• Fixed percentage outside air (set in next field)</li> <li>• Economizer</li> </ul>
Damper Position (Fraction of OA – Outside Air)	This field is only available for input when the “Fixed percentage outside air” option is chosen as the Outside Air selection. The damper position is expressed as a percentage and input as a whole number. For example, 30 would express that the damper position is set for 30% Outside Air.
Demand Control Ventilation	<p>Select Yes if the system has demand control ventilation (DCV).</p> <p>The type of system (CO<sub>2</sub> monitoring, occupant counting or lighting controlled) is not specified.</p>
Supply Fan Controls	<p>Please select from the following options:</p> <ul style="list-style-type: none"> <li>• Constant Speed</li> <li>• Damper Discharge</li> <li>• Inlet Guide Vanes</li> <li>• VSD (Variable Speed Drive)</li> </ul>

### 3.7. Plant (Existing)

The fourth tab describes the current HVAC plant characteristics

Operating Inputs		HVAC (Proposed)		Plant (Proposed)		Results	
Project Inputs		Facility		HVAC (Existing)		Plant (Existing)	
<b>Plant Inputs</b>							
Cooling System Type	<input type="text"/>						
Chilled Water Temperature	<input type="text"/>						
Chilled Water Pumps	<input type="text"/>						
Condenser Water Temperature	<input type="text"/>						
Condenser Water Pumps	<input type="text"/>						
Cooling Tower Fan	<input type="text"/>						
Cooling Tower Size	0						Tons
Heating Type	<input type="text"/>						
Heating Efficiency							%

Please refer to Table 5 for the general inputs. Depending upon the Cooling System Type, different inputs are required.

The specific inputs for Air Cooled and Water Cooled Chillers are covered in table 5A.

The specific inputs for DX (Direct Expansion) and Absorption systems are covered in table 5B.

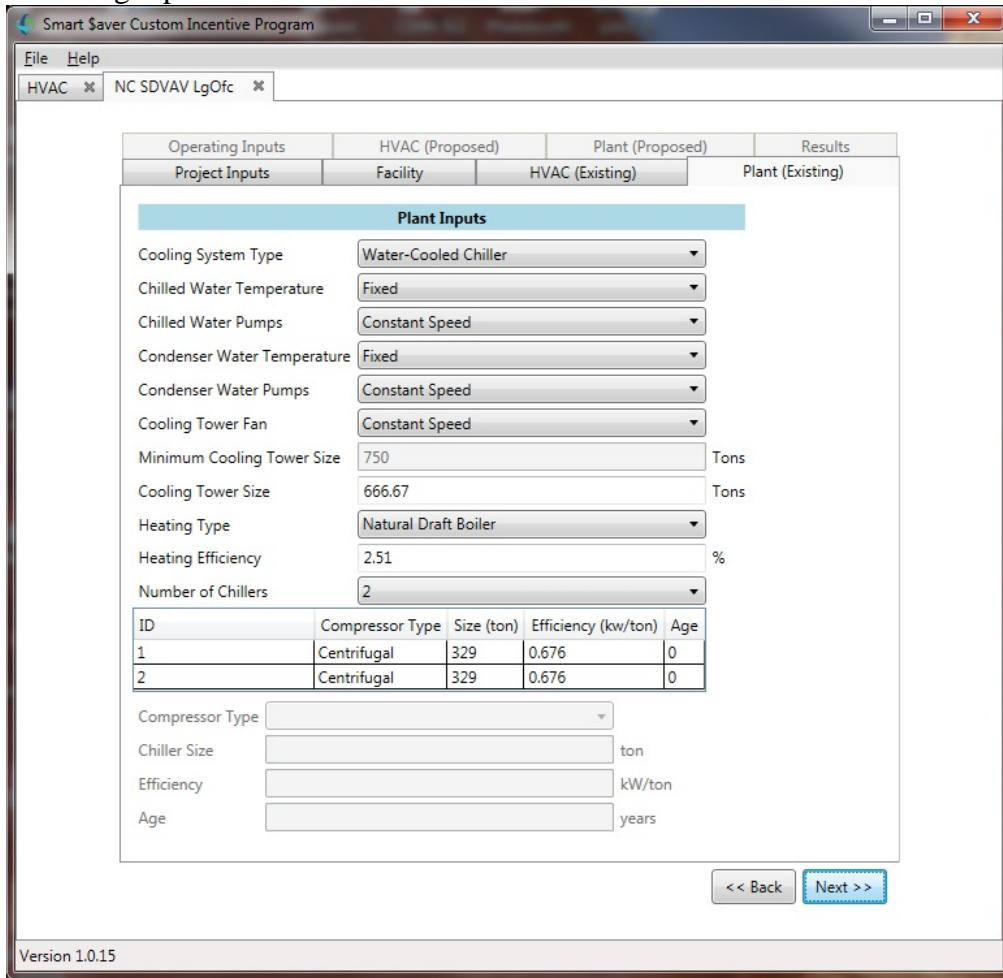
**Table 5 – General Existing HVAC Plant Inputs**

<b>Input/Name</b>	<b>Description/Purpose</b>
Cooling System Type	Select from the following cooling equipment types: <ul style="list-style-type: none"> <li>• Air Cooled Chiller</li> <li>• Water Cooled Chiller</li> <li>• DX (Direct Expansion)</li> <li>• Absorption</li> </ul>
Chilled Water Temperature	Water chillers typically operate with a fixed leaving evaporator water set point. Many hours of the year, the chiller could satisfy building loads while providing warmer water to the chilled water coils. Such a strategy generally increases HVAC fan energy at the air handlers, but reduces chiller energy (by means of increased operating efficiency) by a greater margin, saving energy. <p>Please select from:</p> <ul style="list-style-type: none"> <li>• Fixed</li> <li>• Reset</li> </ul>
Chilled Water Pumps	Please select from: <ul style="list-style-type: none"> <li>• Constant Speed</li> <li>• Variable Speed Drive</li> </ul>
Condenser Water Temperature	Water-cooled chillers typically operate with a fixed entering condenser water set point. Most hours of the year cooling towers can be operated to provide cooler water. Condenser water reset controls the tower fans to produce cooler water when OA conditions allow, savings energy at the chiller. <p>Please select from:</p> <ul style="list-style-type: none"> <li>• Fixed</li> <li>• Reset</li> </ul>
Condenser Water Pumps	Please select from: <ul style="list-style-type: none"> <li>• Constant Speed</li> <li>• Variable Speed Drive</li> </ul>

<b>Input/Name</b>	<b>Description/Purpose</b>
Cooling Tower Fan	Please select from: <ul style="list-style-type: none"> <li>• Constant Speed</li> <li>• Variable Speed Drive</li> </ul>
Minimum Cooling Tower Size	System displays the minimum/default cooling tower size based on the sq. ft. of the building.
Cooling Tower Size	Please indicate the Cooling Tower Size in Tons  (Note: Conversion is 1 ton = 15,000 Btu/hr for cooling tower.)
Heating Type	Please select from the following Heating Types: <ul style="list-style-type: none"> <li>• Natural Draft Boiler</li> <li>• Forced Draft Boiler</li> <li>• Condensing Boiler</li> <li>• Furnace</li> <li>• Electric</li> <li>• Heat Pump</li> </ul>
Heating Efficiency	Please enter the heating efficiency percentage using the following conventions: <ul style="list-style-type: none"> <li>• Furnace in annual fuel utilization efficiency (AFUE)</li> <li>• Electric in percentage (%)</li> <li>• Heat pump in COP</li> </ul> Please note the efficiency does not have to be a whole number. For example, a heating efficiency of 2.51% may be input at 2.51.

**Table 5A – Chiller (Air & Water) System Inputs for Existing HVAC Plant**

If an air or water chiller is present, the Plant Input tabs (existing and proposed) will show the following inputs and selections.



Input/Name	Description/Purpose
Number of Chillers	Use the drop down to input the number of chillers. This should create the correct number of rows in the Chiller summary area just below. Please cycle through the chillers by selecting the ID field at the left of the summary and then inputting the values in the fields below.
Compressor Type	The Compressor Type is: <ul style="list-style-type: none"> <li>• Screw</li> <li>• Centrifugal</li> </ul>
Chiller Size	Please input the chiller size in tons.
Efficiency	Please input the efficiency in kW per ton
Age	Please enter the age of the system in years

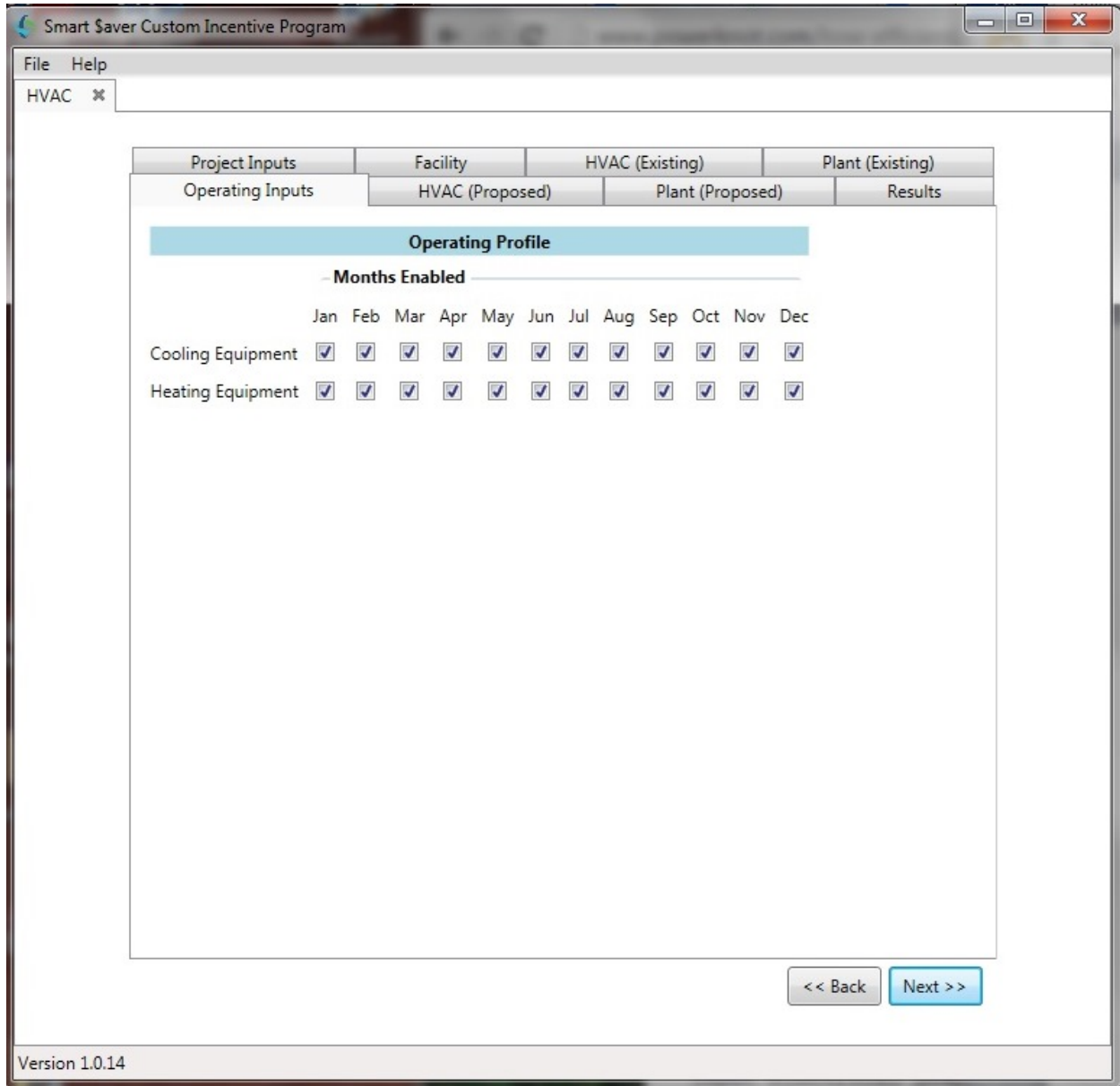
**Table 5B – Direct Expansion and Absorption System Inputs for Existing HVAC Plant**

If a direct expansion or absorption system is used, appropriate inputs and selections will be displayed for the plant tabs (existing and proposed).

<b>Input/Name</b>	<b>Description/Purpose</b>
Number of DX Units	Please input the number of DX units
Compressor Type	The Compressor Type is: <ul style="list-style-type: none"> <li>• Air Cooled</li> <li>• Water Cooled</li> <li>• Evaporatively Cooled</li> </ul>
Total DX Capacity	Please input the total DX capacity in tons.
DX Efficiency (EER)	Please input the DX efficiency. This may also be known as the EER or Energy Efficiency Ratio.
Age	Please enter the age of the system in years

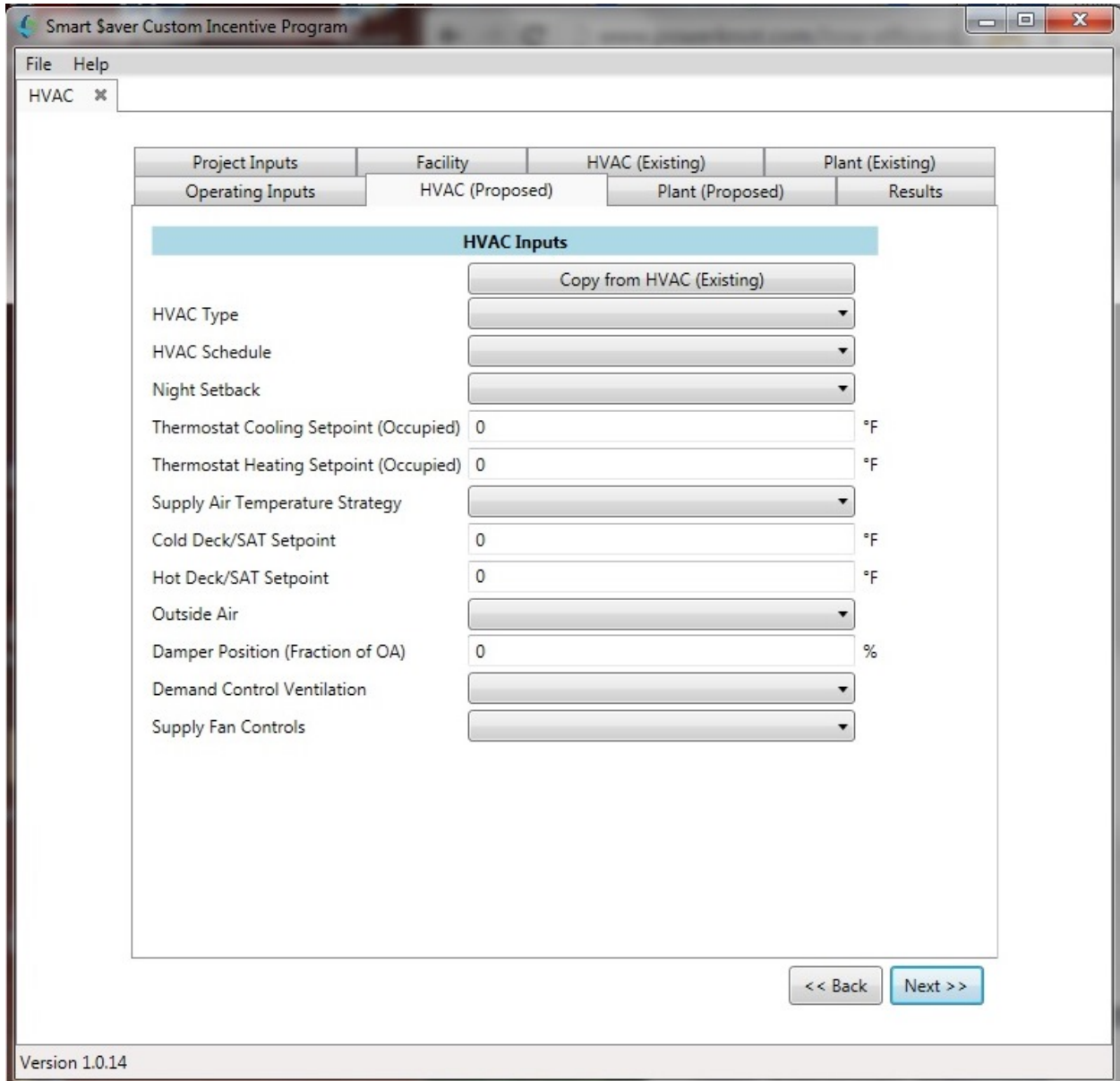
### 3.8. Operating Inputs

The fifth tab (first tab in second row) depicts a series of check boxes used to indicate whether or not the cooling or heating equipment is enabled during that month. For example, climatic conditions in the region might allow for the cooling system to be turned off for the winter months.



### 3.9. HVAC (Proposed)

The sixth tab (second in the second row) presents the HVAC Inputs for the proposed system. The user may copy the values in the existing system from tab 3 using the “Copy” button at the top of the input section.





### 3.10. Plant (Proposed)

The seventh tab (third in the second row) presents the Plant Inputs for the proposed system. The user may copy the values in the existing system from tab 4 using the “Copy” button at the top of the input section.

The screenshot shows a software window titled "Smart Saver Custom Incentive Program" with a menu bar containing "File" and "Help". Below the menu bar is a tabbed interface with a tab labeled "HVAC". The main content area is divided into four sections: "Project Inputs", "Facility", "HVAC (Existing)", and "Plant (Existing)". The "Plant (Existing)" section is further divided into "HVAC (Proposed)", "Plant (Proposed)", and "Results". The "Plant (Proposed)" section is highlighted with a blue header "Plant Inputs".

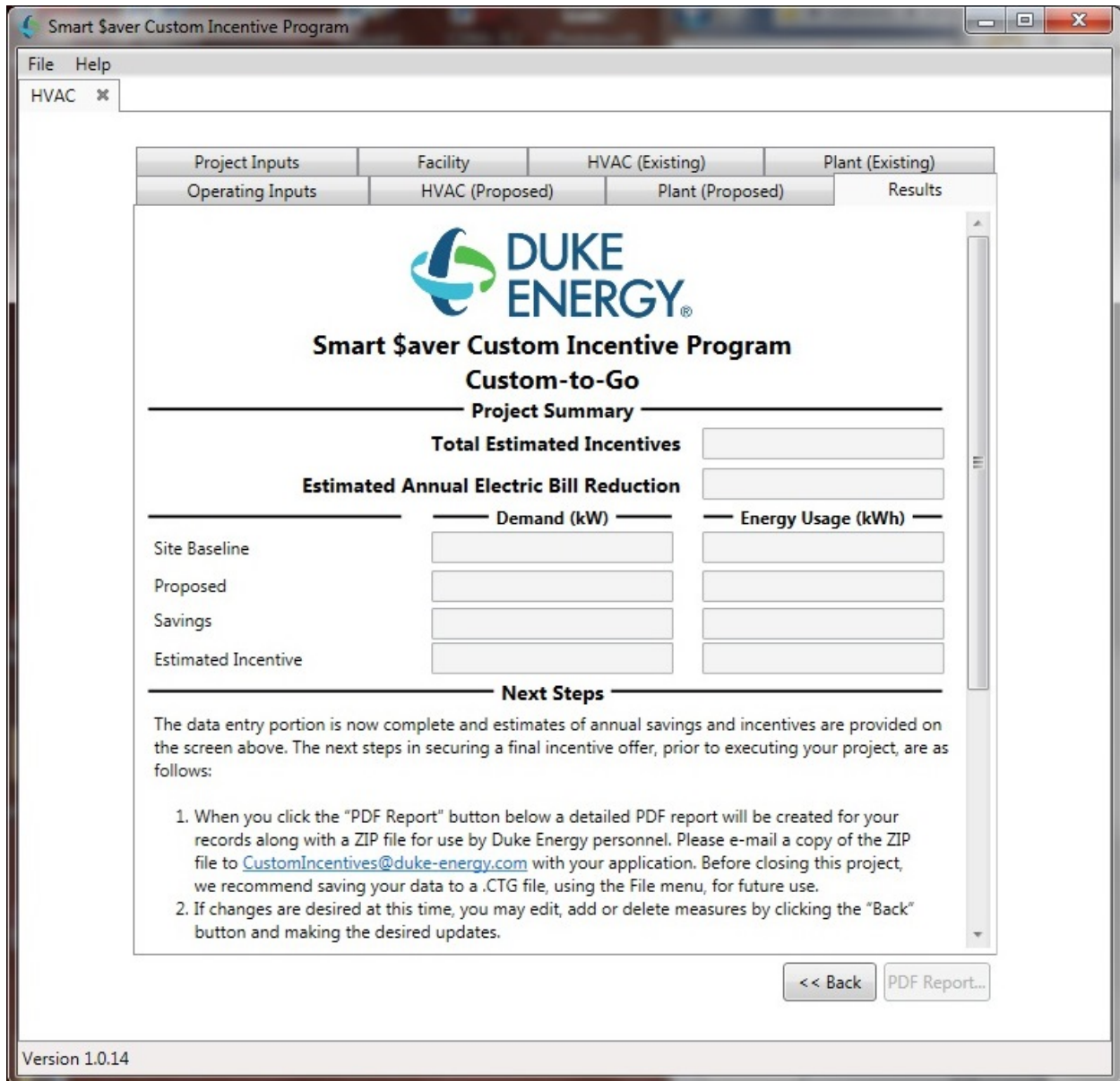
Within the "Plant Inputs" section, there is a "Copy from Plant (Existing)" button at the top. Below this are several input fields:

- Cooling System Type: dropdown menu
- Chilled Water Temperature: dropdown menu
- Chilled Water Pumps: dropdown menu
- Condenser Water Temperature: dropdown menu
- Condenser Water Pumps: dropdown menu
- Cooling Tower Fan: dropdown menu
- Cooling Tower Size: text input field with "0" and "Tons" label
- Heating Type: dropdown menu
- Heating Efficiency: text input field with "%" label

At the bottom right of the "Plant Inputs" section are two buttons: "<< Back" and "Next >>". The bottom left corner of the window displays "Version 1.0.14".

### 3.11. Results

The final tab is the results tab



The following table describes the tool outputs.

**Table 6- Measure Energy Savings and Incentive**

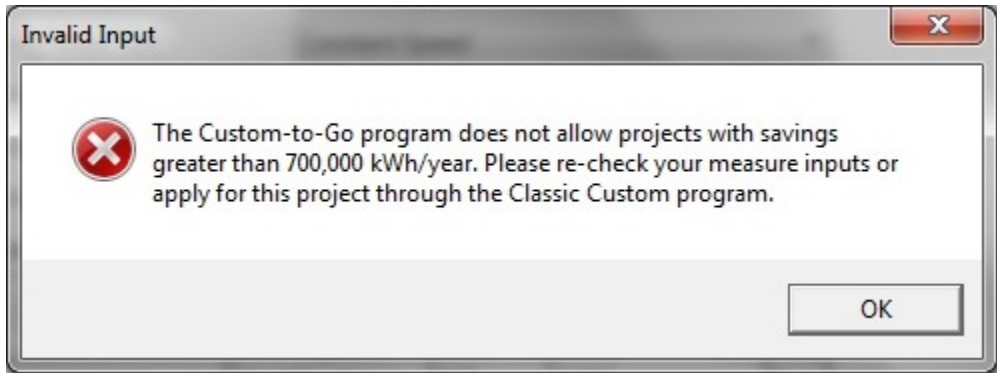
Name	Description / Purpose
Total Estimated Incentives	Dollar amount for the estimated incentives associated with the Smart Saver Custom Incentive Program
Estimated Annual Electric Bill Reduction	Dollar amount for the estimated annual electric bill reduction

Site Baseline, kW	Estimated monthly maximum on-peak demand of the existing HVAC system and fans (based on hourly average between 12pm and 6pm)
Proposed, kW	Estimated monthly maximum on-peak demand of the proposed HVAC system and fans (based on hourly average between 12pm and 6pm)
Site Baseline, kWh	Estimated monthly energy use of the existing HVAC system and fans
Proposed, kWh	Estimated monthly energy use of the proposed HVAC system and fans
Savings, kW	Estimated monthly on-peak demand savings for the selected measures (difference between baseline and proposed)
Savings, kWh	Estimated monthly on-peak demand savings for the selected measures (difference between baseline and proposed)
Estimated Incentive, kW	The estimated incentives from the program based upon the peak demand calculations.
Estimated Incentive, kWh	The estimated incentives from the program based upon the monthly energy use.

The PDF report and the associated Zip file required for the incentive program is generated using the “PDF Report” button in the lower right corner of the results page.

**3.11.1. Invalid Input -- Savings Too Large**

The results tab can calculate a savings which is outside the scope of the Duke energy Smart Saver Custom-to-Go program and display the following message:

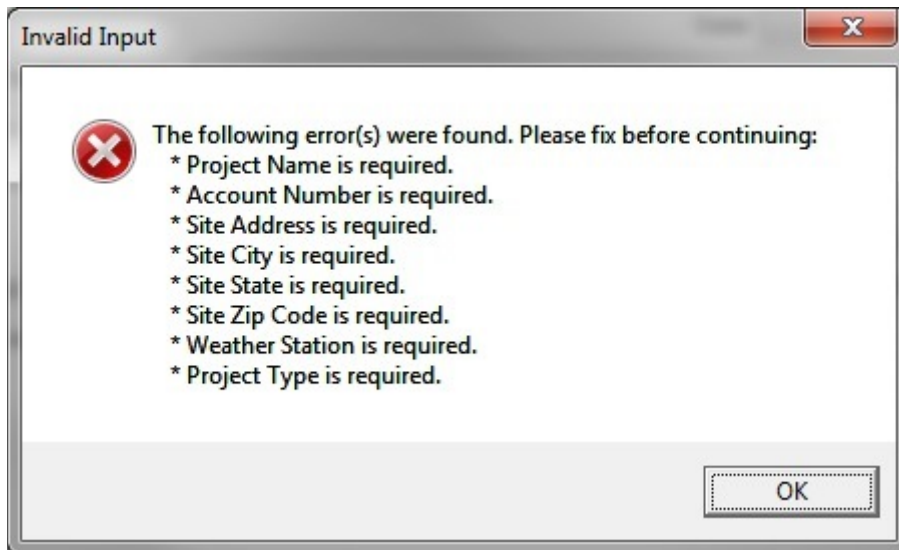


## 4. TOOL OUTPUTS – NOTES AND ERROR MESSAGES

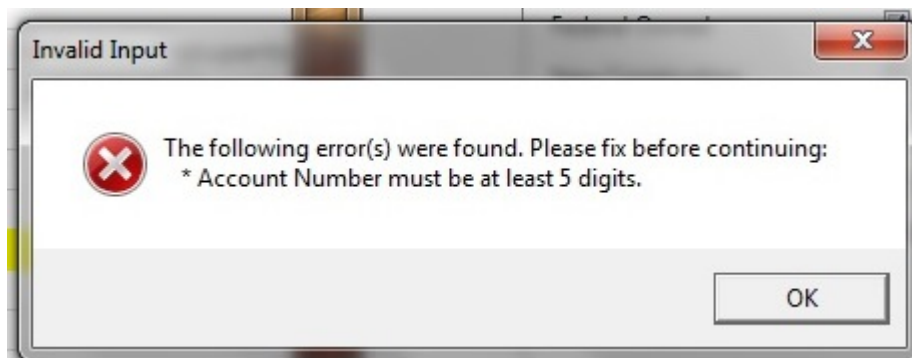
While using the HVAC Savings Calculator, you may see one of the following error messages:

### 4.1. Invalid Input on Project Inputs Tab

The input on this tab was invalid and must be corrected prior to moving forward to the next Tab. Either a singular field or multiple fields will be noted in the error.



The inputs will also be checked for completeness:



### 4.2. Invalid Input on Facility Inputs Tab

The inputs for the Facility Inputs tab are all whole numbers. The values are checked when the "Next>>" button is used to move to the "HVAC (Existing)" tab. Any fractional numbers are outlined in red so the error can be easily spotted later.

Smart Saver Custom Incentive Program

File Help

HVAC ✕

Operating Inputs	HVAC (Proposed)	Plant (Proposed)	Results
Project Inputs	Facility	HVAC (Existing)	Plant (Existing)
<b>Facility Inputs</b>			
Building Type	Office Small		
Square Footage	100000.25		
Number of Floors (above ground)	0		
Number of Floors (under ground)	0		
Operating Hours			
Default Number of Occupants	0		
Actual Number of Occupants	0		
Year of Construction	0		
Wall Insulation			
Window Type			
Lighting Types			

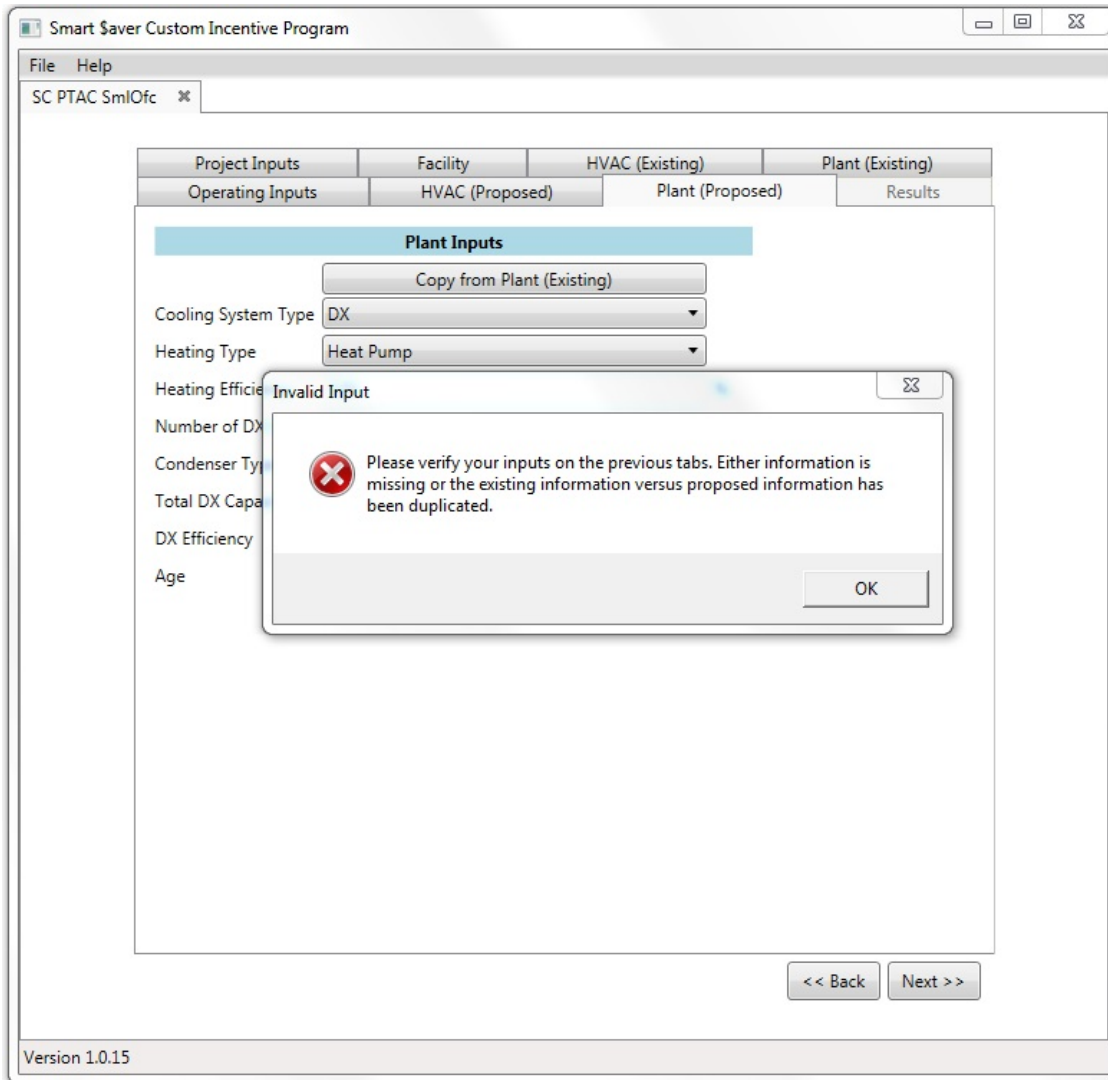
<< Back    Next >>

Version 1.0.14

### 4.3. Invalid Input entering Results Tab

The calculations are made between the “Plant (Proposed)” tab and the Results tab.

If the following error box appears, please verify your inputs on the previous tabs. Either information is missing or the existing information versus proposed has been duplicated.



Most often this happens when an input on one of the previous tabs is blank or invalid. Use the “<<Back” button to navigate back through the input tabs to verify your inputs. If this error still appears after verifying your inputs, please save the CTG file (see section 3.3 for details) and report the incident to Duke Energy for resolution.

## 5. EXAMPLE CASES

The following examples are shown to familiarize the user with the system.

### 5.1. Small Office with DX HVAC

The following screen shots are from an example with a small office building using a DX HVAC system.

The screenshot displays the 'Smart Saver Custom Incentive Program' application window. The interface includes a menu bar with 'File' and 'Help', and a tabbed window titled 'HVAC'. The main content area is organized into a grid of sections: 'Operating Inputs', 'HVAC (Proposed)', 'Plant (Proposed)', and 'Results'. The 'Project Inputs' section is currently active and contains the following fields:

Project Inputs	
Project Name	NC Small Office with DX cooling
Duke Electric Account Number	123-456-789
Site Address	987 Saving Customer
City	Charlotte
State	NC
Zip	28208
Nearest Weather Station	Charlotte Douglas Intl Arpt
Federal Owned	<input type="checkbox"/>
New Construction	<input type="checkbox"/>
Project Type	Retrofit
Average Billing Rate (\$/kWh)	\$0.080 <input type="checkbox"/> Override
Incremental Cost	\$0.00

Navigation buttons '<< Back' and 'Next >>' are located at the bottom right of the form area. The version number 'Version 1.0.14' is displayed in the bottom left corner of the application window.

The screenshot shows a software window titled "Smart Saver Custom Incentive Program" with a menu bar containing "File" and "Help". Below the menu bar is a tab labeled "HVAC". The main content area is divided into four sections: "Operating Inputs", "HVAC (Proposed)", "Plant (Proposed)", and "Results". Under "Operating Inputs", there is a sub-section "Project Inputs" which is currently selected. This section contains a "Facility Inputs" form with the following fields:

Facility Inputs	
Building Type	Office Small
Square Footage	25000
Number of Floors (above ground)	1
Number of Floors (under ground)	0
Operating Hours	M-F 8am-5pm
Default Number of Occupants	200
Actual Number of Occupants	200
Year of Construction	2000
Wall Insulation	
Window Type	Double Pane
Lighting Types	Standard

At the bottom right of the form area, there are two buttons: "<< Back" and "Next >>". The version number "Version 1.0.14" is displayed at the bottom left of the window.



Smart Saver Custom Incentive Program

File Help

HVAC ✕

Operating Inputs	HVAC (Proposed)	Plant (Proposed)	Results
Project Inputs	Facility	HVAC (Existing)	Plant (Existing)
<b>HVAC Inputs</b>			
HVAC Type	Single Zone CV		
HVAC Schedule	On 1 Hour Before and After		
Night Setback	Yes		
Thermostat Cooling Setpoint (Occupied)	76	°F	
Thermostat Heating Setpoint (Occupied)	70	°F	
Supply Air Temperature Strategy	Fixed Set Point		
Cold Deck/SAT Setpoint	55	°F	
Hot Deck/SAT Setpoint	120	°F	
Outside Air	Economizer		
Damper Position (Fraction of OA)	0	%	
Demand Control Ventilation	No		
Supply Fan Controls			

Version 1.0.14

Smart Saver Custom Incentive Program

File Help

HVAC ✕

Operating Inputs	HVAC (Proposed)	Plant (Proposed)	Results
Project Inputs	Facility	HVAC (Existing)	Plant (Existing)
<b>Plant Inputs</b>			
Cooling System Type	DX		
Chilled Water Temperature	Fixed		
Chilled Water Pumps	Constant Speed		
Condenser Water Temperature	Reset		
Condenser Water Pumps	Constant Speed		
Cooling Tower Fan	Constant Speed		
Cooling Tower Size	56.875	Tons	
Heating Type	Furnace		
Heating Efficiency	2.51	%	
Number of DX Units	8		
Condenser Type	Air-Cooled		
Total DX Capacity	77		
DX Efficiency	8.5	(EER)	
Age	15	years	

Version 1.0.14

The screenshot shows a software window titled "Smart Saver Custom Incentive Program" with a menu bar containing "File" and "Help". Below the menu bar is a tab labeled "HVAC" with a close button. The main content area is divided into several sections:

- Project Inputs**: A sub-section containing "Operating Inputs".
- Facility**: A sub-section containing "HVAC (Proposed)".
- HVAC (Existing)**: A sub-section containing "Plant (Proposed)".
- Plant (Existing)**: A sub-section containing "Results".

The "Operating Profile" section is highlighted with a blue header. Below it, there is a section titled "Months Enabled" with a horizontal line. Underneath, the months of the year are listed: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec. Two rows of equipment are shown, each with a checked checkbox for every month:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cooling Equipment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Heating Equipment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

At the bottom right of the main content area, there are two buttons: "<< Back" and "Next >>".

Version 1.0.14

The screenshot shows the 'Smart Saver Custom Incentive Program' application window. The title bar includes 'Smart Saver Custom Incentive Program' and standard window controls. The menu bar has 'File' and 'Help'. A tab labeled 'HVAC' is active. The main content area is divided into four sections: 'Project Inputs', 'Facility', 'HVAC (Existing)', and 'Plant (Existing)'. The 'HVAC (Existing)' section is currently selected, and it contains sub-sections for 'HVAC (Proposed)', 'Plant (Proposed)', and 'Results'. The 'HVAC Inputs' section is highlighted with a blue header and contains the following configuration options:

Parameter	Value	Unit
<b>HVAC Inputs</b>		
<a href="#">Copy from HVAC (Existing)</a>		
HVAC Type	Single Zone CV	
HVAC Schedule	On 1 Hour Before and After	
Night Setback	Yes	
Thermostat Cooling Setpoint (Occupied)	76	°F
Thermostat Heating Setpoint (Occupied)	70	°F
Supply Air Temperature Strategy	Fixed Set Point	
Cold Deck/SAT Setpoint	55	°F
Hot Deck/SAT Setpoint	120	°F
Outside Air	Economizer	
Damper Position (Fraction of OA)	0	%
Demand Control Ventilation	No	
Supply Fan Controls		

At the bottom right of the form area, there are two navigation buttons: '<< Back' and 'Next >>'. The bottom status bar of the application window displays 'Version 1.0.14'.

Smart Saver Custom Incentive Program

File Help

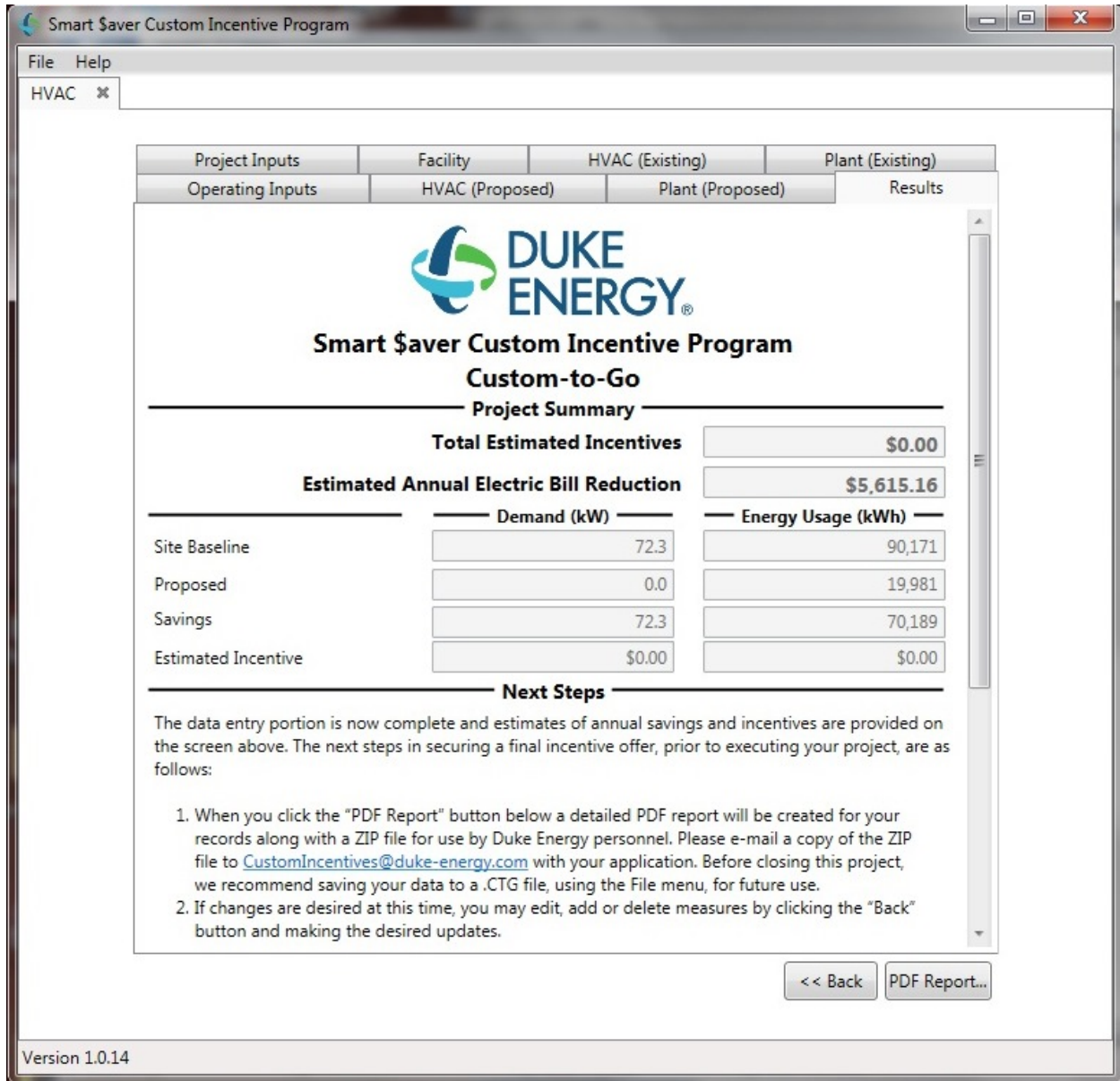
HVAC ✕

Project Inputs	Facility	HVAC (Existing)	Plant (Existing)
Operating Inputs	HVAC (Proposed)	Plant (Proposed)	Results

**Plant Inputs**

Cooling System Type	DX	▼
Chilled Water Temperature	Fixed	▼
Chilled Water Pumps	Constant Speed	▼
Condenser Water Temperature	Reset	▼
Condenser Water Pumps	Constant Speed	▼
Cooling Tower Fan	Constant Speed	▼
Cooling Tower Size	56.875	Tons
Heating Type	Furnace	▼
Heating Efficiency	2.51	%
Number of DX Units	8	
Condenser Type	Air-Cooled	▼
Total DX Capacity	0	
DX Efficiency	0	(EER)
Age	0	years

Version 1.0.14



You will need the PDF Report and the ZIP file to submit your Duke Energy Incentive paperwork. Please select the "PDF Report" in the lower right corner of the results window. The tool will have you select a folder in which to place the results.

The files in that folder should look something like the ones below with your time and date stamp. As a final check, we recommend that you open the PDF output file to verify the inputs and proposed changes prior to submitting your paperwork.

Example 01

-  DukeHVACReport-20150727.125428
-  DukeHVACReport-20150727.125428.ctg
-  DukeHVACReport-20150727.125428