

# The Valley Group, Inc.

## CAT-1™ Transmission Line Monitoring Systems

### Increased Thermal Capacity When Its Needed Most

#### Real Time Ratings Provides Real Time Benefits to CAT-1 System Users

The following graph shows how information from the CAT-1 Transmission Line Monitoring System enables operators to make well informed decisions, resulting in increased grid reliability and more efficient asset utilization.

A common observation from real-time rating systems is that daytime ratings typically exceed nighttime ratings, which is both counterintuitive and contrary to most day/night rating methods. The graph below shows how and why this occurs. At night, observe how conductor temperature rises and falls with load, as you would expect. In this case, the temperature rise over ambient was 16.5 degrees C with about 400 amps of load. Using the standard IEEE-738 heat balance equation, the actual thermal capacity of the line can be readily calculated.

The following day, the conductor is observed to be operating at 15.5 degrees above the solar-adjusted ambient temperature with about 575 amps of load, **6% less temperature rise with 43% more load**. The reason is simple: While the sun adds heat to the conductor, it is also the driving force behind the wind. More often than not, the wind generated by the sun more than compensates for the heat it adds to the conductor. That excess cooling effect enables the conductor to carry more load during the day, which is when capacity is generally needed most. With a CAT-1 Transmission Line Monitoring System in full operational use, this user will now be able to fully utilize their transmission assets.

Also note the risk of operating a line with static ratings based on high average wind speed assumptions. The CAT-1 Transmission Line Monitoring System provides operators with the information they need to help assure safe and reliable operation of the line at all times, under all circumstances.

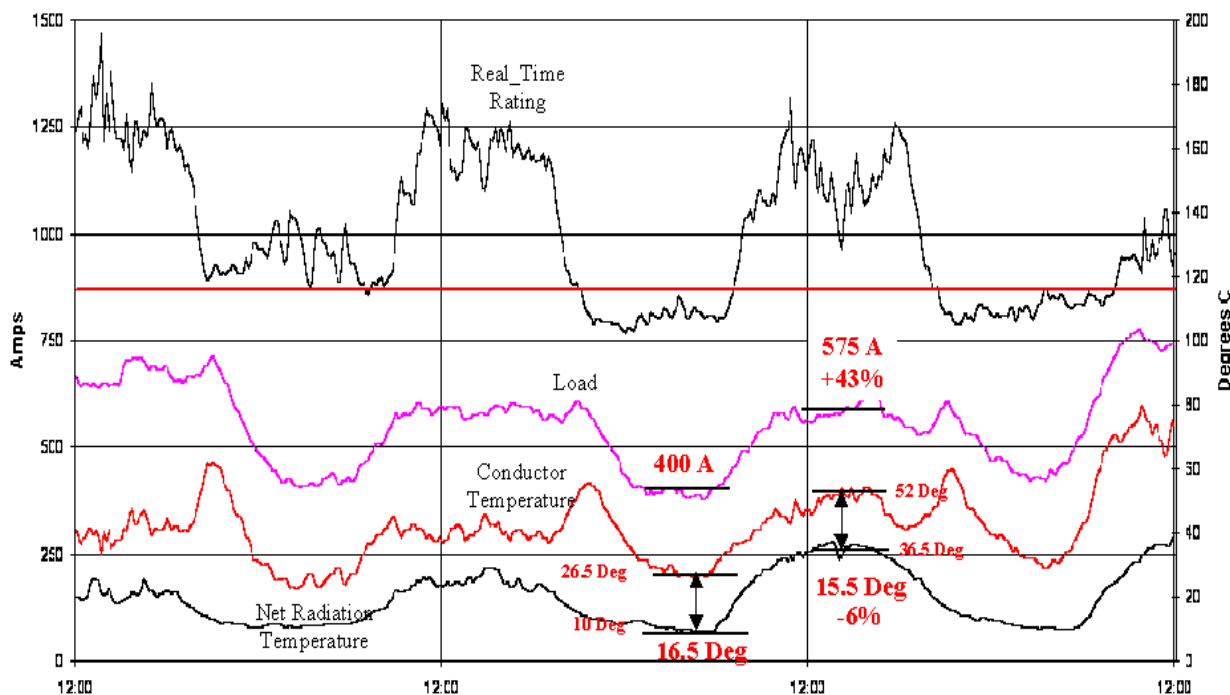


Figure 1. Daytime wind offsets solar heat load and provides additional cooling to support higher loads