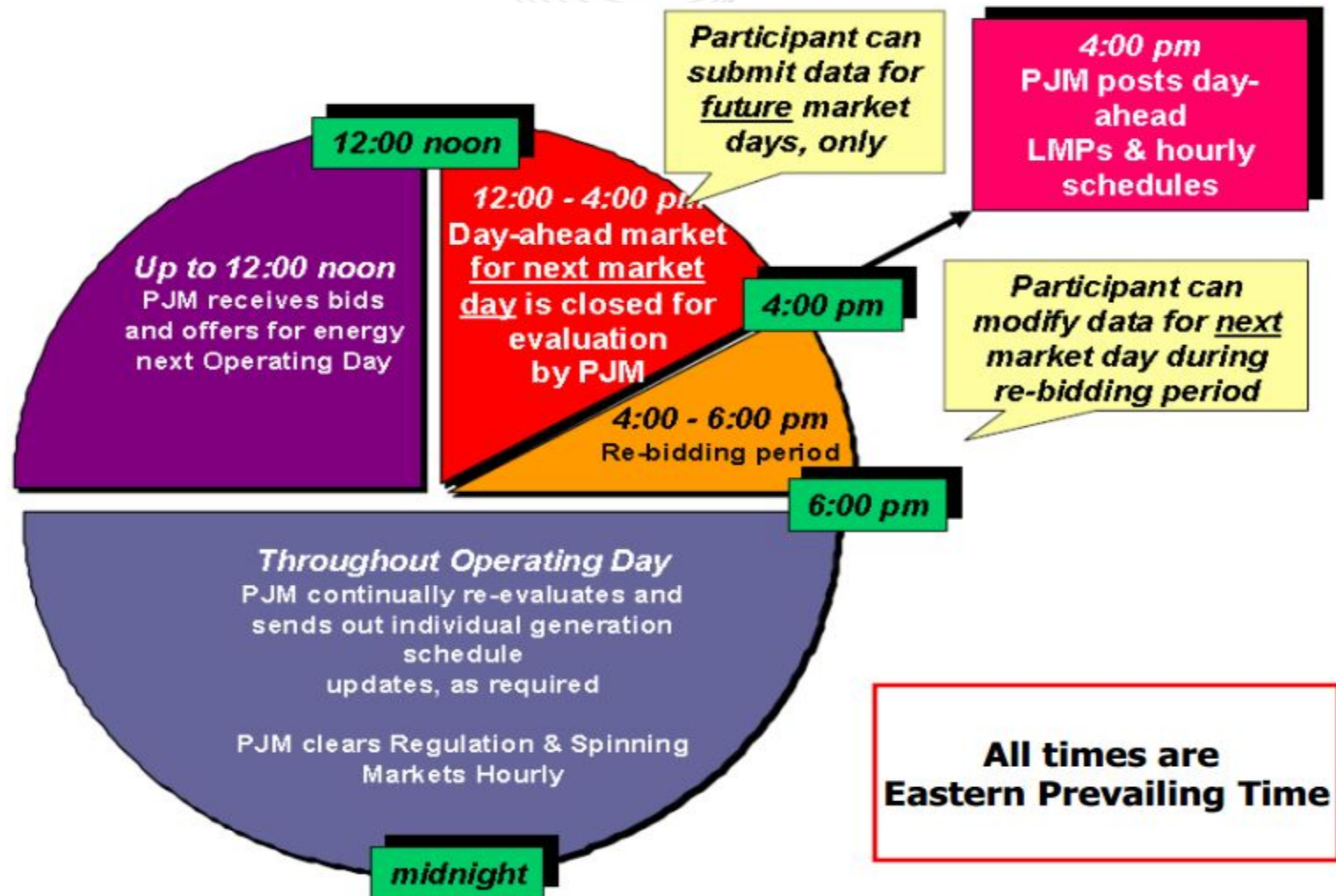


# Day Ahead Market Clearing Process

05/08/2014

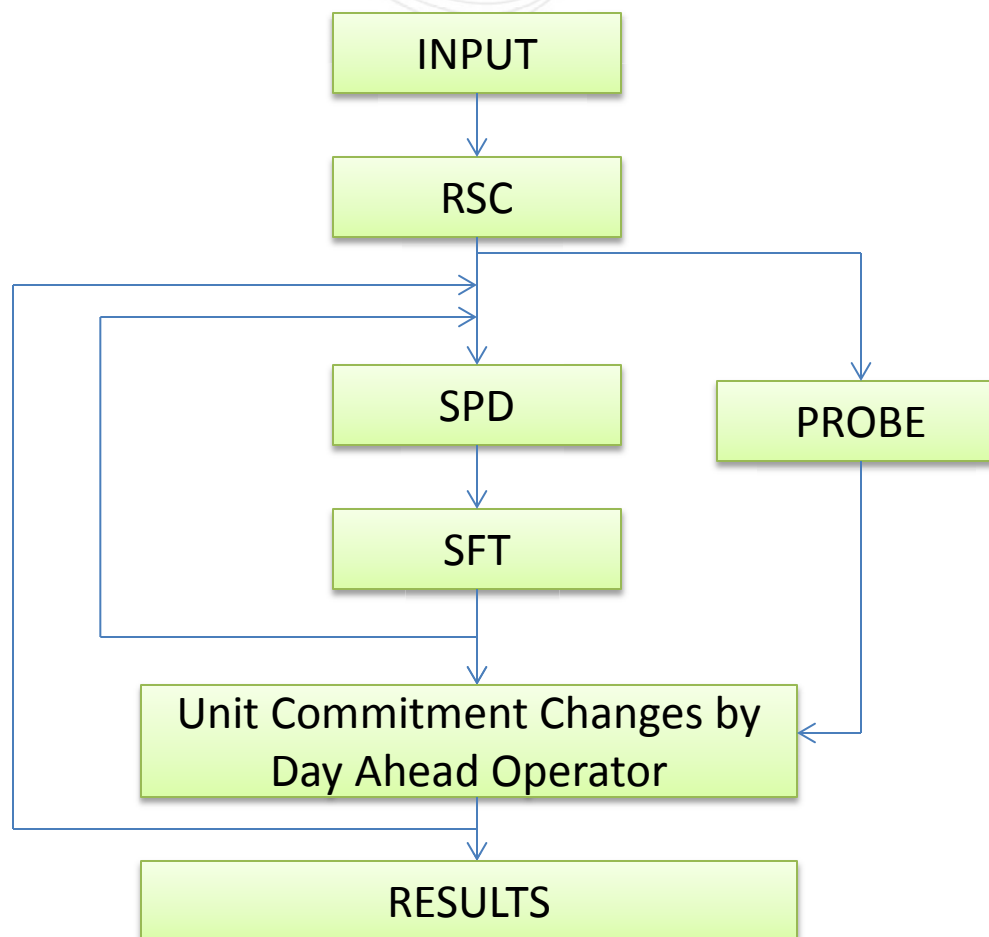
# Day Ahead Market Time Line



## Prior to DAM Closes

- Reliability Engineer Provides following to DAM Operator
  - Study Contingencies
  - Schedule Outages
  - Reliability units
  - Reactive Interface Limits

# Day Ahead Market Clearing Process



## After Day Ahead Market Close

- Resource Scheduling Commitment (RSC)
  - Major Transfer Constraints
  - No up-to congestion transactions
  - Includes increment and decrement bids
  - Unit Commitment only
- Scheduling Pricing and Dispatch (SPD)
  - All Constraints
  - up-to congestion transactions

## After Day Ahead Market Close (Cont.)

- PROBE
  - Provide recommendation to DAM engineer to commit, de-commit or modify unit commitment using all constraints to determine least cost solution
  - Three pivotal supplier test

## Why Bid Volume is a problem

- The solution time for an optimization problem depends on:
  - objective and constraint function
  - number of control variables and constraints
  - structure of matrix (such as sparse, structured, dense)
- A problem is sparse if each constraint function depends on only a small no. of variables
  - A sparse matrix has enough zeros that it is worth taking advantage of them



## Why Bid Volume is a problem (cont.)

- A structured matrix has enough structure that it is worthwhile to use it

$$\begin{bmatrix} a & b & c & d & e \\ b & a & b & c & d \\ c & b & a & b & c \\ d & c & b & a & b \\ e & d & c & b & a \end{bmatrix}$$

- A dense matrix is neither sparse nor structured

$$\begin{bmatrix} \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \end{bmatrix}$$

- Dense matrix requires large memory and takes long time to perform mathematical operations



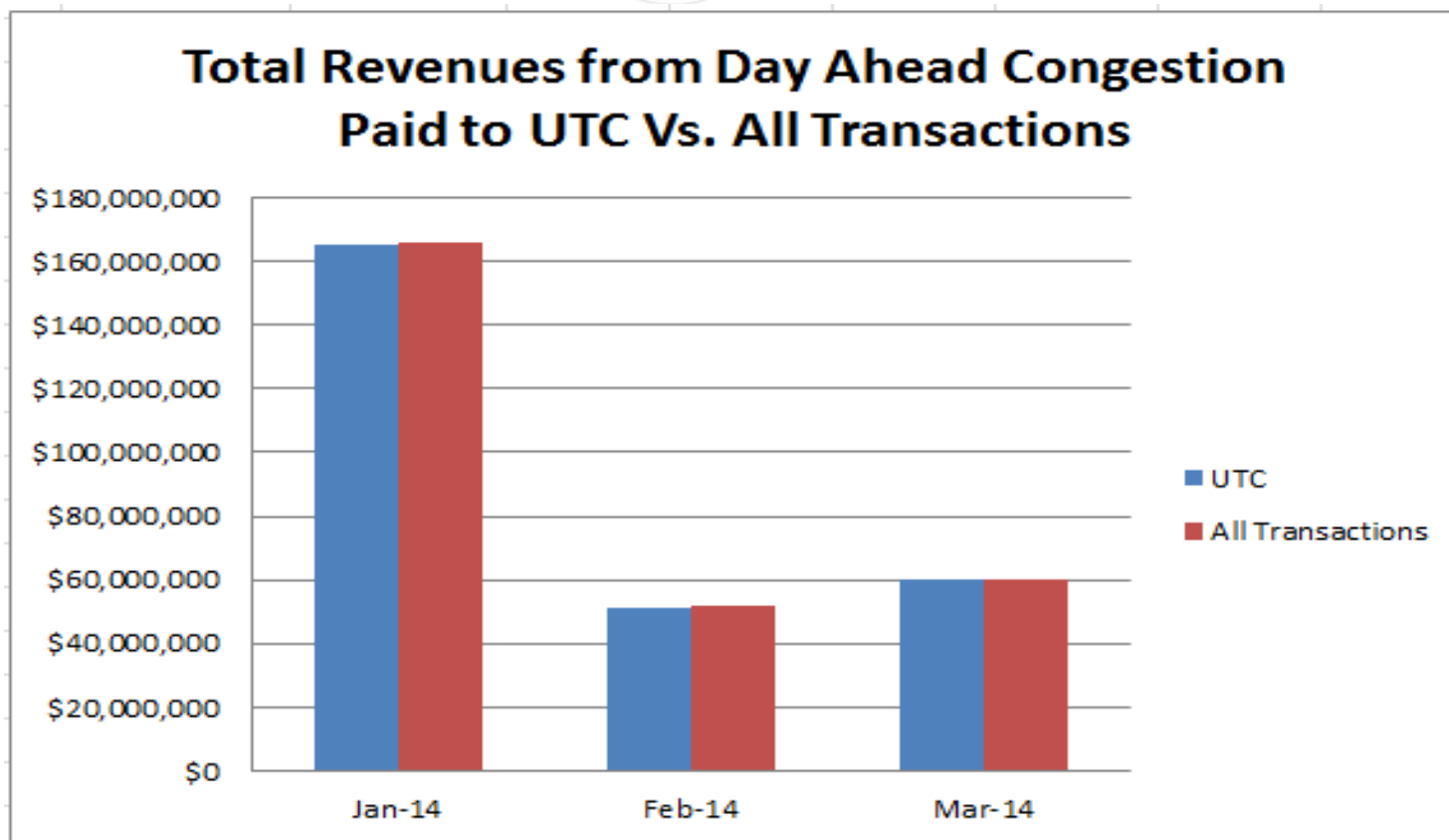
# How to find eliminated paths because of +/- \$50 UTC bid price cap

## Elimination of UTC paths due to +/- \$50 bid cap

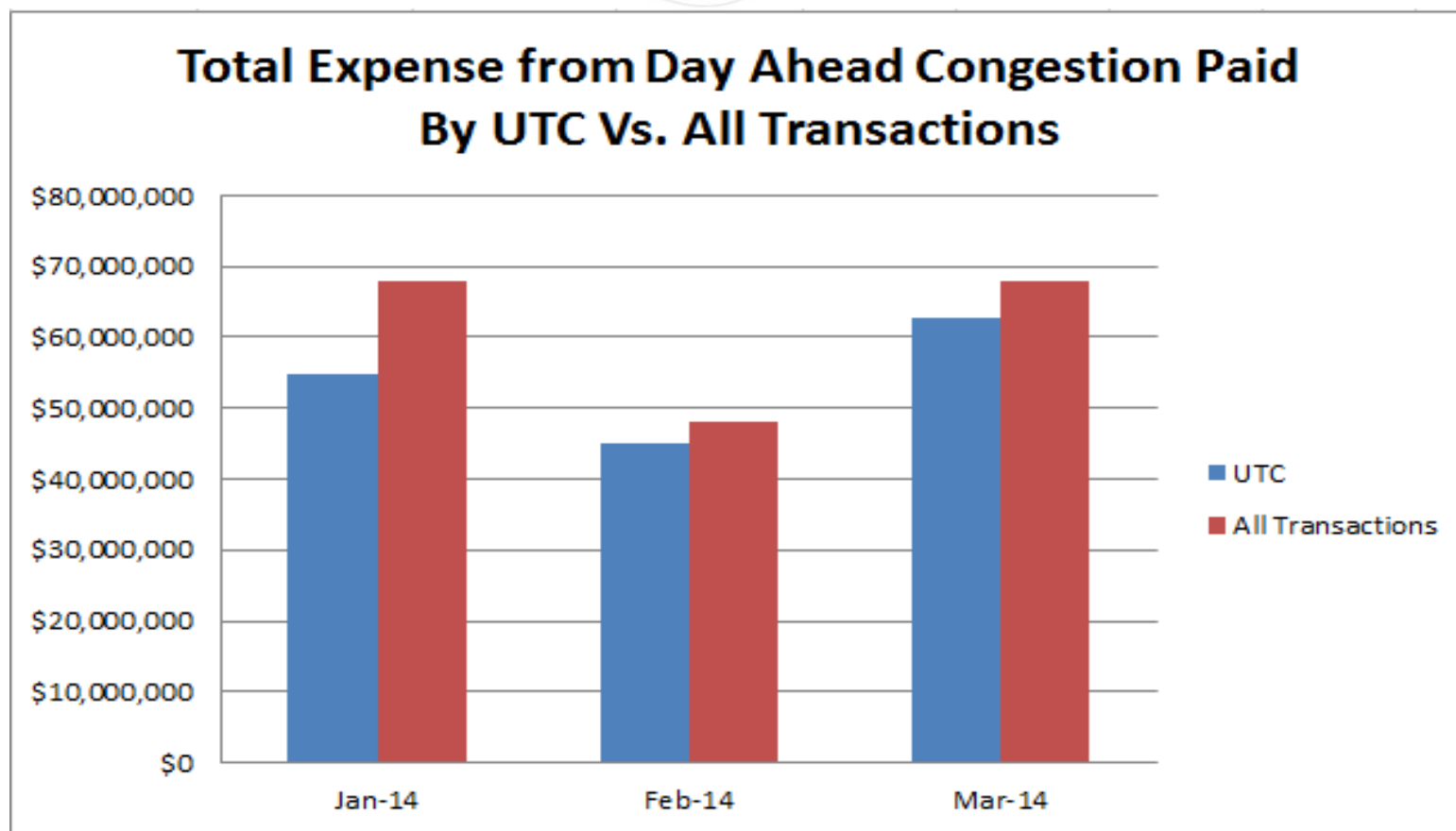
- LMPs are posted at <http://www.pjm.com/markets-and-operations/energy/day-ahead/Impda.aspx>
- For any path if the difference in LMP between the path is greater than \$50 then that path is eliminated

# Information about Revenue and Expense of Congestion and Marginal Loss From Day Ahead and Real-Time Market

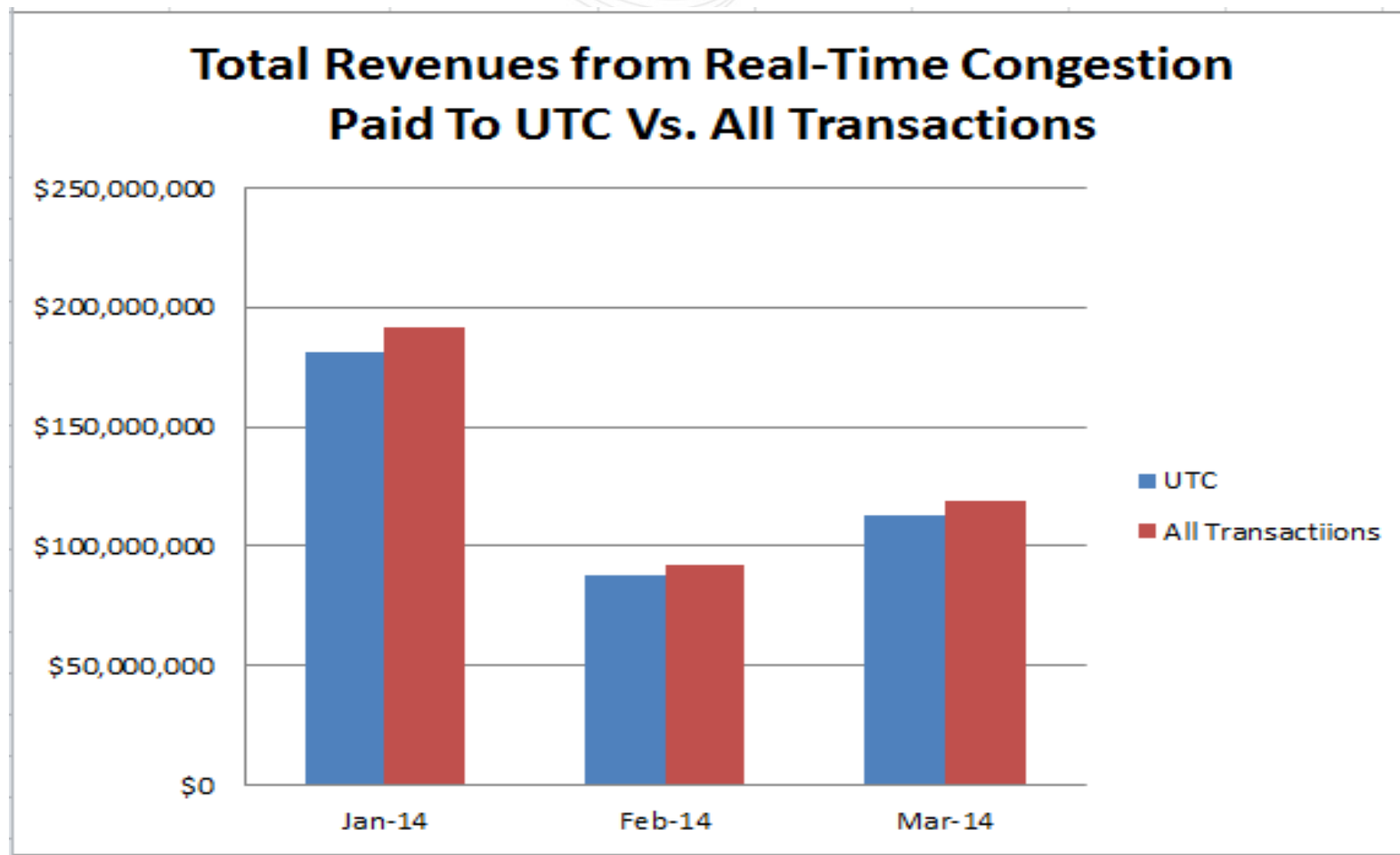
# Congestion and Marginal Loss Data



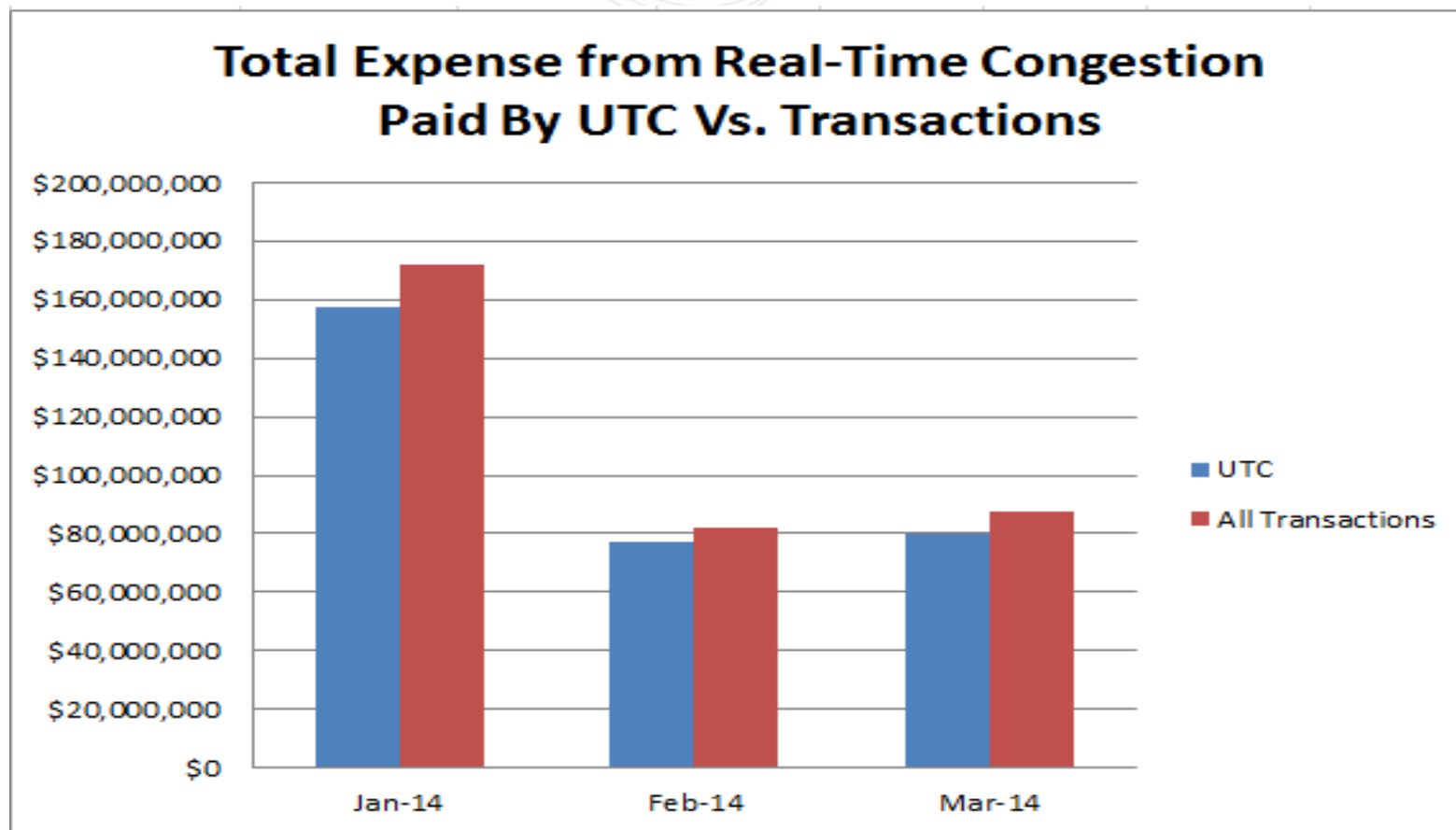
# Congestion and Marginal Loss Data (Cont.)



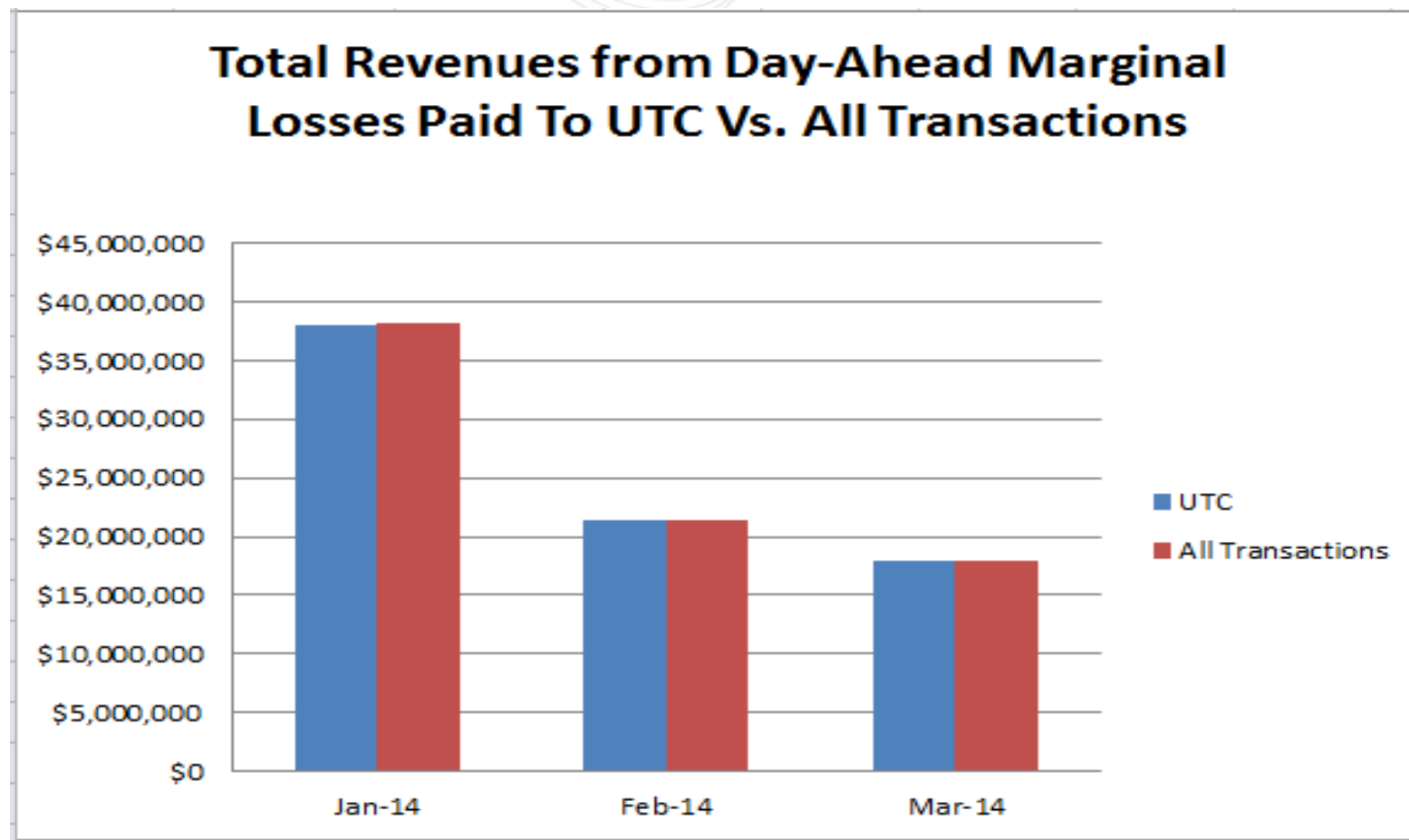
# Congestion and Marginal Loss Data (Cont.)



# Congestion and Marginal Loss Data (Cont.)

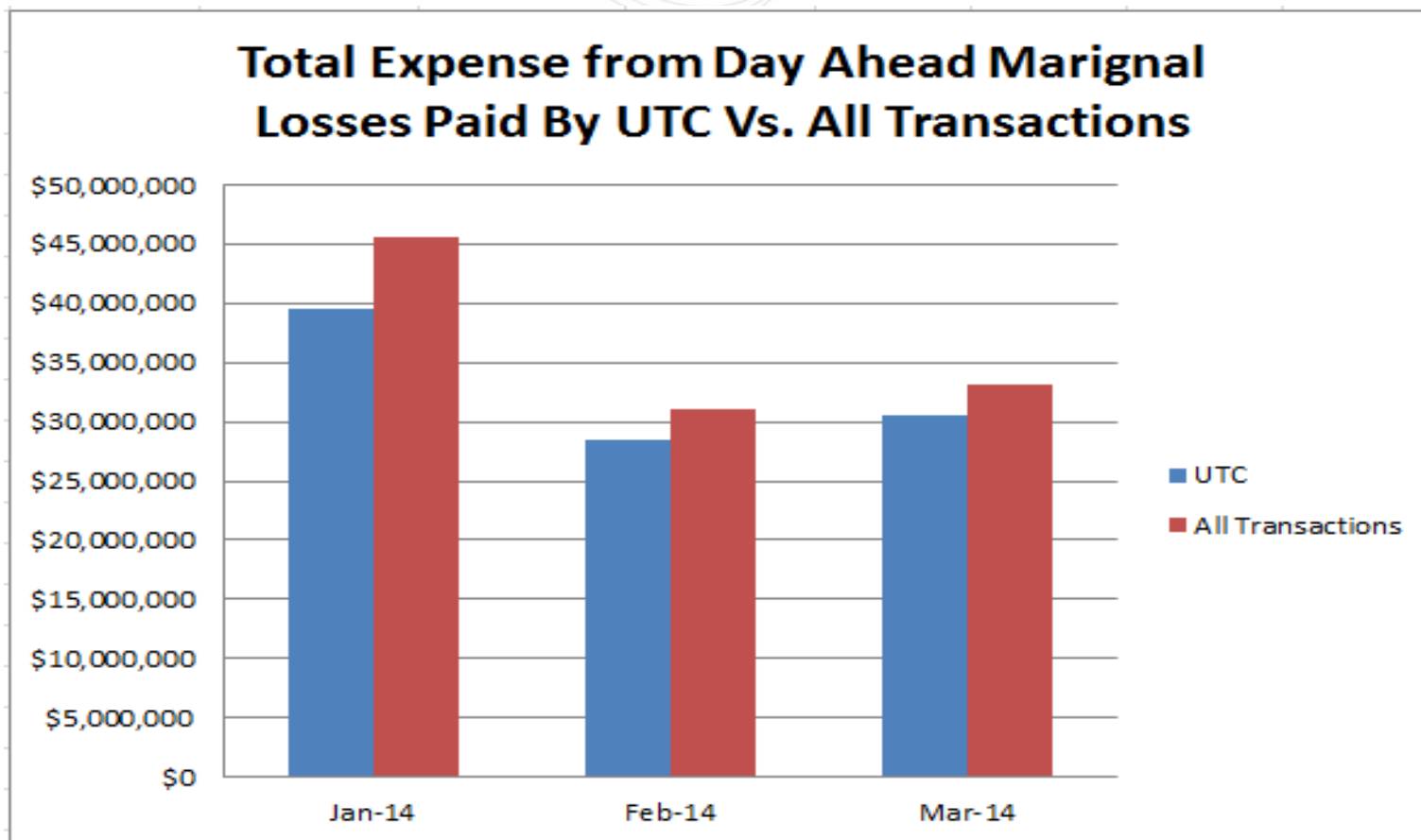


# Congestion and Marginal Loss Data (Cont.)

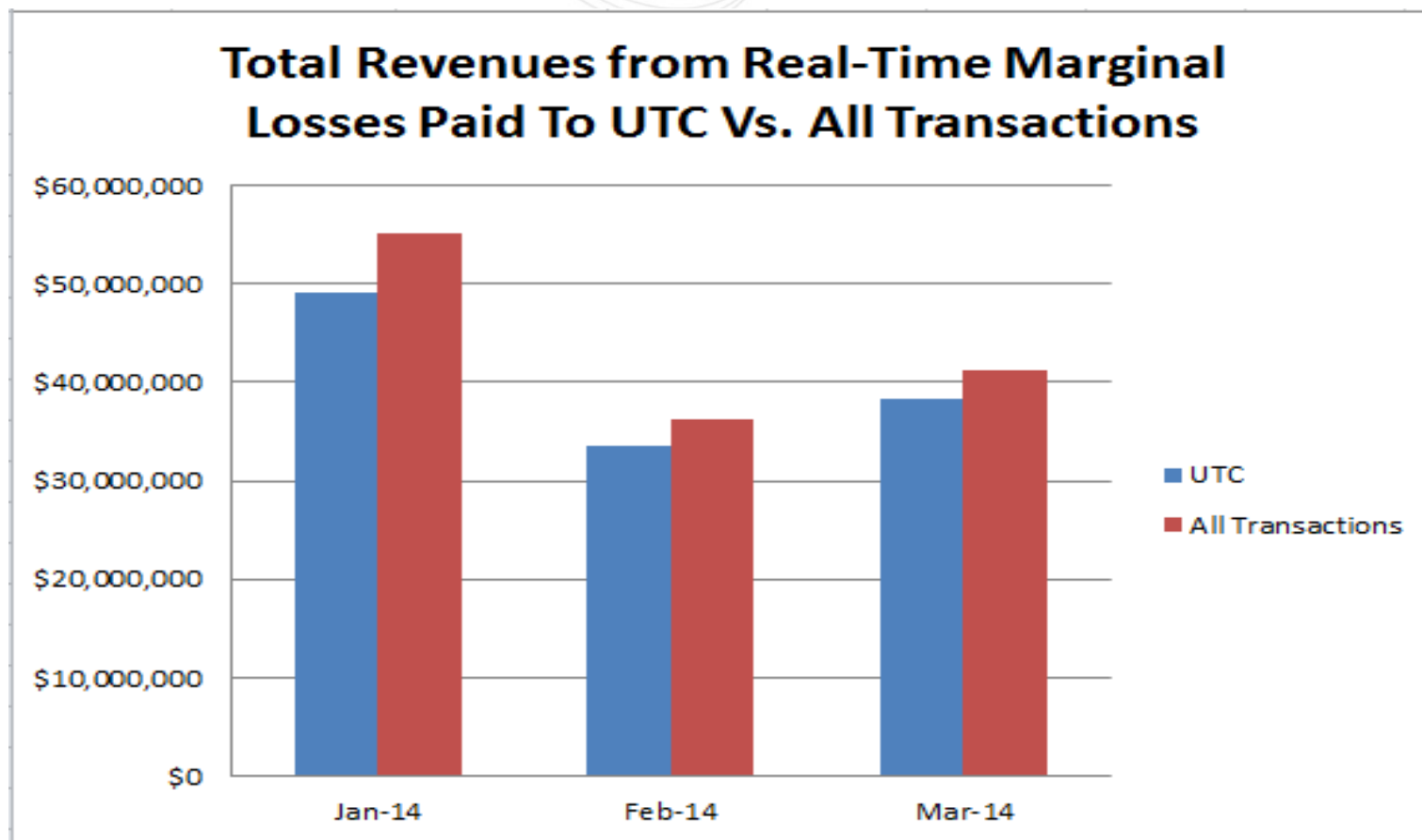




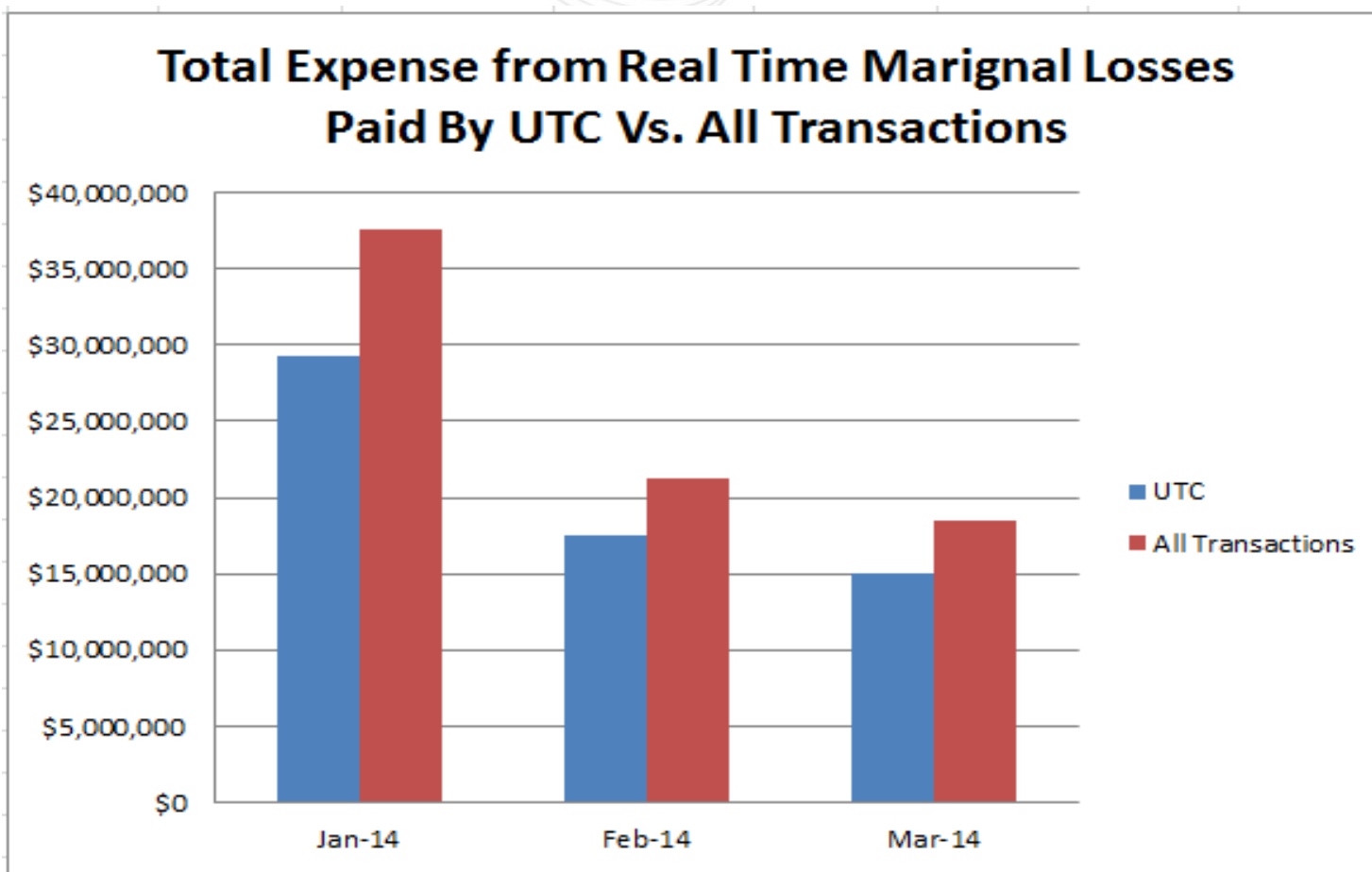
# Congestion and Marginal Loss Data (Cont.)



# Congestion and Marginal Loss Data (Cont.)



# Congestion and Marginal Loss Data (Cont.)



**Questions?**