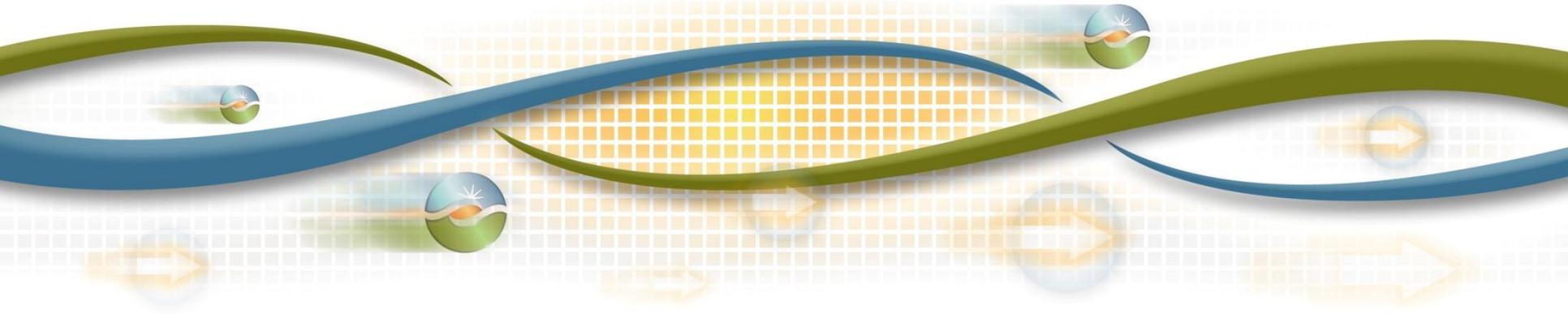




CAISO's proposed TOU periods to address grid needs with high numbers of renewables

Clyde Loutan, Sr. Advisor, Renewable Energy Integration, CAISO

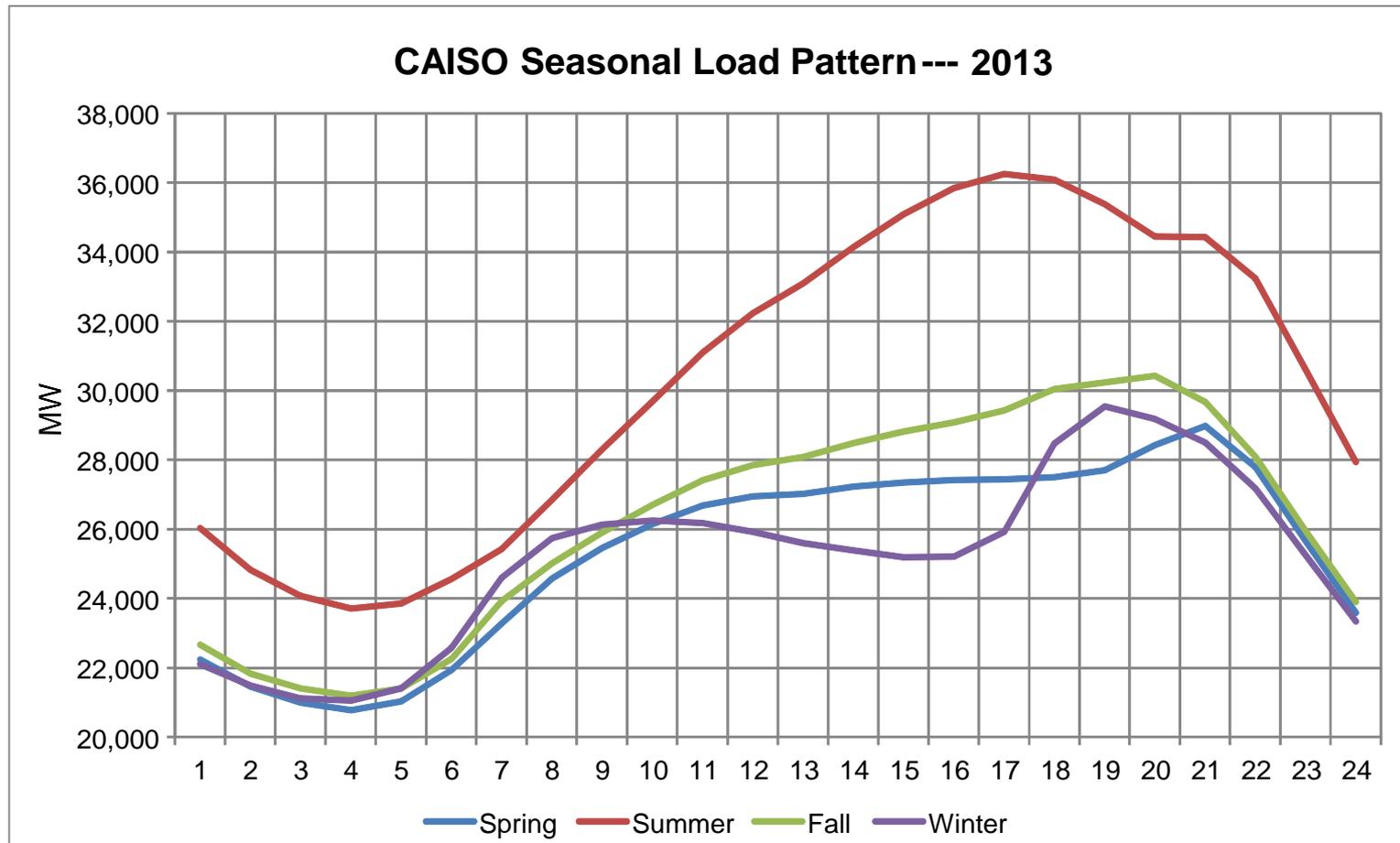
CPUC Residential Rate Reform proceeding (R.12-06-013)
November 17, 2015



The following slides attempt to answer the questions

- Does the time of the CAISO's coincident demand vary by season?
- Does the time of the CAISO's coincident peak coincide with the PTOs' peak demand?
- Is there a noticeable difference between weekdays and weekends/holidays?
- Is there a need for IOU specific TOU periods?
- Can all three IOUs establish common TOU periods based on the CAISO's needs?
- Should TOU periods be grouped by months?

The CAISO coincident peak demand varies by season



Up to a 4-hour spread across the year

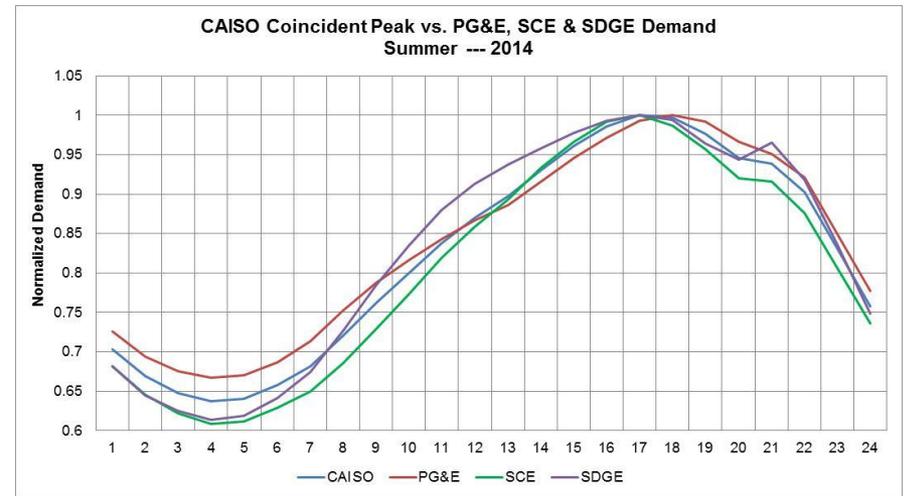
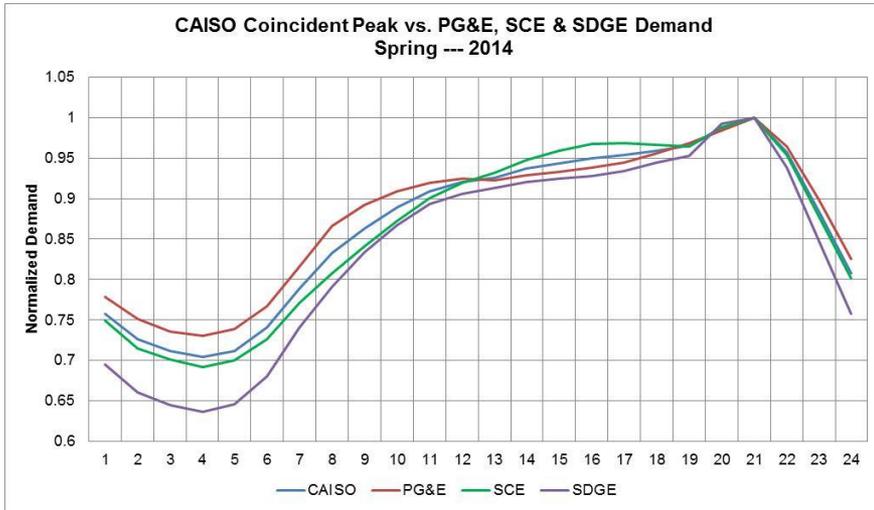
Spring: Mar, Apr & May (HE 21)
Summer: Jun, Jul & Aug (HE 17)

Fall: Sep, Oct & Nov (HE 20)
Winter: Dec, Jan & Feb (HE 19)

ISO's coincident peak vs. PTO's coincident peak

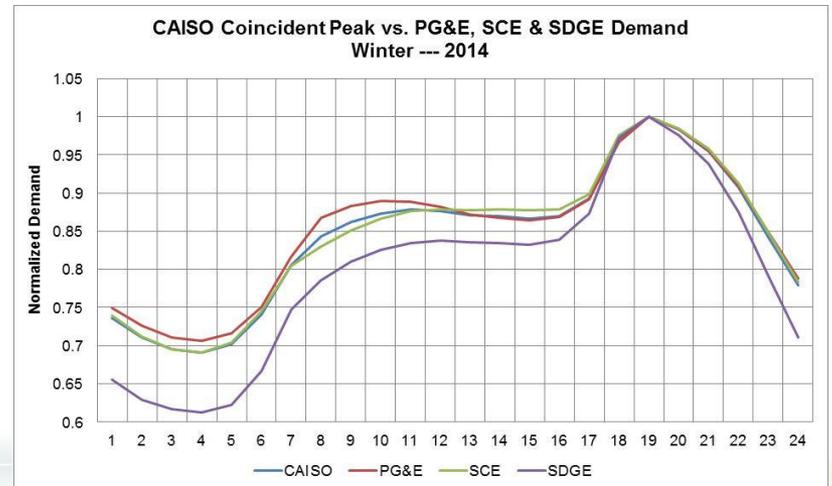
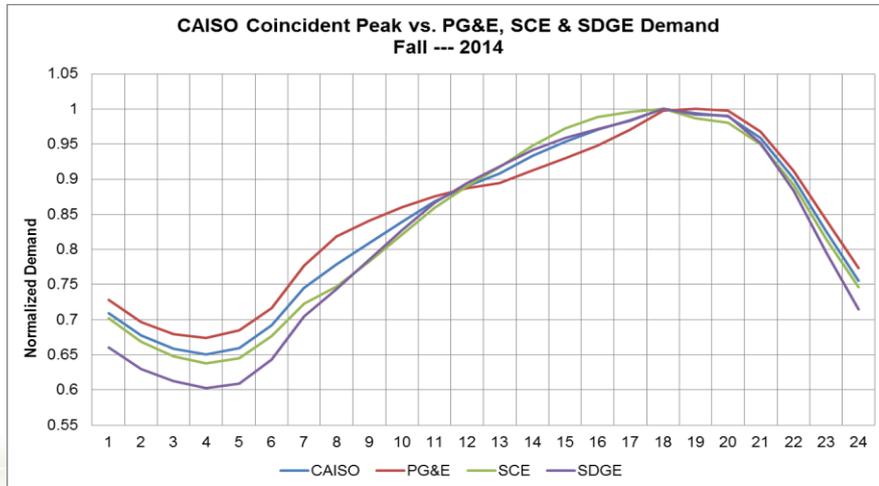
Spring: The ISO and three PTOs coincident peak occurs between 8 p.m. and 9 p.m.

Summer: The ISO, SCE & SDG&E coincident peak occurs between 4:00 p.m. and 5:00 p.m. PG&E is an hour later

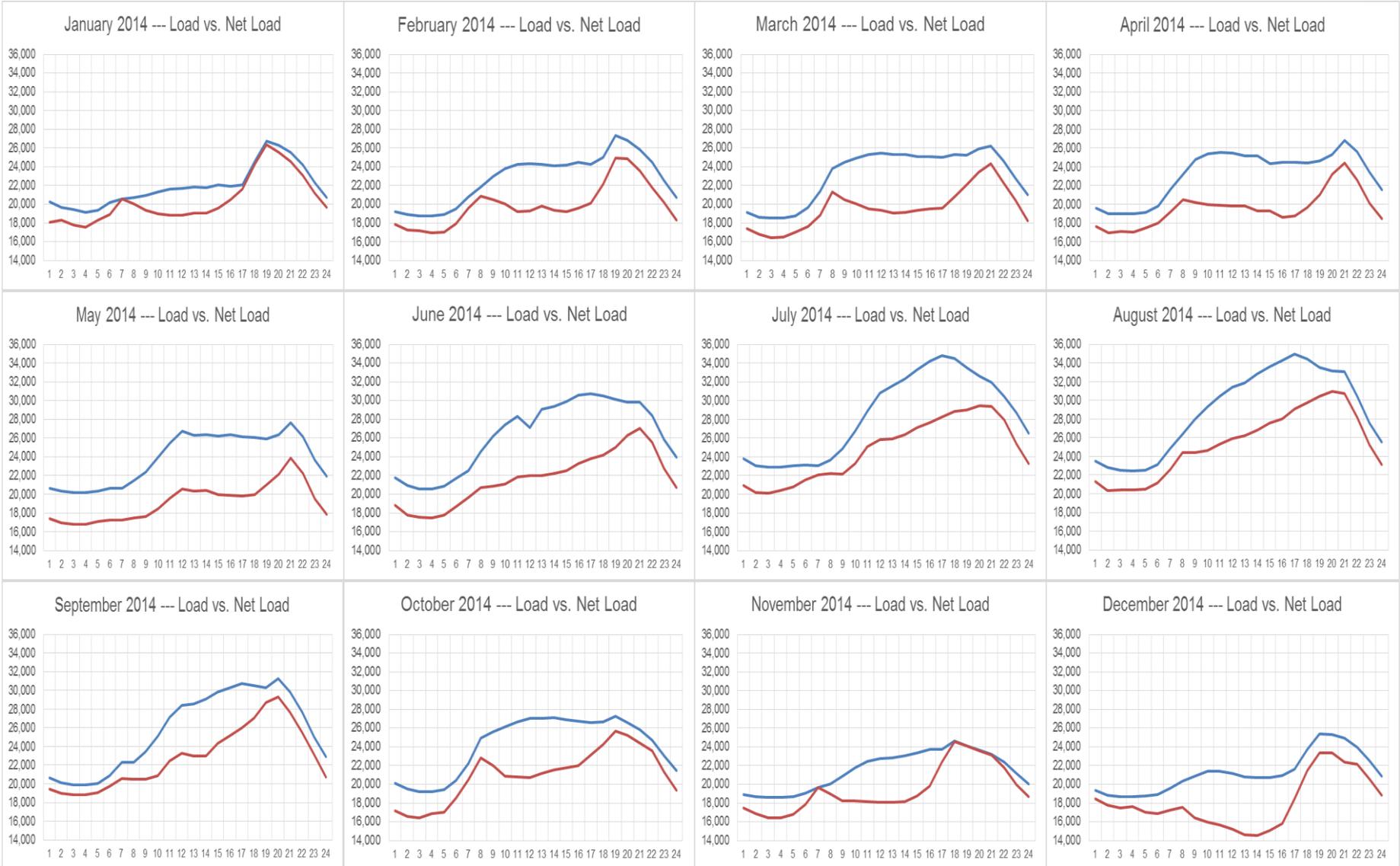


Fall: ISO and three PTOs coincident peak occur between 7:00 p.m. and 8:00 p.m.

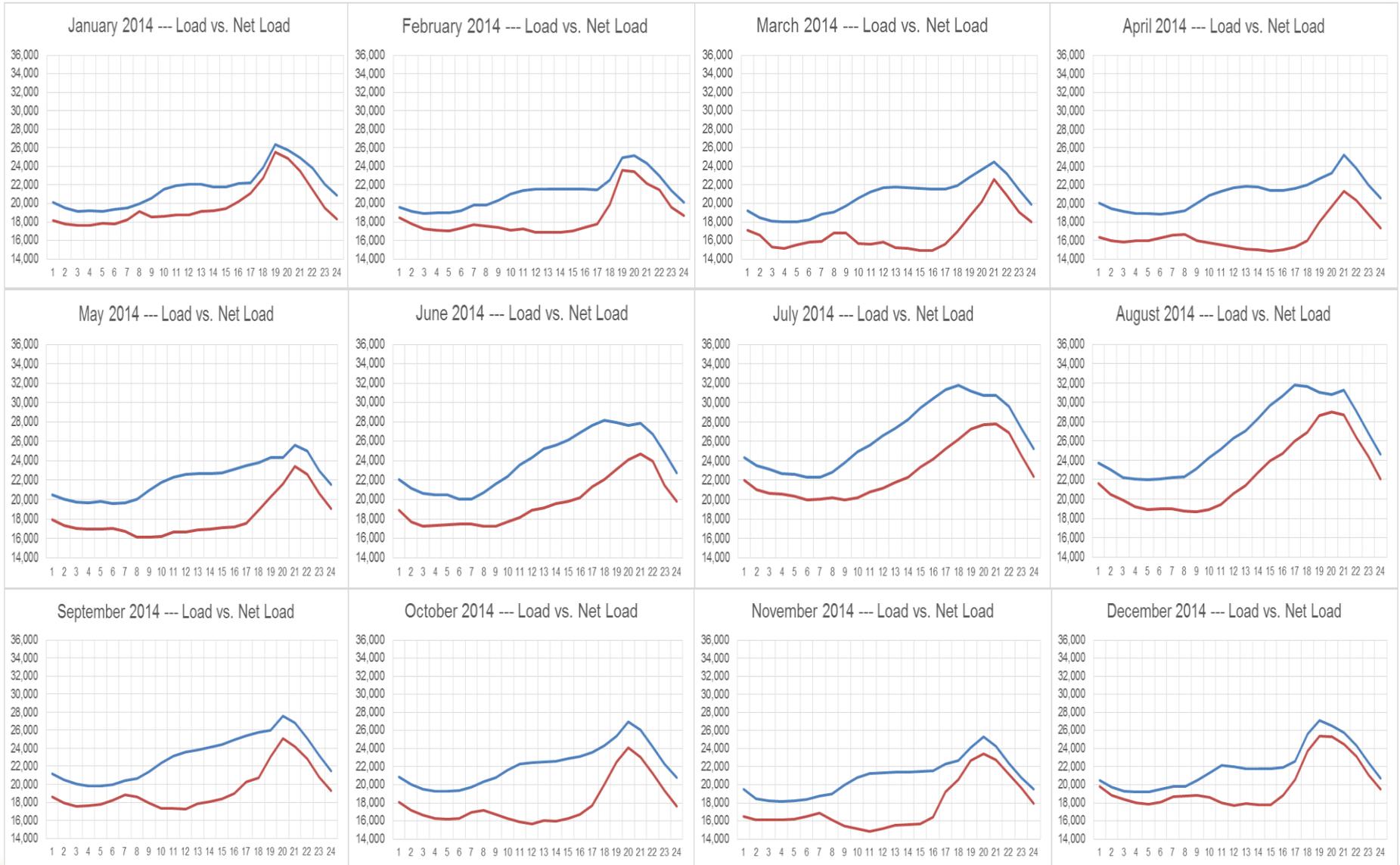
Winter: ISO and three PTOs coincident peak occur between 6:00 p.m. and 7:00 p.m.



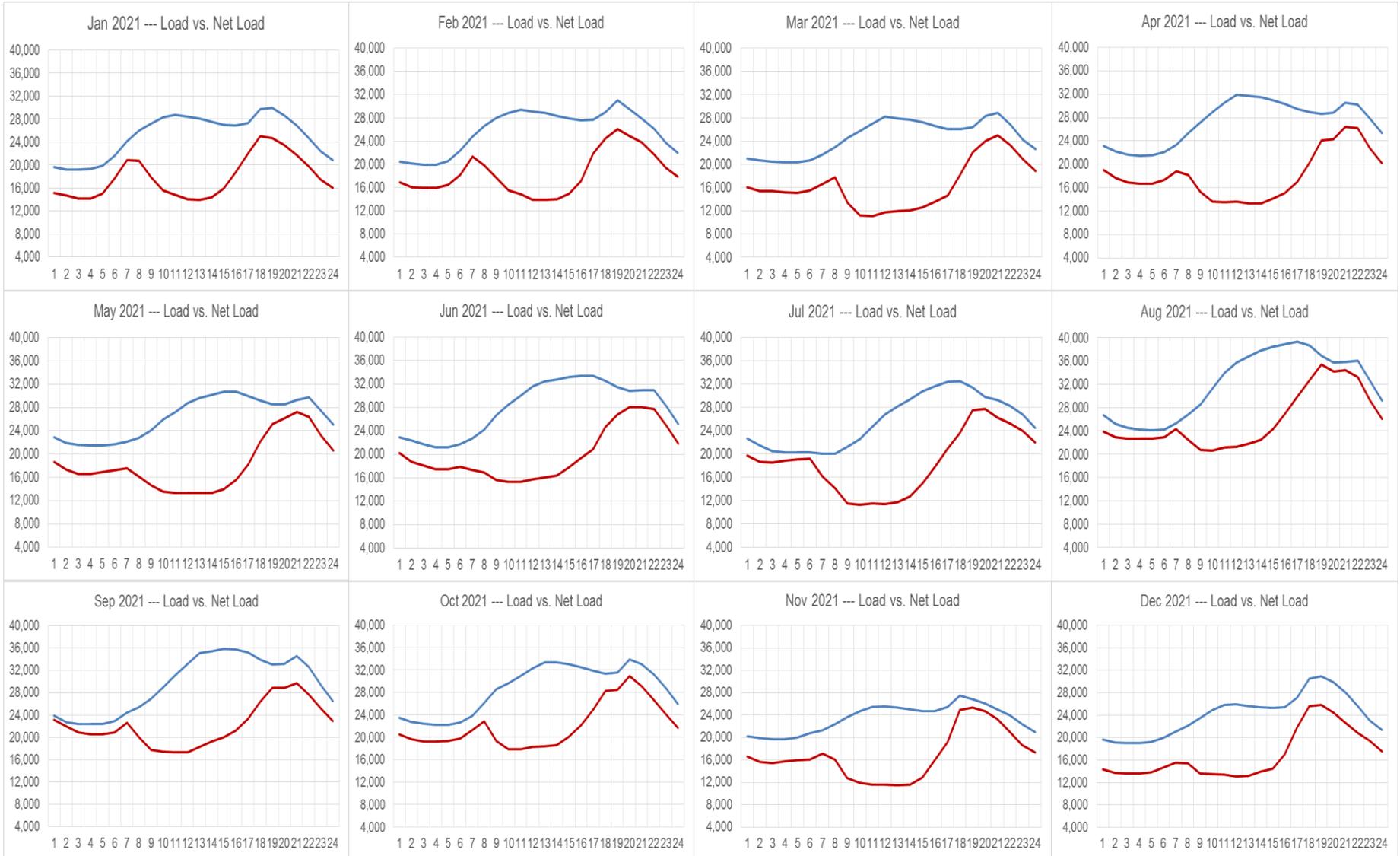
2014 Monthly Load vs. Net Load profiles --- Weekdays



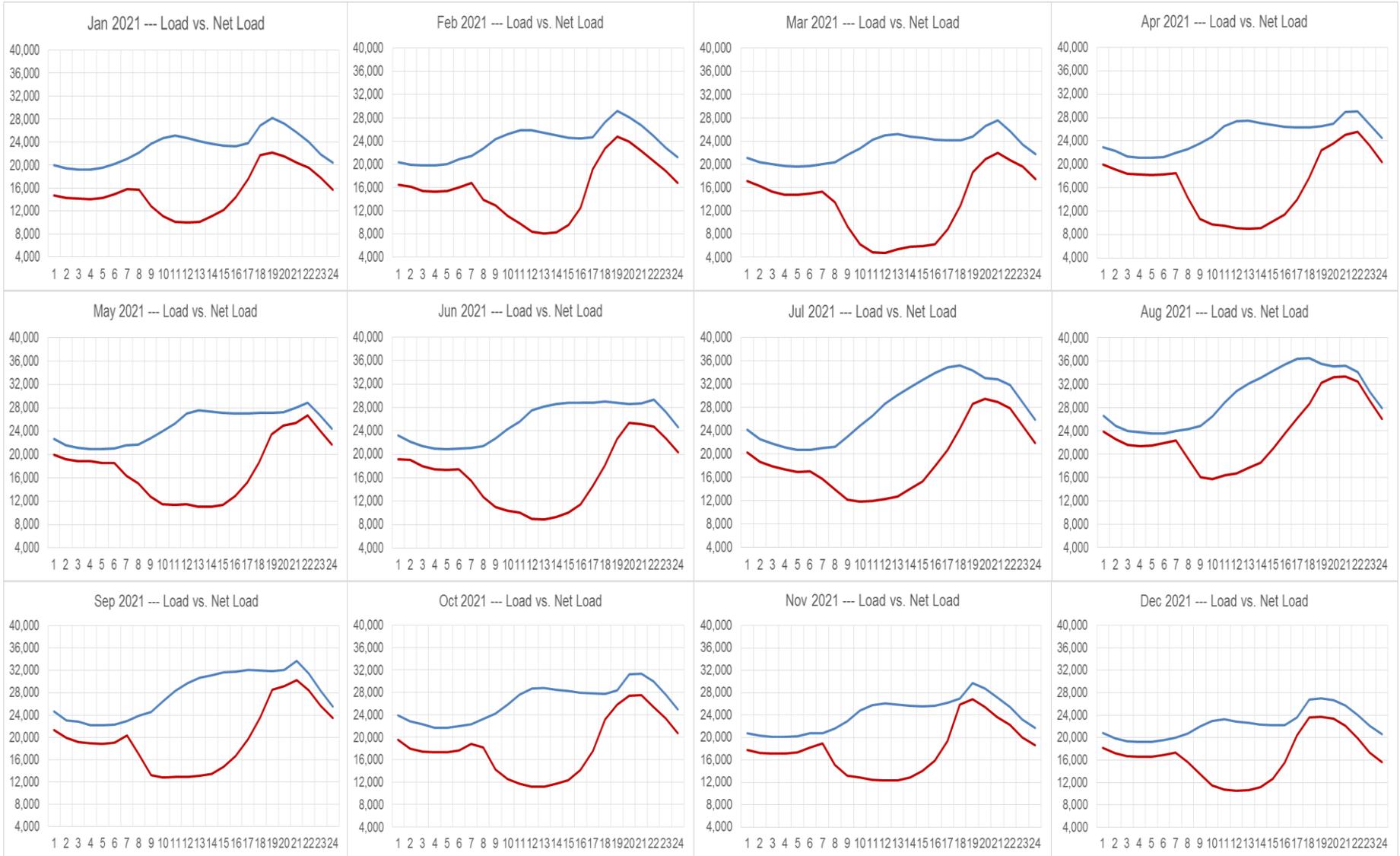
2014 Monthly Load vs. Net Load profiles --- Weekends



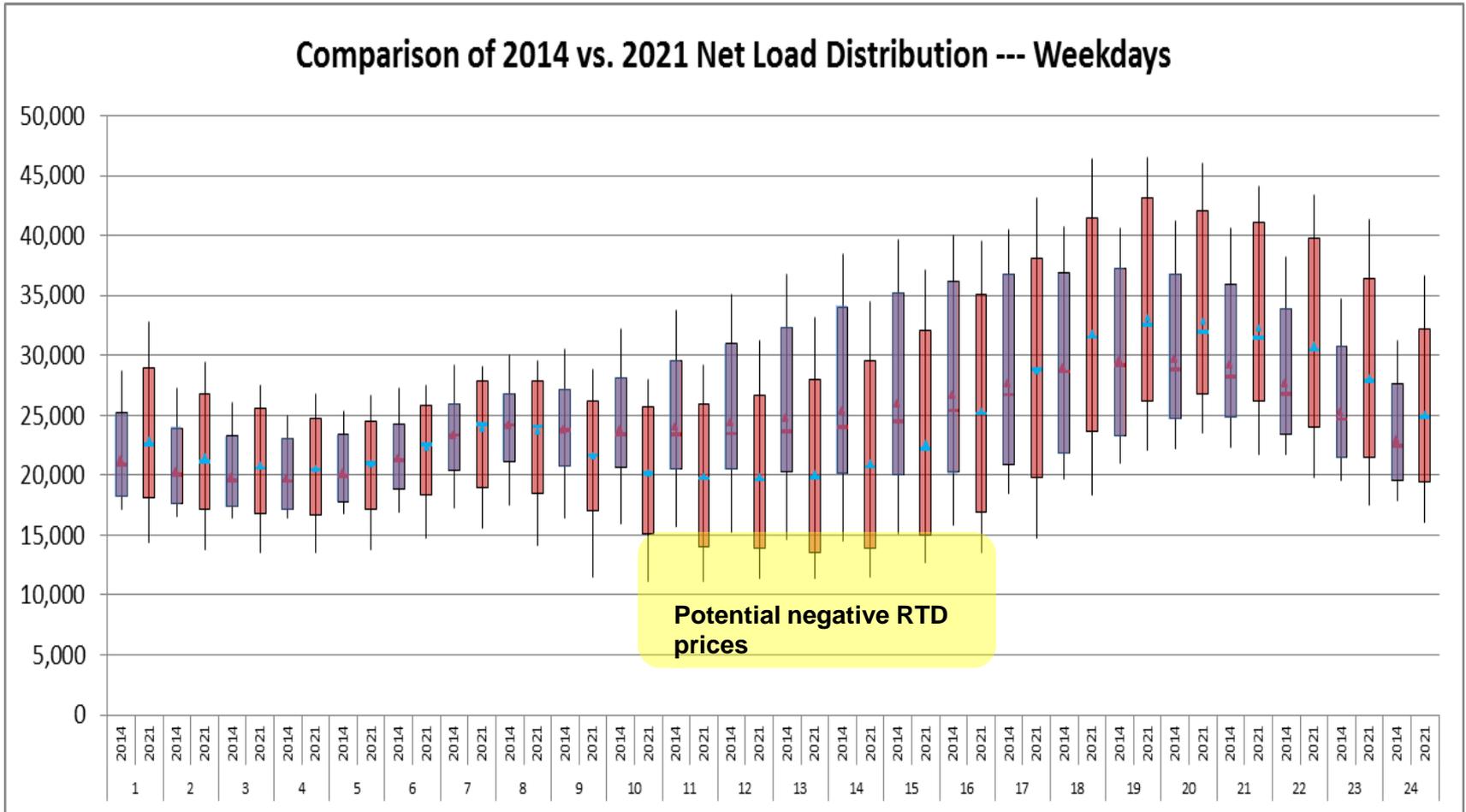
2021 Monthly Load vs. Net Load profiles --- Weekdays



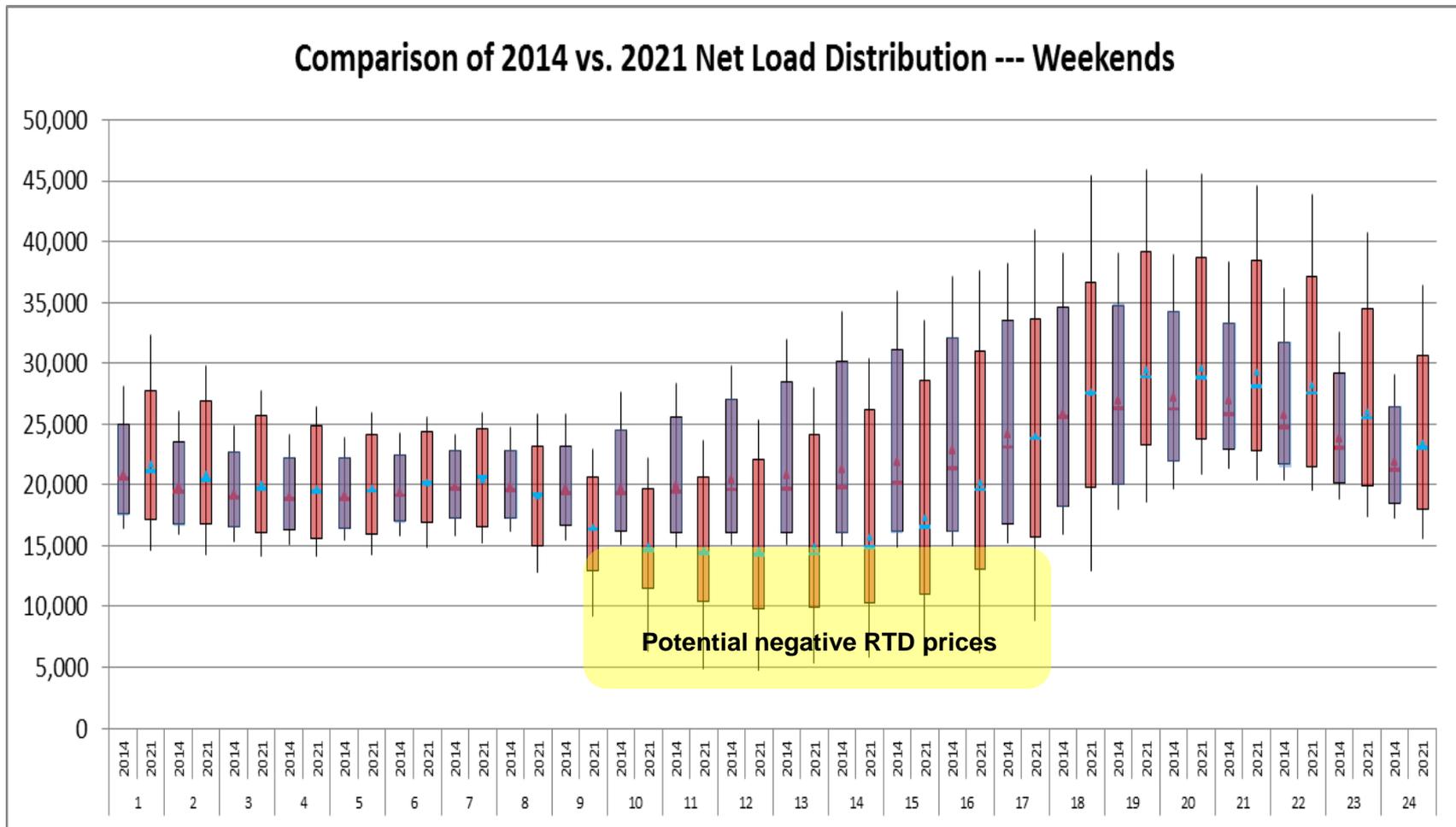
2021 Monthly Load vs. Net Load profiles --- Weekends



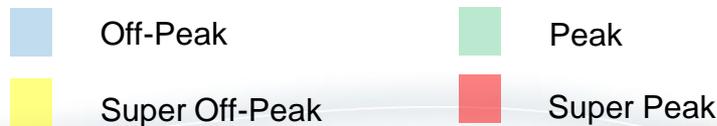
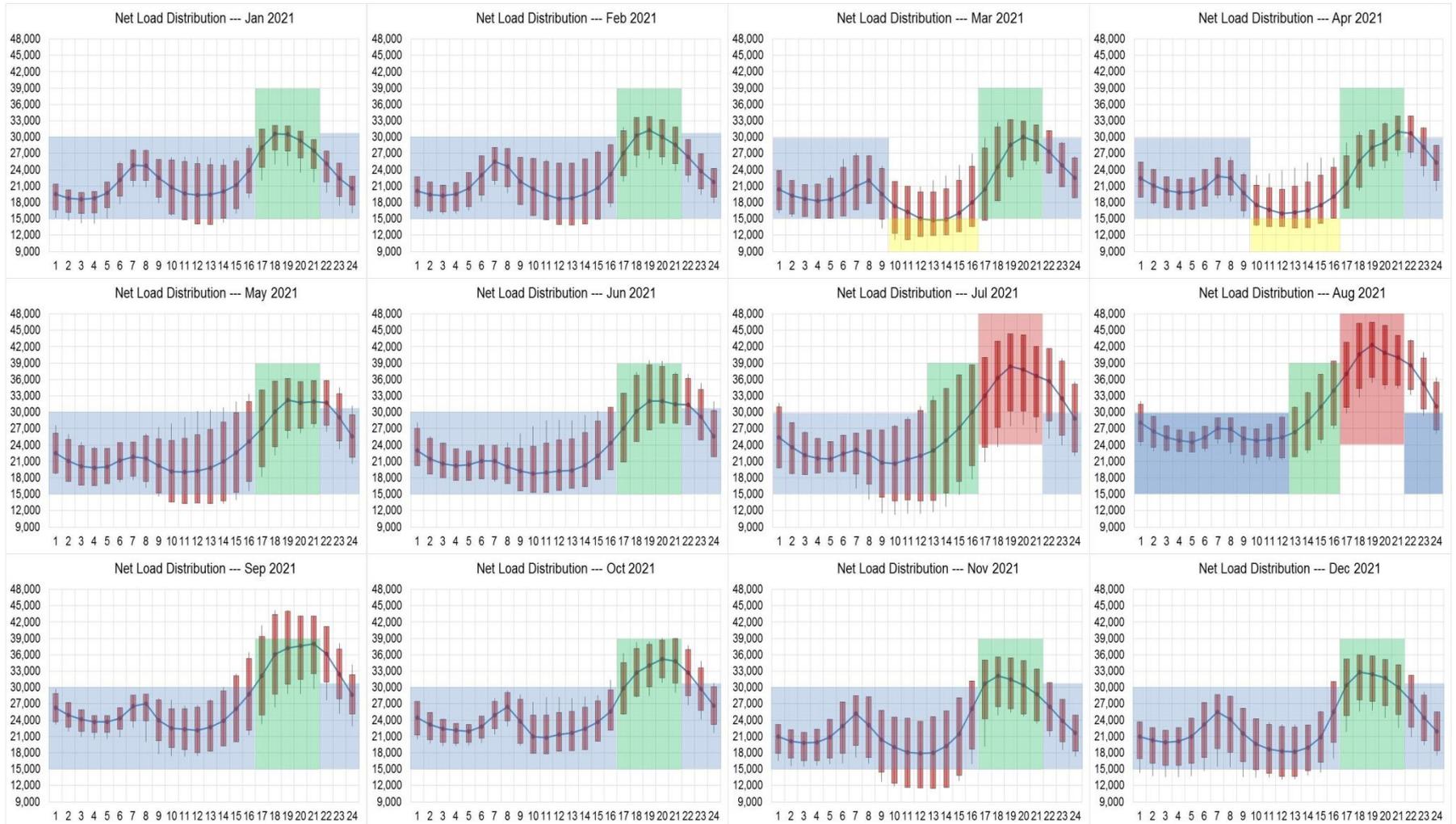
2014 vs. 2021 net load distribution --- Weekdays



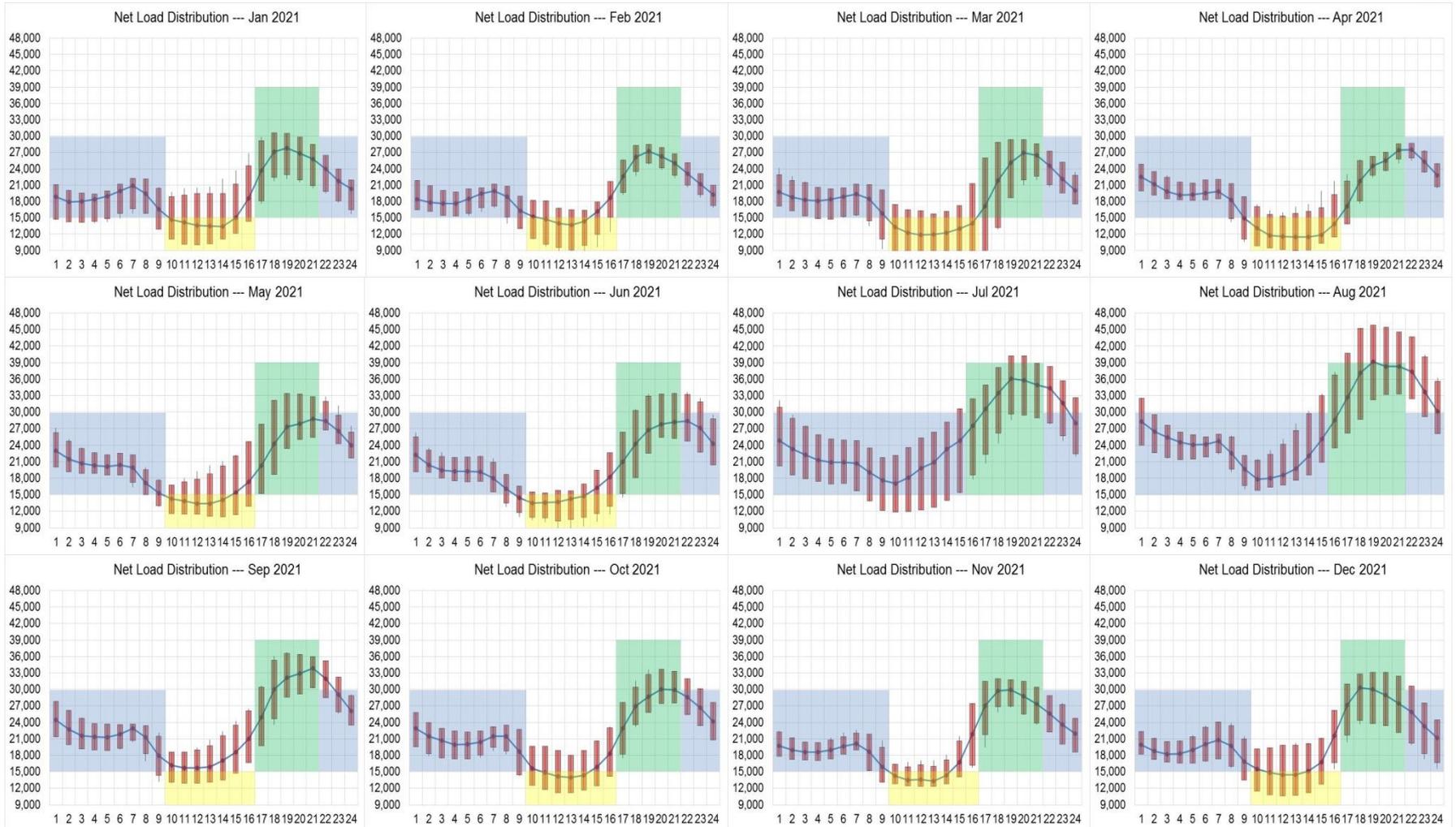
2014 vs. 2021 net load distribution --- Weekends



2021 Monthly Net Load Distribution --- Weekdays



2021 Monthly Net Load Distribution --- Weekends



Proposed TOU Time Periods

Day-type	Months	Super Off-Peak	Off-Peak	Peak	Super Peak
Weekdays	Jan, Feb, May, Jun, Sep, Oct, Nov, Dec	-	Midnight – 4 PM 9 PM - Midnight	4 PM – 9 PM	-
	Mar & Apr	10 AM – 4 PM	Midnight – 10 AM 9 PM - Midnight	4 PM – 9 PM	-
	Jul & Aug	-	Midnight – Noon 9 PM - Midnight	Noon – 4 PM	4 PM – 9 PM
Weekends & Federal Holidays	Jan - Jun & Sep - Dec	10 AM – 4 PM	Midnight – 10 AM 9 PM - Midnight	4 PM – 9 PM	-
	Jul & Aug	-	Midnight – 4 PM 9 PM - Midnight	4 PM – 9 PM	-

What we have learned...

- **TOU rate structures will be more complex in the future**
 - Properly designed rates could help manage RPS impacts; Poorly designed rates could exacerbate system conditions
- **The summer net-load coincident peak occurs later in the day**
- **Over-generation will spur more frequent negative energy prices as more variable resources come on-line**
 - Negative real-time energy prices are occurring and are becoming more probable in the middle of the day, especially on weekends and holidays



Questions!