GENERATION

 **MODELING**

1. Duke generators are now modeled at the nominal seasonal dependable capacity based on data provided by Duke Generation. (The associated ecd & gcp files are kept in the Operating ecdi subdirectory, indicating the files represent expected actual system operation.) This is their expected output during summer and winter peak conditions. Modeling the units at their expected capacity will more closely match actual seasonal peak operation and ensure that the transmission system is planned to accommodate actual system conditions. Duke Generation also provided updated data on reactive power capability.
2. Future resource additions are consistent with the projections of load, capacity and reserves from Resource Planning. Future generation locations were selected based on knowledge gained through generation planning and interconnection studies.
3. Rockingham (previously Dynegy) (825 MW), Broad River Energy Center (BREC) (previously, SkyGen and Polsky - 875 MW), Southern Power Rowan (942 MW), Buck CC (650 MW), Dan River CC (650 MW), Cliffside 6 (825 MW), Southern Power Cleveland County (717 MW), and SunEdison Solar (15.5 MW) generating units have been added to the model and dispatch lists. These generators are presently in commercial operation. New generation sites would be added if they have signed Generator Interconnection Agreements. These new generators would be included in the ecdi files in the years they are assumed to be in operation.
4. Dynegy went in service in 2000 summer and has five units. In 2006, Duke Energy purchased these generators and they are a designated network resource (Rockingham).

Three units at BREC went in service in 2000 summer with two additional units in 2001 summer. All 5 units have annual firm transmission reservations for 850 MW and are dispatched to supply CP&L-E in the models according to Progress Energy’s projections. The units are dispatched at 875 MW’s – 850 MW which meets the transmission reservation and the other 25 MW’s are assumed to meet losses.

CP&L-Rowan placed 3 CT’s in service in 2001 summer and an additional combined cycle plant (3 units) were placed in service in 2004 summer. The first 3 units operate as independent CT’s with ratings of 155 MW summer and 185 MW winter. The second 3 units are combined cycle with two 154 MW summer/183 MW winter CT’s and a 169 MW summer/172 MW winter steam turbine. These units are all now owned and operated by Southern Power.

1. Mill Creek is a CT site at Ripp Tie and is named as a Duke network resource for 2004 and beyond. Units are rated 76 MW summer and 96 MW winter.
2. For modeling of cross compound units, the high pressure (HP) and low pressure (LP) machines must work together, i.e., either both are on-line or both are off-line.
3. Cross compound units, modeled as HP and LP machines, have the naming convention of:
 HP machine ID = unit number
 LP machine ID = L
For example, at Belews Creek, unit 1 is represented at bus 308377, machine 1 (HP) and machine L (LP).
4. Machine ID **L** is reserved for modeling low pressure units only.
5. Jocassee completed a turbine runner upgrade on 2 units in 2007 and 2 units in mid 2011. The upgrade increases the continuous capability of each unit to 195 MW.
6. Var capability for Cowans Ford units has been modified to better reflect actual capability based on its actual operation. The MVAR output has been lowered from 50 MVAR to 20 MVAR per unit. Their AVR is set to regulate at 20 MVAR immediately following startup and is allowed to float with system voltage.
7. Var capability for the Keowee units has been modified to better reflect actual capability based on its actual operation. The MVAR output has been lowered from 42 MVAR to 20 MVAR per unit. The units can achieve 35 MVAR according to their D curve. However, their AVR is set to regulate at 20 MVAR immediately following startup and is allowed to float with system voltage.
8. Valley ecd files were created to support light load cases. These ecd files dispatch units as the SOC would under valley conditions.
9. Based on a past review with System Operations and to make dispatch better match actual practice, only Unit 1 at Cowans Ford is modeled as the swing bus. Unit 2 has been given the same priority as conventional hydro units.
10. Hartwell (SEPA) is modeled as 5 separate generators. Units 1 thru 4 are rated 86 MW and Unit 5 is 96 MW.
11. Cherokee Cogen is modeled as 2 separate generators.
12. Yadkin plants, Badin, High Rock & Tuckertown, are operated by Alcoa Power Generation Inc. Yadkin load has been reduced to 4.0 MW at Badin. High Rock & Tuckertown are modeled as off-line.
13. Hartwell 5 & Badin are the swing buses for their respective control areas. Their capacity curve data has been revised so that they cannot have an unrealistic state with 0 MW output and be producing vars. The .gcp files have been edited to prevent this situation.

Dispatch IPLAN Notes

1. Suggested peak spinning reserve = 80 MW. Actual Contingency Reserve (previously Spinning Reserve) Requirement (SRR) is approximately 505 MW (revised annually according to VACAR Reserve Sharing Agreement).
2. Suggested valley spinning reserve = 2000 MW
Absolute valley period is assumed to occur on a Spring or Fall weekend night. The load swing for this type day ≅ 4000-5000 MW. With 2700 MW of hydro capability, enough fossil/nuclear need to be on-line for the daily peak period.