Introduction to Tas and 90.1 Course

This course explains the methods used in Tas to carry out an ASHRAE 90.1 Appendix G analysis. The content of this course is based upon the 2007 (US units) edition of the 90.1 document.

Please note that the emphasis of this course is on the Tas methods, rather than interpretation of the 90.1 regulations. As the Tas files allow editing, a wide range of different interpretations can be allowed for. Moreover, the exact requirements for results or methods can vary from project to project. It is recommended however that the methods used in this course are used as far as possible, as they are designed to make carrying out a 90.1 project as quick and accurate as possible.

## *90.1 Appendix G project: An overview*

Key Points:

- *Tas includes a 90.1 studio utility which performs the tasks of creating the geometry and constructions baseline buildings, and editing the baseline internal conditions. The 90.1 studio also serves to organise the project files.*
- *The Tas Systems module (TPD) has setups in its wizard for baseline system types 1-13 for 90.1 versions 2007, 2010, and 2013. These systems are fully explained in the "Tas Systems Project Wizard and 90.1 Baseline Systems" guide which can be found in the Manuals folder of Tas Manager.*
- *Generally speaking the structure of a Tas 90.1 project is as follows:*
    - *Tas3D stage*
    - *Proposed TBD stage*
    - *90.1 Studio stage – generating Baseline buildings*
    - *Proposed Systems stage*
    - *Baseline Systems stage*
    - *90.1 Studio stage – copying and simulating Systems files*
    - *Results and documentation stage.*
  The items highlighted in red are the main topics covered on this course.
- *This course follows on from the "Introduction to Tas Systems" course and uses edited versions of the Tas3D and TBD files as the basis for the 90.1 project.*
- *This course shows a run-through of a simple project comparing Proposed energy consumption to Baseline consumption. The same principles apply to making a cost comparison (a key difference being the Tariff setup, as covered on the Systems course).*

Tas 3D Modeller
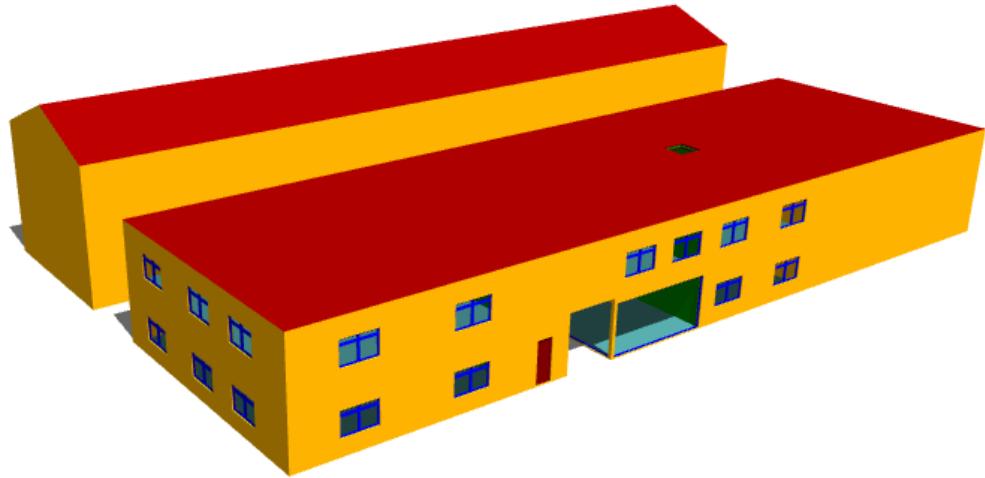
Key Points:

- *This course uses an edited version of the T3D file from the Tas Systems course.*
- *The 3D model can be created in the usual way, but for a 90.1 analysis particular attention should be applied to the zoning.*
- *Spaces on different floors, with different uses, with different system types, or facing different orientations, should be zoned separately.*
- *It is worthwhile to create collections of zones which will assist setting up the HVAC systems later on in the project. Some baseline system types require all zones on the same storey to be served by a common air handling unit – with some exceptions (for example, areas with different internal gains or hours of operation may have to use different systems).*
- *It is a good idea to look up what baseline system type applies to the project before starting work. For 90.1:2007 the relevant table is G3.1.1A. The tables are reproduced in the Tas 90.1 Baseline Systems guide. For this project we have a building of two storeys with fossil fuel heating (gas), and so the Baseline building will use system type 3 – for this type each zone will have its own system.*
- *Areas which have a fully designed heating and cooling system will use this system in the Proposed building. We should mark these areas for future reference using Zone tags.*
- *Tags can be applied to zones in the 3D modeller to create zone groups easily.*

Exercise:

1) Open the file "90.1 Training.t3d"
2) Apply the tag "Fancoil system" to these zones:
   o B1_Office 7
   o B1_Office 8
   o B1_Reception 1
   o B1_Office 15
   o B1_Office 16
   o B1_Office 17
3) View the applied tags in the Zones dialog.
4) Generate the building and export to the TBD with shading calculations. Include the options to create zone groups for tags and create zone sets for storeys.
5) Save and close the 3D modeller.

The Proposed TBD file

Key Points:

- *The Proposed TBD file represents the building fabric and space use of the designed building (with some important exceptions). It is used as the basis for the Baseline buildings, against which it will be compared.*
- *Blinds or shades that are controlled automatically or which are permanent features may be included in the proposed building. Manually controlled blinds or shades cannot be included in the proposed building.*
- *The building is required to be mechanically ventilated for the purposes of the 90.1 project, so apertures for naturally ventilated areas should be removed even if they are part of the design.*
- *In most cases the solar reflectance of roof constructions should be set as 0.30 for an appendix G project.*

Exercise:

1) Change the external solar reflectance of the roof construction to 0.30.

Internal Conditions

Key Points

- *It is in the internal conditions where the Proposed building differs most from the real building design.*
- *For all conditioned areas (i.e. any area which has either heating or cooling), the thermostats for heating and cooling must be set as follows:*
    - *Heating: 70°F with 55°F setback*
    - *Cooling: 75°F with 99°F setback*
- *Automatic lighting controls may be included, but manual lighting controls may not.*
- *If the lighting system has been designed then you should use these values. If not then the proposed building should be set based on the building area method for the appropriate building type (more on this later).*
- *EDSL recommend that the ventilation rate is set correctly in the internal conditions (or at least close to the correct rate) in order to ensure accurate results in TPD. Bear in mind that mechanical ventilation has to be provided in all areas even if they are naturally ventilated in the building design.*

- *At the end of the project there may be a requirement to show that process loads (equipment load + servers + escalators + lifts + refrigeration + cooking) make up at least 25% of the baseline building energy consumption. Bear in mind that the baseline building process load will be the same as the proposed building process load. If the process load works out as less than 25% of the total building energy use, evidence may have to be provided to show that the equipment gain used accurately reflects the true use of the building.*

Exercise:

1) Set the thermostats for all areas so that on weekdays from 9am-6pm they are heated to 70°F and cooled to 75°F. On other hours and at weekends they should be heated to 55°F and cooled to 99°F.
2) Remove the manual lighting control from the "Office Weekday" internal condition.
3) Ensure that all occupied areas have a ventilation rate of 1.05 ACH for the occupied period (9am-6pm).
4) Save and close the TBD file.

The 90.1 Studio
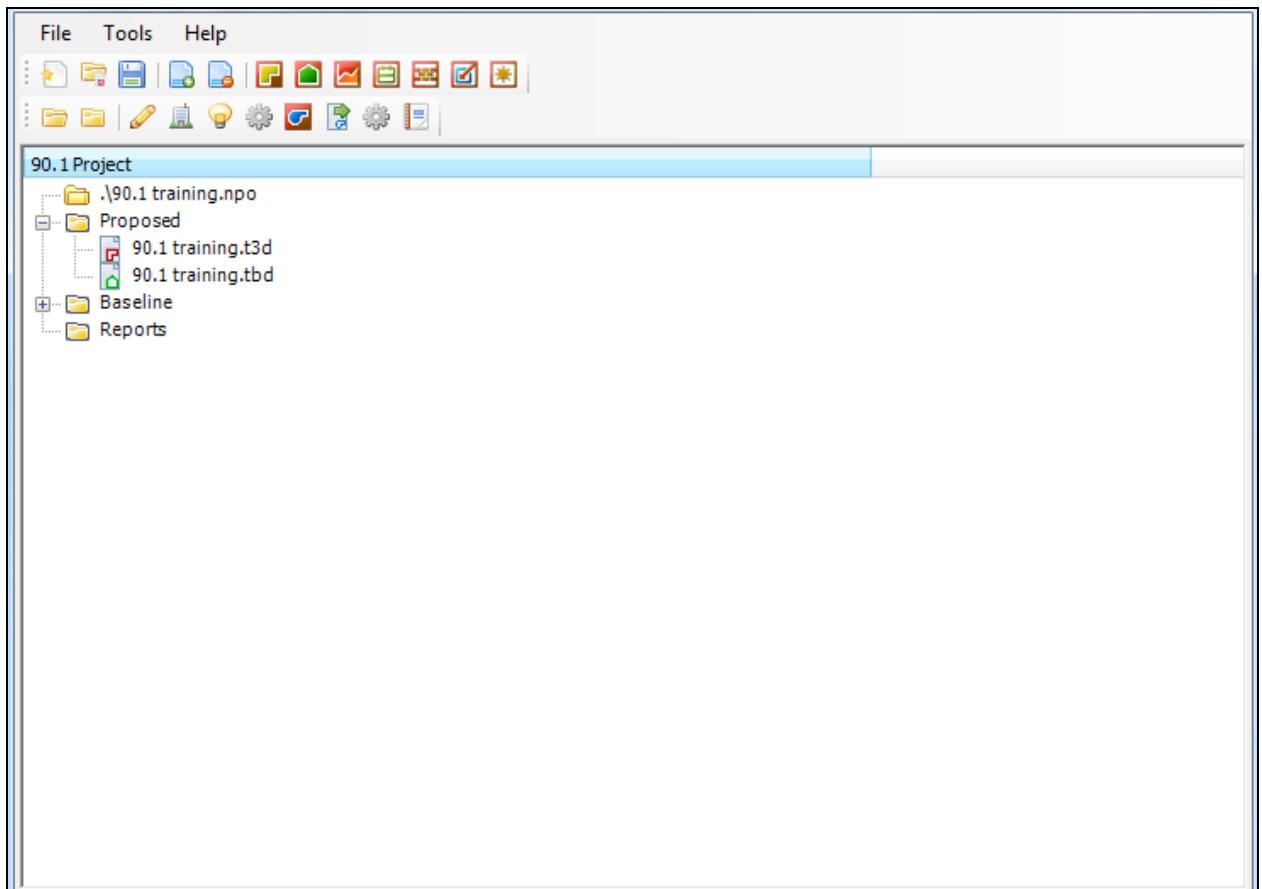
Key points:

- *The 90.1 Studio allows organisation of the files associated with the project. The Studio also has built-in tools to speed up the project work, which will be covered in later exercises.*
- *Studio messages about setting project details will not affect completing the project and can be disregarded.*

Exercise:

1) Create a 90.1 Studio file called "90.1 Training.npo" in the same folder as the T3D and TBD files.
2) Add the files "90.1 training.t3d" and "90.1 training.tbd" to the "Proposed" folder.
3) Save the 90.1 Studio file.

Generating the Baseline Buildings

Key points:

- *The 90.1 Studio can create the geometry for the baseline buildings. This includes rotating the building and applying new constructions in line with the Ashrae regulations.*
- *Constructions will be applied to the baseline wizard according to the type which the user assigns to the building elements from the proposed TBD file, according to the space use types (also assigned by the user), and according to the climate zone.*
- *For new buildings or extensions, these assignments should be used:*
    - *Roofs: Insulation entirely above deck*
    - *External Walls: Steel-framed*
    - *Internal Floors: Steel-joist*
    - *Ground floors: Unheated.*
  In all other cases use the most appropriate type from the list.

Exercise:

1) Start the baseline generation wizard.
2) Set the climate zone to 5A.
3) Assign the building elements as in the image above.
4) Select the construction database "ASHRAE 90.1 Constructions (2007).tcd". This should be in your "Tas Data/Databases" folder.
5) Ensure that all areas are set to "Non Residential" and "Conditioned".
6) Generate the Baseline buildings.
7) Save the 90.1 Studio file.

Baseline Lighting

Lighting Zones
Select Lighting Zones Space Types or Building Type

Name	Type
B1_Circulation	CorridorTransition_Default
B1_Circulation 1	CorridorTransition_Default
B1_Circulation 2	CorridorTransition_Default
B1_Circulation 3	CorridorTransition_Default
B1_Circulation 4	CorridorTransition_Default
B1_Office	Office_OpenPlan
B1_Office 1	Office_OpenPlan
B1_Office 2	Office_OpenPlan
B1_Office 3	Office_OpenPlan
B1_Office 4	Office_OpenPlan
B1_Office 5	Office_OpenPlan
B1_Office 6	Office_OpenPlan
B1_Office 7	Office_OpenPlan
B1_Office 8	Office_OpenPlan
B1_Office 9	Office_OpenPlan
B1_Office 10	Office_OpenPlan
B1_Office 11	Office_OpenPlan
B1_Office 12	Office_OpenPlan
B1_Office 13	Office_OpenPlan
B1_Office 14	Office_OpenPlan
B1_Office 15	Office_OpenPlan
B1_Office 16	Office_OpenPlan
B1_Office 17	Office_OpenPlan
B1_Reception	Lobby_Default
B1_Reception 1	Lobby_Default
B1_Toilet	Restrooms
B1_Toilet 1	Restrooms
B1_Toilet 2	Restrooms
Fancoil system	Various
Ground Floor	Various
First Floor	Various

Key Points:

- *The 90.1 Studio can adjust the lighting level in the Baseline TBD files to comply with 90.1 2007 or 2010 regulations.*
- *If the proposed building uses the building area method (because the lighting system has not been fully designed) then so should the baseline building. In other cases, use the space-by-space method to assign the lighting gains to the baseline building.*
- *Lighting controls are not allowed in the baseline building, and are automatically removed by the lighting wizard.*
- *If the COMNET internal conditions are being used then the lighting wizard should <u>not</u> be used to edit these.*

Exercise:

1) Start the Baseline Lighting wizard
2) Select 2007 regulations, space by space method.
3) Assign the lighting as per the image above.
4) Run the tool to adjust the baseline lighting.
5) Save the 90.1 Studio file.

Batch Simulation of TBD files
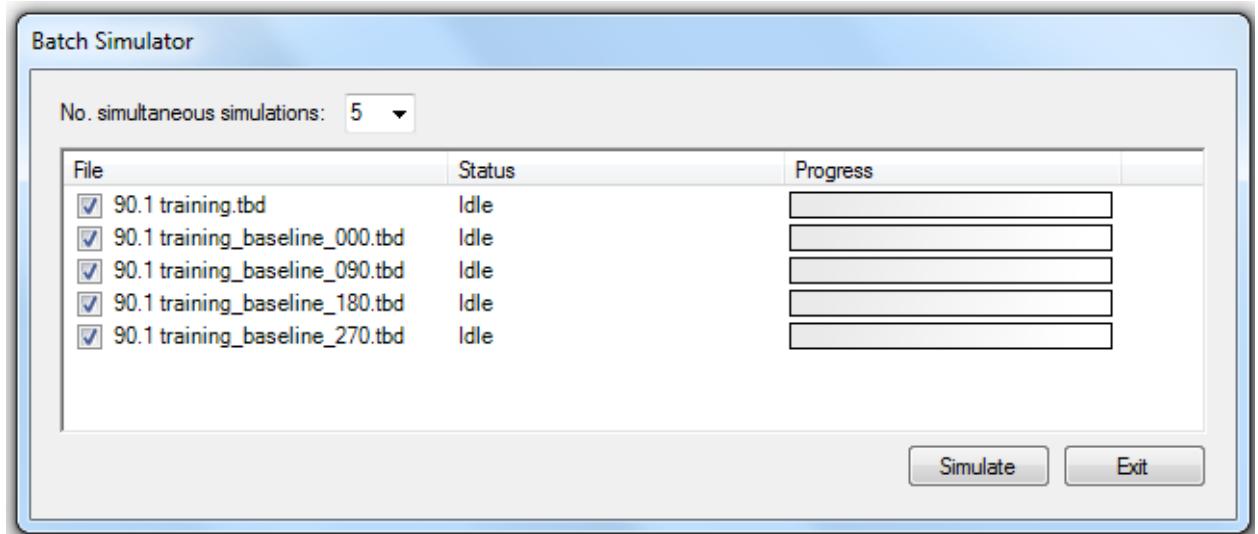
Key points:

- *The 90.1 Studio has a button to simulate all the TBD files associated with the project.*
- *The Tas Manager can perform the same function. The advantage of performing this step within the 90.1 Studio is that the TSD files which will be created by the simulations will be automatically stored within the 90.1 project structure.*

Exercise:

1) Simulate all the TBD files.
2) Look in the project folders to see that each building now has a TBD and TSD file.
3) Save the 90.1 Studio file.

Proposed Systems file
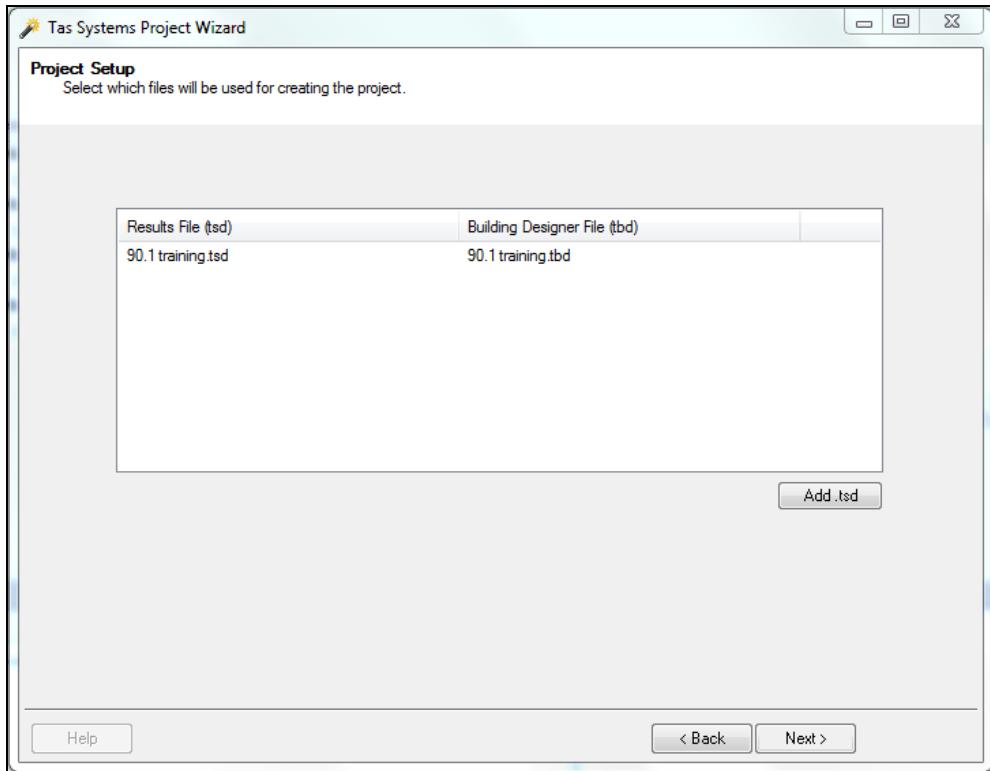
Key points:

- *In the Proposed building, if an area of the building has a fully designed mechanical ventilation system which provides both heating and cooling, then you should model the designed system. In all other cases (for example if the area is intended only to be heated, or it is intended to have heating and cooling but the system has not been designed) you must use the appropriate baseline system.*
- *When modelling the designed system, you should try to replicate the design as closely as possible. Some changes may be necessary, for example due to the fact that the thermostat limits required (70°F and 75°F) do not match the designed limits.*
- *Baseline systems can be created in the wizard.*
- *In most cases with designed systems a close equivalent can be found in the wizard and edited later if necessary.*
- *Modelling a custom system is covered in some detail on the Systems Training Course, so will not be duplicated here. This course will focus on the Baseline system types.*

Exercise:

1) Launch Tas Systems
2) Start the Project Wizard
3) Create a new project
4) Select the Proposed TSD file (90.1 training.tsd)

Zone Assignment
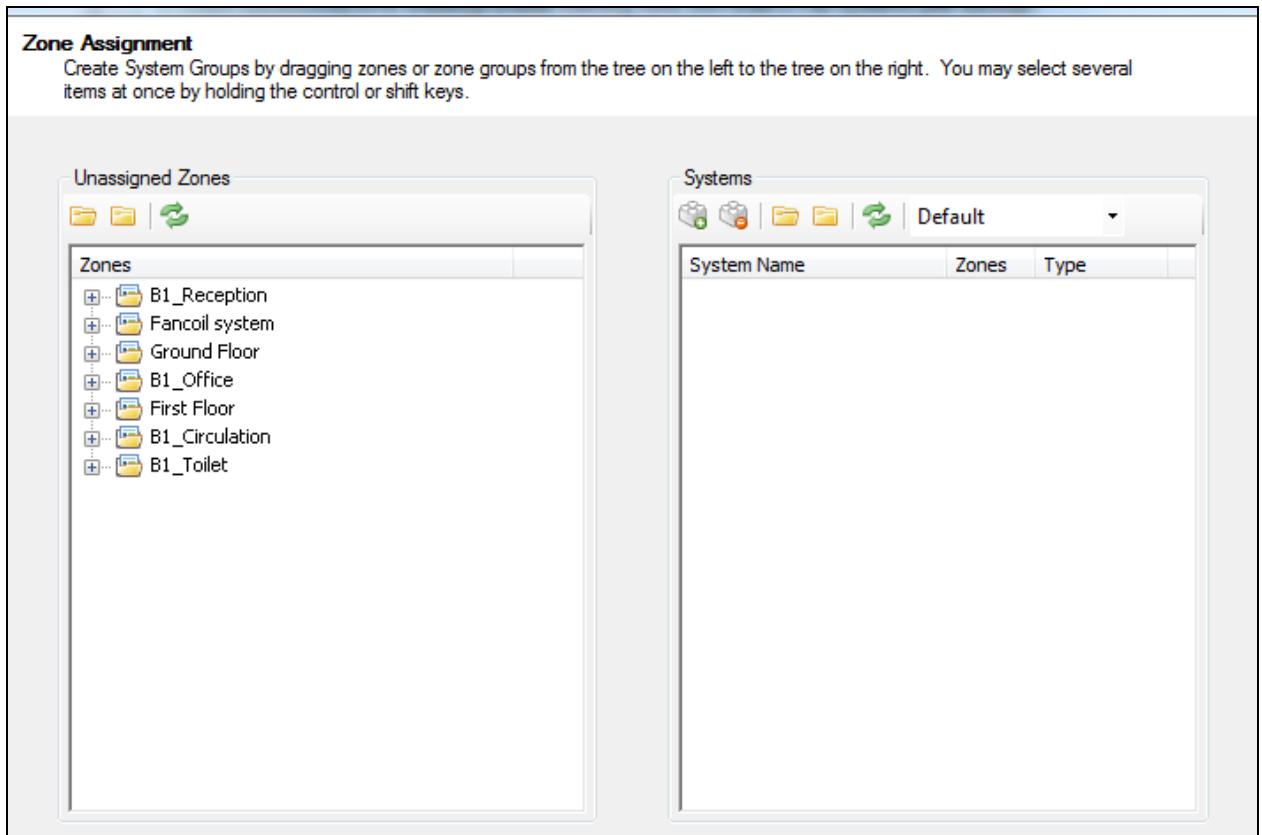
Key points:

- *For the purposes of this model, we will say that only the zones tagged "Fancoil system" have a fully designed heating and cooling system. All other areas will use the appropriate baseline system. For 90.1:2007 the relevant table is G3.1.1A. The tables are reproduced in the Tas 90.1 Baseline Systems guide.*
- *For this model the appropriate baseline system type is system 3. This type has a single zone for each system, but we do not need to create separate systems manually – we can group the system 3 zones together in the wizard and they will be generated separately (as with the Extract Only system on the Systems course).*
- *Some types of baseline system have a common Air Handling Unit serving multiple zones on the same storey, and for these we would create a separate system for each storey – the fact that we exported the T3D file creating a zone set for each storey would make this easier.*

Exercise:

1) Create a system for the zone group "Fancoil System".
2) Drag all the other zones into a second system.

Airside Configuration
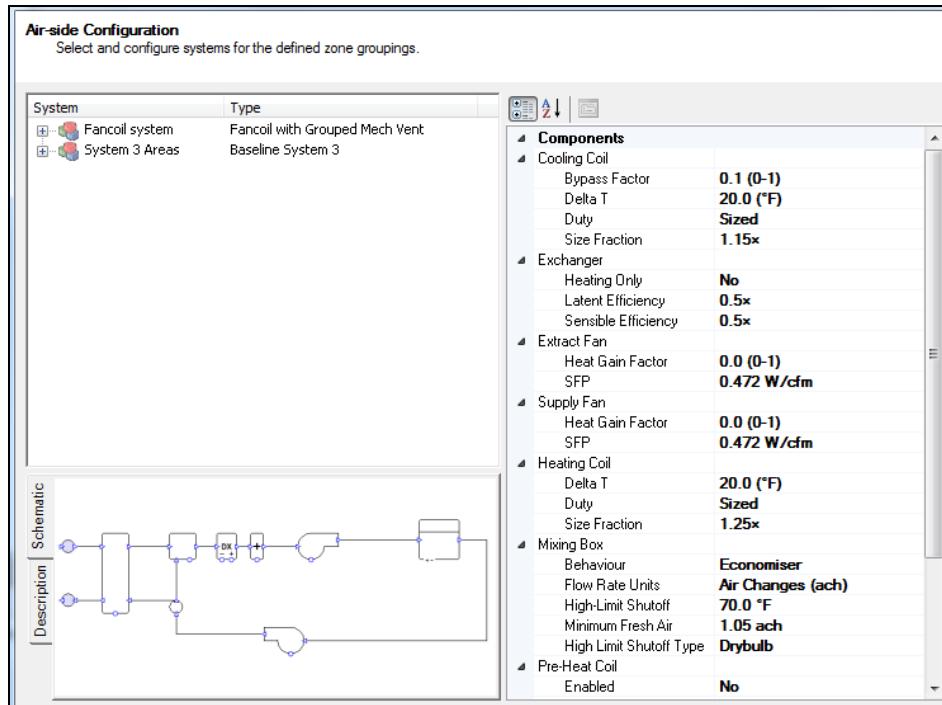
Key points:

- *The designed system should be modelled in detail, to match the design as closely as possible.*
- *It is essential to ensure the correct fresh air rate is applied to each zone. These figures must match between the baseline and proposed files.*
- *For simplicity's sake, in this model we are modelling 1.05 ACH of fresh air into each zone.*
- *For baseline type systems you must also ensure the correct fresh air rate. In general there are no changes to be made to the baseline systems or plant in the wizard but we will need to make changes later.*
- *For 90.1:2007 fresh air economisers may have a high-limit shutoff according to the climate zone. Our model is in climate zone 5A which means a shutoff of 70 °F.*
- *Baseline systems are described in detail in the Tas 90.1 Baseline Systems guide.*

Exercise:

1) Assign "Fancoil with Grouped Mech Vent" to the system "Fancoil system".
2) Rename the second system to "System 3 Areas".
3) Assign baseline system 3.
4) Change the fresh air rate in baseline system 3 to 1.05 ACH.
5) Apply a high-limit shutoff of 70°F to the baseline system 3 fresh air economiser.

Generating the Proposed systems
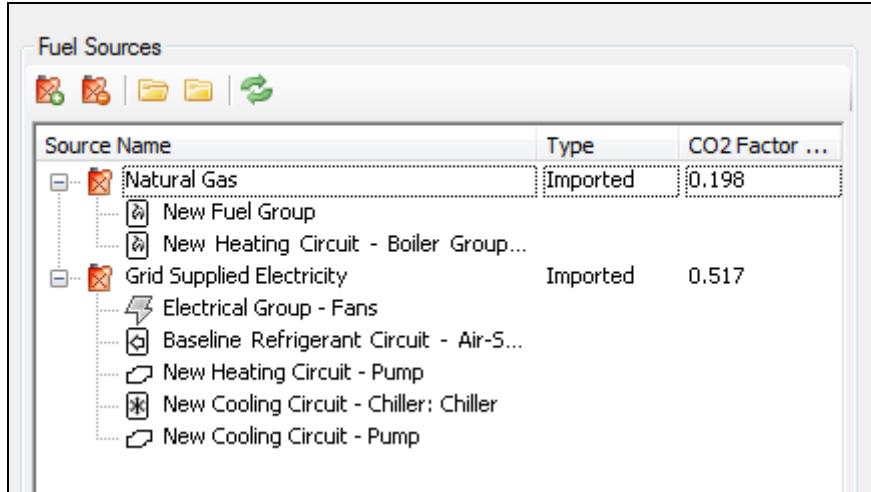
Key points:

- *As mentioned, on a real project you would model the designed systems and plant as closely as possible, but for this course we will pass over this to cover material which is particular to a 90.1 project. The only work we will do on the designed system is to ensure the correct fresh air rate.*
- *Renewables cannot be used for a 90.1 appendix G project.*
- *For today we will skip hot water services (a.k.a. domestic hot water).*
- *In 90.1 you have the option to size systems over the whole year period or use design days. Today we will use the whole year period.*

Exercise:

1) Drag the fancoil heating components onto a default heating circuit.
2) Drag the fancoil cooling components onto a default cooling circuit.
3) Skip the Domestic Hot Water page.
4) Skip the Renewables page.
5) Assign the boiler and fuel group to natural gas.
6) Assign the other items to grid supplied electricity.
7) Create a new design condition covering the whole year and assign all components to it.
8) Generate the systems.
9) Save the TPD file.

Proposed Systems
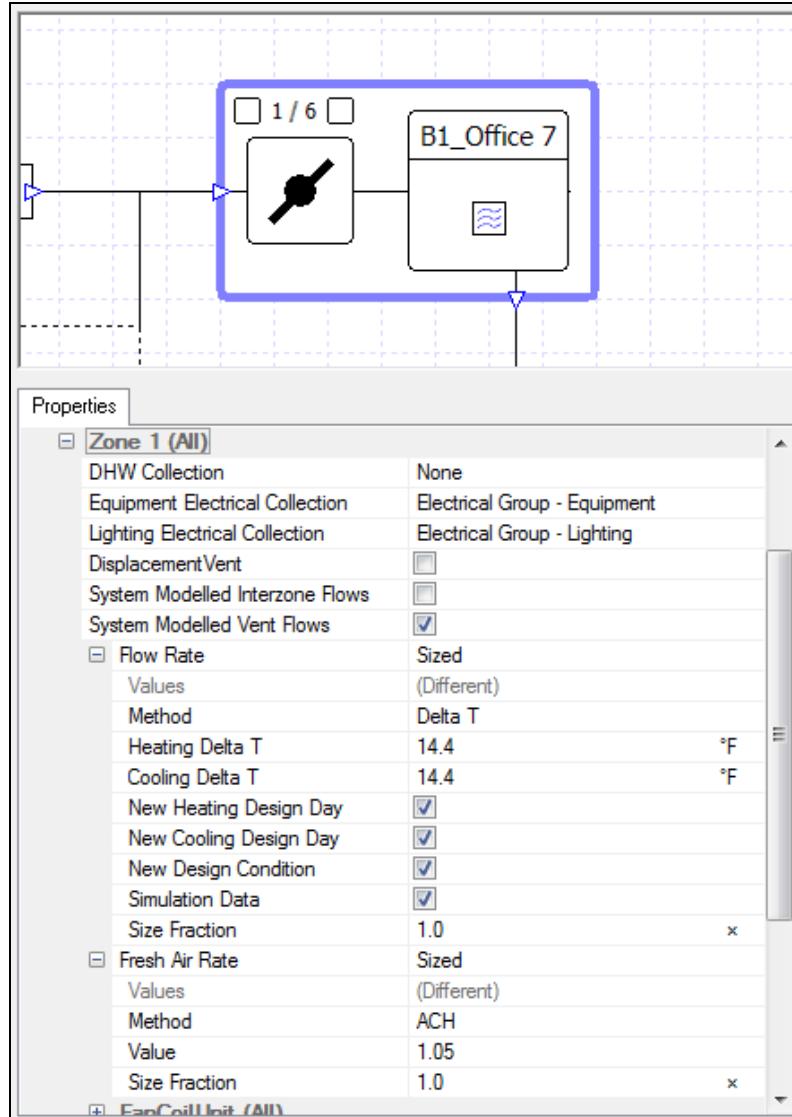
Key Points:

- *The Baseline systems are explained in detail in the Tas 90.1 Baseline Systems guide. The document explains how each system complies with the 90.1 regulations, and indicates which areas require the user to check something and perhaps make a manual change to their model. It also explains the use of the Baseline Efficiency tools which is covered on today's course.*
- *For Baseline systems 1-4 a system is created for each zone.*
- *The efficiencies for Baseline fans, heat exchangers, boilers are set up using tools created for that purpose.*

Exercise:

1) Change the fresh air rate of the fancoil system to 1.05 ACH.
2) Save the TPD file.

90.1 Airside Efficiency Tool

System Name	Number of Fans	Baseline System Type	Fan Horsepower Method	Fan Efficiency Method	Pressure Drop Adjustment	Design Air Flow Rate (CFM)	Horsepow	Efficiency (%)	System SFP (W/CFM)	System Fan Power (W)
Fancoil with Grouped Mech Vent - Fancoil system	2	None Selected	1: Fan System M...	90.1 2007 T...	0	0.00	N/A	N/A	N/A	N/A
Baseline System 3 - B1_Office 1	2	3: PSZ-AC	1: Fan System M...	90.1 2007 T...	0	0.00	N/A	N/A	N/A	N/A
Baseline System 3 - B1_Office 2	2	3: PSZ-AC	1: Fan System M...	90.1 2007 T...	0	0.00	N/A	N/A	N/A	N/A
Baseline System 3 - B1_Office 3	2	3: PSZ-AC	1: Fan System M...	90.1 2007 T...	0	0.00	N/A	N/A	N/A	N/A
Baseline System 3 - B1_Office 4	2	3: PSZ-AC	1: Fan System M...	90.1 2007 T...	0	0.00	N/A	N/A	N/A	N/A
Baseline System 3 - B1_Office 5	2	3: PSZ-AC	1: Fan System M...	90.1 2007 T...	0	0.00	N/A	N/A	N/A	N/A
Baseline System 3 - B1_Office 6	2	3: PSZ-AC	1: Fan System M...	90.1 2007 T...	0	0.00	N/A	N/A	N/A	N/A
Baseline System 3 - B1_Office 9	2	3: PSZ-AC	1: Fan System M...	90.1 2007 T...	0	0.00	N/A	N/A	N/A	N/A
Baseline System 3 - B1_Office 10	2	3: PSZ-AC	1: Fan System M...	90.1 2007 T...	0	0.00	N/A	N/A	N/A	N/A
Baseline System 3 - B1_Office 11	2	3: PSZ-AC	1: Fan System M...	90.1 2007 T...	0	0.00	N/A	N/A	N/A	N/A
Baseline System 3 - B1_Office 12	2	3: PSZ-AC	1: Fan System M...	90.1 2007 T...	0	0.00	N/A	N/A	N/A	N/A
Baseline System 3 - B1_Office 13	2	3: PSZ-AC	1: Fan System M...	90.1 2007 T...	0	0.00	N/A	N/A	N/A	N/A

(Apply settings to all systems | 1: Fan System Motor Nameplate hp | 90.1 2007 Table 10.8)

Key points:

- *This tool is used to set the correct efficiencies for baseline system fans and heat exchangers.*
- *The tool writes code into the baseline components. During the simulation this code executes and ensures that the correct efficiency value is used according to the desired setup, sized flow rates, etc.*
- *Never edit the code which is created in these components.*
- *If you simulate your TPD file in a newer version of Tas you will receive a message that the Lua code is out of date. Simply rerun the airside efficiency tool to update the Lua code.*
- *Before simulation flow rates and other values may appear as zero or N/A in the efficiency tool but this does not matter as the correct values will be calculated during simulation.*
- *After simulation the efficiency tool provides a handy reference, showing how the efficiencies were calculated and displaying flow rates and efficiencies for each system. This data can be copied to Excel.*
- *References to the 90.1 document are given in tooltips for the column headers.*
- *The tool is also explained in the Tas 90.1 Baseline Systems guide.*
- *Baseline efficiencies should not be applied to designed systems.*

Exercise:

1) Open the 90.1 Airside Efficiency Tool.
2) Apply the fan horsepower option 1 to all systems.
3) Apply the fan efficiency method from 90.1 2007 to all systems.
4) Ensure that the fancoil system has "None Selected" as its baseline system type.
5) Ensure that "3: PSZ-AC" has been applied to all other areas.
6) Proceed to the second page, "2/2: Exchangers".
7) Set the climate zone to 5A.
8) Press "Finish".
9) Inspect the efficiency profile on a Baseline System heat exchanger.
10) Save the TPD file.

90.1 Plant Efficiency Tool

Name	Type	Area served (ft²)	90.1 Version	Heating Type	Area served exceeds 15,000ft²	Heating Capacity (Btu/h)	Cooling Capacity (Btu/h)	Heating Efficiency (%)	Cooling Efficiency (%)
Baseline Refrigerant Circuit Heat Pump	ASHP	N/A	90.1:2007	Gas	☐	34121.41	34121.41	225.66	327.65
New Heating Circuit Boiler	Boiler	N/A	None Selected	None S...	☐	0	N/A	N/A	N/A

Key points:

- *This tool is used to set the correct efficiencies for baseline system boilers, chillers, and heat pumps.*
- *The tool writes code into the baseline components. During the simulation this code executes and ensures that the correct efficiency value is used according to the desired setup, sized capacities, etc.*
- *Never edit the code which is created in these components.*
- *If you simulate your TPD file in a newer version of Tas you will receive a message that the Lua code is out of date. Simply rerun the plant efficiency tool to update the Lua code.*
- *Before simulation capacities and other values may appear as zero or N/A in the efficiency tool but this does not matter as the correct values will be calculated during simulation.*
- *After simulation the efficiency tool provides a handy reference, showing how the efficiencies were calculated and displaying capacities and efficiencies for each plant item. This data can be copied to Excel.*
- *The tool is also explained in the Tas 90.1 Baseline Systems guide.*
- *Baseline efficiencies should not be applied to designed plant circuits.*

Exercise:

1) Open the 90.1 Plant Efficiency Tool.
2) Apply "90.1:2007" to the Air Source Heat Pump only.
3) The Boiler serves the designed systems and should not have a 90.1 version selected. It should read "None Selected".
4) The baseline systems are heated by gas furnaces. Select gas as the heat source for the heat pump.
5) Press "Apply".
6) Inspect the cooling power profile on the heat pump.
7) Save and close the TPD file.

Baseline Systems
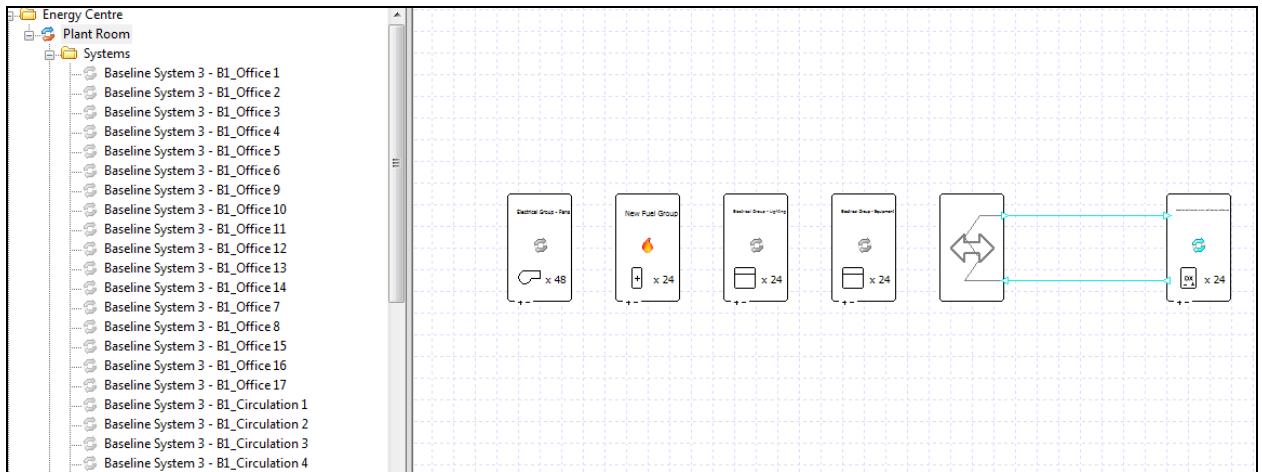
Key Points:

- *All areas in the baseline systems file will use the baseline system appropriate to the building. In our case this is system 3.*
- *We only need to create systems for the baseline orientation 0 building. The TPD files for the three remaining orientations will be generated from the orientation 0 file.*
- *We have already seen how to set up baseline system 3. If you get stuck, refer back to the previous pages.*
- *We should ensure that the fresh air rates match between the Proposed and Baseline buildings. Rather than deal with that in the systems wizard we will skip over it here and show another useful method later.*
- *Any areas which have preheat in the Proposed building should have preheat with an identical setup in the Baseline building. In our project there is no preheat.*

Exercise:

Part 1:
1) Launch Tas Systems.
2) Start the project wizard
3) Create a new project
4) Select the baseline 0 TSD file (90.1 training_baseline_000.tsd)
5) Drag all zones onto a new system.
6) Assign baseline system 3 to the new system.
7) Ignore the fresh air rate – we will deal with this later.
8) Apply a high-limit economiser shutoff of 70°F.
9) Skip the heating, cooling, domestic hot water, and renewables pages.
10) Assign the fuel group to natural gas.
11) Assign the other items to grid supplied electricity.
12) Create a new design condition covering the whole year and assign all components to it.
13) Generate the systems.
14) Save the TPD file.

Part 2:
1) Open the 90.1 Airside Efficiency Tool.
2) Apply the fan horsepower option 1 to all systems.
3) Apply the fan efficiency method from 90.1 2007 to all systems.
4) Ensure that "3: PSZ-AC" has been applied to all areas.
5) Proceed to the second page, "2/2: Exchangers".
6) Set the climate zone to 5A.
7) Press "Finish".
8) Open the 90.1 Plant Efficiency Tool.
9) Apply "90.1:2007" to the Air Source Heat Pump.
10) Select gas as the heat source.
11) Press "Apply".
12) Save and close the TPD file.

Completing the TPD setup in 90.1 Studio
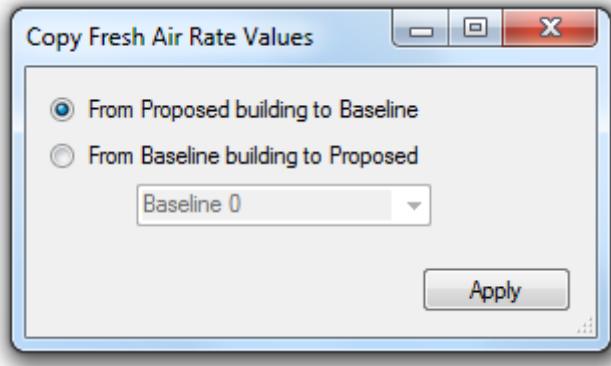
Key points:

- *Fresh air rate values can be copied from the Proposed TPD file to the baseline (or vice versa). This is a good way of ensuring that the values match. It requires the fresh air rates to have been sized.*
- *A single baseline TPD file can be used to create the TPD files for the other three baseline buildings. These copies will retain all the information about fresh air rates, 90.1 airside and plant efficiencies, etc., that we have set up, so no further work is required in these baseline TPD files.*
- *The 90.1 Studio file can batch simulate TPD files.*

Exercise:

Part 1:
1) Close all TPD files and return the 90.1 Studio file.
2) Add "90.1 training.tpd" to the Proposed folder.
3) Add "90.1 training_baseline_000.tpd" to the Baseline folder.
4) Save the 90.1 Studio file.

Part 2:
1) Open the Proposed TPD file and simulate the plant room.
2) Save and close the TPD file.
3) Return to the 90.1 Studio file.
4) Use the "Copy Fresh Air Rate Values" tool to copy fresh air rates from the Proposed Building to the Baseline Building.

Part 3:
1) Select the baseline 0 TPD file.
2) Select the "Use for baseline systems option".
3) Save the 90.1 Studio file.

Part 4:
1) Batch simulate the five TPD files.

Results and Discussion part 1

Tas Systems
90.1 Unmet Hours Comparison

Project Files

Proposed:	90.1 training.tpd
Baseline 0°:	90.1 training_baseline_000.tpd
Baseline 90°:	90.1 training_baseline_090.tpd
Baseline 180°:	90.1 training_baseline_180.tpd
Baseline 270°:	90.1 training_baseline_270.tpd

Hours Summary

	Proposed	Baseline Max	Difference
Heating	5	2	-3
Cooling	0	3	3
Total	5	5	0
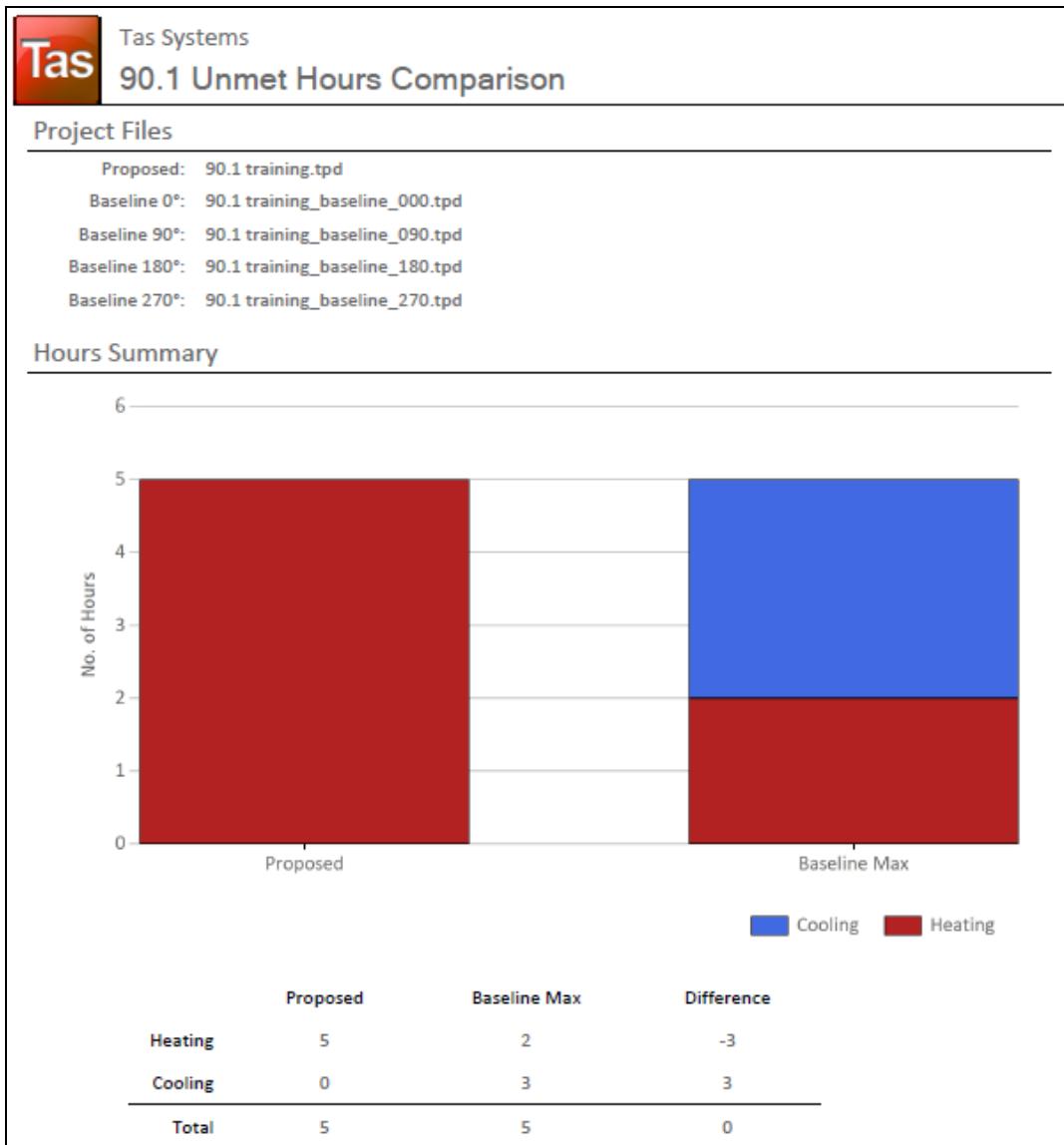
Key Points*:*

- *This course has given an overview of the methods used in Tas to carry out a simple 90.1 appendix G analysis comparing energy consumption between the Proposed and Baseline buildings. A real project relies on the user having a good understanding of using Tas Systems, and being familiar with the relevant 90.1 document for their project.*
- *More information on the modelling of baseline systems is available in the "Tas Systems Project Wizard and 90.1 Baseline Systems" guide which can be found in the Manuals folder of Tas Manager.*
- *For a cost comparison analysis attention should be paid to the tariff applied to the fuel types. This was explained in detail on the Systems Course.*

Exercise:

1) Generate the documentation.
2) Check whether the Proposed building is performing better than the Baseline building.
3) Check the unmet hours.

Discussion:

- For a real project, the designed system in the proposed should have been modelled in detail, as close as possible to the design.
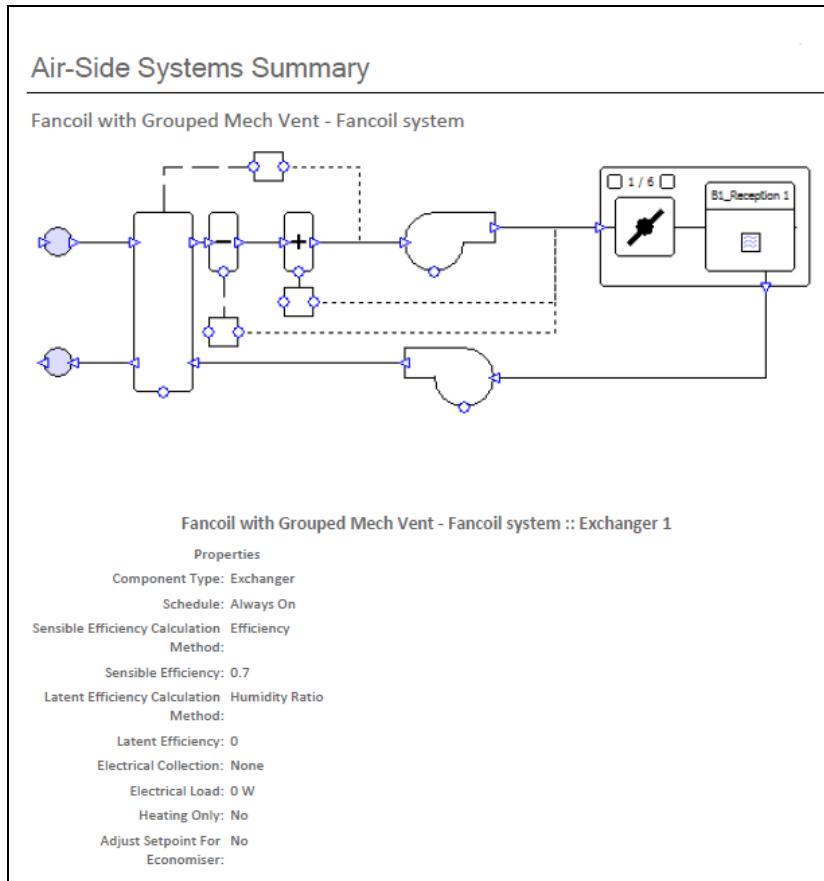- If the number of unmet hours in the a TPD file are more than 300, find the system(s) with the most unmet hours and increase the size factor on their heating/cooling components (depending on the type of unmet hour). Resimulate. Continue this process until the number of unmet hours is 300 or less.
- If the number of unmet hours in a baseline building are 300 or less, but also more than 50 fewer than the unmet hours in the proposed building, decrease the airside heating and cooling capacities in the baseline until this is no longer the case.
- For our project we would not need to make any changes for unmet hours as the unmet hours do not exceed 300.
- A large number of unmet hours could mean:
  - Zones have been grouped together incorrectly, e.g. zones with very different schedules or gains.
  - Airside schedule issues, for example a radiator which is turned off during unoccupied hours and cannot provide out of hours heating.
- As mentioned earlier, some projects have a requirement that at least 25% of the baseline consumption comes from process loads. For our project, the equipment consumption is less than 25% of the total and we have no additional loads (e.g. cooking, lifts, etc.). So if this was a requirement of our project we would have to return to the TBD file and edit our internal conditions to increase the equipment gain. Requirements can vary from project to project but it always pays to plan ahead.

Results and Discussion part 2

Air-Side Systems Summary

Fancoil with Grouped Mech Vent - Fancoil system

Fancoil with Grouped Mech Vent - Fancoil system :: Exchanger 1

	Properties
Component Type:	Exchanger
Schedule:	Always On
Sensible Efficiency Calculation Method:	Efficiency
Sensible Efficiency:	0.7
Latent Efficiency Calculation Method:	Humidity Ratio
Latent Efficiency:	0
Electrical Collection:	None
Electrical Load:	0 W
Heating Only:	No
Adjust Setpoint For Economiser:	No

Key points:

- *Experience shows that most project submissions are assisted by providing supporting documentation to explain the project inputs. A great deal of this information can be extracted from the TPD files.*

Exercise:

1) Open the Baseline orientation 0 TPD file ("90.1 training_baseline_000.tpd")
2) Open the 90.1 airside efficiency tool
3) Select all the rows and copy the data into a new Excel file.
4) Save the Excel file in the same directory as the other 90.1 files.
5) Close the TPD file.
6) Open the Proposed TPD file ("90.1 training.tpd")
7) Open the Report Generator.
8) Select a systems airside report
9) Save the report as a PDF in the same directory as the other 90.1 files.

Discussion:
- When we first set up the 90.1 airside efficiency tool, most of the values we saw were zero or N/A. The values have now been filled in because the components were sized during the TPD batch simulation.
- The airside efficiency tool is a useful way to display output data summarising the sizing methods used and the fan power associated with each system.
- Similarly, we can copy data from the heat exchangers page, and from the 90.1 plant efficiency tool.
- The systems airside report, and other reports which can be generated from TPD, can also be created through the Tas Manager.