INTEGRATED ENVIRONMENTAL SOLUTIONS

Tips on minimizing time spent waiting for VE simulations to run

- Combine rooms in the 3D model into appropriate thermal zones before running loads or thermal simulation (partitions can be maintained; doing so prior to finalizing internal gains can help keep things sorted if you have some spaces with gains entered in fixed values per space and not per unit floor area).
- Run SunCast only as many times as really needed to analyze shading options and glazing in schematic design or other changes in fenestration and shading geometry. In other words, if there is a small change to the geometry that does not need to be assessed, hold off on further SunCast runs until you are ready to start sizing and running systems in ApacheHVAC.
- When populating sensors in Radiance for use in daylight-dimming formula profiles, work with a modest level of "quality" (light bounces, etc.) until you are ready to either do a detailed comparison of daylighting schemes or you have a reasonably final configuration for the geometry, as Radiance runs are time-consuming when performed at a high level of detail.
- When setting up HVAC systems and controls configurations in ApacheHVAC, begin with unique systems (leave duplicates out) and a *small* number of zones for preparing and testing those systems. Place other zones on inactive layers in ModelIt (runs the fastest) or simply allow them to be served by the default "Main system" in ApSys (the latter will apply to any zones on active layers not assigned to a room component in ApacheHVAC).
- Run all design days and thermal zones for Loads run (if using Autosizing tools in VE 6.1 Beta, this should be after assigning all thermal zones to systems in ApacheHVAC, and the systems need to be based upon one of the pre-defined prototypes, although they can be significantly modified). However; if you're not yet doing this to size a system, but rather just to check if anything is grossly out of range or to compare relative loads for different scenarios, you may want to shorted the number of pre-conditioning days that are run prior to the first day of recorded data. Similarly, for these early runs, you may want to work with a 30-minute simulation time step, saving the 6-10-minute range of time steps for a run that will be used to size a system or for results you intend to report.
- When testing and optimizing controls, etc. for complete HVAC systems in ApacheHVAC, run the full model and all systems as needed, but do so for only a very small number (e.g., 3 days) of peak cooling and separately peak heating days until you're confident that all is performing to your satisfaction under these conditions. Then expand to testing shoulder seasons, etc. Avoid running an entire year until you have reason to view annual results, such as for comparing annual energy consumption or final checks of total annual "unmet load hours" when one or more zones is outside the range of proportional controls, etc.
- As it is very calculation-intensive, use Macro flow only when it is truly appropriate---i.e., explicit modeling of pressure differences is needed to drive air movement in the model. This includes wind- or stack-driven natural ventilation, mixed-mode operation, thermal stack-effect-driven internal flows (such as a zonal model of an atrium with thermal displacement ventilation/cooling), or detailed wind-driven modeling of infiltration using crack areas and flow coefficients. Use *only* ApacheHVAC (*not* MacroFlo) for all other environments with mechanically forced airflow, including typical airside systems, which may or may not include transfer airflow and/or infiltration (as an internal gain) and exfiltration (defined in the HVAC model); earth tubes, labyrinths, and TermoDeck when flow will always be fan-driven; and stratified environments where a pre-defined and even proportionally controlled "load split" will be used rather than a dynamic thermal model of this (as in the zonal atrium model).
- Finally, when performing dynamic thermal simulation runs, work with the smallest number of pr-conditioning days and largest simulation time step and reporting interval that will serve you needs until you are ready to do a run that will be used to support design decisions, compare energy consumption, complete reports for LEED, etc. You can also control the type/complexity (and thus accuracy) of the internal and external convection models used as well as the range of variable reported for all zones and for particular zones (see simulation options and output options in ApSim dialog). This can once again offer means of expediting simulations when you are working with the model to get everything set up and interacting as desired. You can then add in simulation detail and output options as needed when approaching a run that you intend to document, etc.