

# **Getting Started with VisualEPlus2**

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Basic Concepts Manual - Essential Information You Need about Running  
VisualEPlus2

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### Getting Started with VisualEPlus2

The remainder of this document is intended to give you a start on using the program with VisualEPlus2 as well as some of the features of using the program.

### Start VisualEPlus2

VisualEPlus is a “Green” Software which can be used just after unzipped. By double clicking on the “VisualEPlus\_EN.exe” (English interface) icon you get the screen shown below for running a solution.

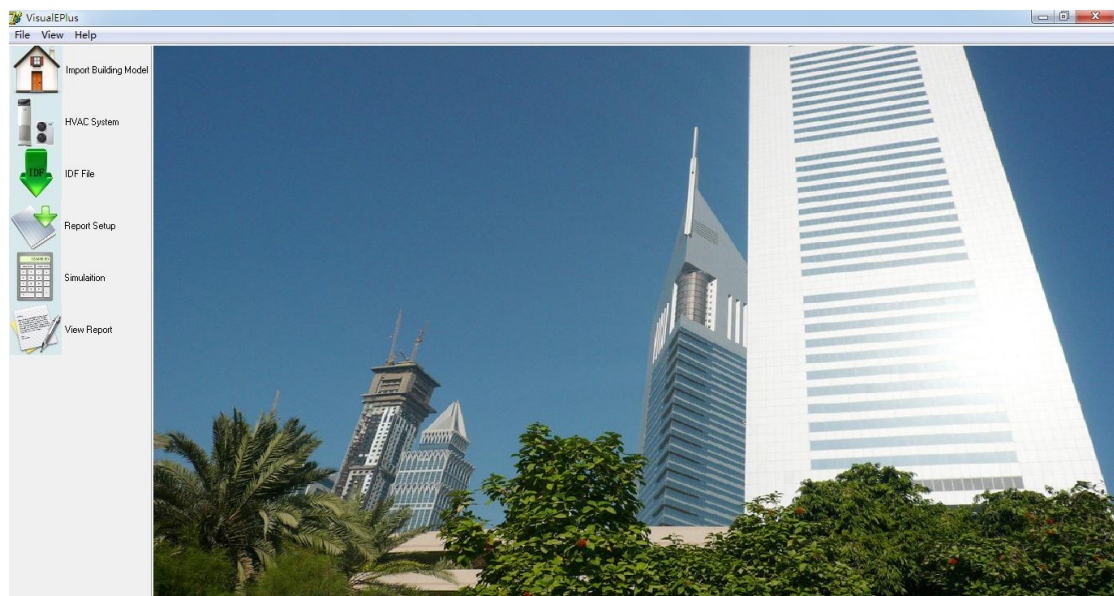


Figure 1. VisualEPlus\_EN.exe Screen

Note that in Win7, you must run VisualEPlus as system administrator when first using the software. (Figure 2)

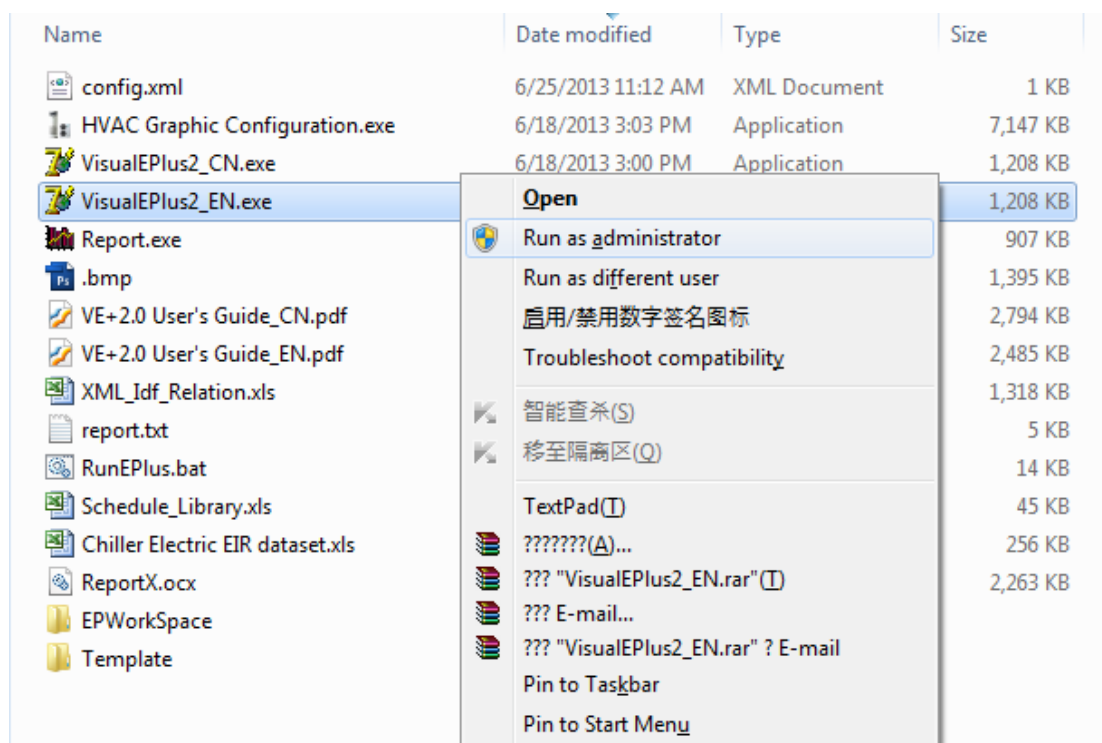


Figure 2. Running VisualEPlus as system administrator

## Creating or Opening a Solution

If you want to create a new solution, you can choose submenu “New Solution” from menu “File”. Then you shall input the solution name and select solution path which mustn’t include Chinese characters or space. In addition, you can configure one typical solution from “Basic Template” pull down list (11 typical solutions offered).

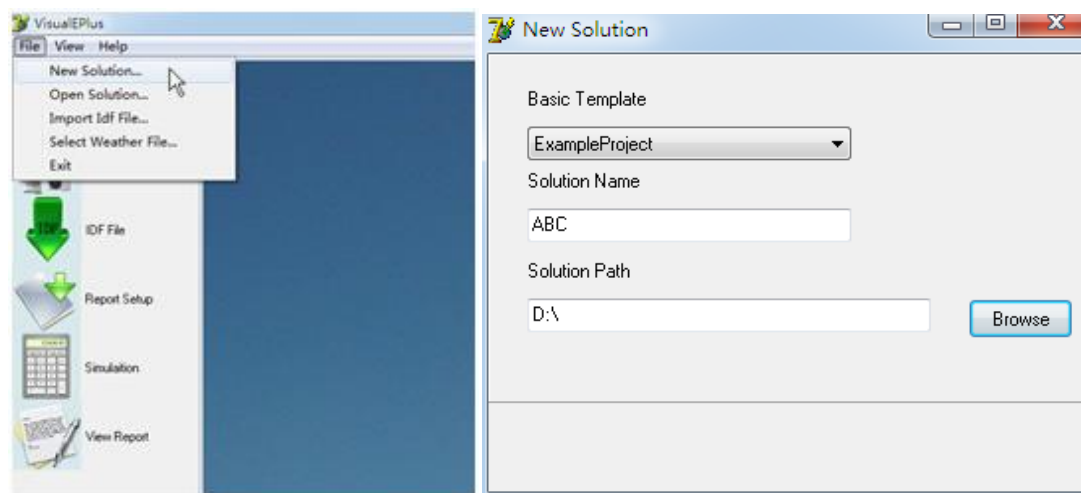


Figure 3. Creating a new solution

The software would automatically generate a folder named “ABC” under “D:\” directory after you press the button “Enter” of the above window (Figure 3). “ABC” folder includes five subfolders which named “BDL”, “HVAC”, “output”, “price” and “weather” and one XML file.

If you have already created a solution, you can press the submenu “Open Solution” from menu “File” to locate a solution (XML file). (Figure 4)

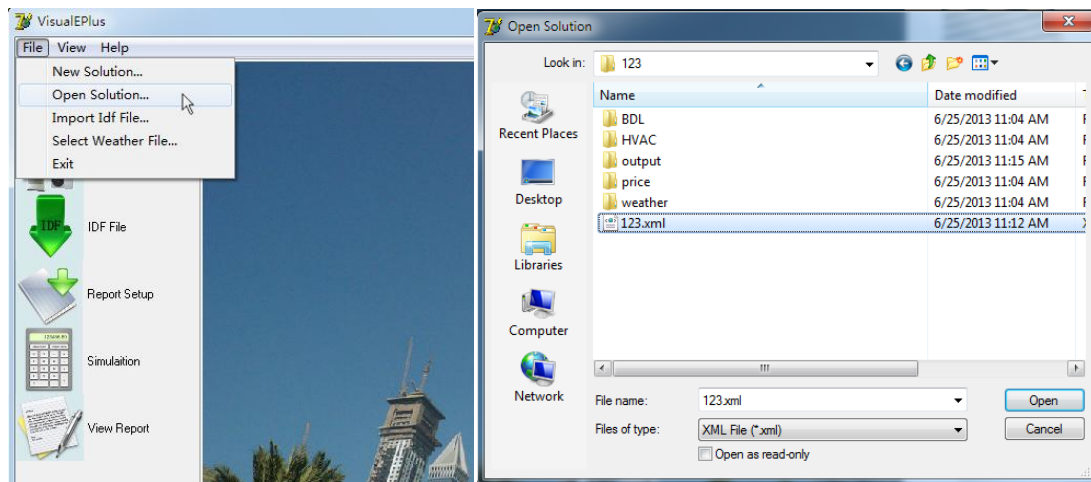


Figure 4. Opening a created solution

## Selecting Weather Files

The weather files can be selected from the submenu “Select Weather File” from menu “File”. The weather files must be *epw* file, the data format of which can be found in detail in the Auxiliary Programs Document of EnergyPlus. The *epw* file would be saved in “weather” folder under current working directory after you finish selecting a weather file.

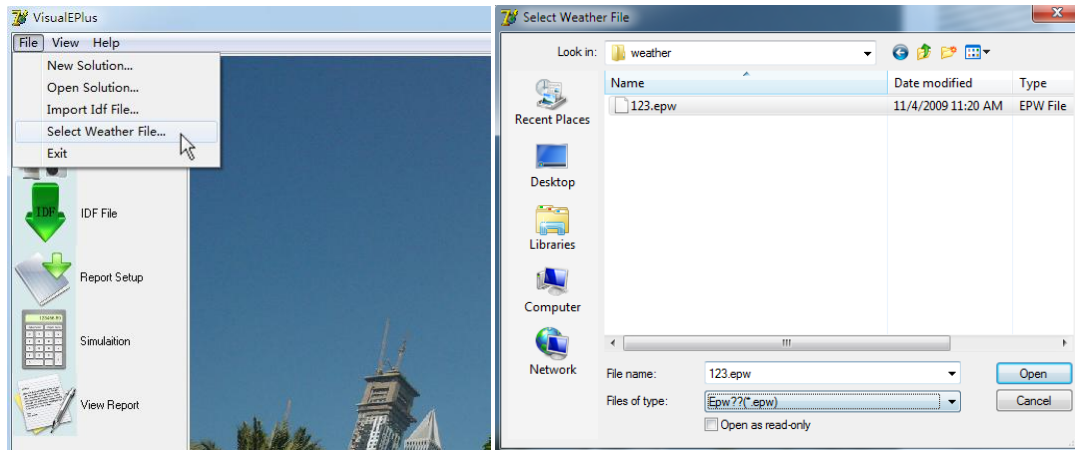


Figure 5. Selecting weather files

## Importing Building Model

You can import building geometry information of IDF files (converted to version 6.0 of EnergyPlus) established by EnergyPlus (or other user interfaces based on EnergyPlus like DesignBuilder) through the function of “Import building model” in the interface or “Import Idf File” from “file” menu. This software would only read the data of geometry, envelope, internal loads and operating schedules in these file. (Other data in the input IDF file would not be read).

The software would generate a *BDL* file named “ABC.bdl” after the building load data input (geometry, envelope, internal load, schedule) is finished. The file would be saved in “*BDL*” folder under current working directory.

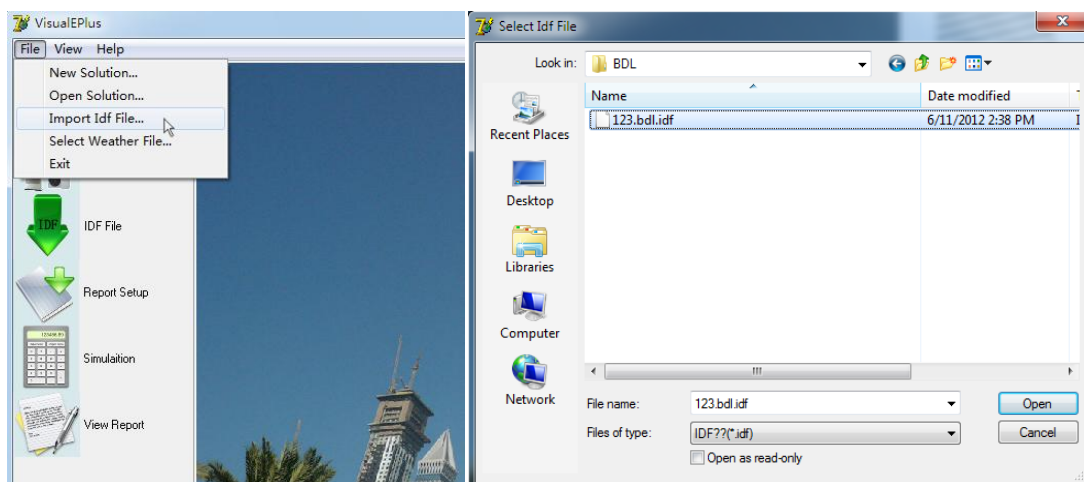


Figure 6. Importing building model

## Describing HVAC System

By clicking on “HVAC System” in the main interface, you get the drag-and-place HVAC system configuration interface (Figure 7), which allows you to freely configure a HVAC system using basic HVAC components, such as zone, fan, coil, pump, pipe, chiller, boilers, etc.

After finishing all HVAC system description, the HVAC configuration interface will generate a *XML* file with user’s system configuration data which would be saved in “*HVAC*” folder under current working directory. You could find more detail description of HVAC system configuration in Users' manual of HVAC configuration & reporting model of VisualEPlus.

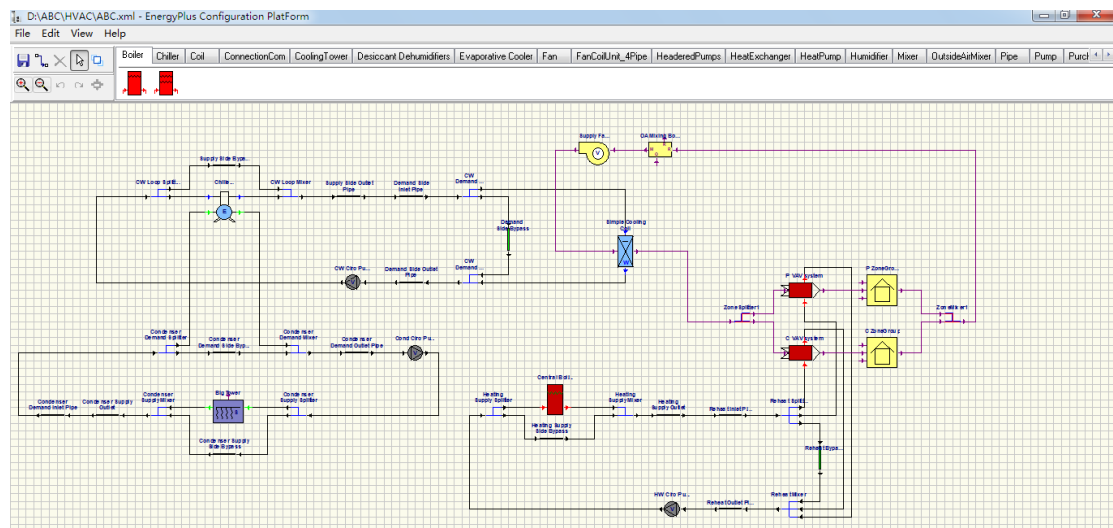


Figure 7. HVAC system interface

## Exporting IDF file

Also, you could use IDF File function (Figure 8) after finishing all the data input to export IDF file. The software would merge the *BDL* file with the *XML* file mentioned above to generate an IDF file which would be saved in an automatic generated folder named “output” under current working directory. In addition, this IDF file with building model and HVAC system information can be opened and edited by Energyplus.



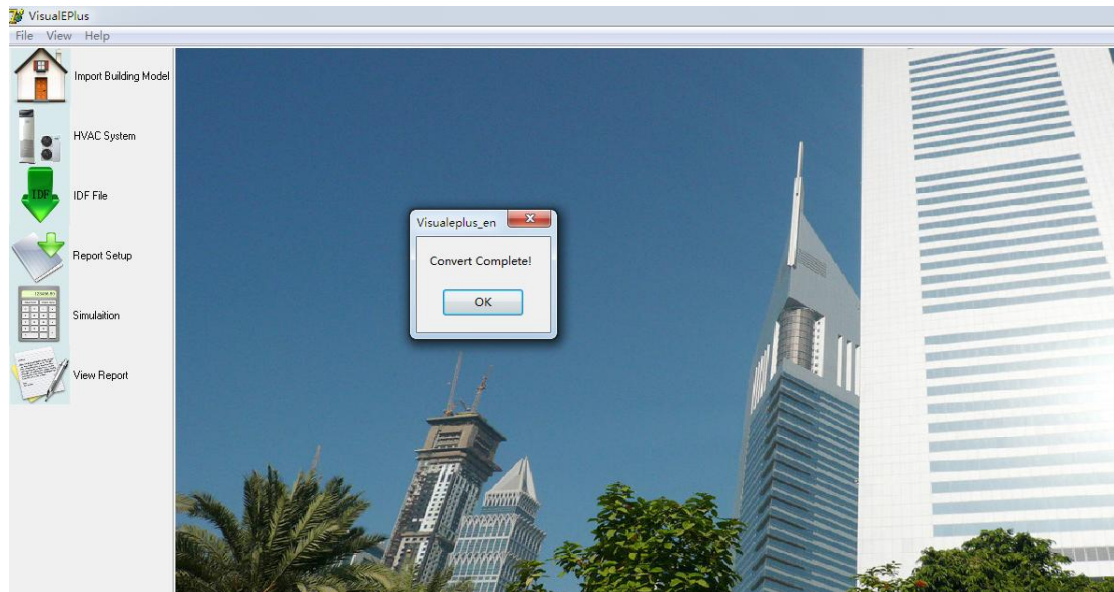


Figure 8. IDF file export

## Report Setup

After the IDF file was generated, you should use Report Setup function to define the variables and meters among all available output data as well as the frequency of outputting. When the Report Setup icon is clicked, the software will have the initial test run. If there is severe error, a warning message window would show up as follow, and then you should modulate the model to eliminate the error before report setup (Figure 9).

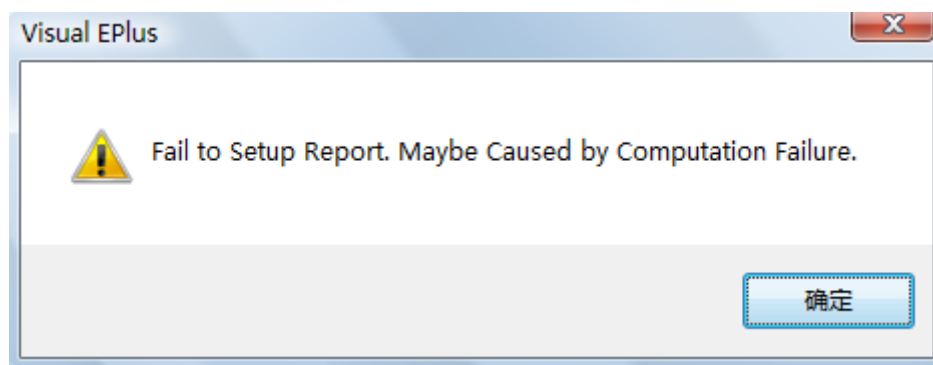
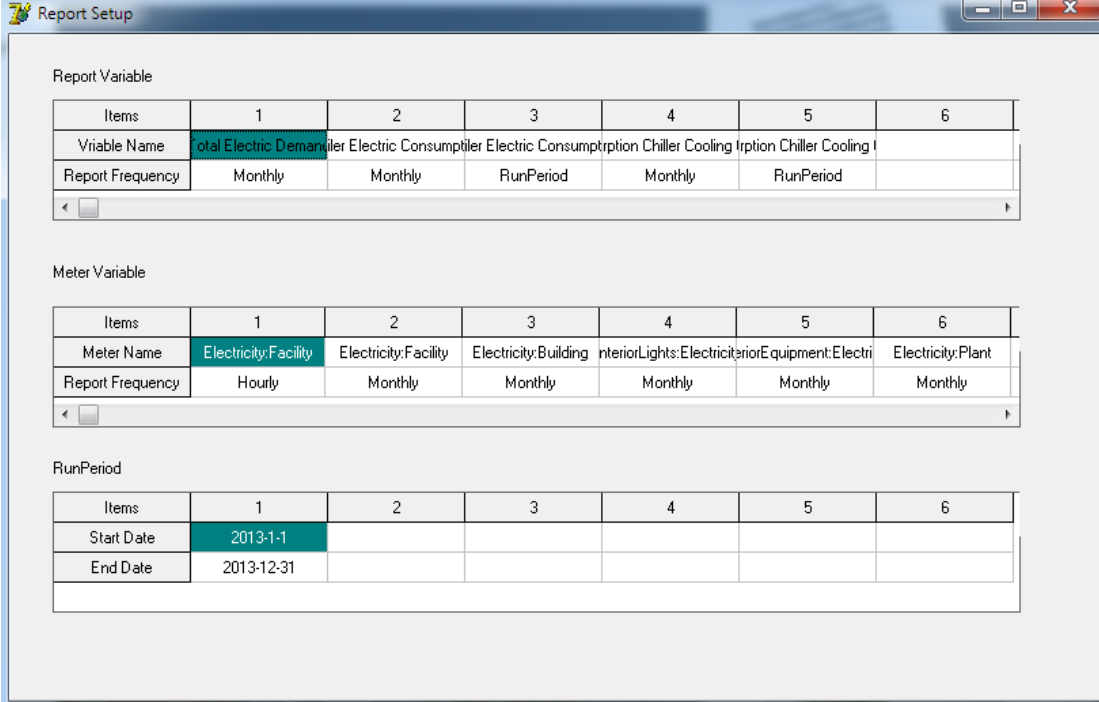


Figure 9. Warning message window

If there is no severe error occurs, the report setup window (Figure 10) will be activated in which you could select the variables, meters that will be reported and the



frequency of reporting.



**Report Variable**

Items	1	2	3	4	5	6
Variable Name	total Electric Demand	Chiller Electric Consumption	Chiller Electric Consumption	Chiller Electric Consumption	Chiller Electric Consumption	Chiller Electric Consumption
Report Frequency	Monthly	Monthly	RunPeriod	Monthly	RunPeriod	

**Meter Variable**

Items	1	2	3	4	5	6
Meter Name	Electricity:Facility	Electricity:Facility	Electricity:Building	InteriorLights:Electricity	InteriorEquipment:Electricity	Electricity:Plant
Report Frequency	Hourly	Monthly	Monthly	Monthly	Monthly	Monthly

**RunPeriod**

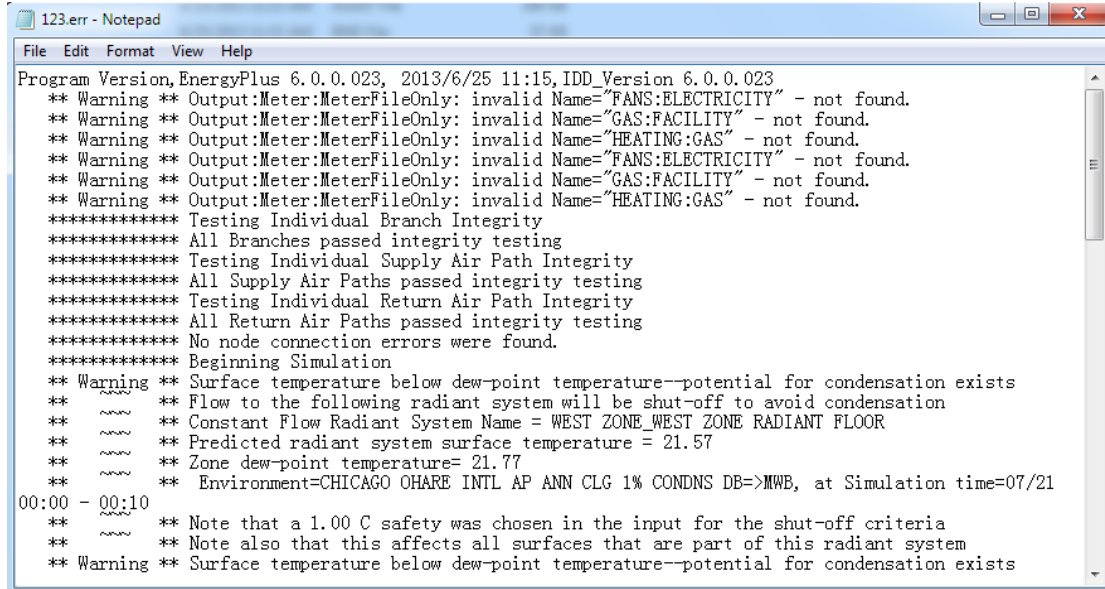
Items	1	2	3	4	5	6
Start Date	2013-1-1					
End Date	2013-12-31					

Figure 10. Report setup window

After the report setup is done, the software would add the report definition part to the existing IDF file in “*output*” folder to generate a complete IDF file for output, review and simulation running (IDF File module).

## Running the Simulation

You can push the "Simulation" button to start the calculating of the solution, which uses EnergyPlus building energy simulation engine. At this point a black DOS window should pop up on your screen and show the progress of your simulation. The simulation is complete when the black DOS box closes.



```

123.err - Notepad
File Edit Format View Help
Program Version, EnergyPlus 6.0.0.023, 2013/6/25 11:15, IDD_Version 6.0.0.023
** Warning ** Output:Meter:MeterFileOnly: invalid Name="FANS:ELECTRICITY" - not found.
** Warning ** Output:Meter:MeterFileOnly: invalid Name="GAS:FACILITY" - not found.
** Warning ** Output:Meter:MeterFileOnly: invalid Name="HEATING:GAS" - not found.
** Warning ** Output:Meter:MeterFileOnly: invalid Name="FANS:ELECTRICITY" - not found.
** Warning ** Output:Meter:MeterFileOnly: invalid Name="GAS:FACILITY" - not found.
** Warning ** Output:Meter:MeterFileOnly: invalid Name="HEATING:GAS" - not found.
***** Testing Individual Branch Integrity
***** All Branches passed integrity testing
***** Testing Individual Supply Air Path Integrity
***** All Supply Air Paths passed integrity testing
***** Testing Individual Return Air Path Integrity
***** All Return Air Paths passed integrity testing
***** No node connection errors were found.
***** Beginning Simulation
** Warning ** Surface temperature below dew-point temperature--potential for condensation exists
** ~~~~~ ** Flow to the following radiant system will be shut-off to avoid condensation
** ~~~~~ ** Constant Flow Radiant System Name = WEST_ZONE_WEST_ZONE_RADIANT_FLOOR
** ~~~~~ ** Predicted radiant system surface temperature = 21.57
** ~~~~~ ** Zone dew-point temperature= 21.77
** ~~~~~ ** Environment=CHICAGO OHARE INTL AP ANN CLG 1% CONDNS DB=>MMWB, at Simulation time=07/21
00:00 - 00:10
** ~~~~~ ** Note that a 1.00 C safety was chosen in the input for the shut-off criteria
** ~~~~~ ** Note also that this affects all surfaces that are part of this radiant system
** Warning ** Surface temperature below dew-point temperature--potential for condensation exists
  
```

Figure 11. Err file text

After simulation is completed, and the text of *err* file is displayed (Figure 11). This err file gives you a detailed information about where warnings (**should look at**), severe (**should probably fix**) or fatal (**must fix**) errors are in the run as well as the time it took for the simulation to complete. Furthermore, the output files of calculating which are directly out of EnergyPlus, such as ABC.dxf (from Report, Surfaces, DXF), ABC.dbg (from Debug Output object), ABC.bnd (about the nodes and branches), ABC.mtd (meter details report) and so on, would be generated in “*output*” folder. The extension of these files is described in detail in “Output Details and Examples” of EnergyPlus.

## Reporting

The View Report module is capable of displaying both Standard Report and Other Report. Standard Report (Figure 12) includes all-year and monthly energy consumption and all-year and monthly energy cost as well as energy consumption breakdown.

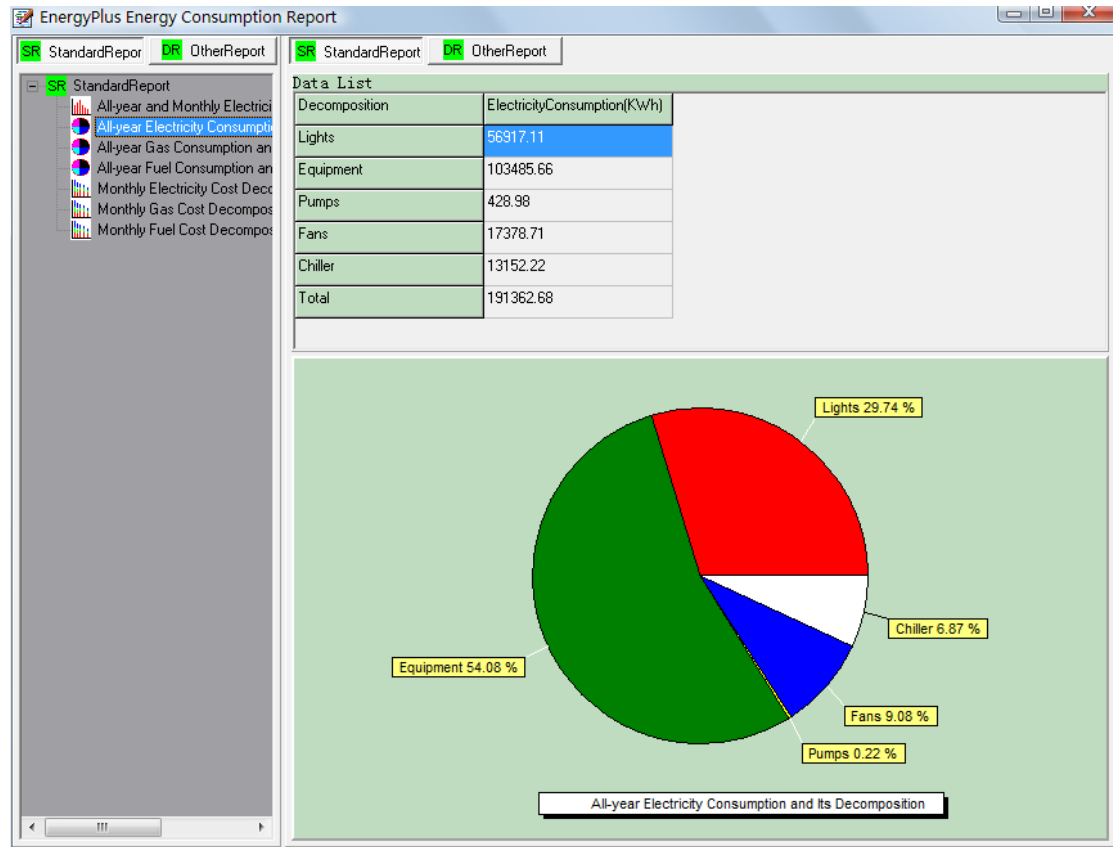


Figure 12. Standard report output interface

Other report (Figure 13) includes standard *Eso* files, *Meter* files and User-defined Report, which can display other simulation results defined by users in report setup, such as indoor air temperatures, flow rates of nodes, hourly energy consumption, etc.

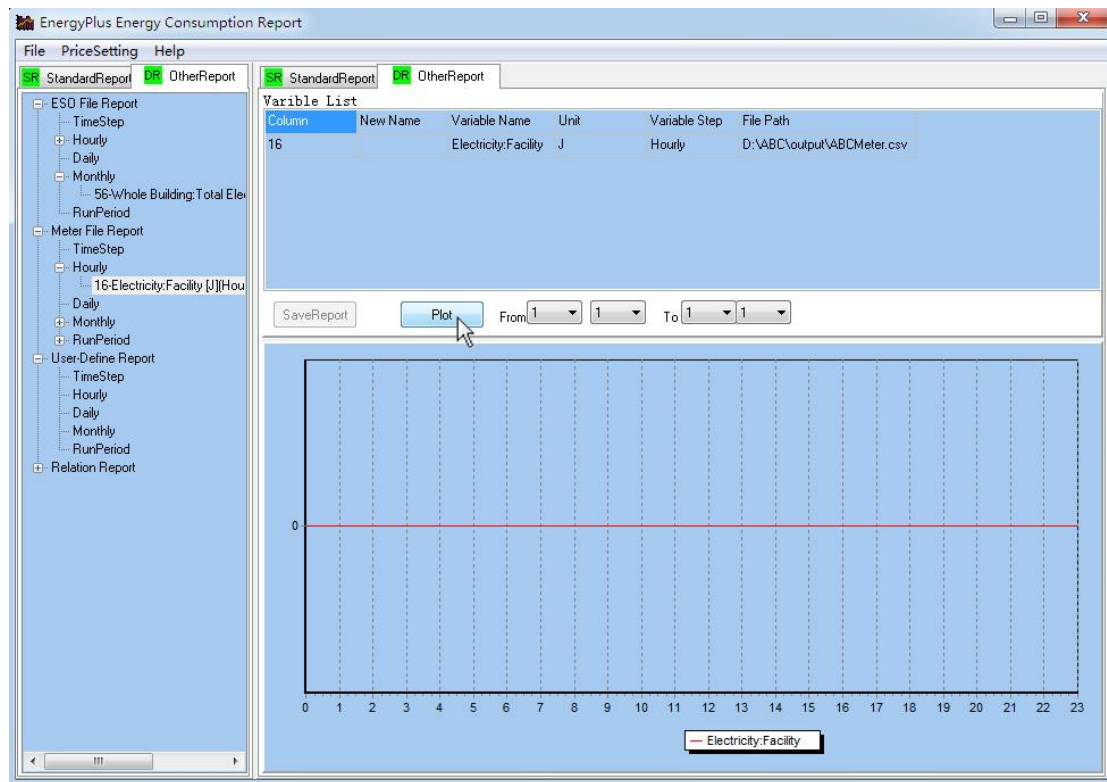


Figure 13. Other report output interface

The distinguishing feature of the report part is to make the EenergyPlus output graphical. You can display value and graphics of one variable separated, or put several together as well, then you can press the submenu “Save Chart” from menu “File” to export the chart as *bmp* file. (Figure 14)

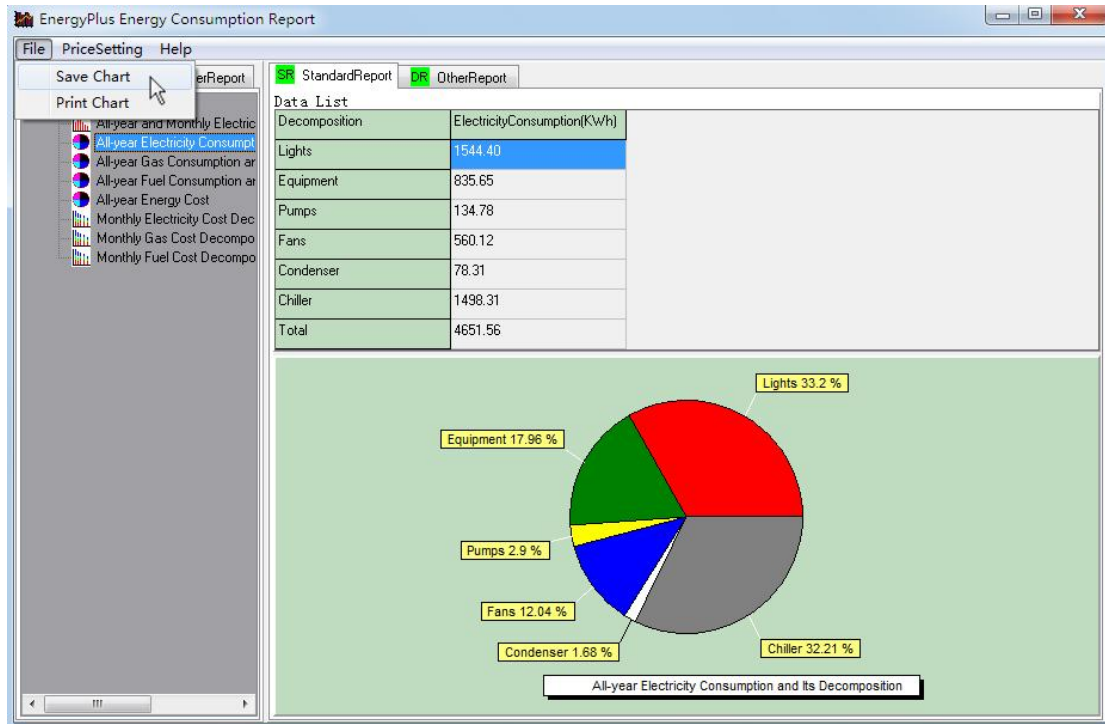


Figure 14. Save Chart screen

## Help Menu

More help is provided for the program under the “Help” menu.

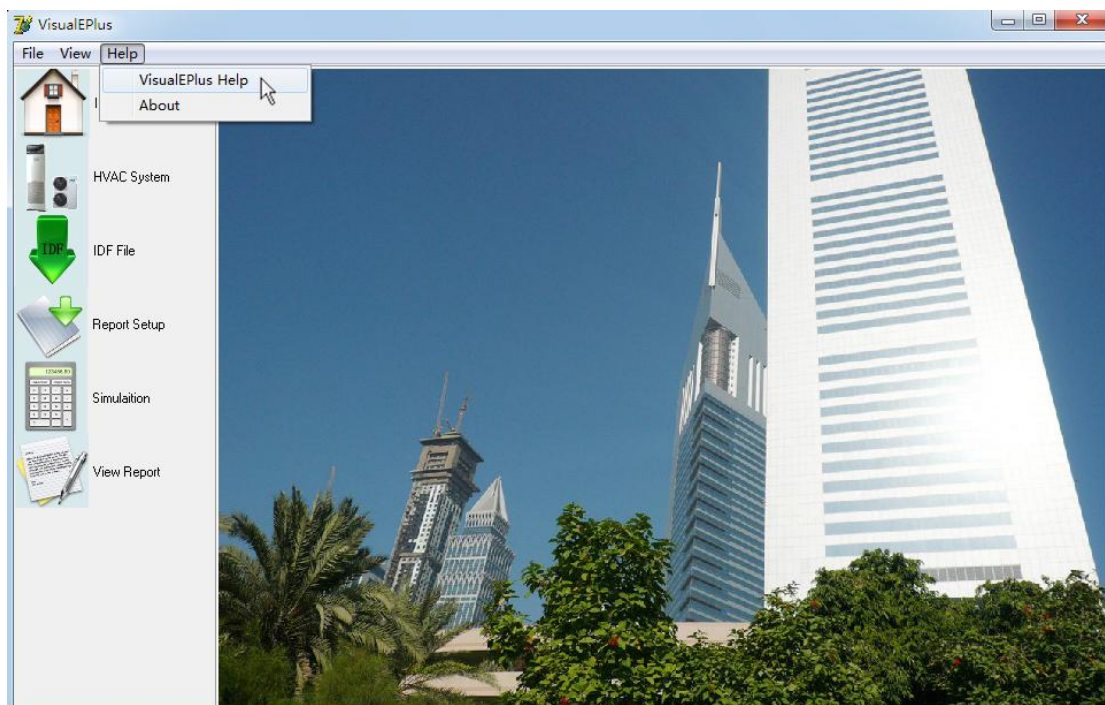


Figure 15. Help menu

## Tutorial Example for running VisualEplus2

The following example provides an introduction of actually using VisualEplus2 to build a model step by step.

### Exercise 1

Exercise 1 presents an introduction to create a model in VisualEplus2 example file, “1ZoneEvapCool”.

#### Overview

- ✧ Rectangular single story building
- ✧ Windows in east and west walls
- ✧ Single zone with no interior partitions
- ✧ Lightweight construction

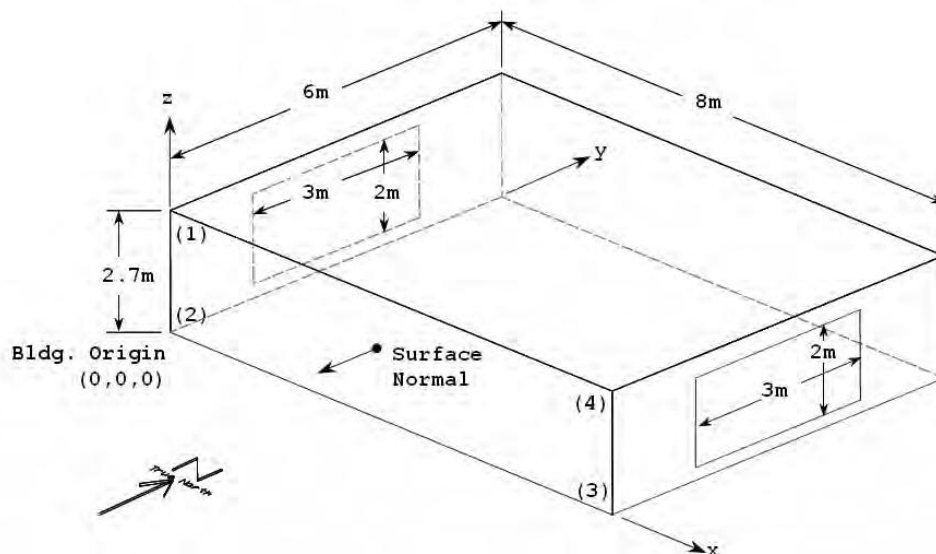


Figure 16. Schematic for Exercise 1

The building is located in Shanghai. This building uses evaporative cooling system in cooling season.

#### Space Conditioning

Cooling setpoint 24 °C, no setback

#### Instructions

## 1. Running VisualEplus2, Creating solution, Select weather file, import building model

- 1) Open VisualEPlus\_EN.exe.
- 2) Under “File”, select “new solution” to create a new solution named 1ZoneEvapCool.
- 3) Under “Select Weather File”, browse for weather file shanghai.epw.
- 4) Under “Import Building Model”, browse for input file 1ZoneEvapCool.idf. This input file contains the 1-zone model, internal loads information and the information shows as follow.

```
NoWind,                                !- Wind Exposure
1.000000,                              !- View Factor to Ground
4,                                     !- Number of Vertices
15.24000, 0.000000, 0.0,               !- X,Y,Z 1 {m}
0.000000, 0.000000, 0.0,               !- X,Y,Z 2 {m}
0.000000, 15.24000, 0.0,               !- X,Y,Z 3 {m}
15.24000, 15.24000, 0.0;               !- X,Y,Z 4 {m}

BuildingSurface:Detailed,
Zn001:Roof001,                          !- Name
Roof,                                  !- Surface Type
ROOF31,                                !- Construction Name
Main Zone,                             !- Zone Name
Outdoors,                              !- Outside Boundary Condition
,                                       !- Outside Boundary Condition Object
SunExposed,                            !- Sun Exposure
WindExposed,                           !- Wind Exposure
0,                                     !- View Factor to Ground
4,                                     !- Number of Vertices
0.000000, 15.24000, 4.572,             !- X,Y,Z 1 {m}
0.000000, 0.000000, 4.572,             !- X,Y,Z 2 {m}
15.24000, 0.000000, 4.572,             !- X,Y,Z 3 {m}
15.24000, 15.24000, 4.572;             !- X,Y,Z 4 {m}

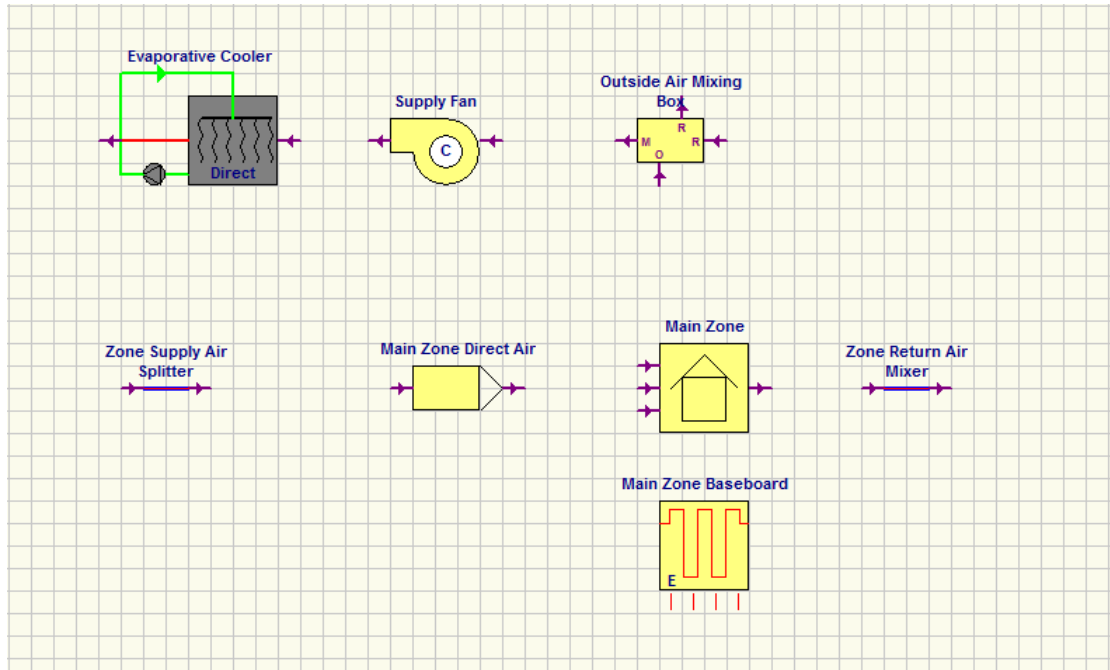
!- ===== ALL OBJECTS IN CLASS: ZONEINFILTRATION:DESIGNFLOWRATE =====



ZoneInfiltration:DesignFlowRate,
Main Zone Infiltration,                 !- Name
Main Zone,                             !- Zone or ZoneList Name
System Availability Schedule,           !- Schedule Name
Flow/Zone,                             !- Design Flow Rate Calculation Method
0.02,                                  !- Design Flow Rate {m3/s}
,                                       !- Flow per Zone Floor Area {m3/s-m2}
,                                       !- Flow per Exterior Surface Area {m3/s-m2}
,                                       !- Air Changes per Hour
1.0000,                                !- Constant Term Coefficient
0.0000,                                !- Temperature Term Coefficient
0.0000,                                !- Velocity Term Coefficient
0.0000;                                !- Velocity Squared Term Coefficient
```

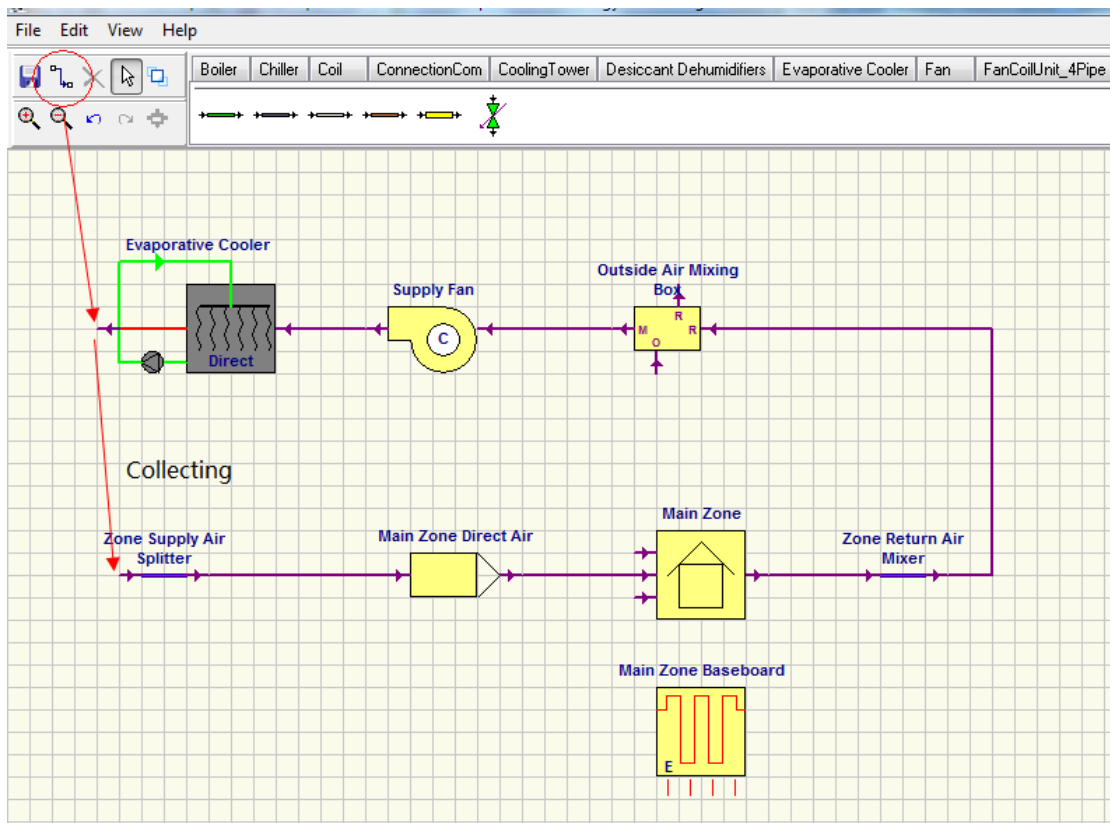
## 2. Describing HVAC System, Exporting IDF File, Report Setup


- 1) Under “HVAC System”, add 8 basic HVAC components, Zone, Evaporative Cooler - Direct, Fan - Constant Volume, Outside Air Mixer, Splitter - Zone Splitter, Mixer-Zone Mixer, SingleDuct – AirTerminal: SingleDuct: Uncontrolled and RadiantDevice – ZoneHVAC: High TemperatureRadiant. The names and detailed descriptions for each component can be referenced from the example file.



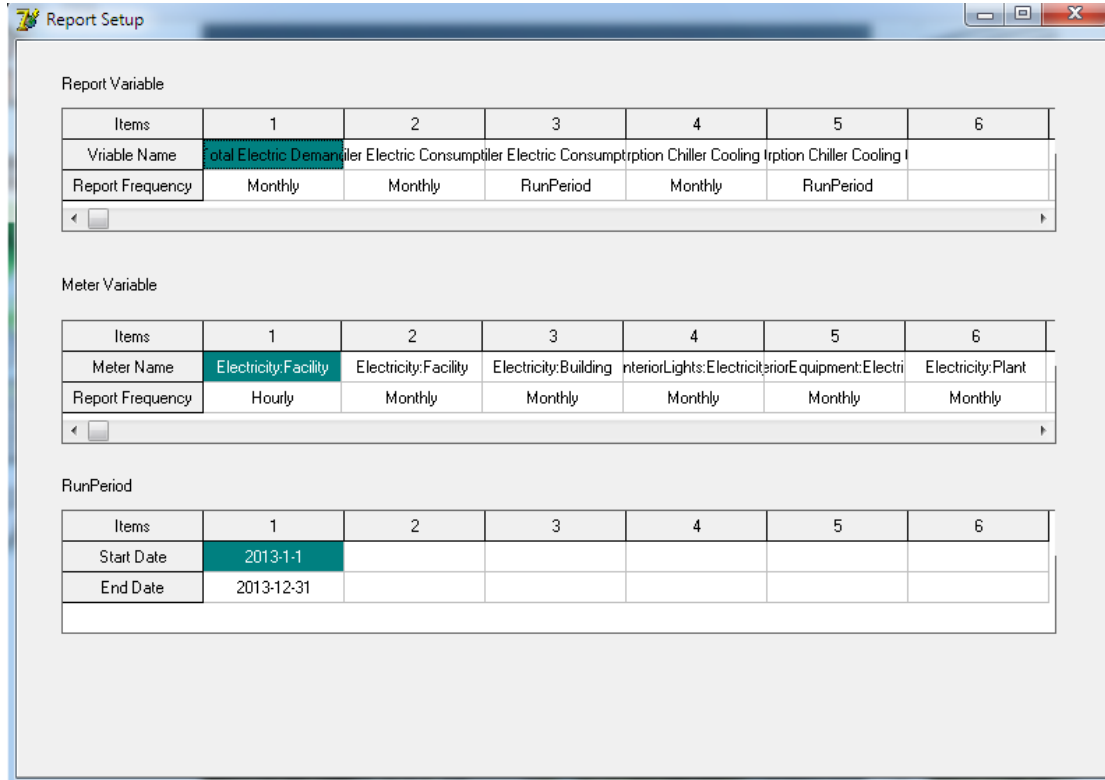


2) Use  button in the upper left corner of the main interface to connect the 8 components. Click the  icon, move the cursor to the output node of the source component, when input focus shows up, left-click, and a connecting line is finished.



3) Click the  icon to save the configuration, select IDF File function to export

IDF file, Change the reporting frequency from Hourly to Monthly and remain other objects as default.



**Report Setup**

Report Variable

Items	1	2	3	4	5	6
Variable Name	Total Electric Demand	Electricity:Facility	Electricity:Building	InteriorLights:Electricity	InteriorEquipment:Electricity	Electricity:Plant
Report Frequency	Monthly	Monthly	RunPeriod	Monthly	RunPeriod	

Meter Variable

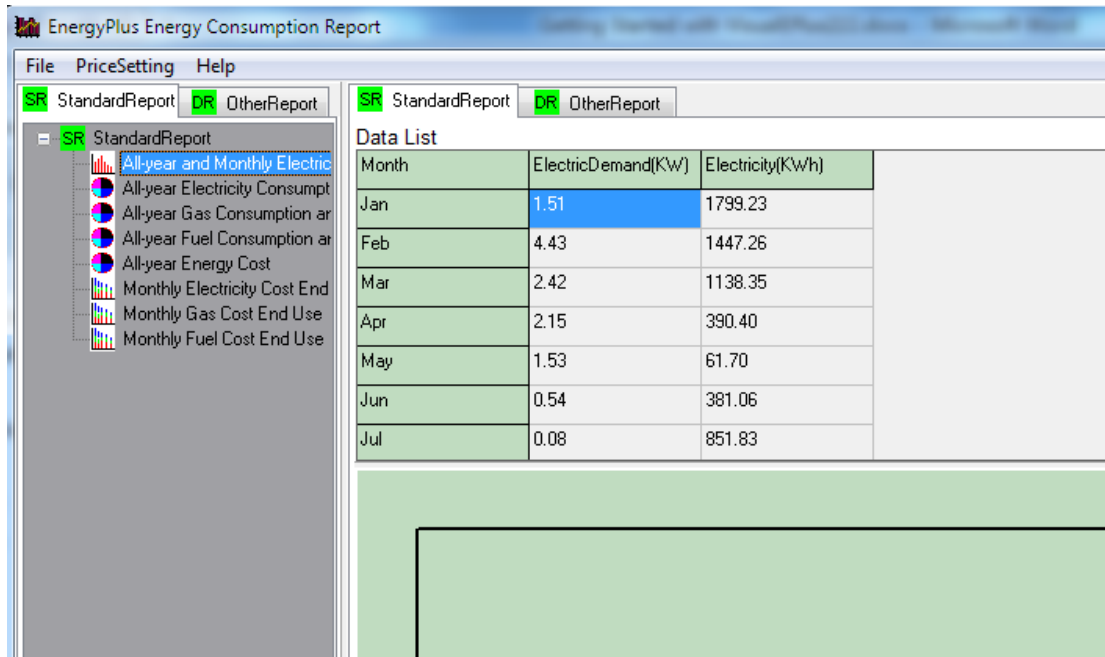
Items	1	2	3	4	5	6
Meter Name	Electricity:Facility	Electricity:Facility	Electricity:Building	InteriorLights:Electricity	InteriorEquipment:Electricity	Electricity:Plant
Report Frequency	Hourly	Monthly	Monthly	Monthly	Monthly	Monthly

RunPeriod

Items	1	2	3	4	5	6
Start Date	2013-1-1					
End Date	2013-12-31					

### 3. Running the simulation and Reporting

Click the "Simulation" button to start the calculating of the solution. After simulation is completed, the result can be reported as follow.



**EnergyPlus Energy Consumption Report**

File PriceSetting Help

SR StandardReport DR OtherReport

SR StandardReport

- All-year and Monthly Electric Demand
- All-year Electricity Consumption
- All-year Gas Consumption
- All-year Fuel Consumption
- All-year Energy Cost
- Monthly Electricity Cost End Use
- Monthly Gas Cost End Use
- Monthly Fuel Cost End Use

**Data List**

Month	ElectricDemand(KW)	Electricity(KWh)
Jan	1.51	1799.23
Feb	4.43	1447.26
Mar	2.42	1138.35
Apr	2.15	390.40
May	1.53	61.70
Jun	0.54	381.06
Jul	0.08	851.83

## Exercise 2

Exercise 2 presents an introduction to apply a template in VisualEplus2 example file to other building model. This method involves the combination of the HVAC configuration in the template and the building model built by the uses and several revisions in HVAC system. This method can be used when the users have the same HVAC system with the template in VisualEplus2 example file while the building is different.

### Overview

The building is located in Shanghai. This is a single story building with single zone. This building uses evaporative cooling system, which is the same with the system in VisualEplus2 example file “1ZoneEvapCool”.

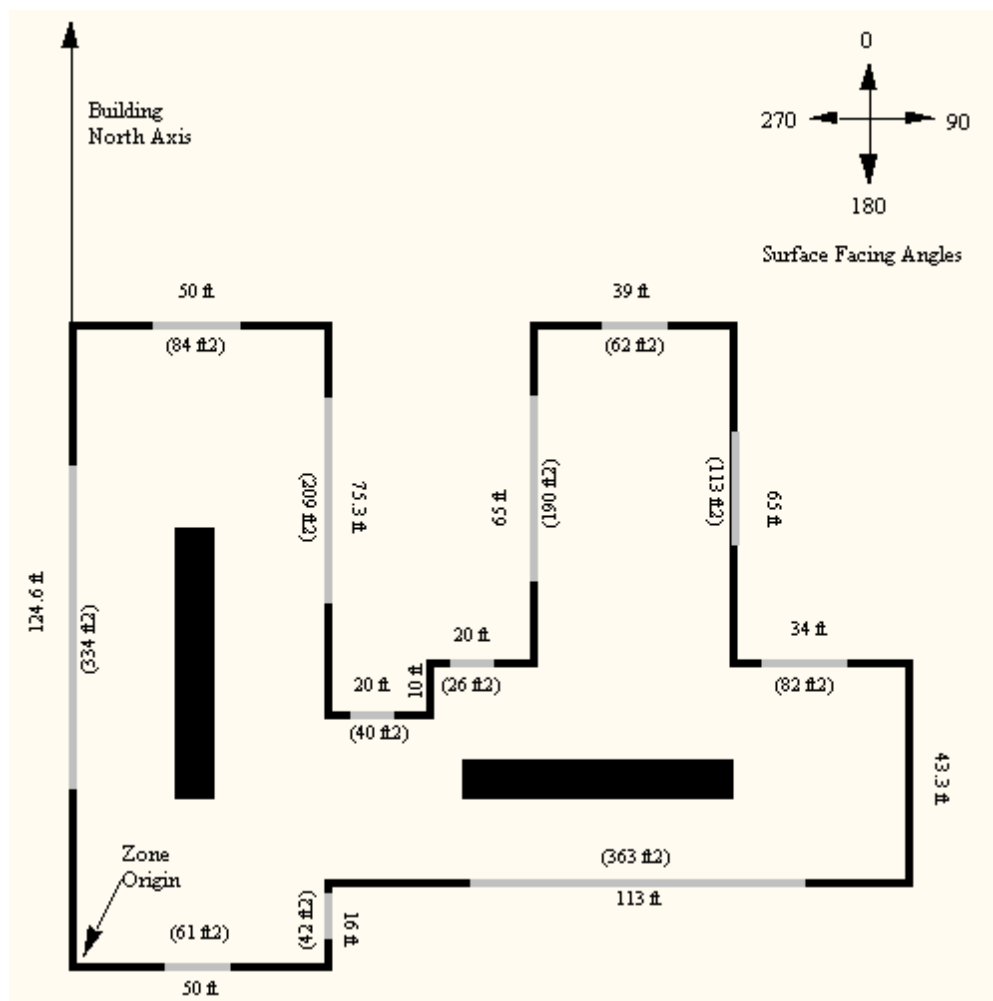


Figure 17. Schematic for Exercise 2

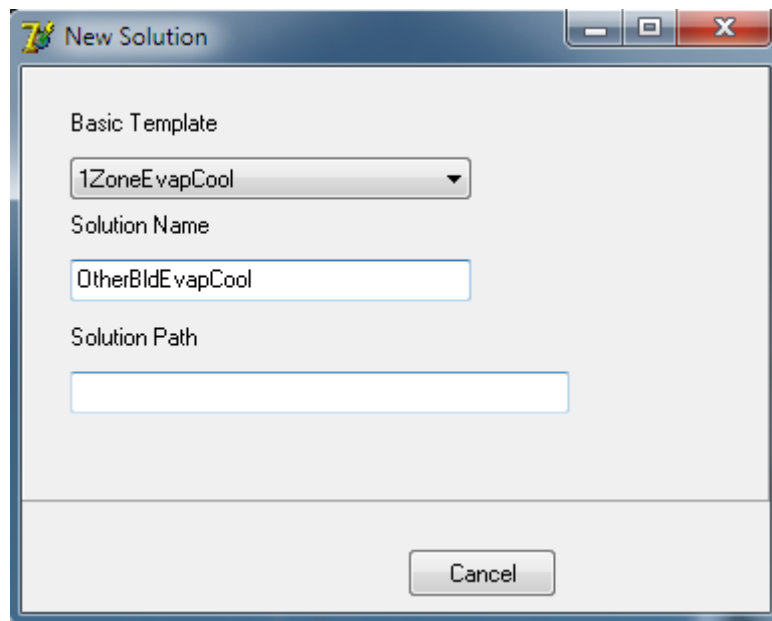
### Space Conditioning

Cooling setpoint 24 °C, no setback

## Instructions

### 1. Running VisualEplus2, Creating solution, Select weather file, import building model

- 1) Open VisualEPlus\_EN.exe.
- 2) Under “File”, select “new solution” to create a new solution named OtherBldEvapCool and select “1ZoneEvapCool” under “Basic Template”.



- 3) Under “Select Weather File”, browse for weather file shanghai.epw.
- 4) Under “Import Building Model”, browse for input file OtherBldEvapCool.idf that built by the users. This input file should contain the building model, internal loads information and other information till ZoneInfiltration: DesignFlowRate.

```

0,          !- Fraction Latent
0.3000000,  !- Fraction Radiant
0;          !- Fraction Lost

ElectricEquipment,
EAST ZONE ElecEq 1,  !- Name
EAST ZONE,          !- Zone or ZoneList Name
OFFICE EQUIP,       !- Schedule Name
EquipmentLevel,     !- Design Level Calculation Method
464.375,            !- Design Level {W}
,                  !- Watts per Zone Floor Area {W/m2}
,                  !- Watts per Person {W/person}
0,                !- Fraction Latent
0.3000000,        !- Fraction Radiant
0;                !- Fraction Lost

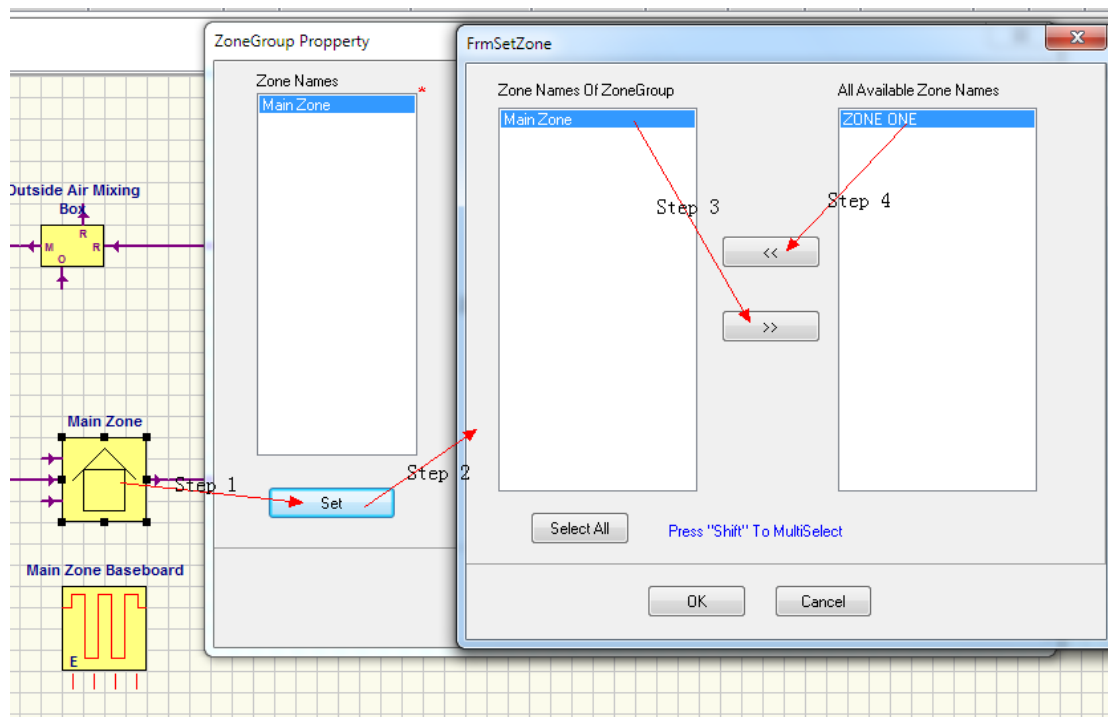
ElectricEquipment,
NORTH ZONE ElecEq 1,  !- Name
NORTH ZONE,          !- Zone or ZoneList Name
OFFICE EQUIP,       !- Schedule Name
EquipmentLevel,     !- Design Level Calculation Method
2928.751,           !- Design Level {W}
,                  !- Watts per Zone Floor Area {W/m2}
,                  !- Watts per Person {W/person}
0,                !- Fraction Latent
0.3000000,        !- Fraction Radiant
0;                !- Fraction Lost


!- ===== ALL OBJECTS IN CLASS: ZONEINFILTRATION:DESIGNFLOWRATE =====
ZoneInfiltration:DesignFlowRate,
WEST ZONE Infil 1,  !- Name
WEST ZONE,          !- Zone or ZoneList Name
INFIL-SCH,          !- Schedule Name
flow/zone,          !- Design Flow Rate Calculation Method
0.0,                !- Design Flow Rate {m3/s}
,                  !- Flow per Zone Floor Area {m3/s-m2}
,                  !- Flow per Exterior Surface Area {m3/s-m2}
,                  !- Air Changes per Hour
0,                  !- Constant Term Coefficient
0,                  !- Temperature Term Coefficient
0.2237,             !- Velocity Term Coefficient
0;                  !- Velocity Squared Term Coefficient

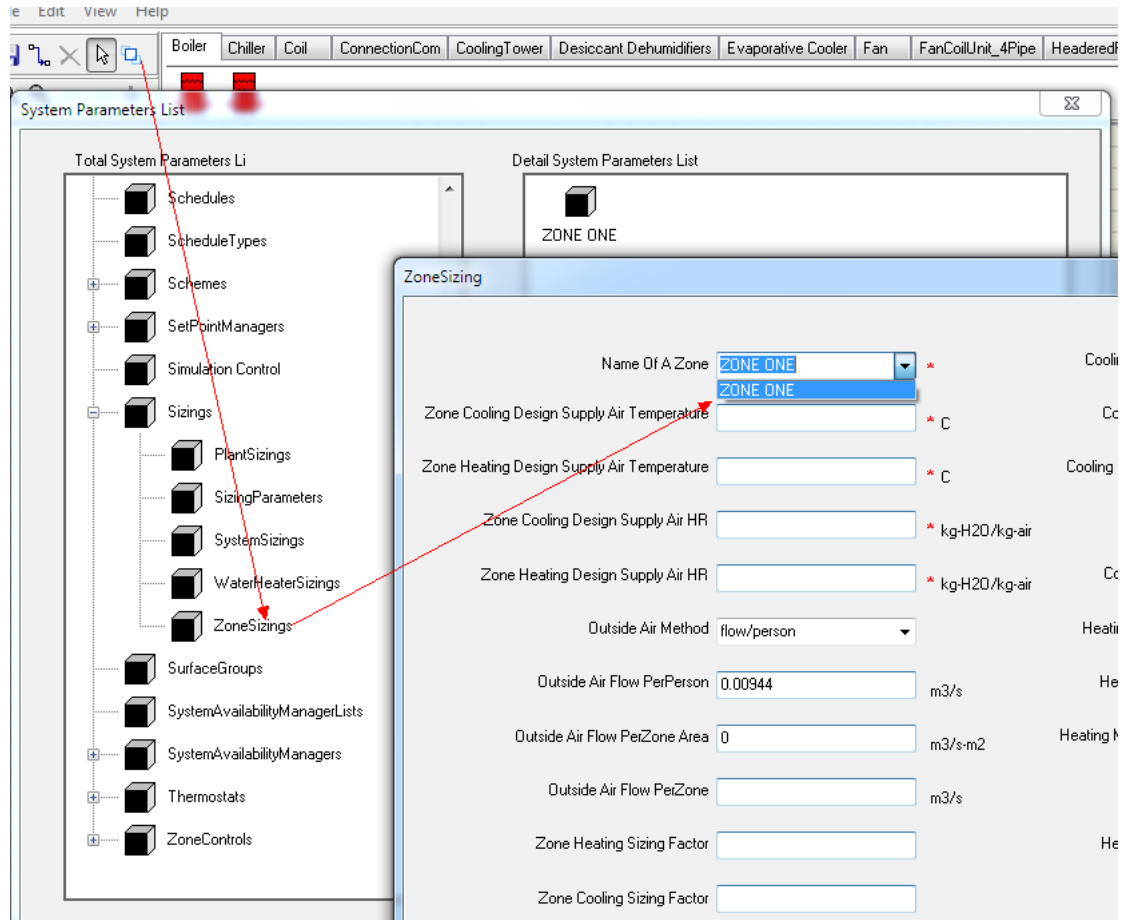
```


## 2. Revising HVAC System, Exporting IDF File, Report Setup

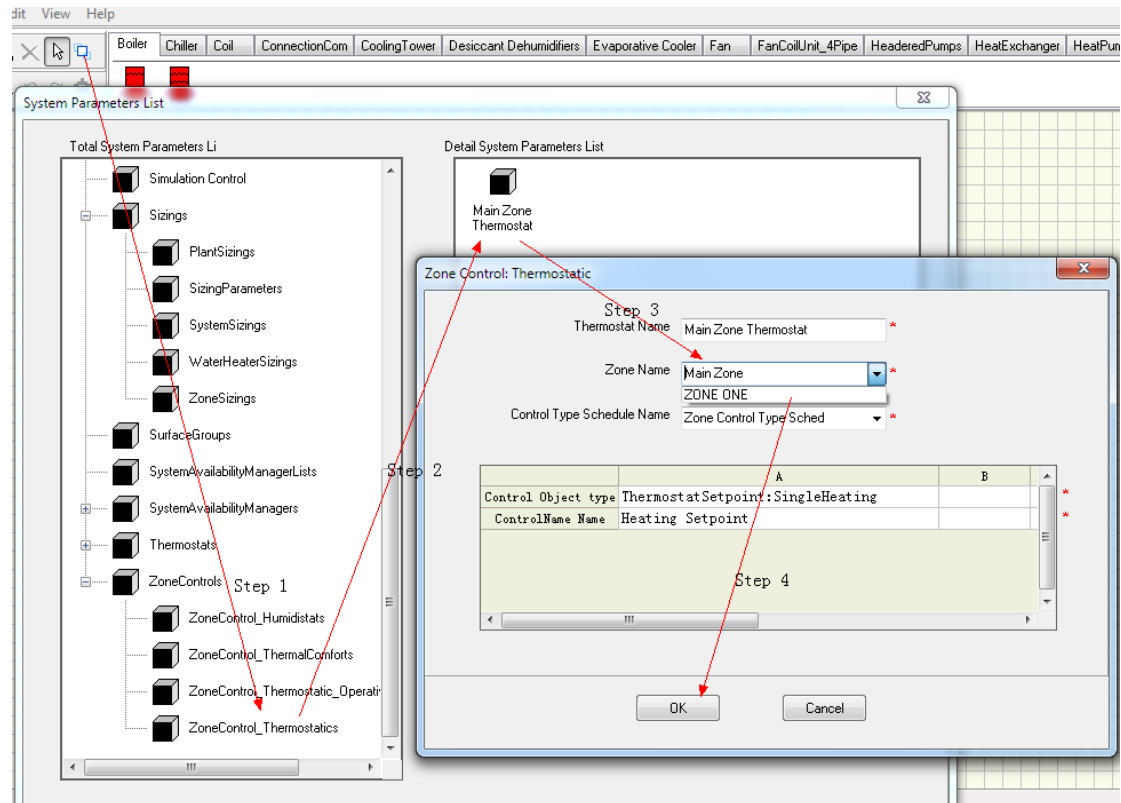
1) Click HVAC System, as the BDL file has been replaced, the zone information has been read by the software automatically. Double click the component “Main Zone”, click “Set” button, then exchange the zone name shows as step 3 and step 4 in the following figure. Finally, click “ok” to save the revision.



2) Second, click  button in the upper left corner of the main interface. If there is already an object in “ZoneSizing”, “Name of A Zone” should be changed to the Zone Name in the replaced building model. If there is no “ZoneSizing” setting, skip this step.



3) Third, click  button, Under “ZoneControl\_Thermostatic”, double click the object and replace the Zone Name. Then, Click “OK” to save the change.



4) After the above three revisions in HVAC configuration, the old building information concerned with “Zone Name” has been replaced by the new one from the imported BDL file. Select IDF File function to export IDF file and change the “Report Setup” as Exercise 1.

### 3. Running the simulation and Reporting

Click the "Simulation" button to start the calculating of the solution. After simulation is completed, the result can be reported as follow.



