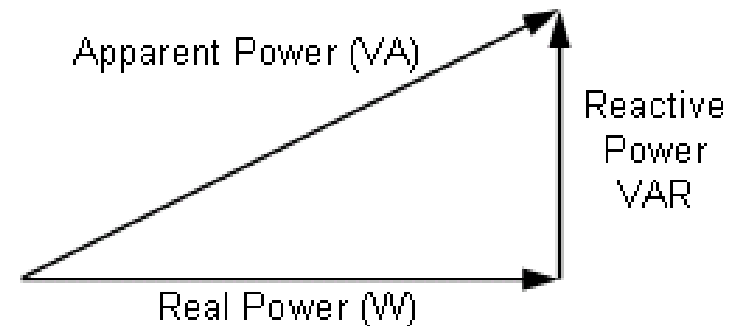


Load Power Factor Modeling in CETL Base Cases

Paul McGlynn
PJM Planning Committee
May 12, 2011

- Load Power Factor

- Dimensionless number between 0 and 1
- When = 0, the power consumed by the load is entirely reactive (MVAR)
- When = 1, the power consumed by the load is entirely real (MW)
- Apparent Power increases as the load PF approaches 0
 - ✓ Lower PF = more apparent power
 - ✓ Higher PF = less apparent power



- The test ensures the transmission system is robust enough to import energy to an area during a capacity emergency
- The test simulates conditions typically experienced during the third or fourth day of a heat wave
 - High System Loads
 - Internal capacity deficiency
- Per Manual 14B, loads in the area under test are scaled up to 90/10 loads at a 0.8 PU power factor

- 90/10 load levels in the area under test will be reduced by the available energy efficiency and DR
- The greater of the 90/10 load in the area under test reduced by the total amount of energy efficiency and DR or the 50/50 load reduced by forecast energy efficiency, will be modeled in the area being tested
 - ✓ The load adder is assumed to be at 0.8 power factor
- Using the 50/50 load reduced by energy efficiency does not reflect the worse system power factor seen at higher load levels

90/10 – DR – EE Greater Than or Equal 50/50

- **90/10 – DR – EE forecast used**
- 90/10 – 50/50 load is scaled up at an 80% power factor and the reduction in DR is taken off at the area power factor (~97-98% PF)

90/10 – DR – EE Less Than 50/50

- **50/50 – EE forecast used**
- Same PF as base case (~97-98% PF)

➤ Potential Issue: when the 50/50 load is used, the reactive portion can be lower than when the 90/10 – DR – EE is used

**90/10 – DR – EE
Greater Than or Equal
50/50**

- **90/10 – DR – EE forecast used**
- Potential improvement:
 - None needed

**90/10 – DR – EE
Less Than
50/50**

- **50/50 – EE forecast used**
- Potential improvement:
 - First, scale 50/50 load up to 90/10 @ 80% PF
 - Next, reduce 90/10 load by DR at the area PF (~97-98% PF) down to the 50/50 load level

➤ Result: Consistent load PF modeling regardless of magnitude of Demand Response

- Questions
- Stakeholder Suggestions
- Next Steps