Energy Analyzer

Energy & Operating Cost Comparison Software

Inside This Manual

- How to Input Data for Energy & Cost Comparison Calculations.
- View Comparison Summaries and Print Reports & Graphs.
- Understand Equipment Energy Savings & Benefit
- Understand Technique to assist in Closing the Sale

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Overview

Thank you for purchasing our Energy Analyzer software program! If you have comments for this manual or the software program please fax, email or call us, we appreciate your input.

This manual is intended to show the end user how to properly use this software. It assumes that the user has general knowledge of construction practices and a basic knowledge of residential HVAC. We have attempted to show each screen and show how data is entered into the fields. We designed the interface to be used with a tablet PC. You will notice that very little typing is required.

Look for ***Hints:***
Throughout this workbook, you will find boxes like this with additional information or hints that are informative and helpful.

System Requirements:

Windows® 98 or higher, NT, XP, Win-7 or Win-10 operating system.
Pentium® 100 or higher processor.
64 megabytes of RAM.
High color monitor.
30 MB hard drive space available.

Recommended hardware for best performance:

Pentium® 300 or higher processor.
128 megabytes of memory or more.
1 GB or more of storage (hard drive).
Portable printer & external mouse

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ADTEK SOFTWARE
516 NW 20th St. | Oklahoma City, OK 73103
Phone: 815-452-2345 | Fax: 405-844-6314
www.adteksoft.com | sales@adteksoft.com

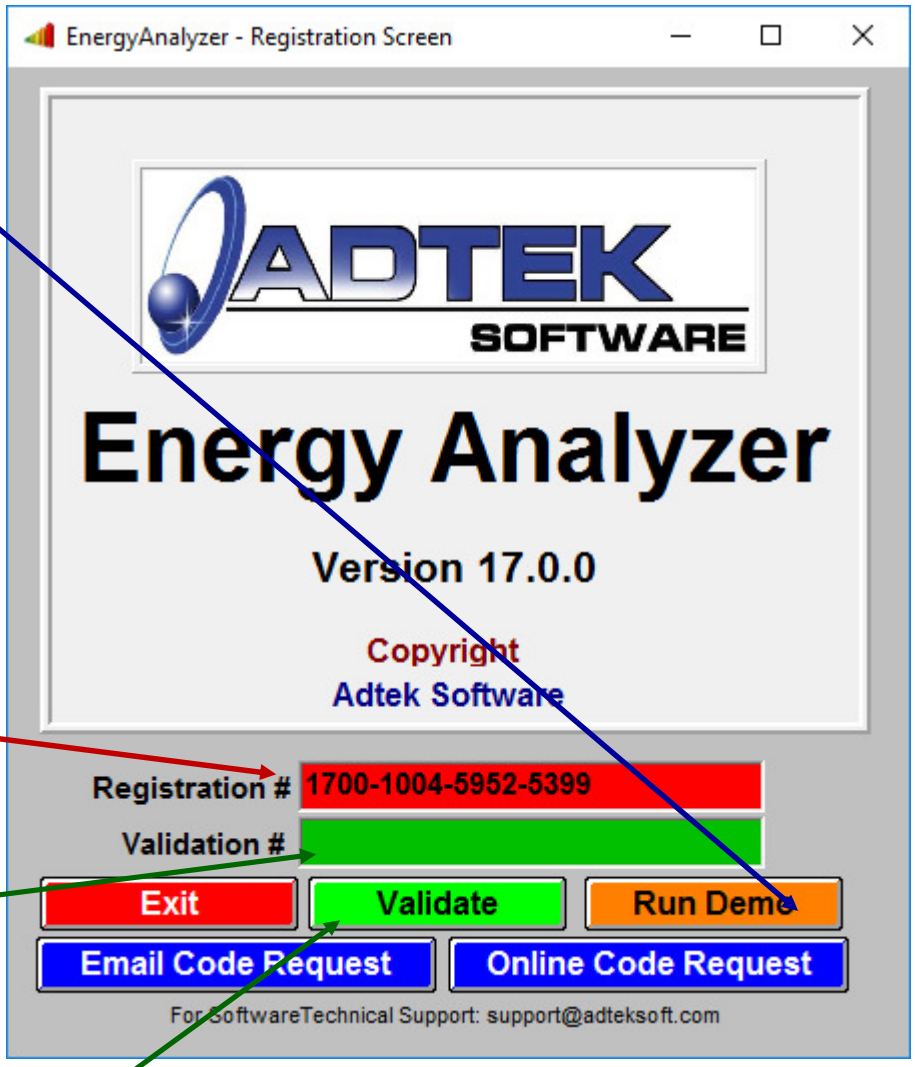
Unlocking your Program

Once the software is successfully installed, the Registration screen will pop-up.

Click on the **Run Demo** button. You can then navigate through the program in demo mode.

After you have completed the demo and want to purchase the product, you can order the program online at www.adteksoft.com or you can call us at 815-452-2345.

Once you pay for the program and provide the **Registration number** in the **RED** box, an unlock Validation number will be provided (through email or over the phone) to be typed in the **Green** box.



Finally, click the **Validate button** to unlock the full program capabilities.

Definitions

ARI:
Air-Conditioning and Refrigeration Institute.

AFUE:
Annual Fuel Utilization Efficiency. A measure of gas furnace's efficiency in converting fuel to energy, the higher the rating , the more efficient the unit. Example: A rating of 80 means that approximately 80% of the fuel is being used and 20% is exhausted.

CFactor:
A factor which is required to make the design heating load hours correlate with the effective heating load hours experienced under actual operating conditions.

COP:
Coefficient of Performance.

Default settings:
A particular value for a variable that is assigned automatically by the operating system and remains in effect unless canceled or overridden by the operator.

ECM fan motor:
Electronically Controlled Motor (variable speed).

Economic Balance Point:
The point at which it would be more economical to use auxiliary heat than a heat pump.

GAMA:
Gas Appliance Manufacturers Association.

HTM:
Heat Transfer Multiplier.

Path:
The necessary steps taken to find a file.

Payback (period):
The time it takes to recover an investment (expressed in months or years)

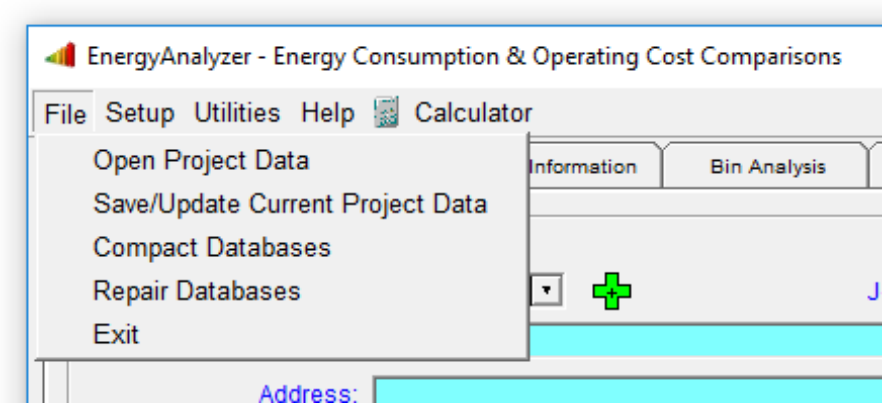
ROI:
Return on investment. (% rate)

SEER:
Seasonal Energy Efficiency Ratio.

Thermal Balance Point:
The point where the heat pump produces enough heat to meet the load requirements.

Weather BIN or Temperature BIN:
The average number of hours the temperature is at a given degree range annually for a given location. Example: In Chicago, Illinois there are 75 hours that the temperature is between 5-10 degrees (F).

Section I. Input Basics
The File Menu



Open Project Data:
Opens previously saved Customer Information.

Save Current Project Data:
Saves Customer information that is currently being viewed from an open file.

Update Current Project Data:
Update any changes made to the current Customer.

Delete Current Project Data:
Deletes the current Customer information viewed on the screen.

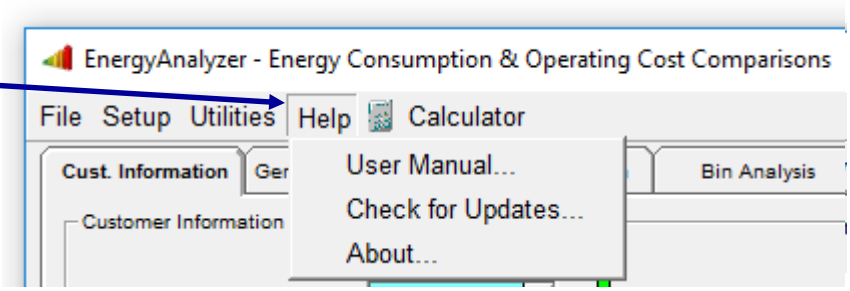
Compact Database:
Organizes data so your system will run more efficiently by removing spaces in databases caused by deleting files. This utility should be run periodically for best performance.

Repair Database:
A utility that may repair errors to a database by improperly shutting down the computer.

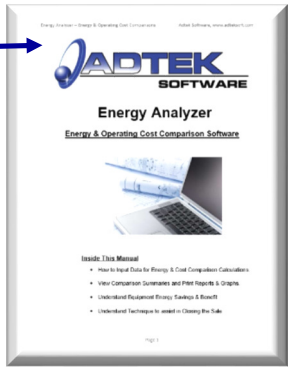
Exit:
Closes Energy Analyzer. Save information before exiting if desired.

Section I. Input Basics
The "Menu" Toolbar

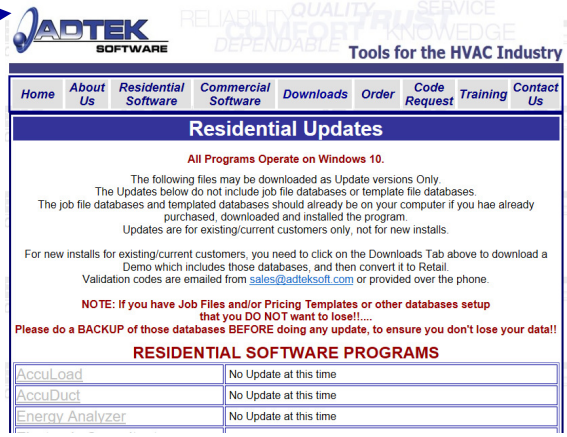
The Help Menu:
When you click Help on the toolbar, you will see this menu.



1. User Manual:
Opens the User Manual PDF File.



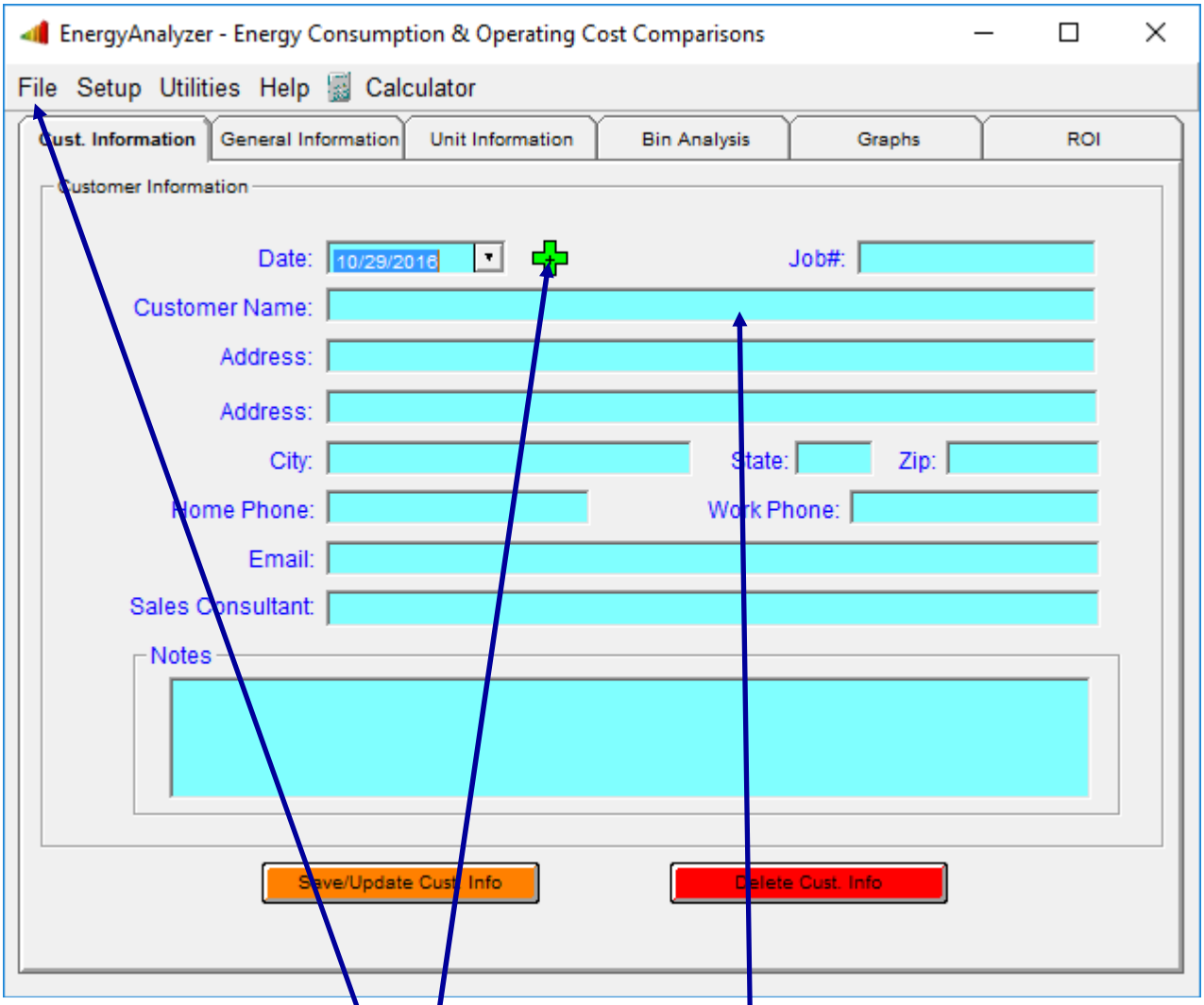
2. Check for Updates:
Opens the Update Webpage.



3. About:
View software version and system information.

Hint: You may view your computer's system information, such as memory, etc., by clicking on "System Info"

Section I. Input Basics
Customer Information Tab



You may enter customer information in different ways.

First, you may click on the “Open” button and select from the drop-down list if you previously saved the customer information.

Second, if you have entered the customer information in the Electronic Consultant, then you may click on the “Import” button & the fields will be populated automatically.

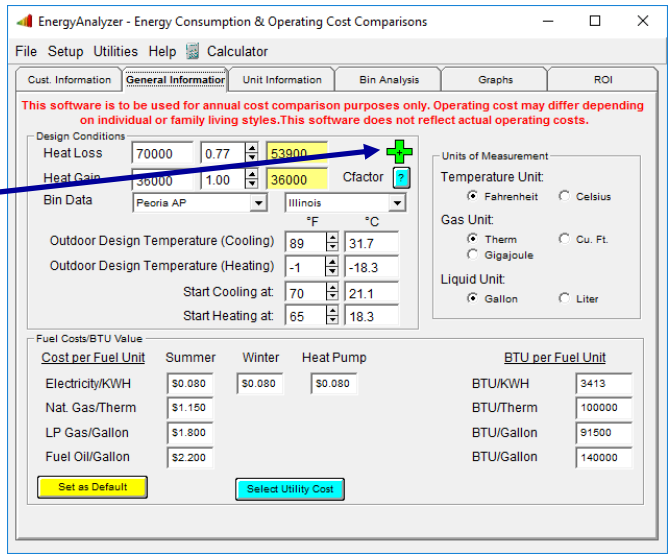
You may also manually type the information in by hand.

Section I. Input Basics
General Information Tab

Design Conditions

Heat Loss/Gain

Enter Heat Loss and Gain information by typing or importing from the Electronic Consultant Software.



Click on the green "+" button to import data. The last calculated load will be imported.

Bin Data

Bin data may be selected by clicking on the down arrow next to the state. Select the state. Repeat to select the city.

The design conditions will be updated according to the bin data. You may change the design conditions to match the ones used when determining your load requirement.

Fuel Cost

Enter current fuel cost in the appropriate fields or import the data by clicking on the "Select Utility Cost" button for previously entered values.

A list of utility companies will be displayed, then click on the desired company to import current costs. This list can be modified by selecting the Utility Database Menu item as described in the Setup Section of this manual. Click on "Close" to continue.

BTU Value

BTU per fuel unit can be modified if needed to adjust for the heat content of a particular fuel. Please note that the cost per fuel unit must correspond to the BTU per fuel unit. The cost is calculated for the amount of BTU's viewed on the screen.

Buttons

"Set as default"

This button is used to set all screen values as default.

"Select utility cost"

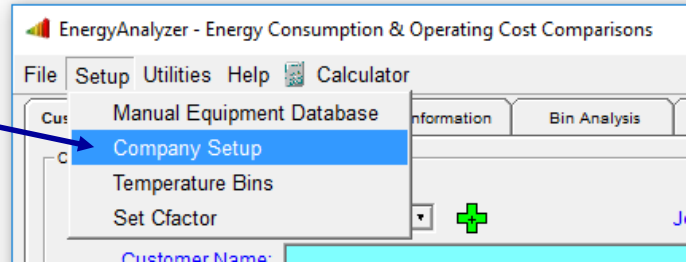
This button is used to store more than one utility company.

> ***Hint:*** Be sure the design conditions are the same values used in the loss/gain calculations.

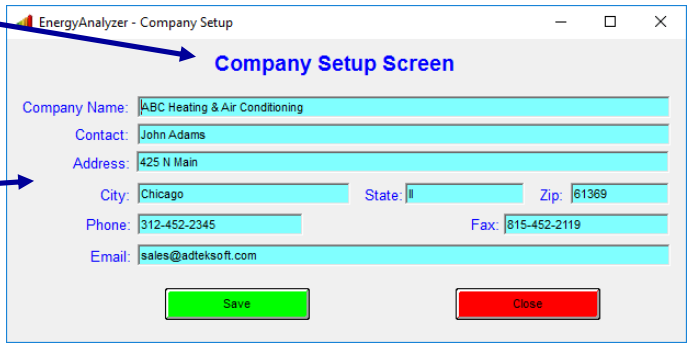
Section II. How to Setup Your System

Company Setup

Select “Company Setup” from the “Setup” dropdown menu.



The Company Setup screen will pop-up. All reports will contain this information.

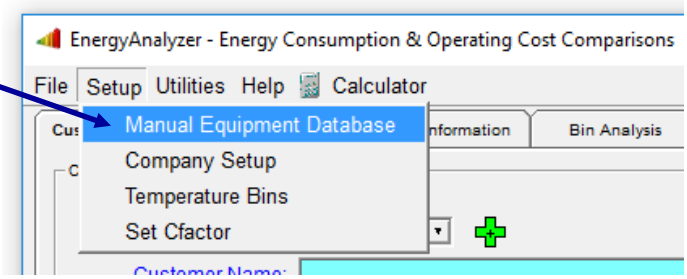


Company Setup Screen

1. Fill in the Company’s general information.
2. Click the “Save” button.
3. Click the “Close” button.

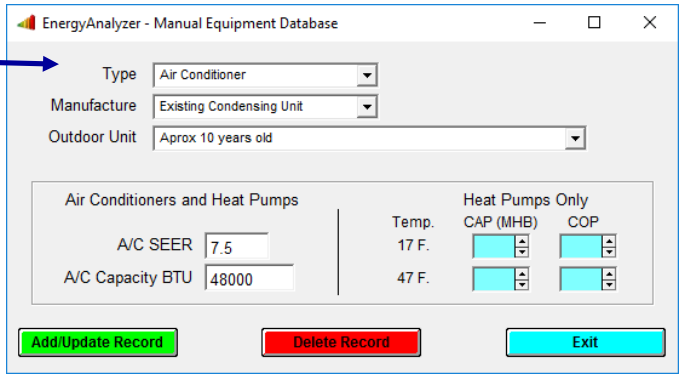
Adding to the Manual Equipment Database

Select “Manual Equipment Database” from the “Setup” dropdown menu.



Preston’s Guide for AFUE & SEER information for the years 1960 thru 2000 is available from their website www.prestonguide.com.

The Manual Equipment Database screen will pop-up.



This database can be used to store different types of existing equipment.

Manual Equipment Database Screen

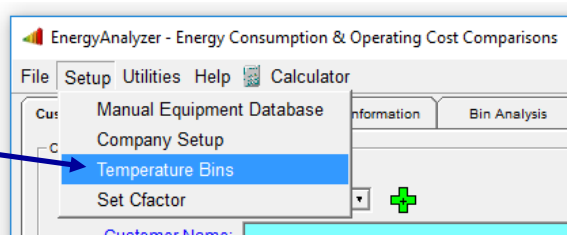
1. Fill in the Type of equipment you are adding.
2. Enter the Fuel Type.
3. Enter the estimated age of the equipment.
4. Enter the Outdoor Unit.
5. Enter the Efficiency and Capacity.
6. For Heat Pumps, enter Capacity & COP at 17º & 47º.
7. Click the “Add/Update Record” button.
8. Click “Exit” to close.

Note:
This software is to be used for annual cost comparison purposes only. Operating cost may differ depending on individual or family life styles. This software does not reflect actual operating costs.

Section II. How to Setup Your System

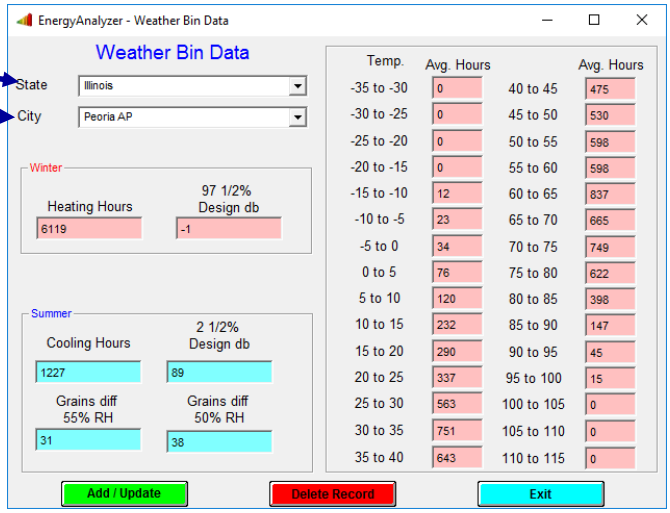
Weather Bin Data

Select “Temperature Bins” from the “Setup” dropdown menu.



<u>To view weather bin data</u>

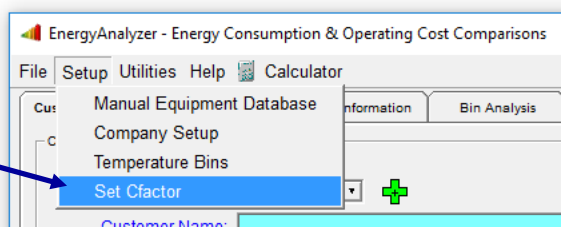
1. Select the state.
2. Select the city.
3. The chart to the right lists the average number of hours in each temperature bin.
4. You may add your local city if not in listed in the database.
5. Bin hours may be added or changed by typing in the desired number and clicking the Add/Update Record button.



Cfactor

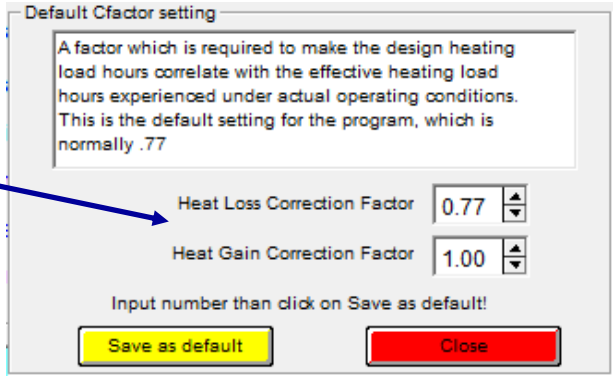
Select “Set CFactor” from the “Setup” dropdown menu.

The Cfactor is a factor which is required to make the design heating load hours correlate with the effective heating load hours experienced under actual operating conditions. The default is set at 0.77. The allowable range is 0.75 to 1.00.



<u>Set Cfactor</u>

1. Enter the desired factor.
2. Click the “Save as default” button.
3. Click “Close” to exit.



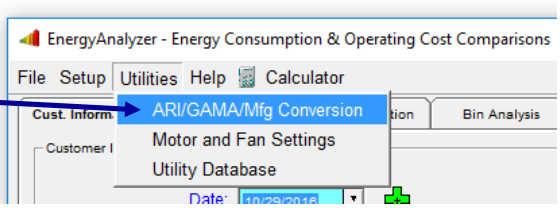
Class Exercise

1. Open the Company Setup File.
2. Enter your company data.
3. Click on Save.
4. Add a 4-ton A/C to the manual equipment database. 20 years old, 5.5 SEER, Generic manufacturer.
5. How many average hours are in temperature bin 30 - 35 degrees for Peoria, IL.

Notes:

Section II. How to Setup Your System
ARI/GAMA Conversion

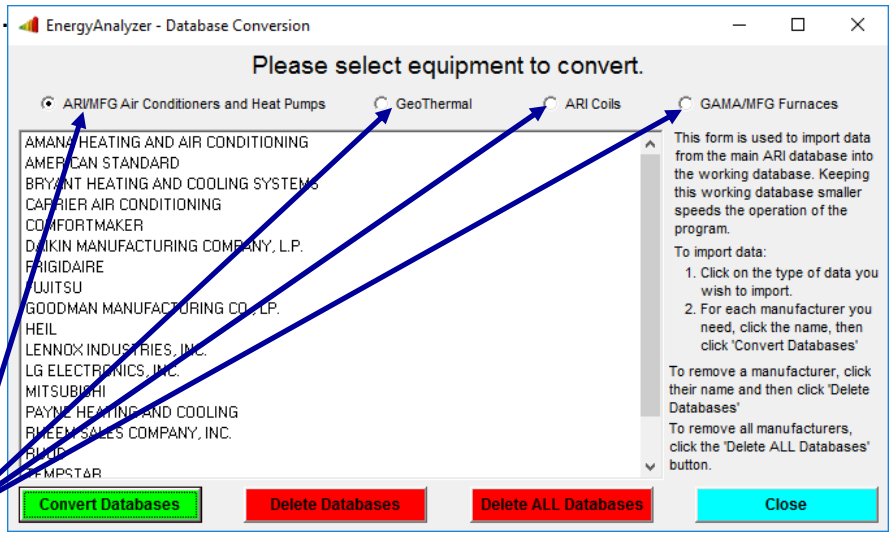
Select “ARI/GAMA Conversion” from the “Utilities” dropdown menu.



You may import equipment from GAMA and ARI for comparisons in the Energy Analyzer. All databases are included with the program. This includes:

- Air Conditioners
- Heat Pumps
- Coils
- Air Handlers
- Geothermal
- Furnaces
- Boilers

This screen will allow you to select desired Manufacturer's equipment and import the information into the Energy Analyzer Program.
First, select the equipment type.



Note:
All Equipment in the Database Should be Current at all Times.
If Data is Not Current, please contact us at support@adteksoft.com and we will get it updated in a Fast Manner

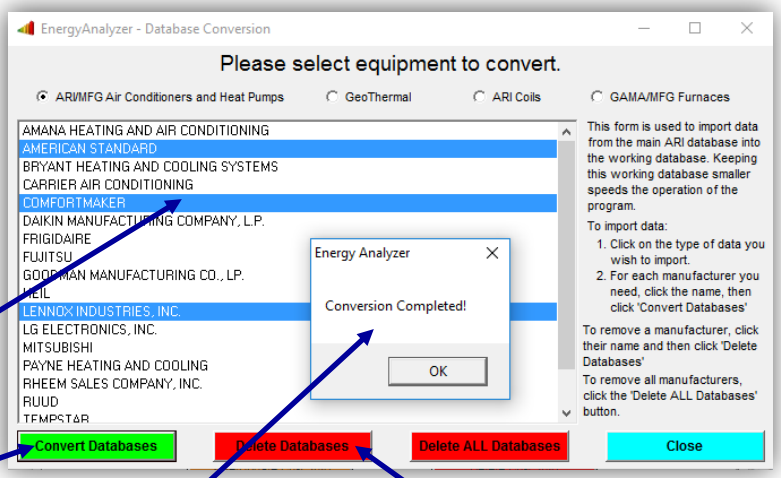
Converting a database for use

Once type is selected, the Database Conversion screen will list all the Manufacturer’s for that equip type.

Scroll the list, highlight the desired Manufacture, and click on the “Select Manufacture” button. Hold The Control (Ctrl) button down to select multiple manufacturers.

Selections are highlighted.

To convert the desired Manufacturer’s Databases, click the “Convert Databases” button.
A pop-up screen will say “Conversion Completed”.

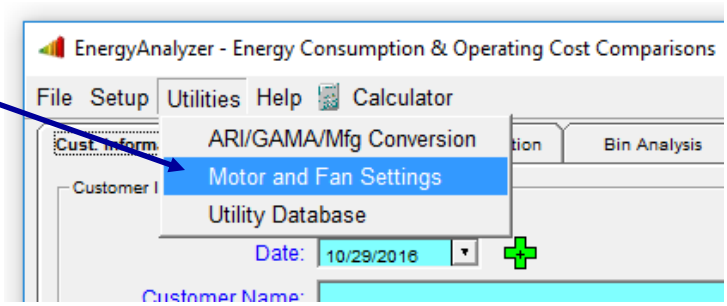


You may remove Manufacturers from the Energy Analyzer Database by using the same procedure, then click on the “Delete Database” button.

Repeat the same steps for conversion of Geothermal applications, and/or Furnaces.

Section II. How to Setup Your System
Motor and Fan Settings

Select “Motor and Fan Settings” from the “Utilities” dropdown menu.



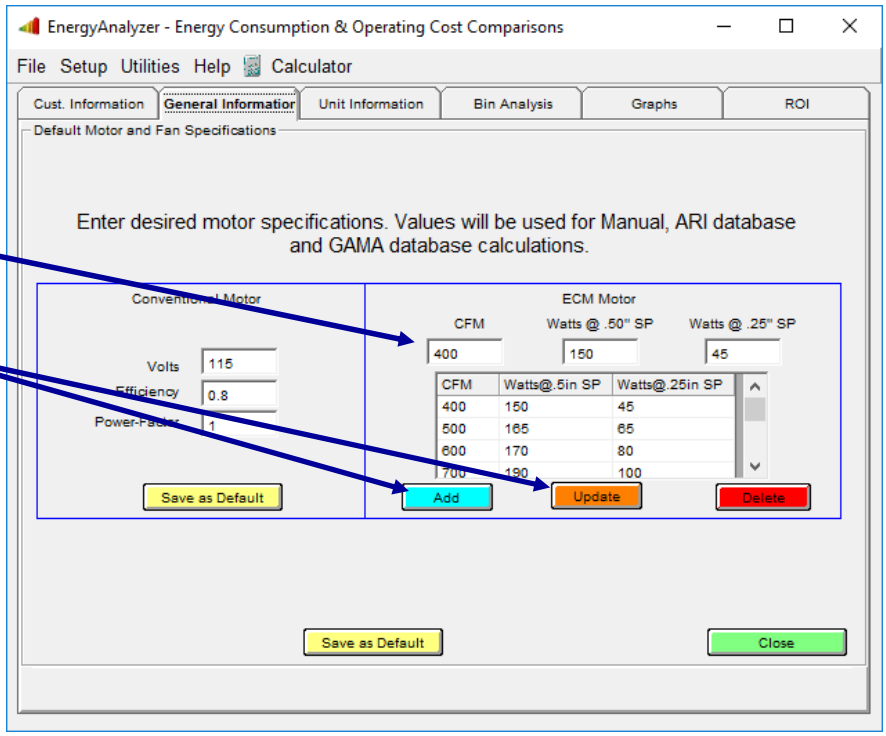
Motor specifications can be adjusted in The Motor and Fan Specification Screen.

You may set efficiency and power factors for conventional motors and cfm/watts for ECM motors.

The default settings are the most Common settings.

To change a setting, follow the steps below:
1) Insert a CFM Value
2) Insert wattage values
3) Click Add, or update to change an existing
4) Now it should be added to the list
5) You may save that option as a default

To exit the screen and return to the main program, please click close.



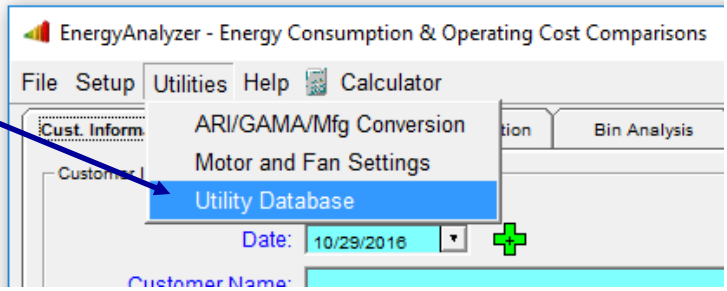
Class Exercise

1. Click on the “Utilities” Button.
2. Highlight and click on “Motor and Fan Settings”
3. Review the ECM Motors database.

Notes

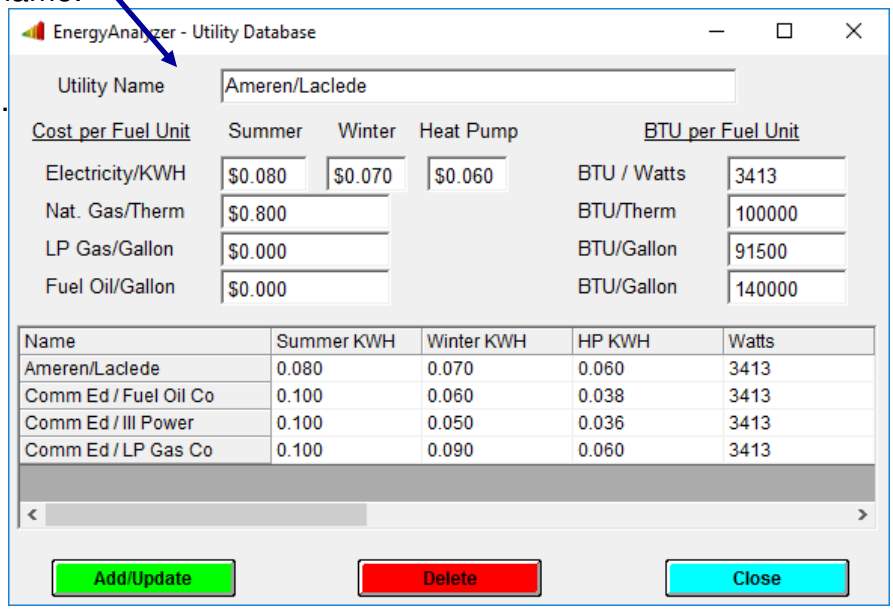
Section II. How to Setup Your System
Utilities Database

Select “Utilities Database” from the “Utilities” dropdown menu.



The Utilities Database Screen will allow the Consultant to enter commonly used utility cost.

Adding to the Utilities Database
1. Enter the Utility Company name.
2. Enter the current cost per fuel unit.
3. Enter the BTU per fuel unit.
4. Click on the “Add/Update” button.
5. Click “Close” to exit.



You may enter combinations of utility companies, such as a local electric company and a local LP supplier.

Leave the “Cost per Fuel Unit” field at “00.0” if the fuel type does not apply to that utility company.

The Consultant will be able to import this information when doing an energy analysis from the General Information Screen by clicking on the “Select Utility Cost” button and selecting the desired utility company.

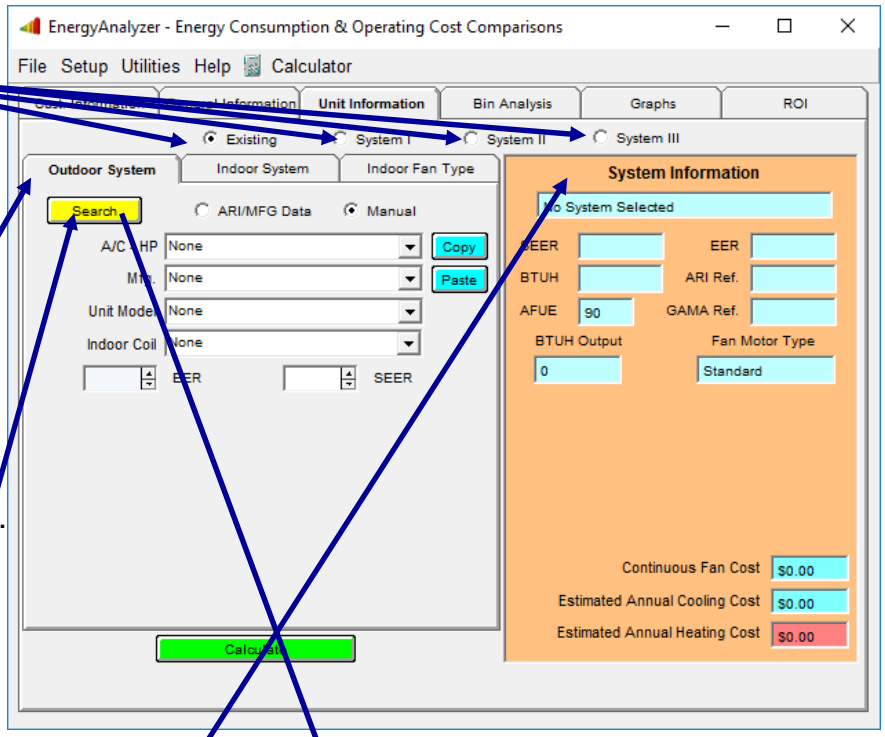
Class Exercise **Notes**

1. Type in your local utility. _____
2. Enter the new fuel cost. _____
3. Enter “0” for all fuel types that do not apply. _____
4. Add it to the database (click Add/Update). _____

_____

Section III. Comparing Operational Cost of Equipment
Unit Information & Search Feature

Unit Information Tab
You may compare up to four systems.

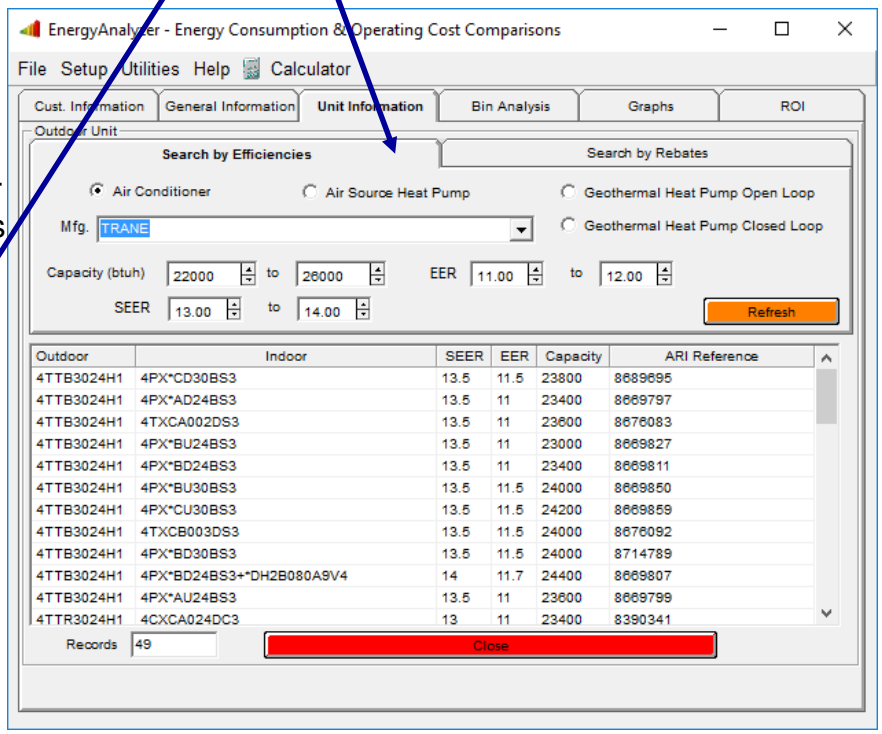


1. Select the desired system option. (Existing, System I, System II, System III)
   It is best to start with the existing system then from the least efficient to the most efficient.

2. **Outdoor System:**
   Select ARI Database, MFG Database, or Manual. You will then have the option of selecting where the equipment information (SEER and COP) will be extracted from.

3. Select Air Conditioning or Heat Pump Equipment.
4. Select the Manufacturer.
5. Select the Unit Model.
6. Select the Indoor Coil.

"Search Feature"
1. Choose Your Manufacturer
2. Choose your Specifications
3. Click Refresh and select your choice



"System Information"
Here you will see a summary of the system, you have entered, included spec information and type of system you have chosen. Along with that, you will see the costs of each calculation for the proper system that you have chosen.

Note: Use the Manufacturer's database when possible. This is generally the most current information.

Section III. Comparing Operational Cost of Equipment
Unit Information & Search Feature

Unit Information Tab (continued)

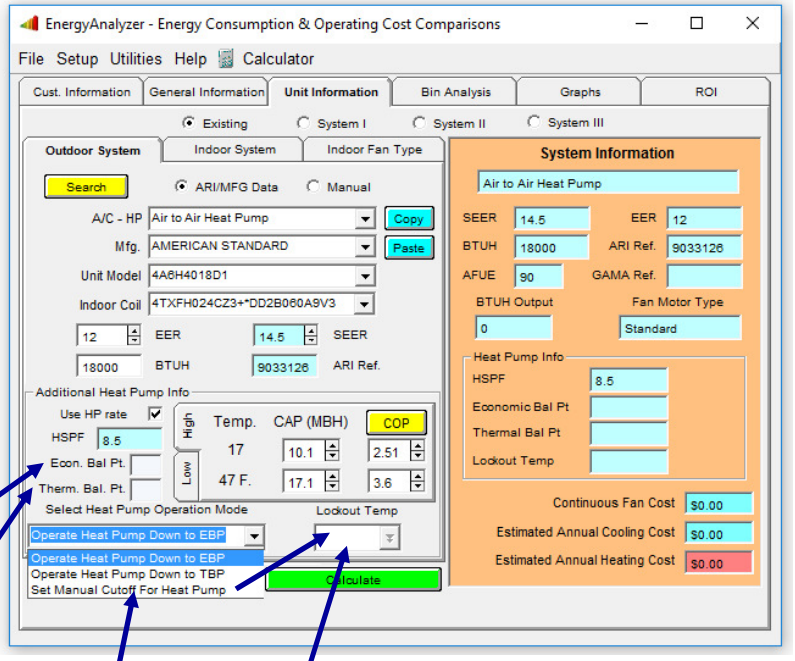
Heat Pumps

Low & High Values
For two stage equipment, you must enter low and high values for 1st and 2nd stage, if not given.

CAP (MBH)
Example: 16.8 MBH = 16,800 BTUH

KW & COP
You may toggle between COP and KW for heat pumps by clicking on the yellow "KW" button.

$$COP = \frac{MBH}{3.413 * KW}$$



Economic Balance Point
The lowest temperature at which the operation of the heat pump is more cost effective.

Thermal Balance Point
The lowest temperature where the heat pump produces enough heat to meet the load requirements

You have a choice when selecting <u>heat pumps.</u>

- **Operate Heat Pump Down to EBP (Economic Balance Point)**
  This will include heat pump operating cost running above the economic balance point when the economic balance point is below the thermal balance point.

- **Operate Heat Pump Down to TBP (Thermal Balance Point)**
  This will not include heat pump operating cost running above the economic balance point when the economic balance point is below the thermal balance point. This will only include the HP runtime above the thermal balance point.

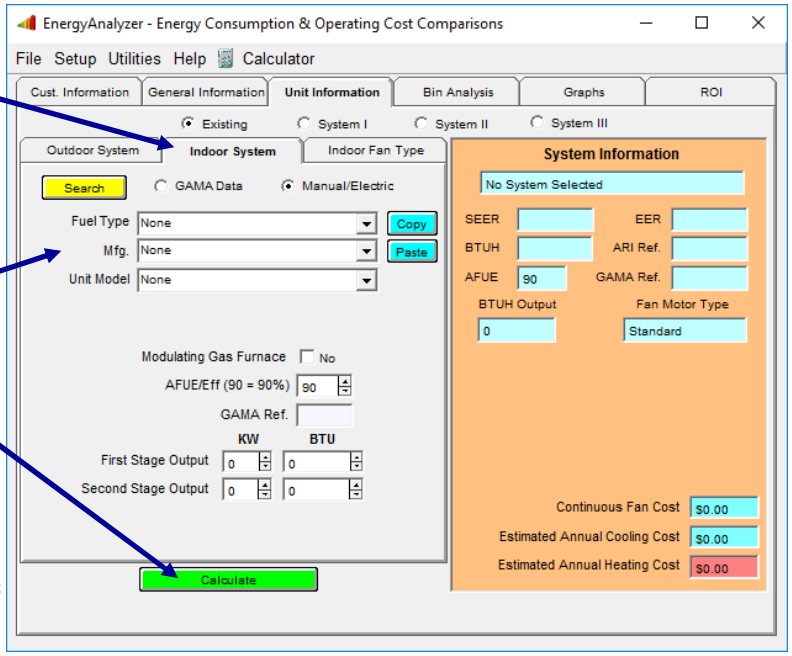
- **Set Manual Cutoff For Heat Pump**
  This will include heat pump operating cost running above the manually entered temperature.

Section III. Comparing Operational Cost of Equipment
Unit Information & Search Feature

Unit Information Tab (continued)

Indoor System.
You will then have the option of selecting where the equipment information will be extracted from.

1. Select GAMA Database, MFG Database, or Manual.
2. Select the fuel type from the drop down menu.
3. Select the Manufacturer.
4. Select the Unit Model.



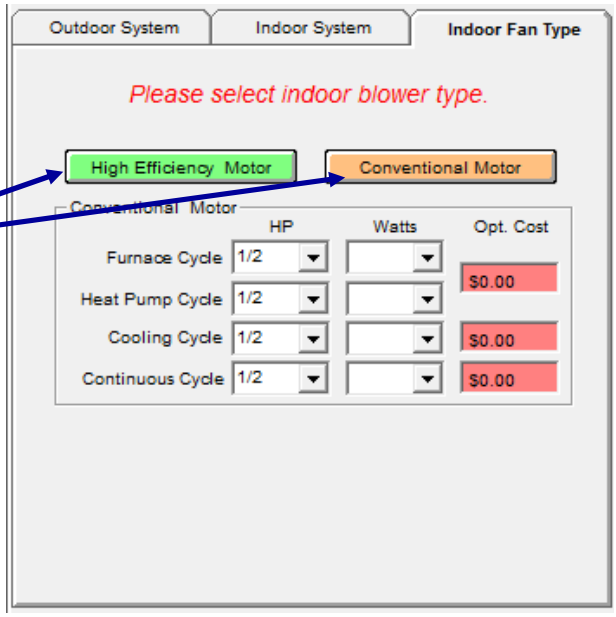
Click on the "Calculate" button to view the estimated operating cost.

Estimated annual cost will be displayed along with the Economic Balance Point and the Thermal Balance Point for heat pumps.
The breakdown of fan cost can also be viewed in the appropriate fields.

AFUE can be entered in manually or will be imported from the database section.
The proper BTU Output will then be displayed or can be entered in manually.
If the unit is single stage use the first stage for output.

Indoor Fan Type

If a manual entry is used, you have the option of selecting the fan motor type, High Efficiency (ECM) or conventional.

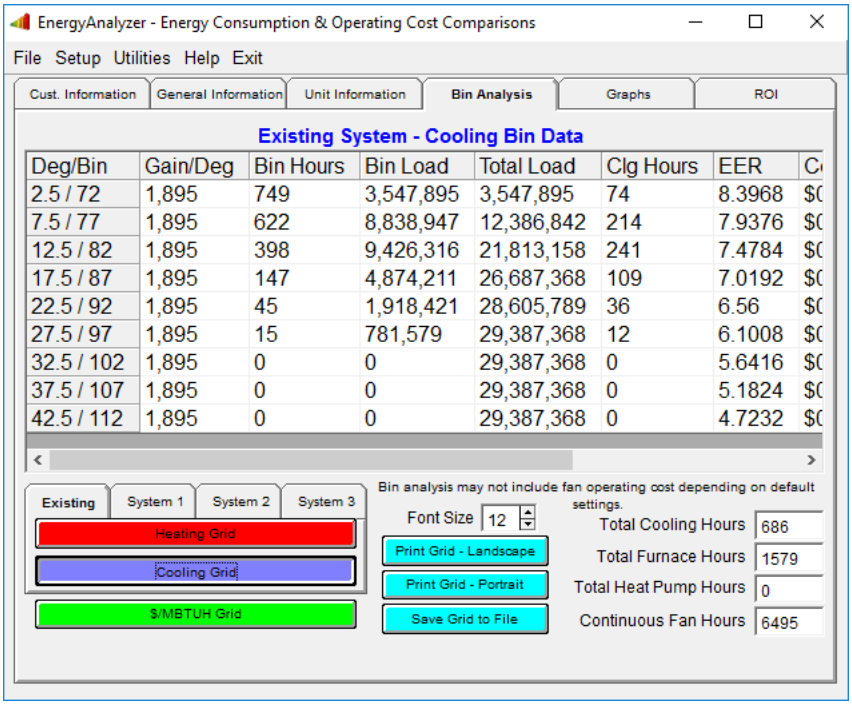


Section III. Comparing Operational Cost of Equipment
Bin Analysis

The Bin Analysis screen can be used by the dealer to confirm the operating cost per bin.

Please note, this software is intended for annual cost comparisons only.

It is very difficult, if not Impossible to calculate the exact operating cost due to life styles, utility cost fluctuations, equipment efficiencies, installations, etc.



1. Select which system you wish to review.
2. You may toggle back & forth between the Cooling Grid and the Heating Grid. (see the next page for Heating Grid information)

Cooling Analysis:

$$\text{Estimated Bin Operating Cost} = \frac{(\text{Bin hours x Bin cooling load x cost per KWH})}{(1000 \text{ x SEER})}$$

Hint:
Please note that Equipment operating hours are not the same as Bin Hours.
Bin Hours relate to the hours that are recorded at that bin temperature.
Equipment operating hours will vary depending on efficiency.
Longer operating hours can increase comfort by decreasing temperature variations and improve air filtration.

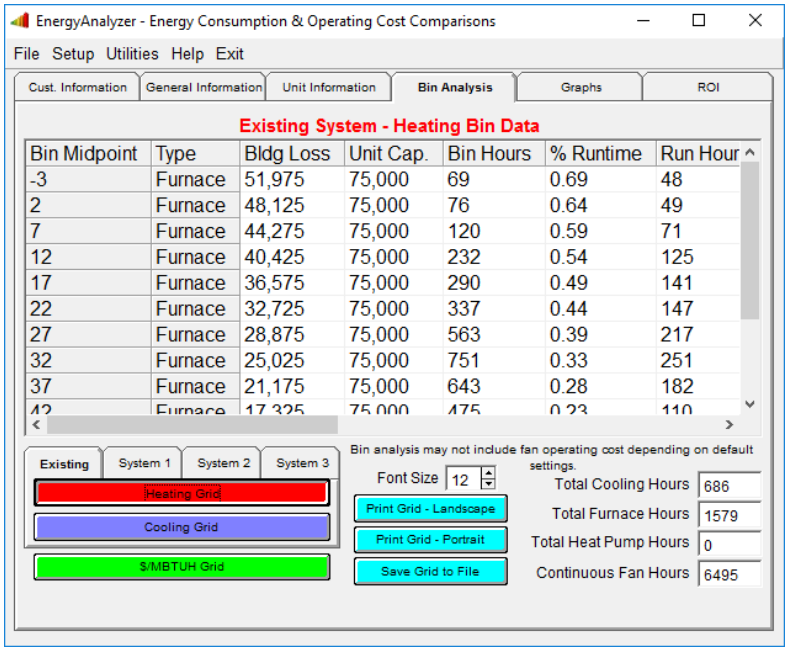
Section III. Comparing Operational Cost of Equipment
Bin Analysis continued….

Heating Analysis:

Furnace Only

$$\text{Estimated Furnace Bin Operating Cost} = \frac{(\text{Bin hours x Bin heating load x fuel cost x Cfactor})}{(\text{Heating value of fuel x Seasonal Efficiency})}$$

Heat Pump operating cost will be calculated for bins above or below thermal balance point depending on selection by user.



Heat Pump with Electric Heat

Heat Pump run time is determined by dividing the Bin loss by the heat pump capacity at that bin. Use 1 for bins that have a heat loss greater than the heat pump capacity.

The estimated Heat Pump bin cost can then be determined by:

$$\text{Estimated Heat Pump Bin Operating Cost} = \text{Bin hours x Heat Pump KWH x Heat Pump run time x fuel cost x Cfactor}$$

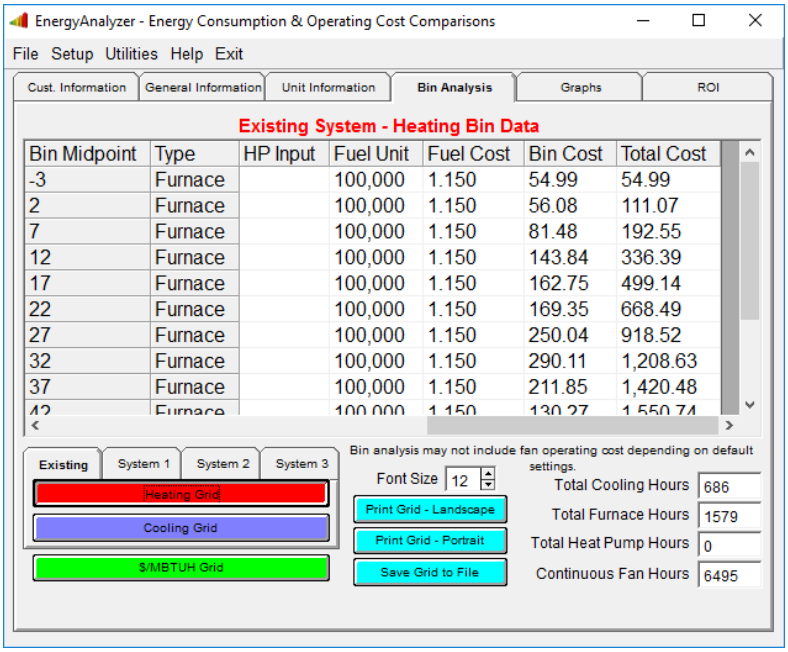
The estimated Electric Heat bin cost can then be determined by:

- On the bins where the Heat Pump Capacity is less than the Bin Heat Loss, calculate the electric heat required by subtracting the Heat Pump Capacity from the Bin Heat Loss.

$$\text{Estimated Electric Heat Bin Operating Cost} = \frac{(\text{Bin Hours x Electric Heat required x Cfactor x Fuel Cost})}{3.413}$$

Section III. Comparing Operational Cost of Equipment
Bin Analysis continued….

Heating Analysis continued:



Add-on Heat Pumps

For Heat Pumps operating above the Economic Balance Point but below the Thermal Balance Point, the % run time is calculated by:

$$\%\ \text{Heat Pump runs} = \frac{(\text{winter design load} - \text{bin load})}{(\text{winter design load} - \text{bin heat pump capacity})}$$

$$\%\ \text{Furnace runs} = 1 - \%\ \text{heat pump runs}$$

For all other heat pump operating conditions, the % run time is calculated by:

% Heat Pump Runs = Bin loss divided by the heat pump bin capacity.

Use 1 for bins that have a heat loss greater than the heat pump capacity.

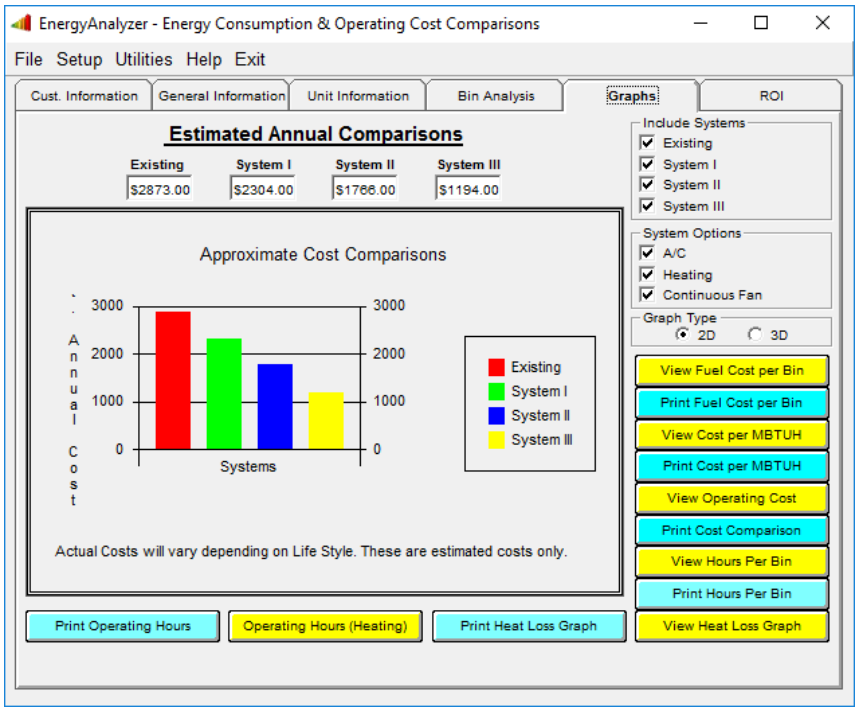
$$\text{Estimated Heat Pump Bin Operating Cost} = \text{Bin Hours} \times \text{Heat Pump KWH} \times \text{Heat Pump Run Time} \times \text{fuel cost} \times \text{Cfactor}$$

$$\text{Estimated Furnace Bin Operating Cost} = \frac{(\text{Bin Hours} \times \text{Bin Heating Load} \times \text{fuel cost} \times \text{Cfactor} \times \text{furnace run time})}{(\text{Heating Value of Fuel} \times \text{Seasonal Efficiency})}$$

Fan operating hours can be viewed on this screen. A breakdown is indicated in the various fields (Cooling, Heating, Heat Pump and Continuous).

Section III. Comparing Operational Cost of Equipment Graphs

The "Graphs" screen will allow the Consultant to view and/or print various graphs. These graphs should be used to explain to the homeowner the benefits of purchasing High Efficiency Equipment.



To setup your graph:

1. Select the systems you want to include.
2. Select the system options for the type of equipment you want to include.
3. Select the Graph type. (two-dimensional bar graphs are the only graphs that will print)

Hint: You may view the graphs by clicking on the desired yellow button.

Comparing Operating Costs

Print Operating Hours
Click to print the equipment operating hours. This is a good sales tool that may indicate longer operating times with lower operating costs. Better air filtration and even temperatures.

Print Heat Loss Graph
Print the heat loss of your customer's home. Show the customer why two stage equipment is important. The customer may have a difficult time understanding that they do not need the same heat output at design temperature as they might at perhaps 35 degrees.

Print Hours per Bin
Print the hours recorded at various temperature bins. This will also show the % of time during that particular bin. This will reinforce the importance of correct sizing and two stage equipment to the homeowner.

Print Cost Comparisons
Print the estimated annual cost comparisons for selected equipment.

Section III. Comparing Operational Cost of Equipment
Estimated Return on Investment (ROI)

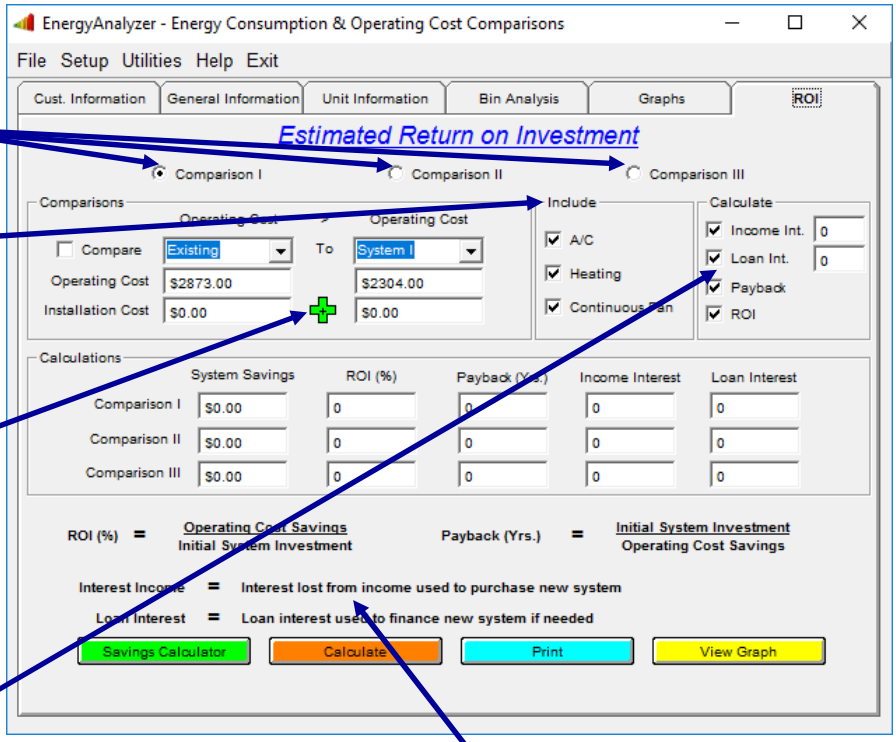
Fundamentals

You may make up to three different comparisons by checking I, II, or III.

You may include A/C, Heating, or Continuous Fan or any combination in your comparison.

If you have previously calculated a proposal in the Electronic Consultant, you may automatically bring in the installation cost by clicking on the green cross.

If you want to calculate Interest Income, Loan Interest, Payback or Return On Investment; then enter the rate and check the appropriate box.



Calculation formulas

Hint: Keep in mind that the interest income is probably taxable and that energy savings is not taxable income. You may enter existing equipment repair cost in installation cost box if desired.

Steps for Comparing Equipment Operating Cost

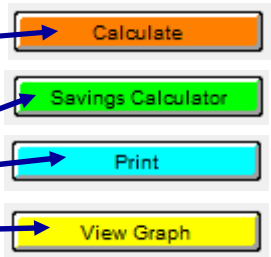
To compare operating cost between the existing system and a new system (system I for example) follow the steps below.

1. Check Comparison I box
2. Check the Compare box
3. Select Existing System
4. Select System I
5. Enter the Installation Cost
6. Check the optional information boxes you want analyzed.
   Add the interest rate if applicable
7. Click the Calculate Button
8. The results will be tabulated and listed in the Comparison I fields

The Savings Calculator will be discussed on the next page

To print your results, click on the Print button

To View graph, click on the View Graph button



Section III. Comparing Operational Cost of Equipment
Estimated Return on Investment (ROI)

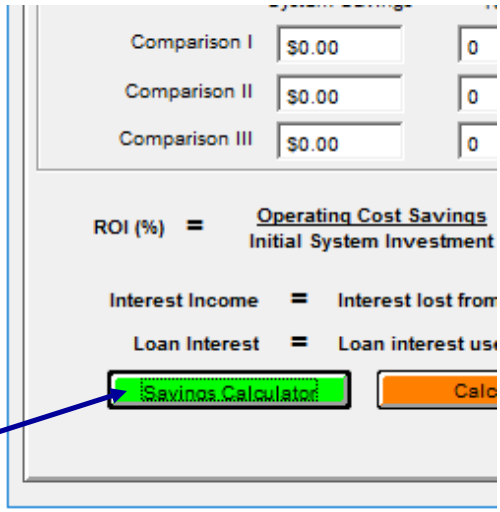
The Savings Calculator

The Savings Calculator is a tool to help generate a summary of current and projected financial data based on the comparisons estimated on the previous screen.

You may enter the estimated life of the new equipment and estimate energy cost inflation.

The Financing Sections allows you to enter the number of months to be financed and the current rate.

To open the Savings Calculator, click on the Savings Calculator button located on the bottom of the Estimated Return On Investment Screen.

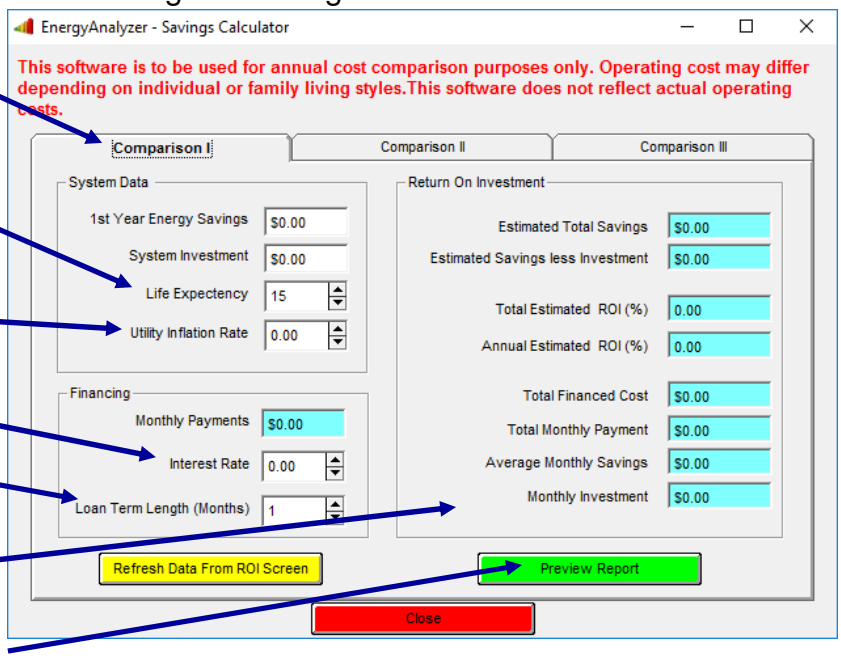


Note: This software is to be used for annual cost comparison purposes only. Operating cost may differ depending on individual or family life styles. This software does not reflect actual operating costs.

Using The Savings Calculator

The following is a step by step guide to using the Savings Calculator.

1. To start, select Comparison I, II, or III.
2. Click on the "Refresh Data from the ROI Screen" button at the bottom of the screen.
3. Enter the estimated life of the new equipment (in years).
4. Enter the estimated utility inflation rate.
5. Enter the current financing interest rate.
6. Enter the number of months to be financed.
7. Review the result.
8. Click on the "Preview Report" button to preview and print a summary.



Continue on next page for printing instructions.

Section III. Comparing Operational Cost of Equipment

Print/Preview Screen

After you clicked on the Preview Reports button the Preview/Print Reports screen pops up.

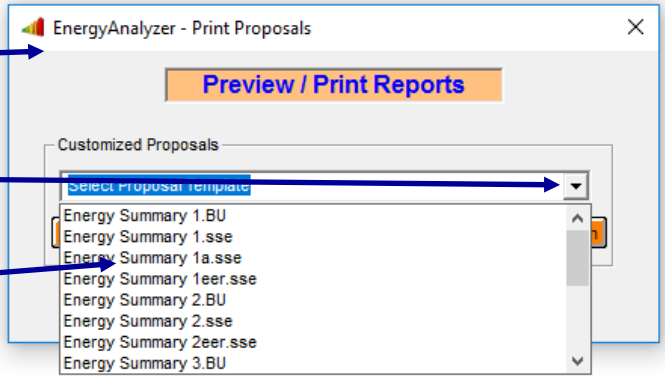
Click the Select Proposal Template down arrow.

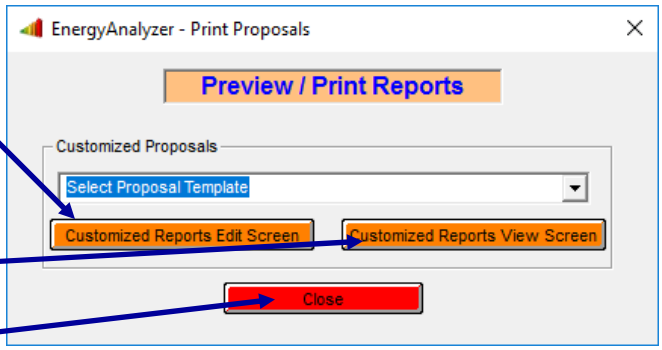
Select the Template you want to view or print.

Click on the Customized Report Edit Screen button to edit an existing template or design a new one.

Click on the Customized Reports View screen to view your report before printing.

Click Close to return to the Savings Calculator Screen





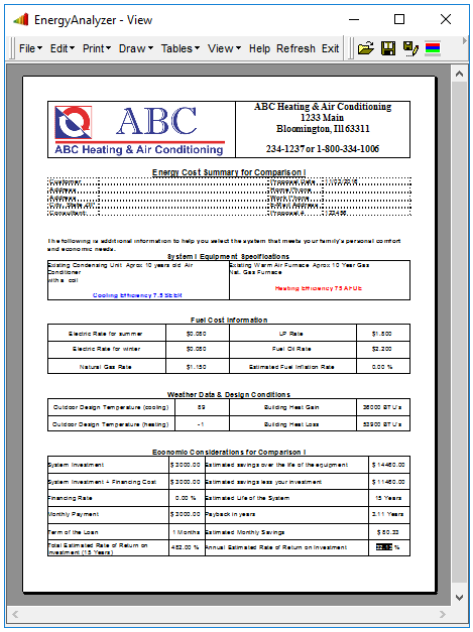
Note: See the Report Writer Manual to design or customize templates.

Sample Summary

A sample Summary Template is available, but you may design your own using Report Writer.

This example shows:

- Customer Information
- Equipment Specifications
- Fuel Cost Information
- Weather Data and Design Conditions
- Economic Considerations, including:
  - System Investment
  - System Investment + Financing Cost
  - Financing Rate & Term
  - Monthly Investment
  - Estimated savings over the life of equip.
  - Estimated Savings less your investment
  - Estimated life of the equipment
  - Payback in years
  - Estimated Monthly Savings
  - Rate of Return On Investment
  - Rate of Return On Investment (15Yrs.)



Section IV. Techniques for Closing the Sale

Helpful hints to closing more sales

The Energy Analyzer is a valuable tool in the sales process. It will allow you to graphically show your customer the benefits of investing in a higher SEER rating, 2-stage equipment, or possibly a heat pump.

From an economic point of view

- Do not pre-judge your customer's desire or ability to purchase high-efficiency equipment, and always offer options.
- Collect all the utility costs from your local utility companies and insert them into the Energy Analyzer. Use the lowest rate if it is a tiered rate system. The higher rates are for general lighting, cooking, etc. Keep them current.
- Know the efficiencies of the equipment you most often replace. You may add them to the Manual Equipment database and select them by checking the "Manual" checkbox.
- Do your homework. Pre-determine the best equipment to offer by analyzing different high-efficiency equipment and heat pumps.
- Always offer the most efficient equipment first on your proposal.
- Always show a monthly payment amount on every proposal.
- Always select the equipment with the highest operating cost first when comparing different equipment.
- Using the heat loss graph and operating hours per bin, show the value in dual fuel heat pumps and two stage equipment.
- Review the Energy Cost Summary with the homeowner. Explain the Operating Cost Comparisons of the existing equipment with the equipment you are offering. Explain the estimated monthly savings and how long it will take for the homeowner to regain their investment.
- Show the Rate of Return on their investment and the estimated savings over the life of the equipment.

Customer Assurance

- Show your customer the benefit of adjusting the Economic Balance Point for heat pumps on an annual basis. Be sure to offer "Maintenance Agreements" on every proposal.
- Show the value of no major maintenance expenses for over ten years with Extended Warranties.
- Review the Energy Cost Summary. This summary helps the homeowner make an informed decision on investing in high-efficiency.

Comfort & Health

- Show how variable speed high-efficiency equipment may have the higher runtime, but will have the lower operating cost.
- Explain that the longer runtime hours will produce even temperatures, increasing comfort without increasing cost.
- Explain the improved air filtration due to the increased runtime of the variable speed equipment.
- Always explain the comfort and health benefits of variable speed equipment as well as the financial benefit of high-efficiency.

Section IV. Techniques for Closing the Sale

Accuracy

The results of the energy analysis are very accurate. This system draws its conclusions from several information files listed below.

1. Load Requirements

The building's load requirements may be imported from LoadCalc in the Electronic Consultant by clicking on the green plus sign. You may also manually enter the data.
If the loads requirement comes from a computer printout it is perceived to be more accurate than if hand written.

2. Design Conditions

Be sure the design conditions are the same values used in the heat loss/gain calculation.

3. Cfactor

The Cfactor is required to make the design heating load hours correlate with the effective heating load hours experienced under actual operating conditions.

4. Weather Bin Data

The weather bin data is derived from the National Weather Service over a period of many years and is the average number of hours the temperature is at a given degree range annually for a given location.

5. Local Fuel Cost

You should contact your local utility companies for fuel cost in your area. Be sure and ask for the heat pump rates, if available. You may want to check back periodically for any rate changes. Use the lowest rate for heat pumps if a tiered rate is used. Note: Do not average utility rates.

6. BTU Value

BTU per fuel unit can be modified if needed to adjust for the heat content of a particular fuel.

7. Equipment Efficiencies

The Manufacturer's equipment database contains the equipment specifications and temperature bin ratings as determined by equipment testing. It may also contain fan motor watts.

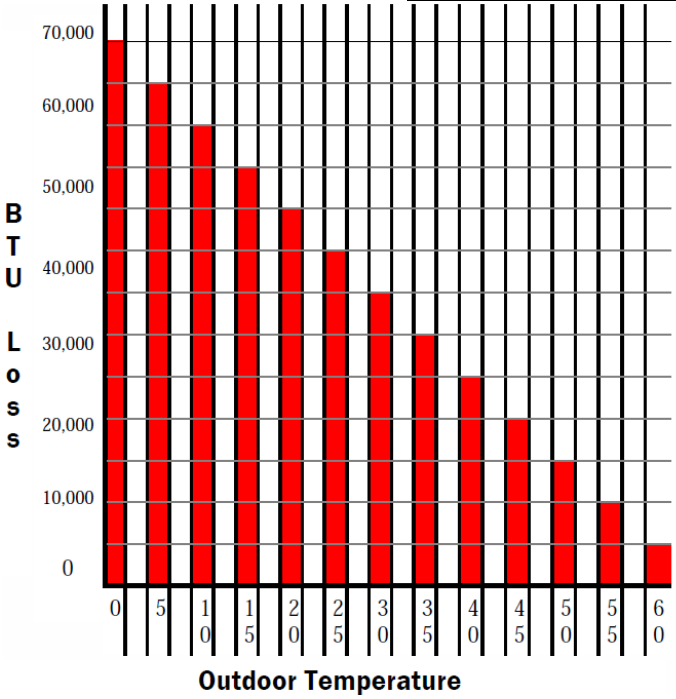
Closing The Sale

- When you combine the accuracy, as outlined above, with the system cost and other financial variables, such as savings interest and loan interest, a very dramatic graph is produced.
- The Homeowner will clearly see the advantage of high-efficiency equipment after reviewing their return on investment and/or years payback.
- You might mention that there is no income tax on cost savings, but there might be on interest income.
- From the savings calculator screen, you may print a one page summary of all the economic
- considerations.
- This summary will reinforce your recommendation for investing in high-efficiency equipment and/or dual-fuel heat pumps.

Note: Even though this software is very accurate, operating cost may differ depending on individual or family life styles. This software is to be used for annual cost comparison purposes only and does not reflect actual

Section IV. Techniques for Closing the Sale

Heat Loss Graph



Calculated Heat Loss

This example is for Chicago, IL

Heat Loss 70,000
Heat Gain 36,000

Winter Design Temp. 0
Summer Design Temp. 91

Note:
You may draw a line showing 2-stage furnace output to reinforce to your customer, the benefits of purchasing High-End equipment.

Temperature Bin Graph

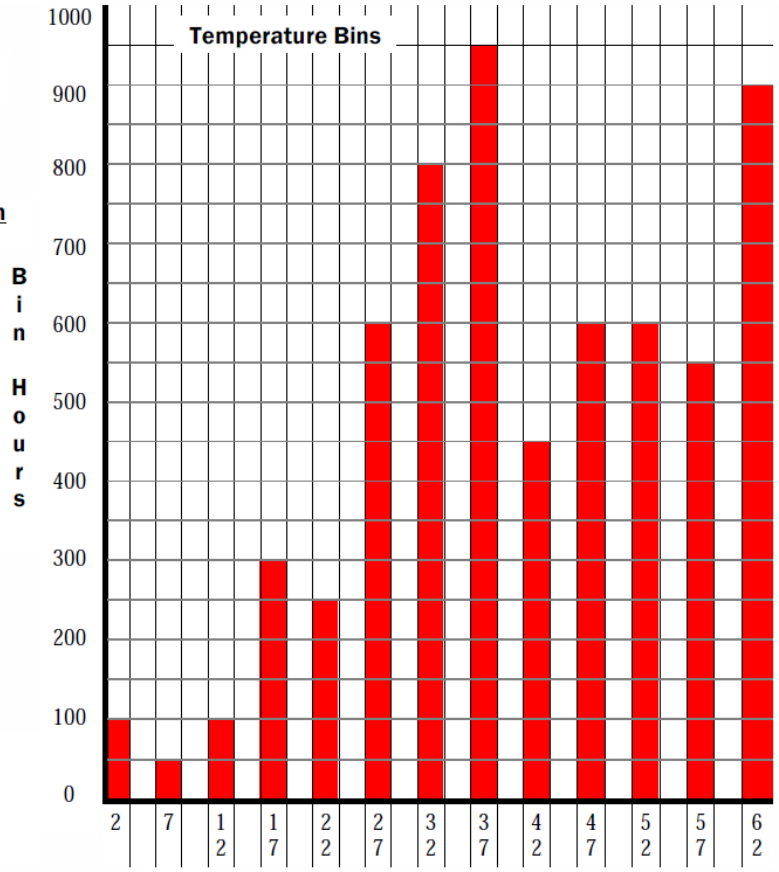
Sample Temperature Bin Graph

Heating Hours per Temperature Bin

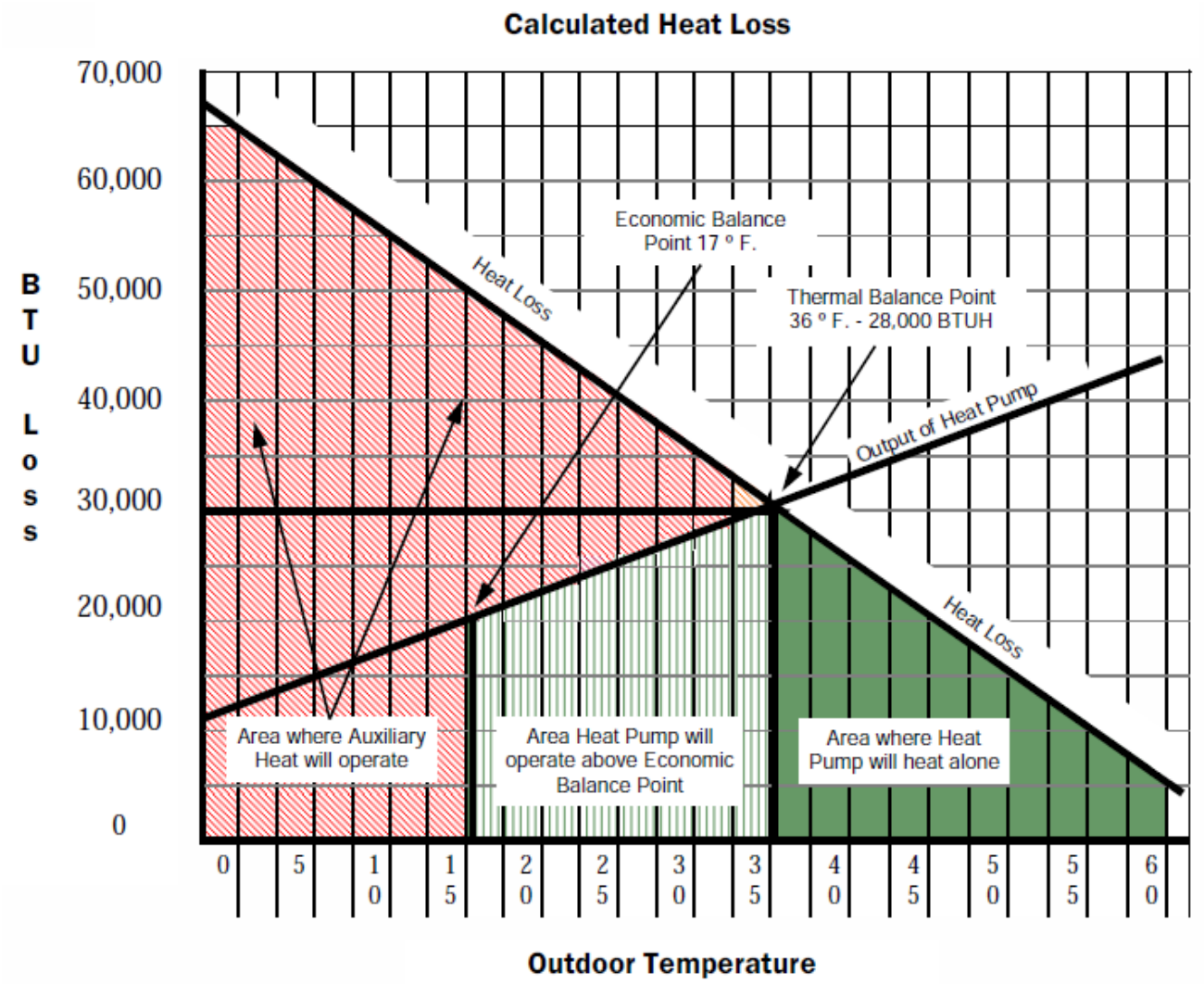
This example is for Chicago, IL

Heat Loss 70,000
Heat Gain 36,000
Winter Design Temp. 0
Summer Design Temp. 91

Note that approximately 85 % of the recorded hours are in temperature bins from 27° F. to 62° F., Excellent for heat pump operation and/or two stage equipment.



Section IV. Techniques for Closing the Sale
Economic/Thermal Balance Point Graph



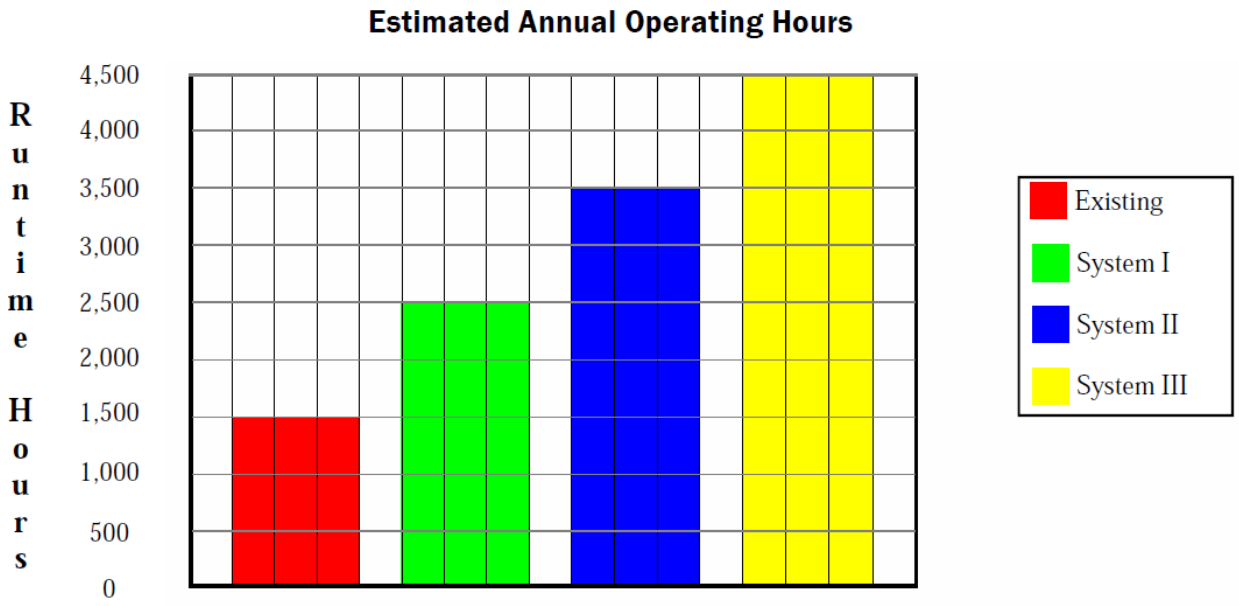
Where the Heat Pump is the most efficient source of heat.

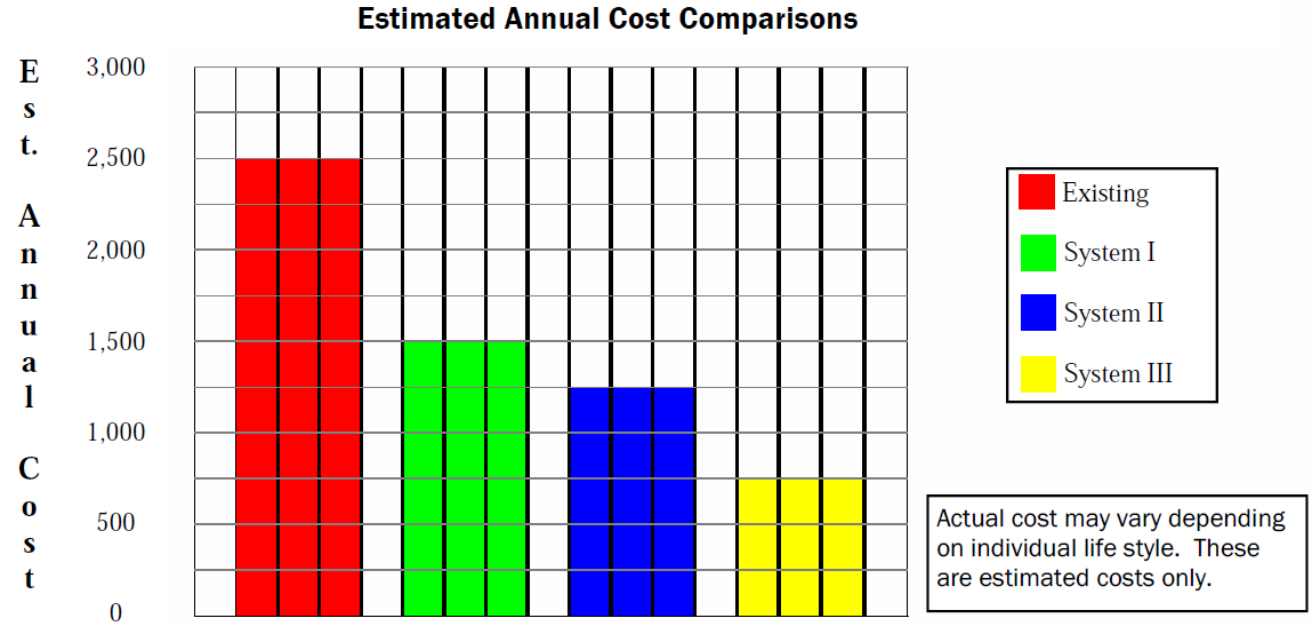
Where the Heat Pump will operate above the economic balance point and is more efficient.

Area where auxiliary heat will operate.

The above Heat Loss chart graphically shows how a Heat Pump can save dollars.

Section IV. Techniques for Closing the Sale
Comparing Operating Hours to Operating Cost





Selling two speed equipment and accessories
The Chart at the top of the page is a tool you may use to show the homeowner the operating hours of each system quoted. The Chart at the bottom will show the homeowner the estimated annual cost to operate each system quoted. In the above examples, the system that cost the least runs the most. You should explain that with the system running more, the filters will be more effective and the temperature will be more constant. This will produce a healthier more comfortable environment. Additional Sales Opportunity: Electronic Air Cleaner, UV light and ERV.

Section IV. Techniques for Closing the Sale

Energy Cost Summary

The Energy Cost Summary can help you close the sale.

When you propose high-efficiency equipment and show the savings over the life of the equipment, the homeowner can see that investing in high-efficiency is the right choice.

In some instances, when financed, the savings will exceed the payment, causing a positive cash flow when compared to existing utility costs.

This example shows:

- Customer Information and Proposal #
- Equipment Specifications, including SEER rating and AFUE
- Fuel Cost Information
- Weather Data and Design Conditions
- Economic Considerations

ABC

ABC Heating & Air Conditioning

ABC Heating & Air Conditioning
1233 Main
Bloomington, Ill 63311

234-1237 or 1-800-334-1006

Energy Cost Summary for Comparison I

Customer		Proposal Date	11/03/2016
Address		Home Phone	
Address		Work Phone	
City, State ZIP		E-Mail Address	
Consultant:		Proposal #	123456

The following is additional information to help you select the system that meets your family's personal comfort and economic needs.

System I Equipment Specifications

Existing Condensing Unit Aprox 10 years old Air Conditioner with a coil Cooling Efficiency 7.5 SEER	Existing Warm Air Furnace Aprox 10 Year Gas Nat. Gas Furnace Heating Efficiency 75 AFUE

Fuel Cost Information

Electric Rate for summer	$0.080	LP Rate	$1.800
Electric Rate for winter	$0.080	Fuel Oil Rate	$2.200
Natural Gas Rate	$1.150	Estimated Fuel Inflation Rate	0.00 %

Weather Data & Design Conditions

Outdoor Design Temperature (cooling)	89	Building Heat Gain	36000 BTU's
Outdoor Design Temperature (heating)	-1	Building Heat Loss	53900 BTU's

Economic Considerations for Comparison I

System Investment	$ 3000.00	Estimated savings over the life of the equipment	$ 14460.00
System Investment + Financing Cost	$ 3000.00	Estimated savings less your investment	$ 11460.00
Financing Rate	0.00 %	Estimated Life of the System	15 Years
Monthly Payment	$ 3000.00	Payback in years	3.11 Years
Term of the Loan	1 Months	Estimated Monthly Savings	$ 80.33
Total Estimated Rate of Return on Investment (15 Years)	482.00 %	Annual Estimated Rate of Return on Investment	32.13 %

Section IV. Techniques for Closing the Sale
Proposal Package

When you use the Electronic Consultant, LoadCalc, and the Energy Analyzer to develop your proposal you will have the most professional package available.

Even your competition will be impressed!!

Your Professional Proposal Packet will consist of:

- A Cover Sheet with a picture of the customer's home, your Company name, and the Consultant's name
- A copy of your Liability Insurance (optional)
- A Loads Summary showing heat loss/gain of customer's home
- A Picture of Modifications necessary for a comfortable and efficient system
- The Custom Needs Survey outlining the customer's preferences
- The Energy Cost Summary with Return On Investment and Payback period
- The Proposal accurately priced in minutes, right in front of the homeowner

Notes

Notes

ADTEK SOFTWARE
516 NW 20th St. ▪ Oklahoma City, OK 73103
815-452-2345 Phone ▪ 405-844-6314 Fax
www.adteksoft.com