



# **Load Shape Modeling for 2017 IRM/LCR Studies**

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*KCC*

# Background Information

- **NYISO Staff automated Load Shape Development process in late 2014 with MATLAB<sup>®</sup>**
- **Reasons for automation:**
  - *Repeatable Adjustments (no subjectivity)*
  - *Time Savings (easy to adapt to new forecasts)*
  - *Better handling of constraints (e.g. G-J Locality)*
- **Process actively used for RNA/CRP/IRM/LCR**



# Load Shape Tool Workflow

- **Import Input Data**
- **Perform Adjustments**
  - 1. *Match Zonal NCP Targets***
  - 2. *Match Constraint Peaks***
    - a) NYCA Coincident Peak**
    - b) G-J Locality Peak**
- **Export Data**

# Input Data Requirements

- **Historic Load Shapes**
  - *LFU Bin 1: 2006*
  - *LFU Bin 2: 2002*
  - *LFU Bin 3 – 7: 2007*
- **Adjustment Targets**
  - *NYISO Gold Book Forecast & subsequent updates*
  - *Can handle Summer and Winter peak forecasts*

# Zonal NCP Adjustment

- **Adjustment Method:**
  1. *Scale each zonal shape to match target peak*
    - **If modeling Summer and Winter peaks, these periods are scaled independently**



# NYCA & G-J Peak Adjustments

- **Adjustment Method: (set NYCA first, then G-J)**
  - 1. Find time of peak in historic shape,  $hr_{peak}$** 
    - If modeling Summer and Winter peaks, these periods are set independently
  - 2. Perform in-day adjustment to each zone at  $hr_{peak}$** 
    - Apply smoothing to adjacent hours
    - If a zone's peak is coincident, relocate it to the closest hour with the highest load
  - 3. Verify all target values are satisfied**

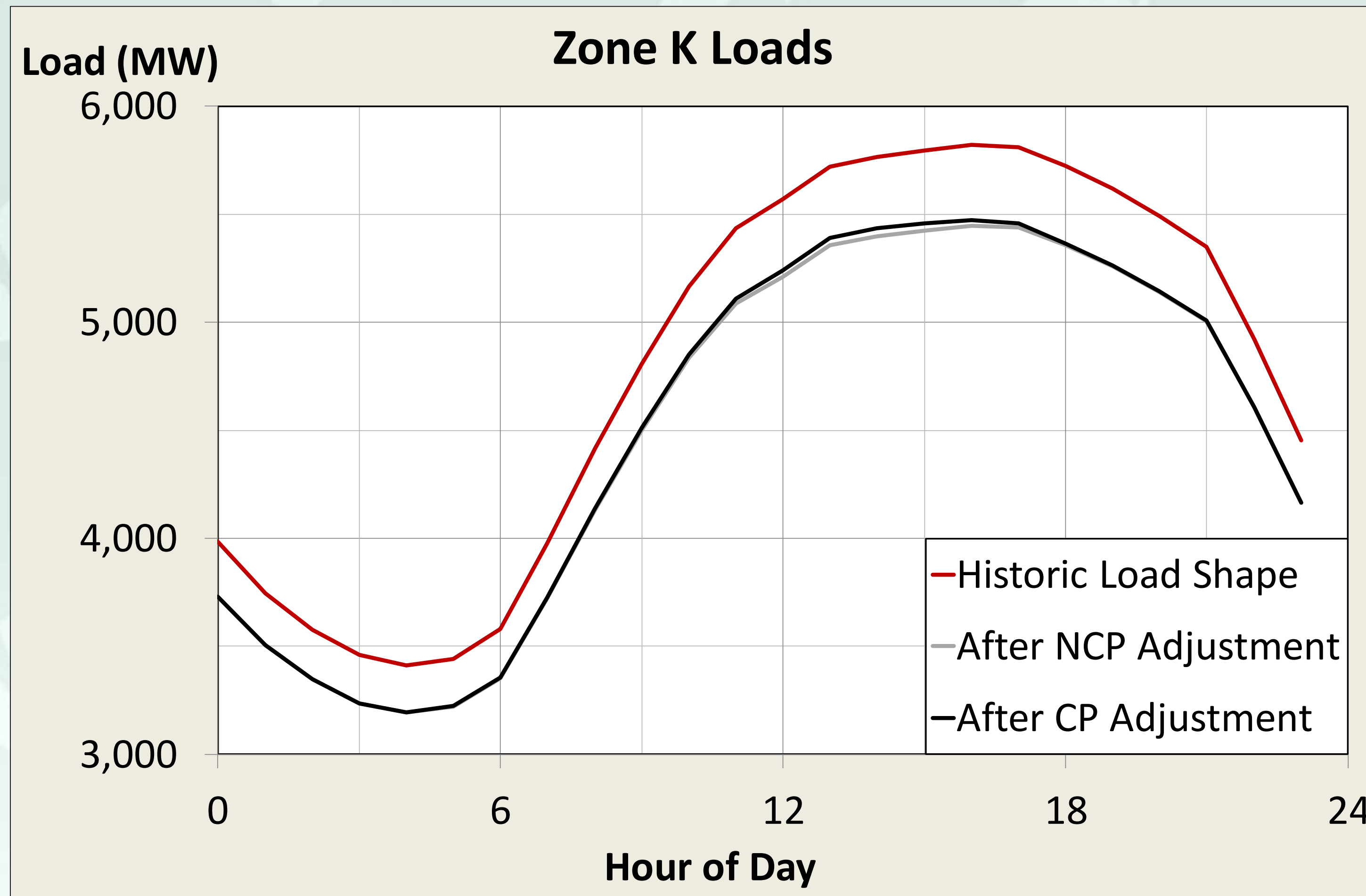
# Example Framework

- **Based on 2006 Historic Load Shape**
  - *Adjusted to 2016 ICAP Forecast*
  - *This shape was used in 2016 LCR Study*
- **All examples show data for Day 209**
- **Important Dates and Times:**
  - *NYCA Peak: Day 209 at hour 14*
  - *G-J Locality Peak: Day 209 at hour 16*

**NOTE:** Day 209 is Day 210 in MARS model due to leap year



# Zone K Example

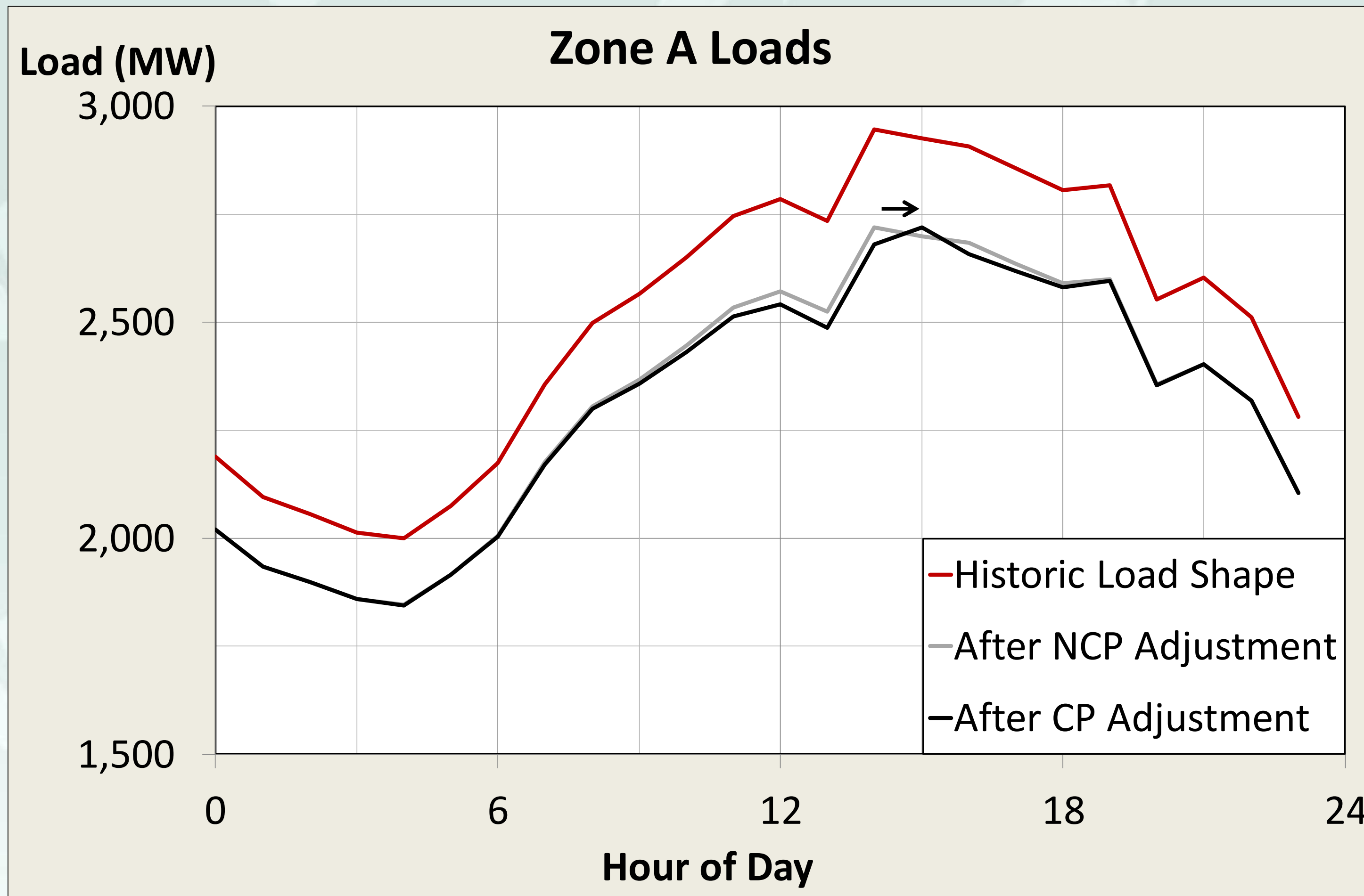


## Zone K Notes:

- Exhibits upward adjustment to meet NYCA CP



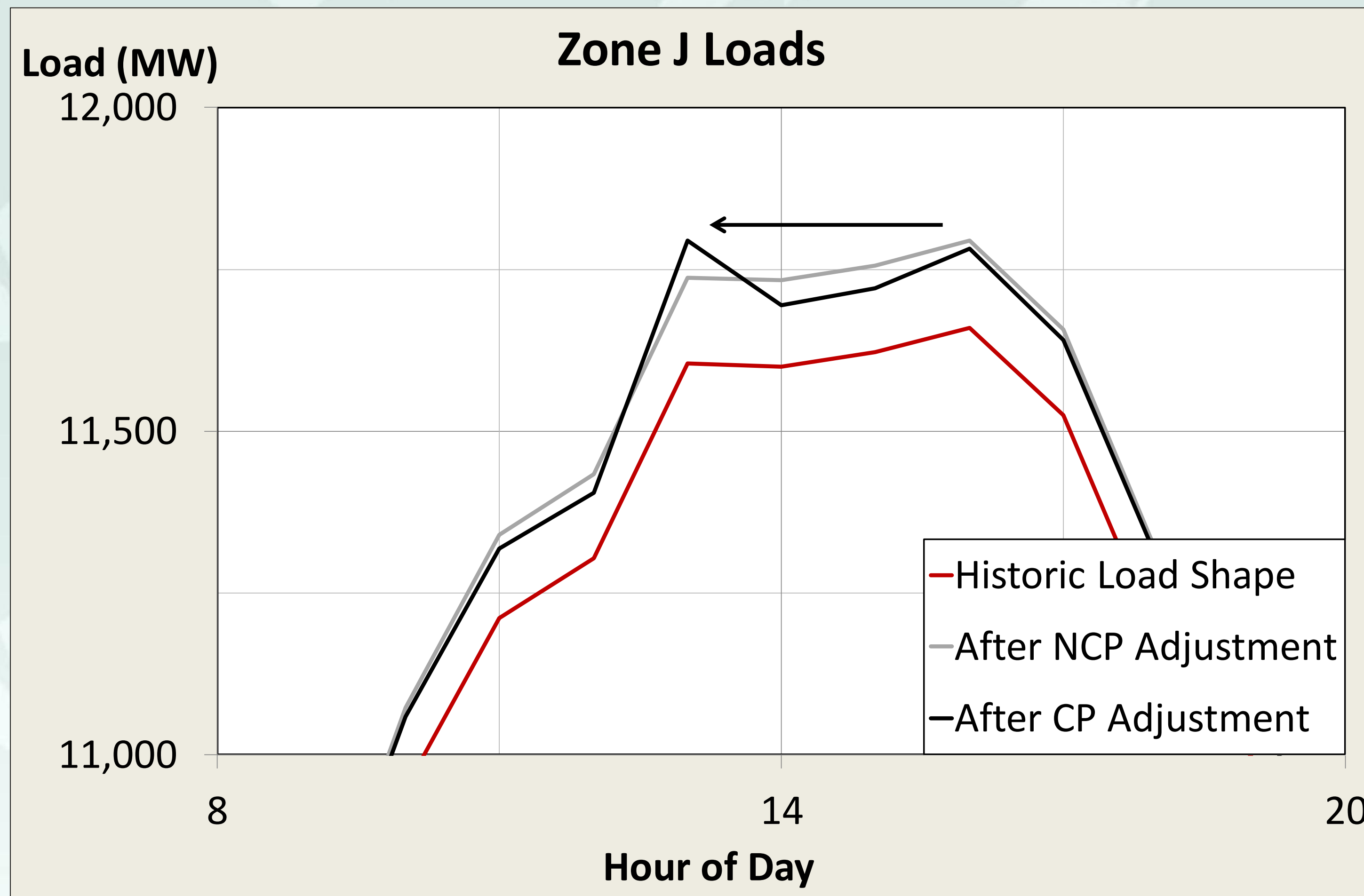
# Zone A Example



## Zone A Notes:

- Coincident with NYCA Peak
- Hour swap performed to maintain NCP and NYCA CP
  - Hour 14 / Hour 15
- Exhibits downward adjustment to meet NYCA CP, excludes NCP hour

# Zone J Example

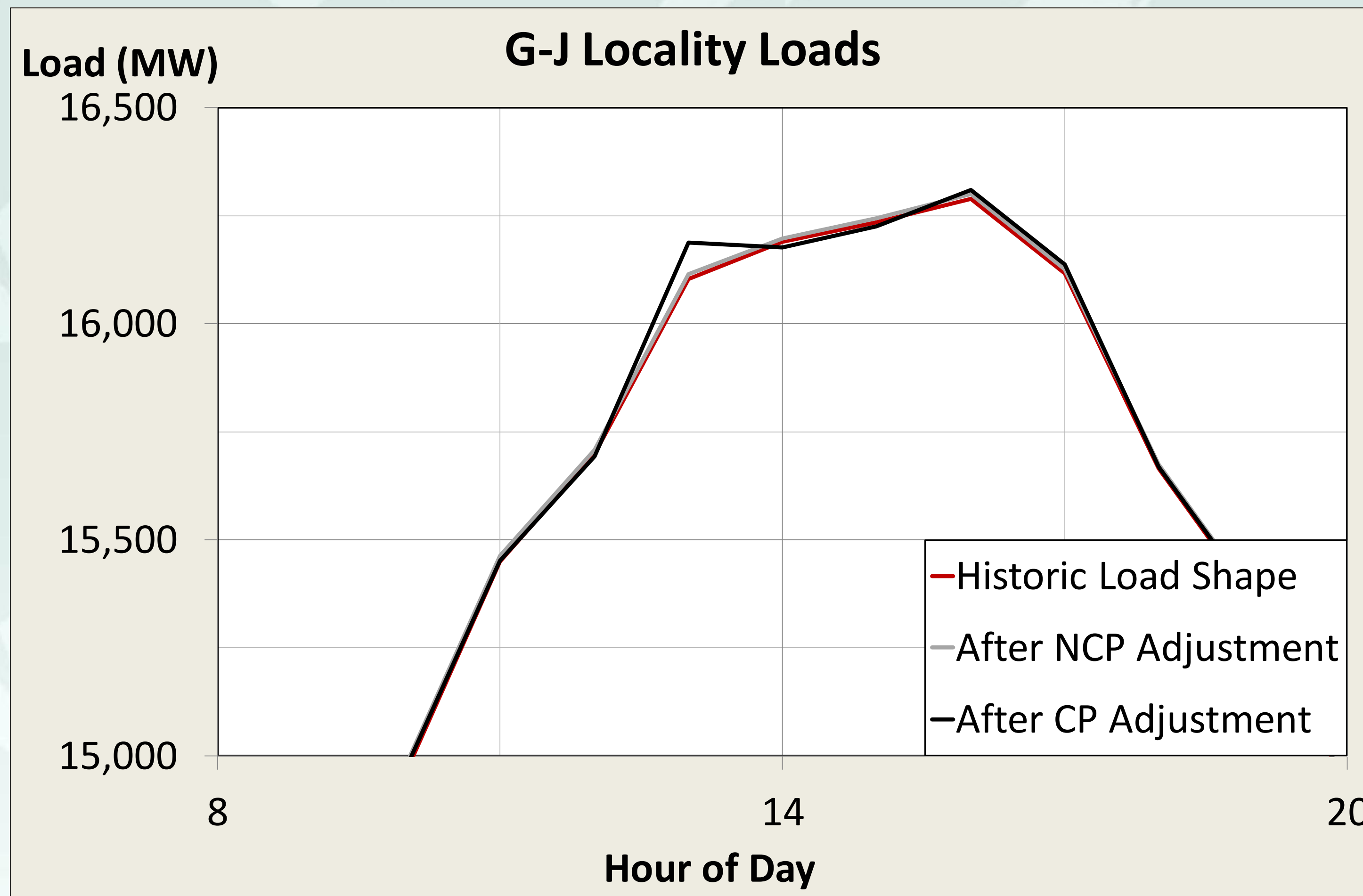


## Zone J Notes:

- Same day as NYCA Peak
- Same day as G-J Peak
- Hour swap performed to maintain NCP and G-J Peak
  - Hour 13 / Hour 16
  - Why not Hour 15? G-J!
- Exhibits downward adjustment to meet NYCA CP



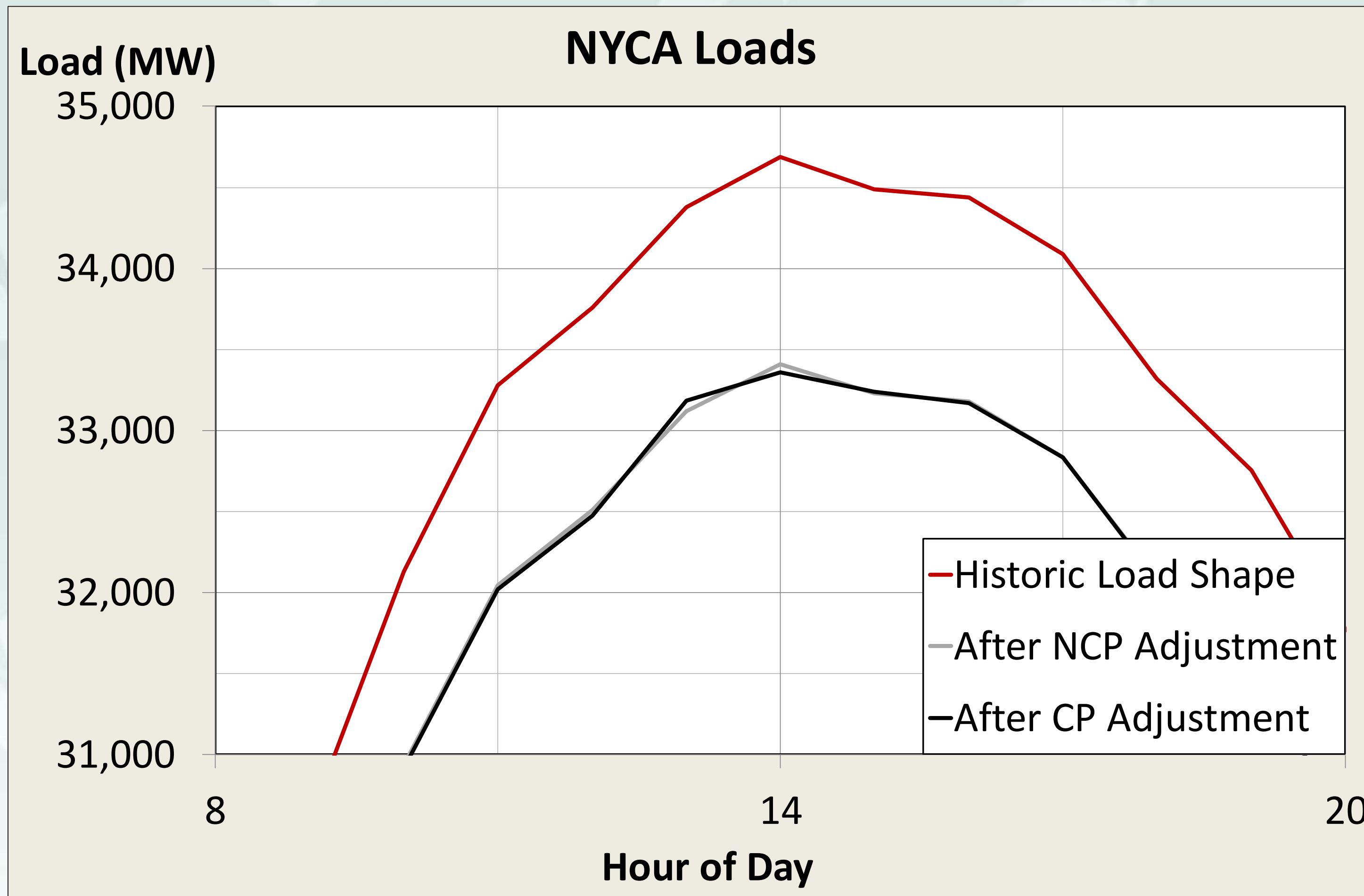
# Zone G-J Example



## G-J Locality Notes:

- Upward adjustment at Hour 13 from movement of Zone J peak
- Zone J peak at Hour 15 would violate G-J Peak
- Zone J peak could not be at Hour 14 due to NYCA Peak

# NYCA Example



## NYCA Notes:

- Exhibits upward adjustment to meet NYCA CP



# Adjustments External to Tool

- **For each External Pool (PJM, ISO-NE, etc.)**
  - *Identify top 3 load days in NYCA shapes*
  - *Perform day-swap operation on external zones to force top 3 days of pool to match NYCA*
- **Solar Forecast**
  - *In progress.*

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- *Maintaining and enhancing regional reliability*
- *Operating open, fair and competitive wholesale electricity markets*
- *Planning the power system for the future*
- *Providing factual information to policy makers, stakeholders and investors in the power system*

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