California ISO
Shaping a Renewed Future

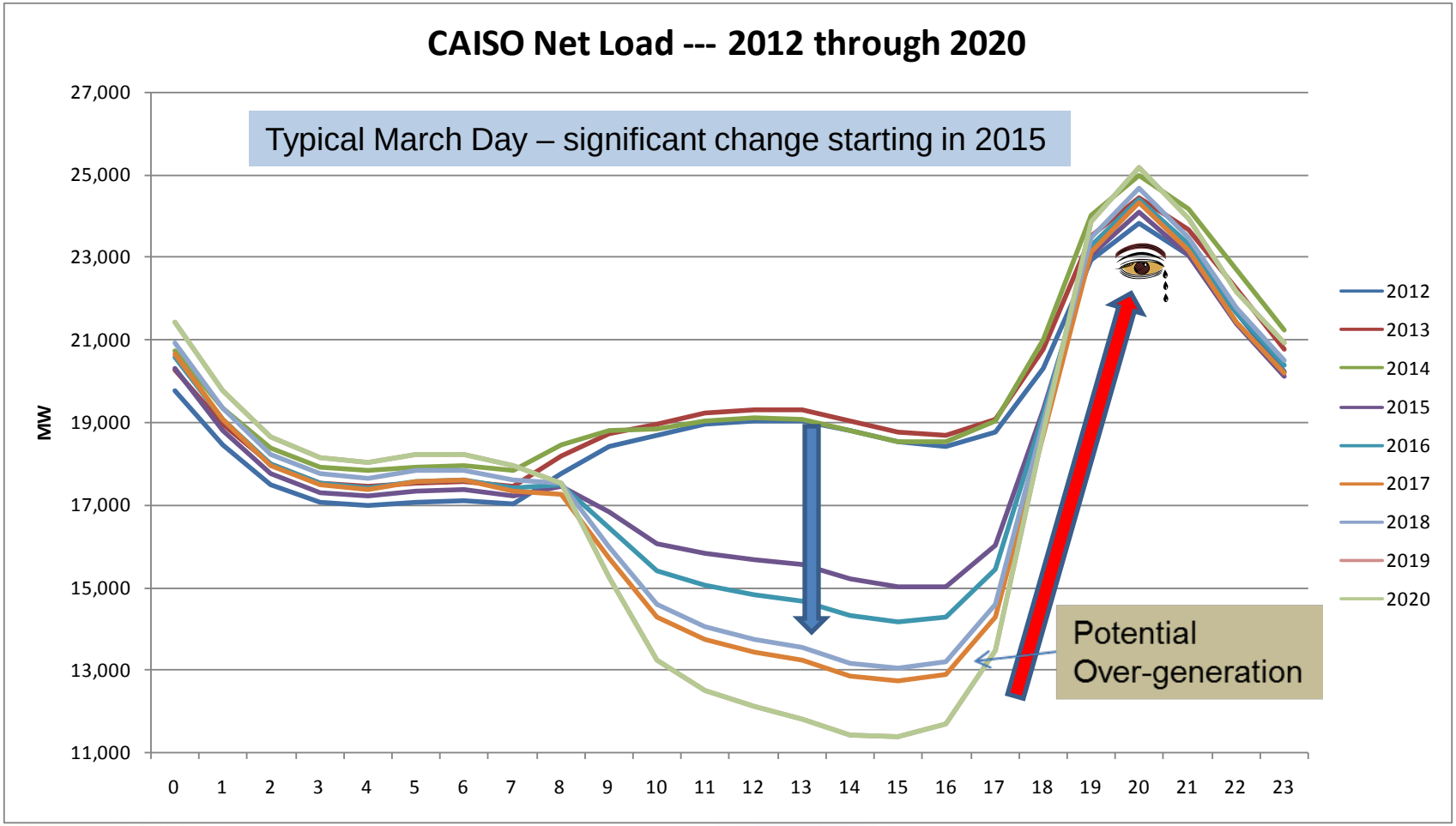
Dealing with the duck:
How utilities are using pricing to address projected solar impacts

National Town Meeting on Demand Response and Smart Grid
Washington D.C.
Breakout Session #2

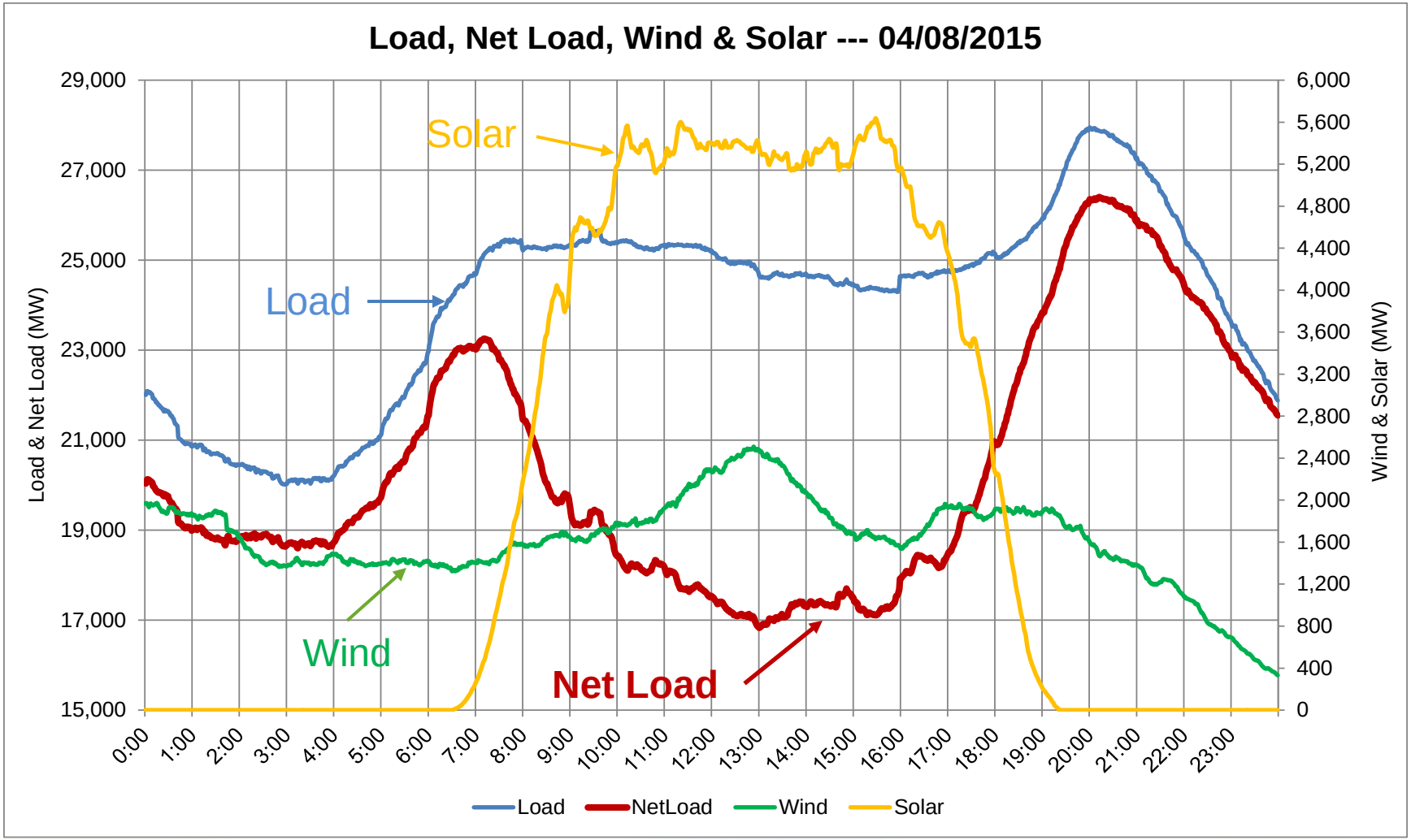
John Goodin
Regulatory Policy Manager
May 28, 2015

The Original Conceptual Duck Chart- August 2012

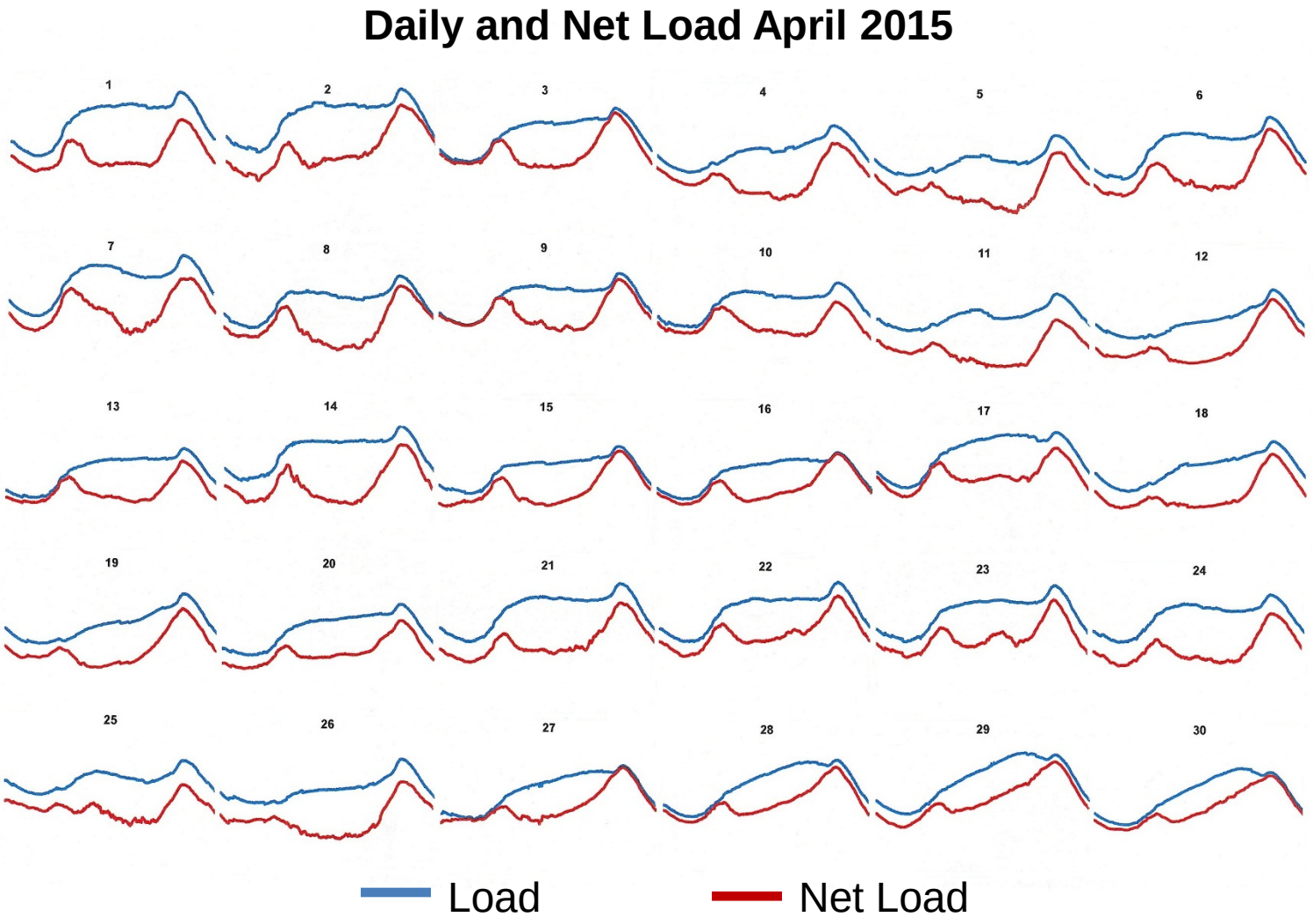
Net load patterns change significantly starting in 2015



A Real Duck Chart- April 8, 2015



Actual Flock of Ducks- April 2015



Questions We Sought to Answer...

Can TOU rates enhance reliability and simplify operations by creating a flatter net-load profile in a high RPS environment?

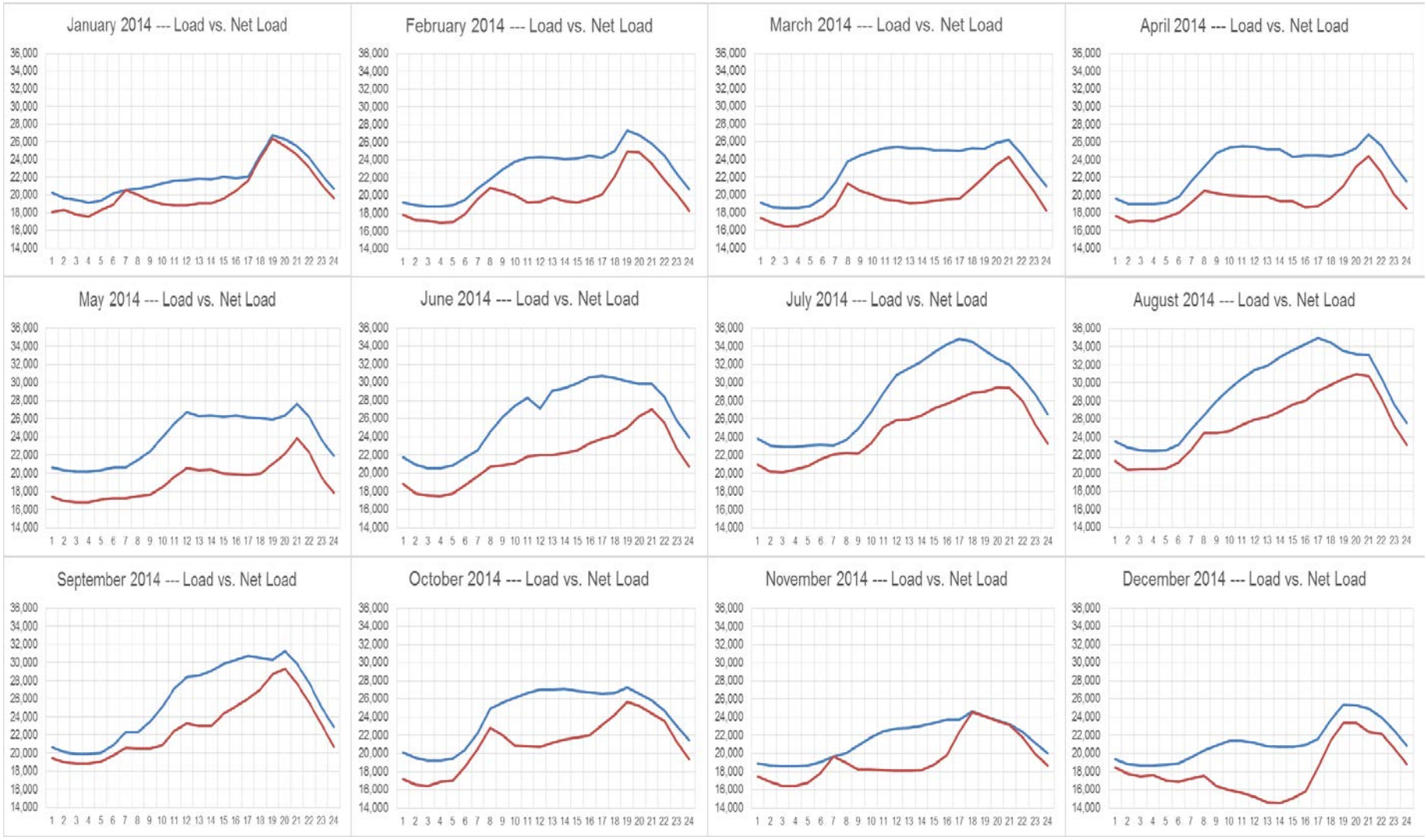
- Is there a noticeable net-load load profile difference between seasons, weekdays and weekends/holidays?
- How diverse is the net-load shape across the balancing area?
- Can the balancing area have the same TOU periods?
- Should TOU periods be grouped by months?
- What are reasonable design constraints/parameters?

How much can we differentiate TOU periods and still look and feel like a “traditional” TOU rate?

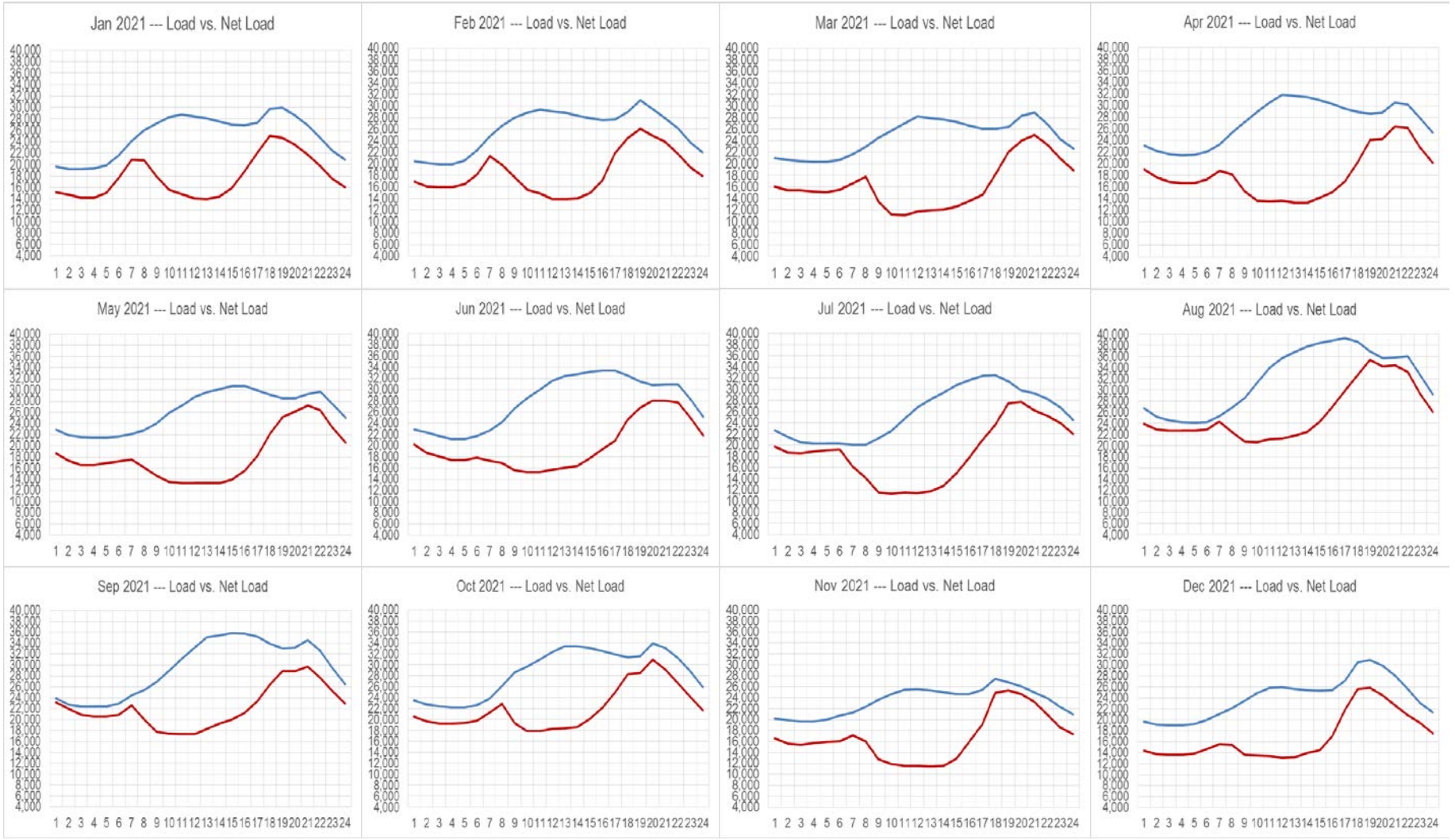
TOU Design Constraints and Parameters:

- ✓ Weekdays different than weekends.
- ✓ Rates can differ by season (not monthly).
- ✓ Incent curtailment, consumption, load shifting.
- ✓ Max 3 to 4 TOU periods per day.
- ✓ Midnight-to-6 AM a single low price period.
- ✓ TOU design based on system needs, not local.

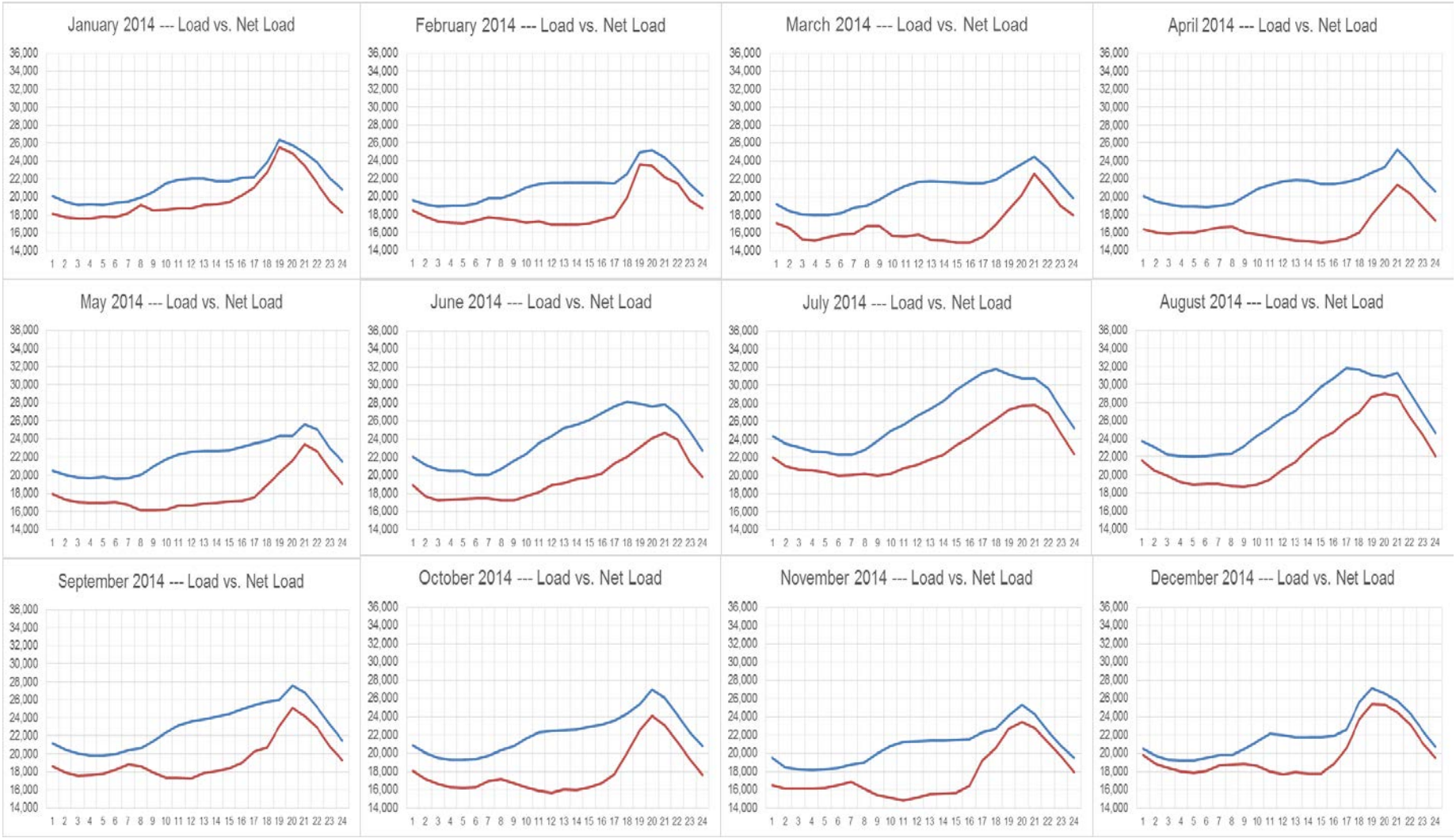
2014 Monthly Load vs. Net Load profiles --- Weekdays



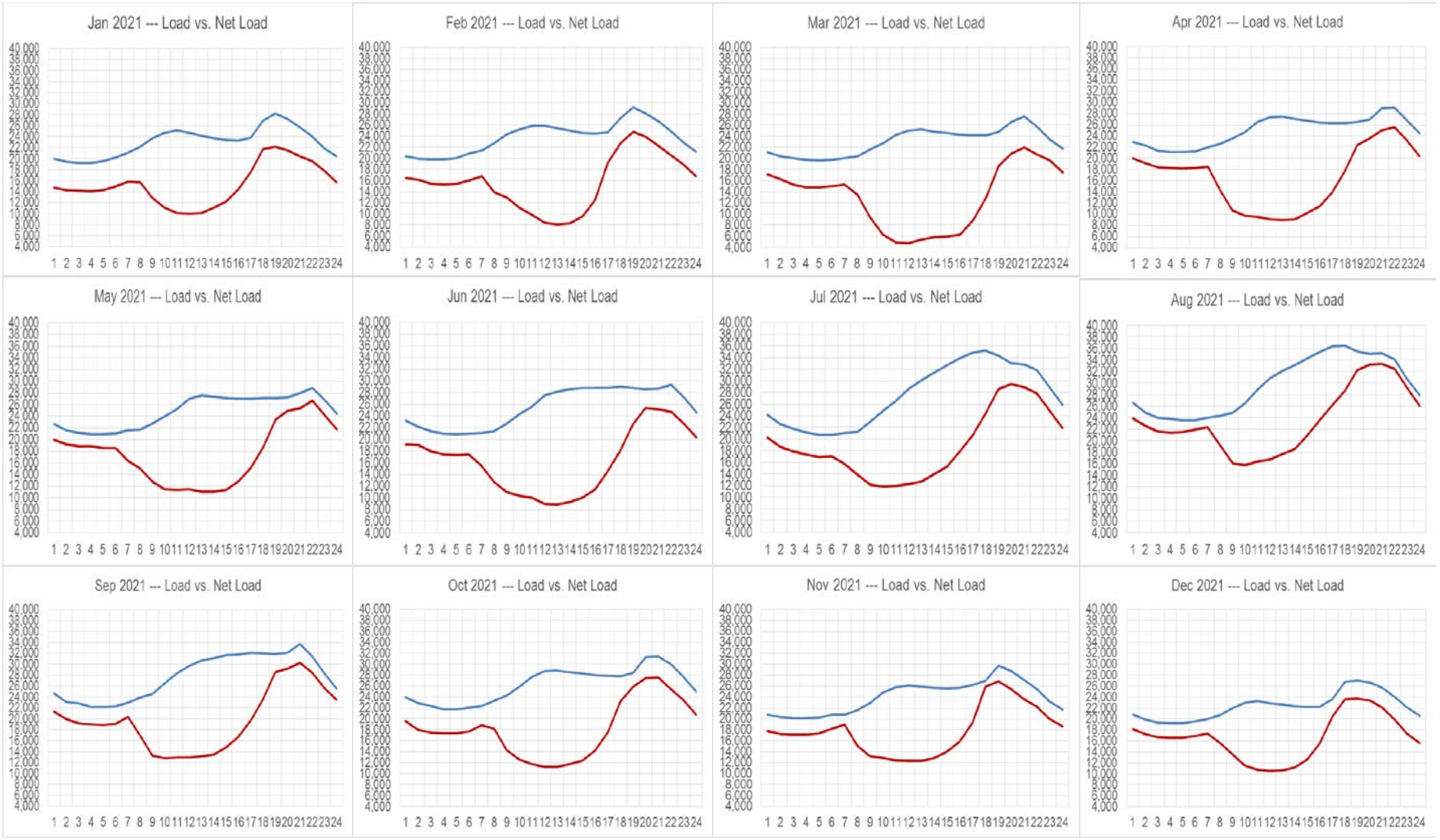
2021 Monthly Load vs. Net Load profiles --- Weekdays



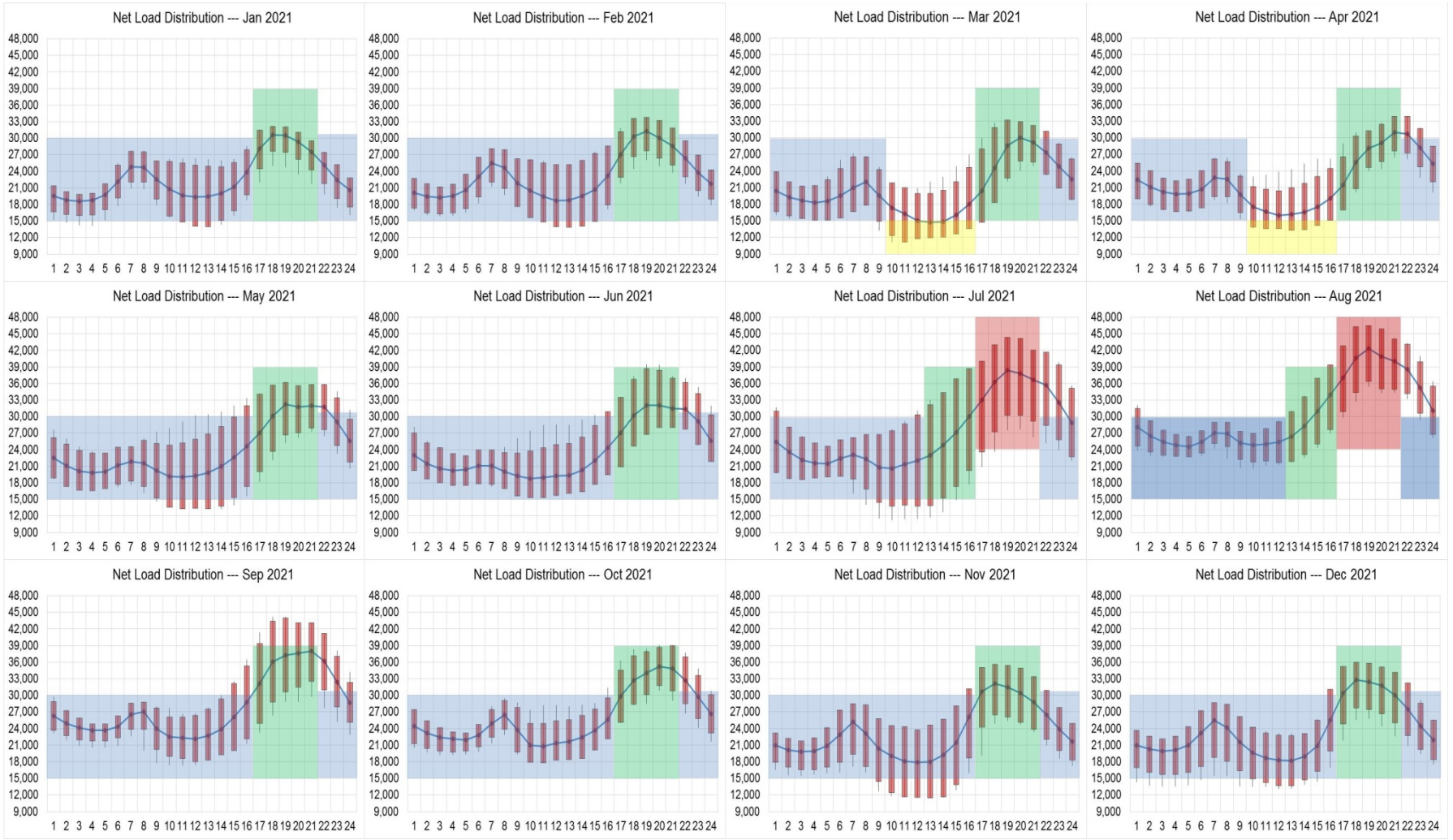
2014 Monthly Load vs. Net Load profiles --- Weekends



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



2021 Monthly Net Load Distribution --- Weekdays*



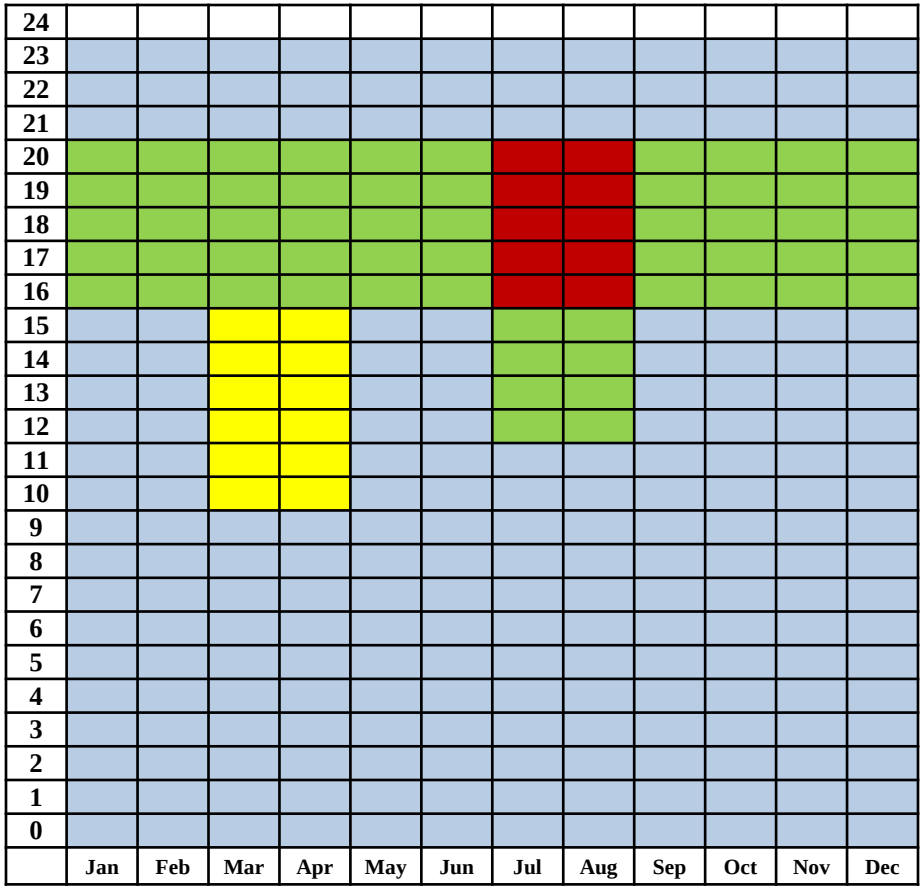
*Illustrative only: TOU periods here don't reflect proposed periods on following slide.

Proposed TOU periods to Address System Needs

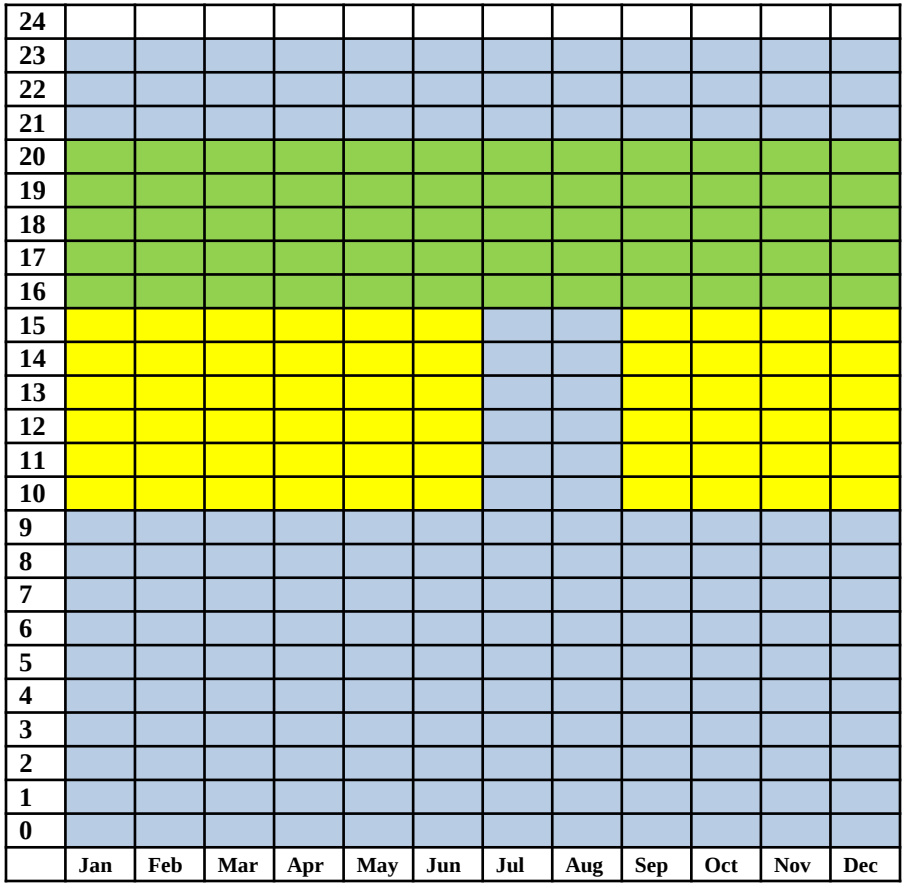
Day Type	Season	Months	TOU Periods			
			Super Off-Peak	Off-Peak	Peak	Super Peak
Weekday	Winter	Nov-Feb		Midnight – 4 PM 9 PM - Midnight	4 PM to 9 PM	
	Spring	Mar-Apr	10 AM to 4 PM	Midnight -10 AM 9 PM - Midnight	4 PM to 9 PM	
	Outer Summer	May-Jun Sep-Oct		Midnight - 4 PM 9 PM - Midnight	4 PM to 9 PM	
	Inner Summer	Jul-Aug		Midnight - Noon 9 PM - Midnight	Noon to 4 PM	4 PM to 9 PM
Weekend & Federal Holiday	Winter	Nov-Feb	10 AM to 4 PM	Midnight – 10 AM 9 PM - Midnight	4 PM to 9 PM	
	Spring	Mar-Apr	10 AM to 4 PM	Midnight -10 AM 9 PM - Midnight	4 PM to 9 PM	
	Outer Summer	May-Jun Sep-Oct	10 AM to 4 PM	Midnight – 10 AM 9 PM - Midnight	4 PM to 9 PM	
	Inner Summer	Jul-Aug		Midnight - 4 PM 9 PM - Midnight	4 PM to 9 PM	

Proposed Weekday and Weekend TOU Periods

WEEKDAY



WEEKEND & HOLIDAYS



Off-peak

Peak

Super off-peak

Super-peak



High-Renewables TOU proposal (for SCE)

(Consistent with CAISO March 12 TOU period definitions)

Total Volumetric NonCARE Rates per TOU period	2021

Weekday	Super-off	Off-pk	Peak	Super-Pk	Ratio (h/l)
Winter		$ 0.137	$ 0.166		1.21
Spring	$ 0.075	$ 0.127	$ 0.326		4.35
Outer Summer		$ 0.145	$ 0.411		2.84
Inner Summer		$ 0.138	$ 0.309	$ 0.600	4.36

Weekend	Super-off	Off-pk	Peak	Ratio (h/l)
Winter	$ 0.075	$ 0.142	$ 0.167	2.23
Spring	$ 0.075	$ 0.129	$ 0.152	2.02
Outer Summer	$ 0.075	$ 0.136	$ 0.199	2.65
Inner Summer		$ 0.145	$ 0.239	1.64

Fixed Charge	$ 11.33	per month	(In 2021)

Disclaimer:
Note: Electric utilities may only modify their tariff formulas consistent with an order voted on by the full Commission and pursuant to the advice letter processes explained in CPUC General Order 96-B (http://docs.cpuc.ca.gov/PUBLISHED/GENERAL_ORDER/164747.htm#P951_100011; see e.g., Electric Industry Rules 5.1-5.3.) The purpose of the analysis is to examine potential load impacts of rate design under various scenarios, not to develop any specific rate designs for consideration by the CPUC in any pending proceeding. As such, the rates described herein are illustrative, and should not be viewed as a proposal or formal position by the CPUC staff for any particular rate design. Accordingly, the analysis contained herein is to be used for discussion purposes only.

What are we learning...

- **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.
- **What are the anticipated load impacts?**
- **Need to inform and retrain consumers about energy use.**