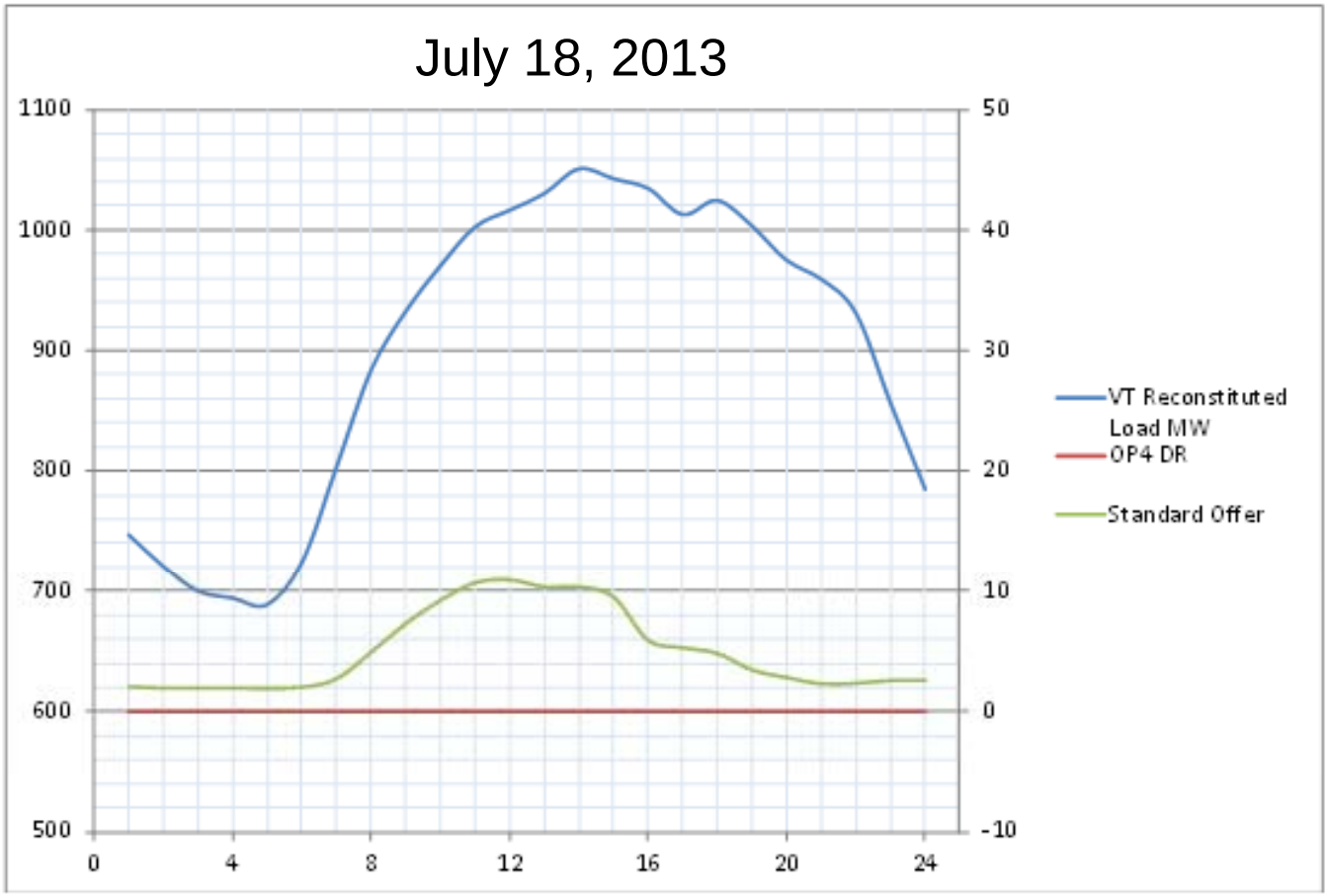
Review of 2013 summer peak

September 11, 2013

VSPC meeting

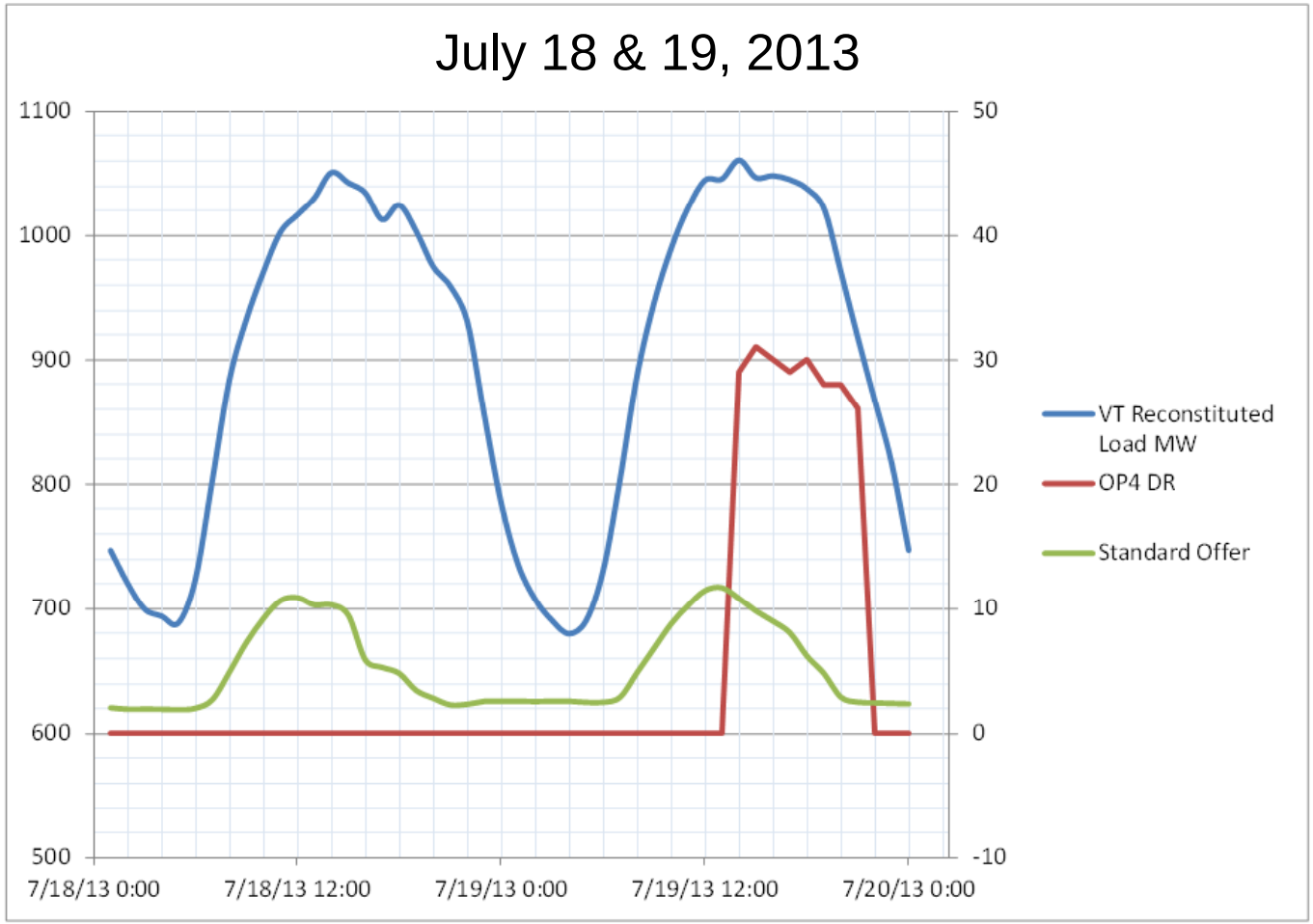
2013 summer peak was 1040 MW, net of standard offer generation (10 MW generated out of 20 MW nameplate)

- Peak occurred July 18, hour ending 2pm
  - Standard offer contribution increased 2.5 times since last year
  - GMP water heater load management program (rate 3) increased the 6pm load
  - VT peak was non-coincident with the New England peak, which occurred on July 19



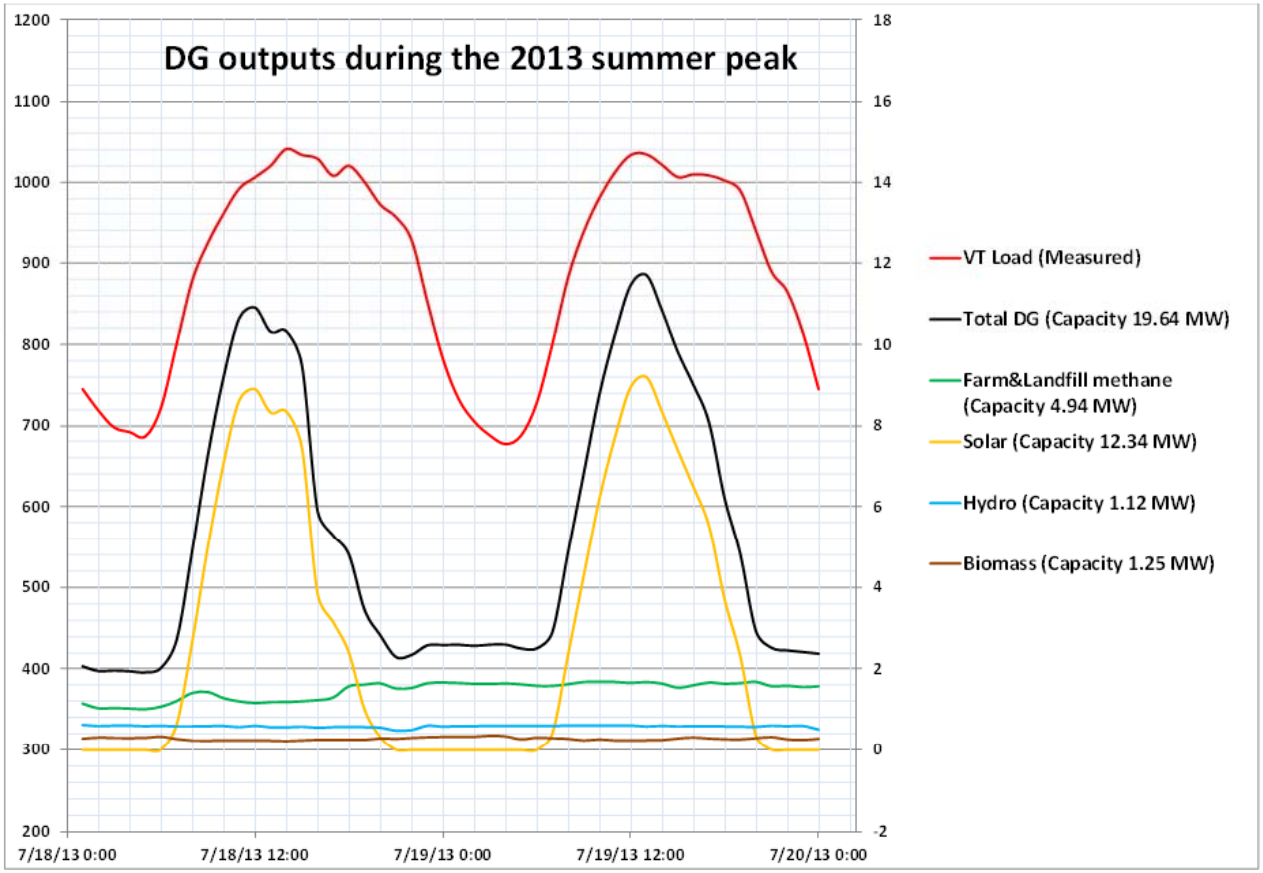
However, the true peak occurred on July 19 at 2 PM

- July 19 measured load was lower because of OP4
  - Peak reconstituted by adding OP4 DR and standard offer to the load
  - Peak was 1061 MW on 8/19 compared to 1051 MW on 8/18



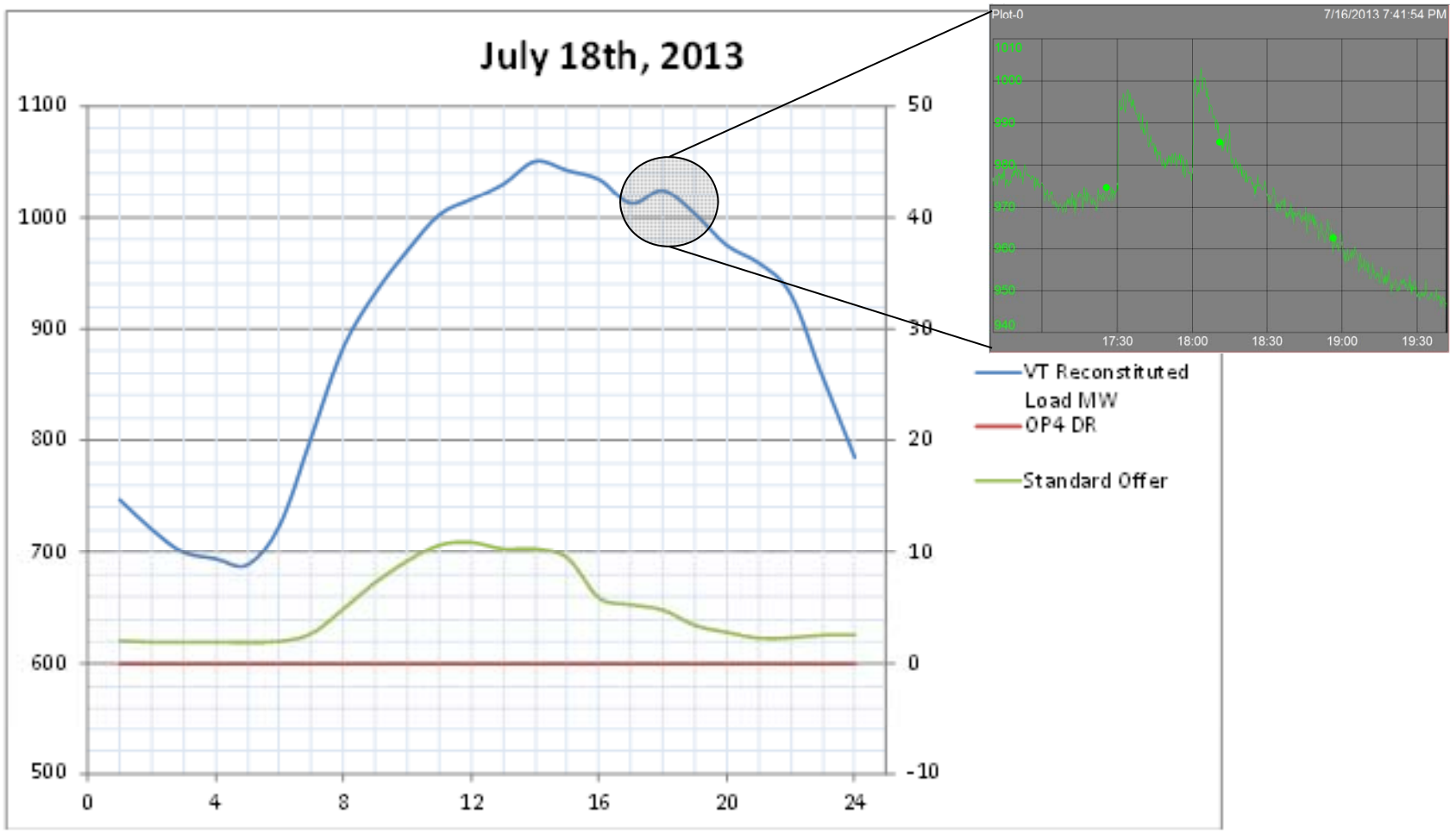
Standard offer contribution during the peak day

- Standard offer installed capacity currently 19.6 MW
  - 4.9 MW farm & landfill methane, 12.3 MW solar, 1.1 MW hydro, 1.3 MW biomass
- Standard offer contribution lower than nameplate during the peak
  - Methane at 25% of capacity, solar at 65%, hydro at 50%, and biomass at 20%
  - Notice the changing shape of the solar PV



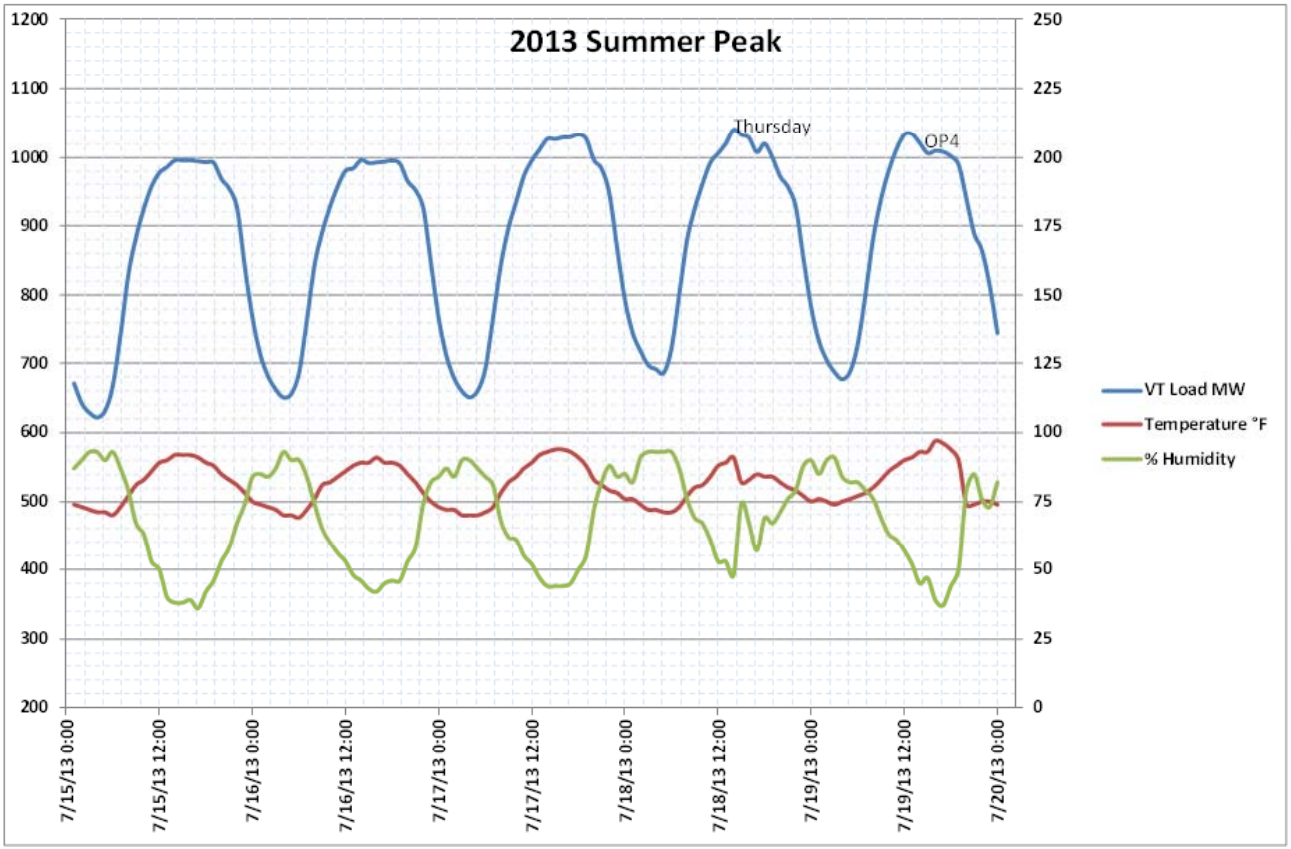
DG and load management are affecting the daily load shape

- Solar PV generation flattens and shifts the peak towards the evening
- Rate 3 program reduces the midday load, but increases the early evening load
- As solar PV penetration increases, the rate 3 program will set the daily peak



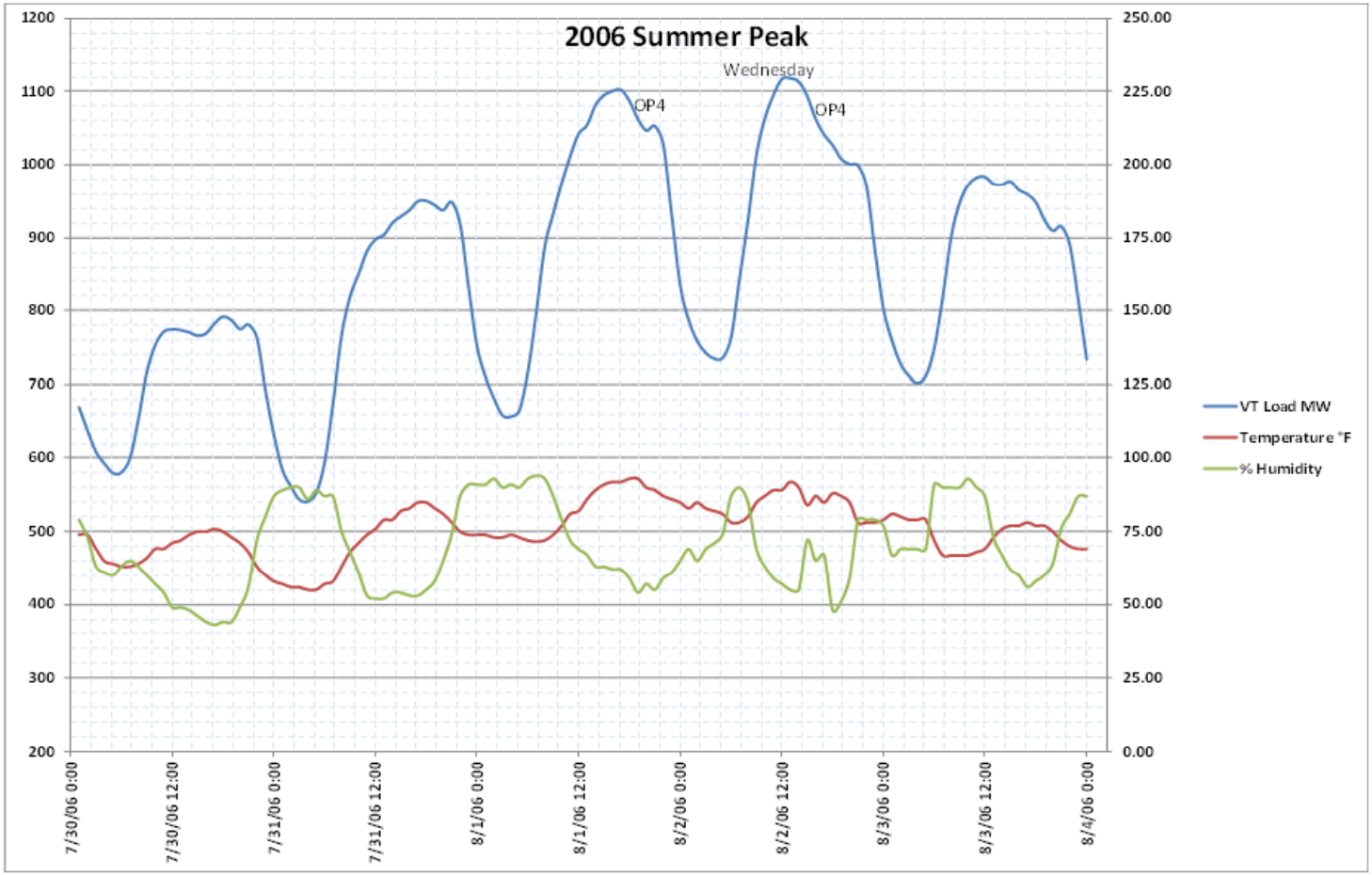
The 2013 summer peak week was unusually hot

- Peak occurred on 8/18, but that day's weather was not the warmest of the week
- Midday loads can be quite flat due to solar PV and load management
- Daily peaks were similar (weather was already hot early in the week)



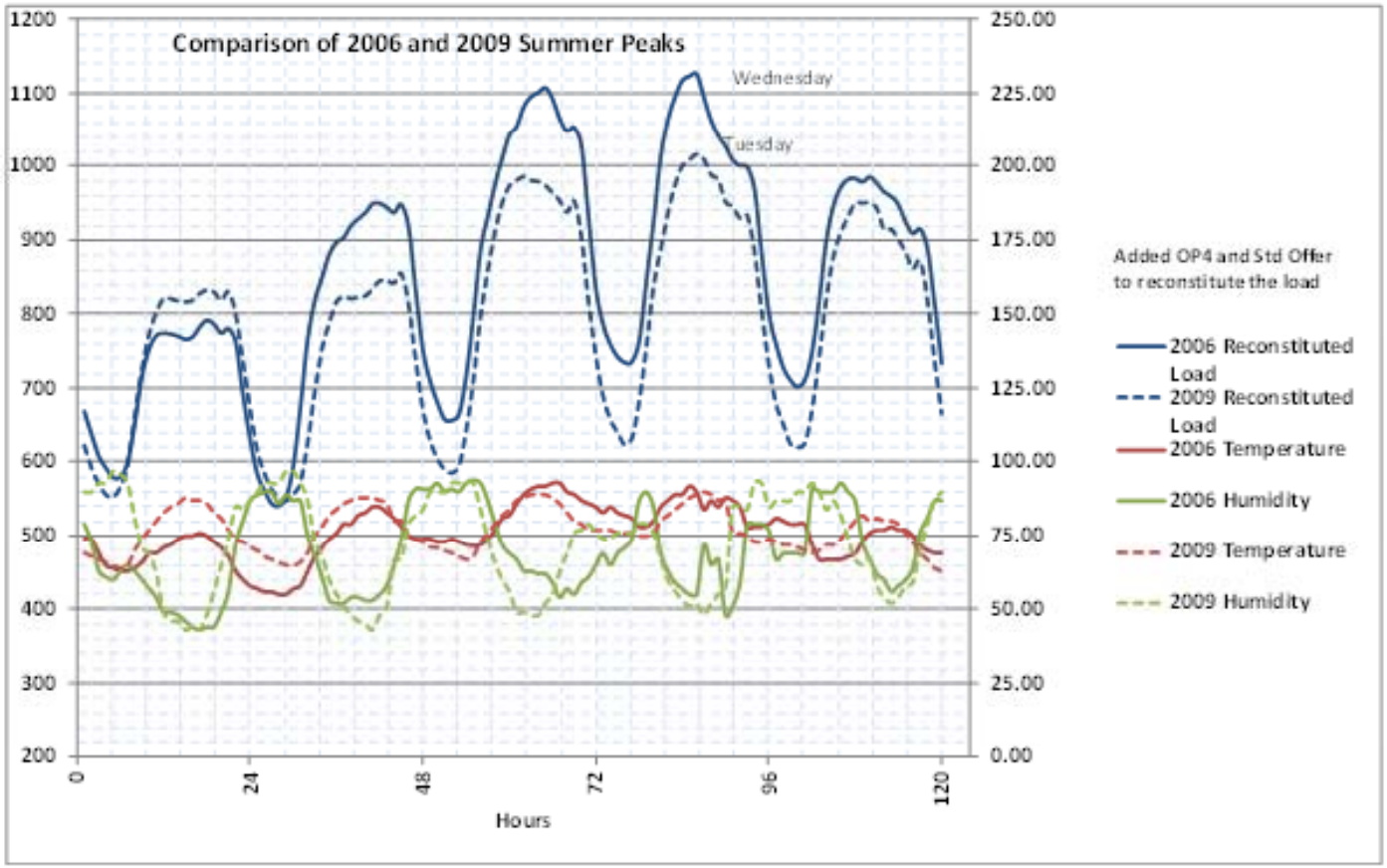
Weather during the all-time summer peak week – July 2006

- Temperature started lower earlier in the week
- Temperature was lower on the day of the peak
- Temperature dropped significantly the night of the peak



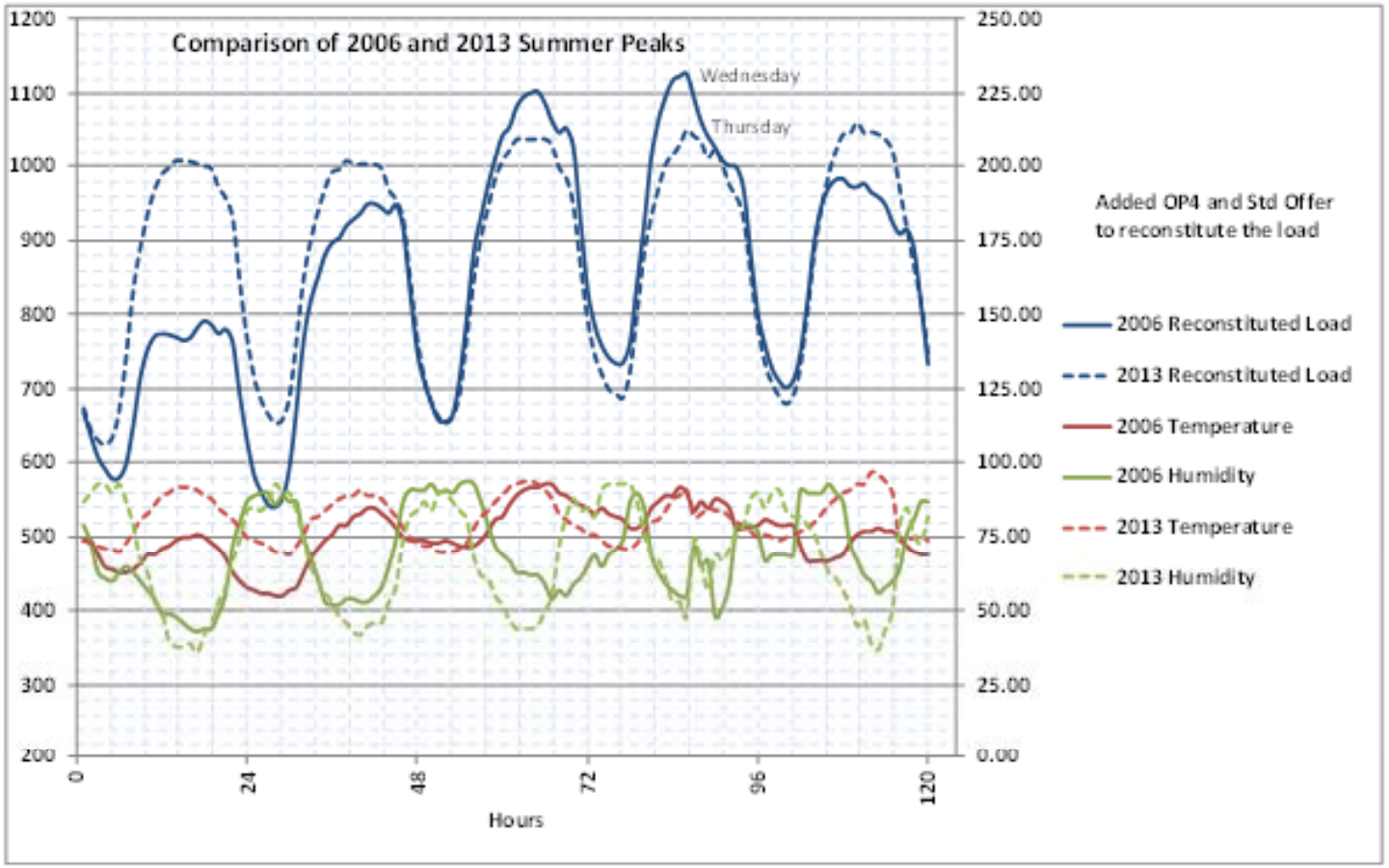
Comparing the 2006 and 2009 summer peaks

- 2009 peak was about 100 MW lower than in 2006
  - 2009 was the lowest point of the recession—most significant factor
  - 2009 peak occurred earlier in week—the earlier timing tends to be lower
  - The temperature did not exceed 90 degrees in 2009
  - More hot days led up to peak day in 2006 compared to 2009



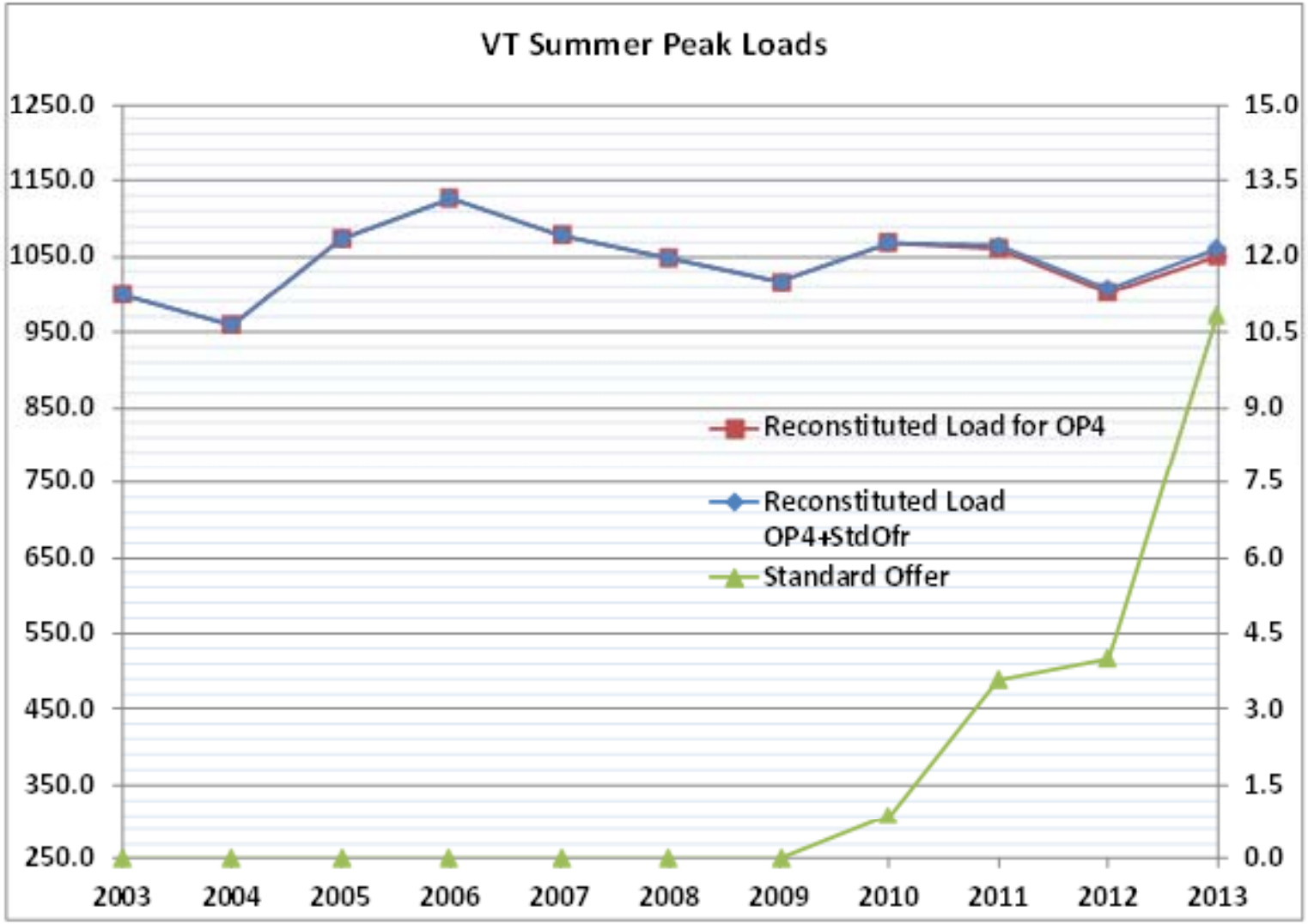
Comparing the 2006 and 2013 summer peaks

- 2013 peak was about 65 MW lower than 2006
  - 2013 peak occurred later in week—the later timing tends to be higher
  - Temperature exceeded 90ºF for 5 straight days in 2013 (98ºF on fifth day)
  - More hot days led up to peak day in 2013 compared to 2006



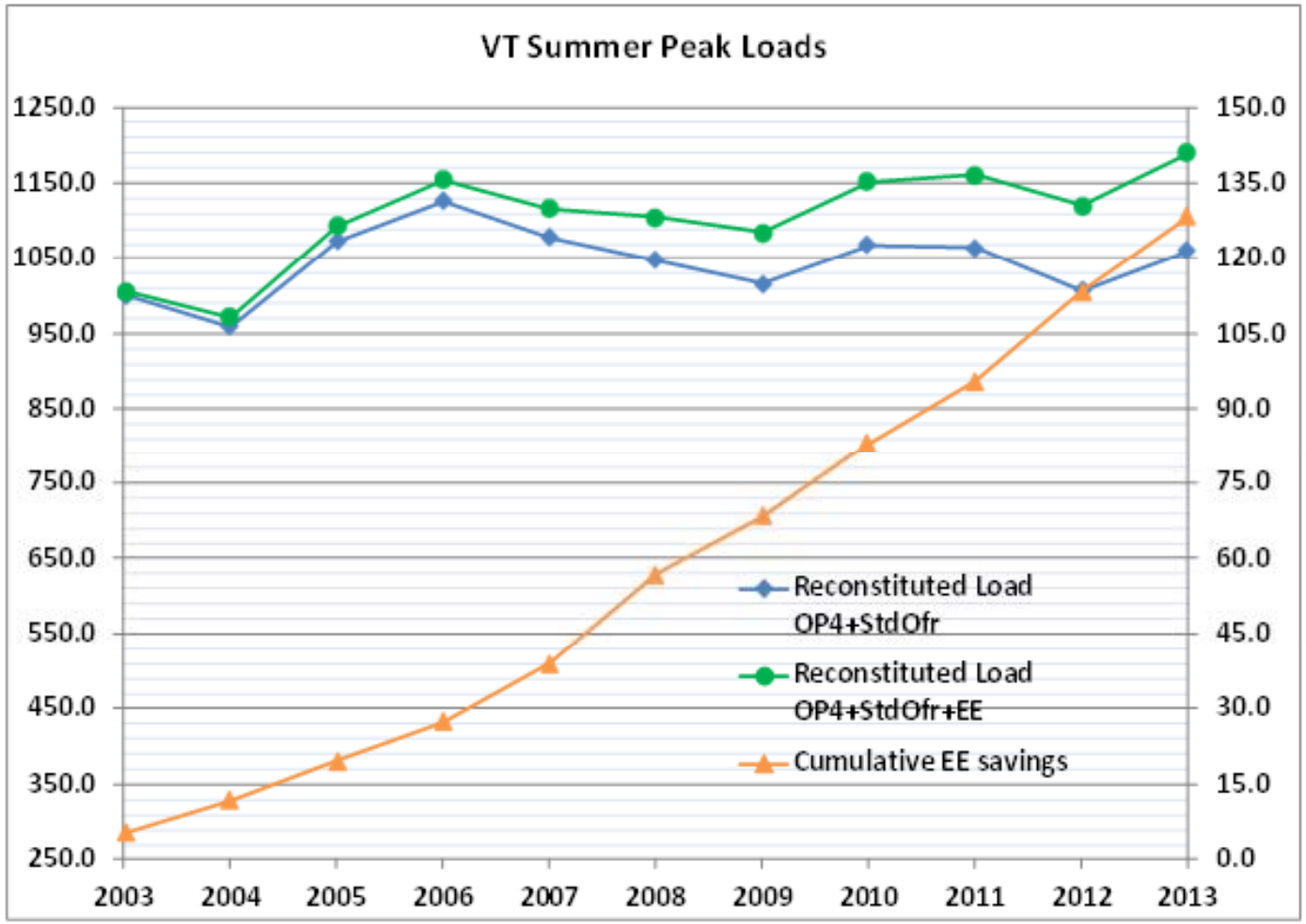
Effects of standard offer on the summer peaks

- Can expect similar effects from net metering



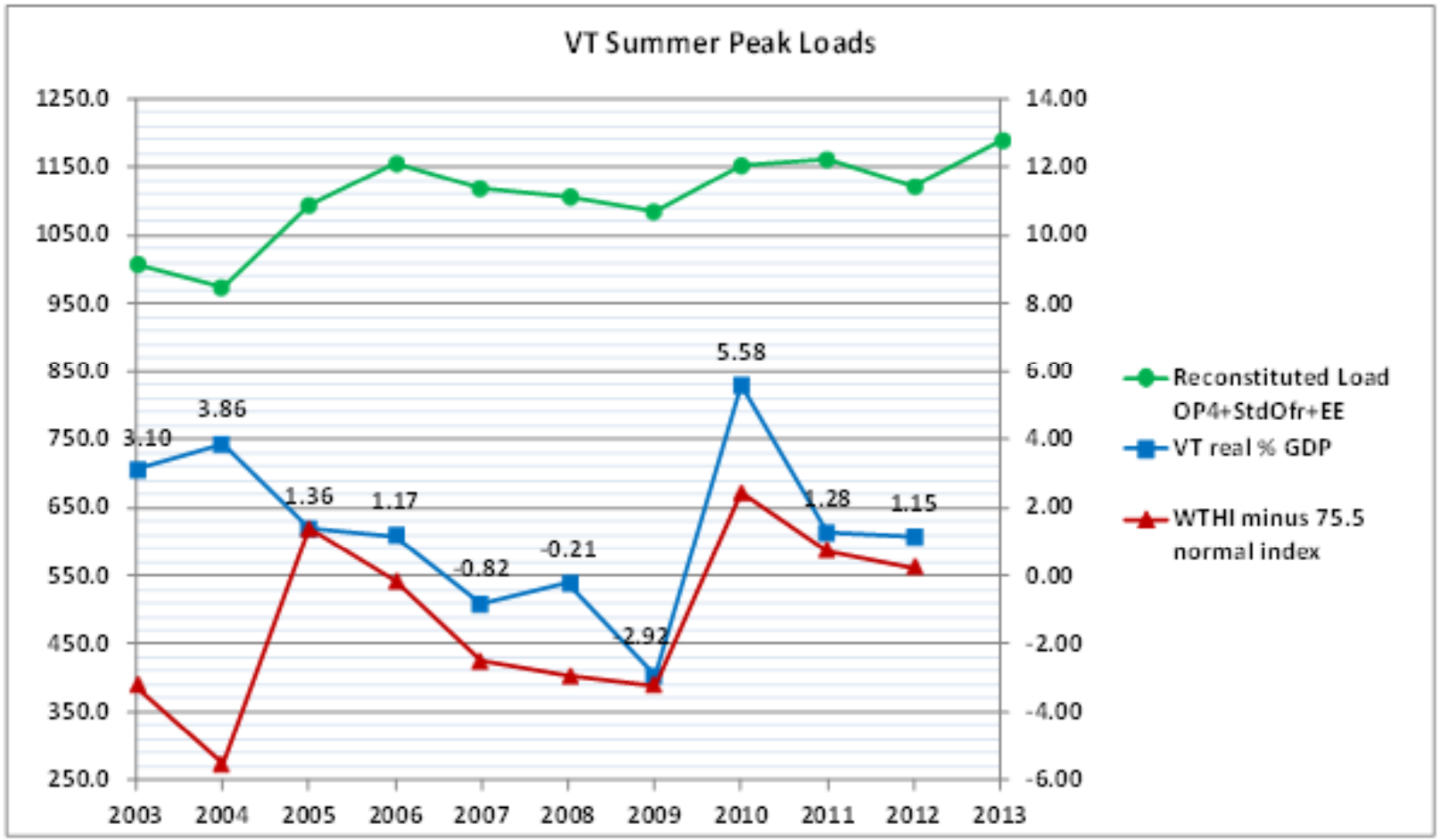
Effects of energy efficiency on the summer peaks

- Reported EE savings from VEIC annual reports (2013 incremental EE savings estimated by VELCO at 15 MW)



Historical annual state economic growth and weather

- Percent annual state Gross Domestic Product (GDP) growth from BEA.GOV (Bureau of Economic Analysis, US Dept of Commerce)
- Three-day Weighted Temperature Humidity Index (WTHI) from Itron
  - Plotted figures are relative to the normal weather WTHI of 75.5



Predicting a relatively flat demand growth

- State policies appear to be the major factor in leveling demand
- The relationships between the load and the influencing factors (regression coefficients) are changing
  - Link between load and economic growth is weakening as a result of structural changes in how we use electricity
  - Integration of future EE impacts on load needs to be adjusted as we continue to build history over time
  - Estimating the effects of net metering is proving difficult due to lack of visibility/data
  - Need to change prediction of ISO-NE DR due to DR leaving the capacity market
  - DU load management programs can have large effects on load but are not currently visible to the system operator
  - State policies can have a significant effect, but are difficult to predict