

Intermediate Level LBMP Recap

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LBMP In-Depth Course

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Session Objectives

- **Upon completion of this module, trainees will be able to:**
 - Identify the Basics Behind LBMP
 - Define Locational Based Marginal Pricing
 - Explain how LBMPs are Established
 - Name the Three Components of LBMP
 - Complete examples that Demonstrate LBMP Concepts

LBMP - Defined

- A methodology where the price of Energy at each location in the NYS Transmission System/NYCA is equivalent to the cost to supply the next increment of Load at that location.
- The cost to provide the next MW of Load at a specific location in the grid is the Marginal Price (LBMP)

LBMP – The Basics

- **LBMP is established for the Day Ahead and the Real Time Markets**
 - Day Ahead Market
 - Security Constrained Unit Commitment (SCUC)
 - Hourly Prices
 - Real Time Market
 - Real Time Dispatch (RTD)
 - 5 Minute Interval Prices

Day Ahead vs. Real Time Market

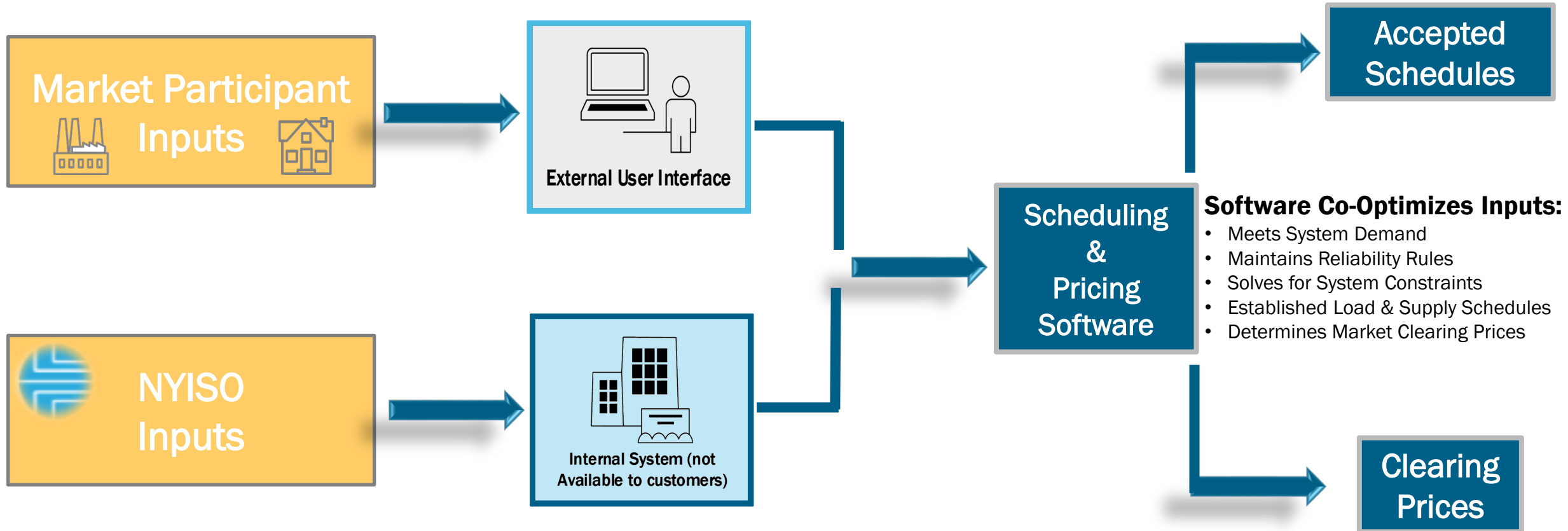
Day Ahead Market

- Buy and sell energy prior to actual consumption or production
- Schedules are binding

Real Time Market

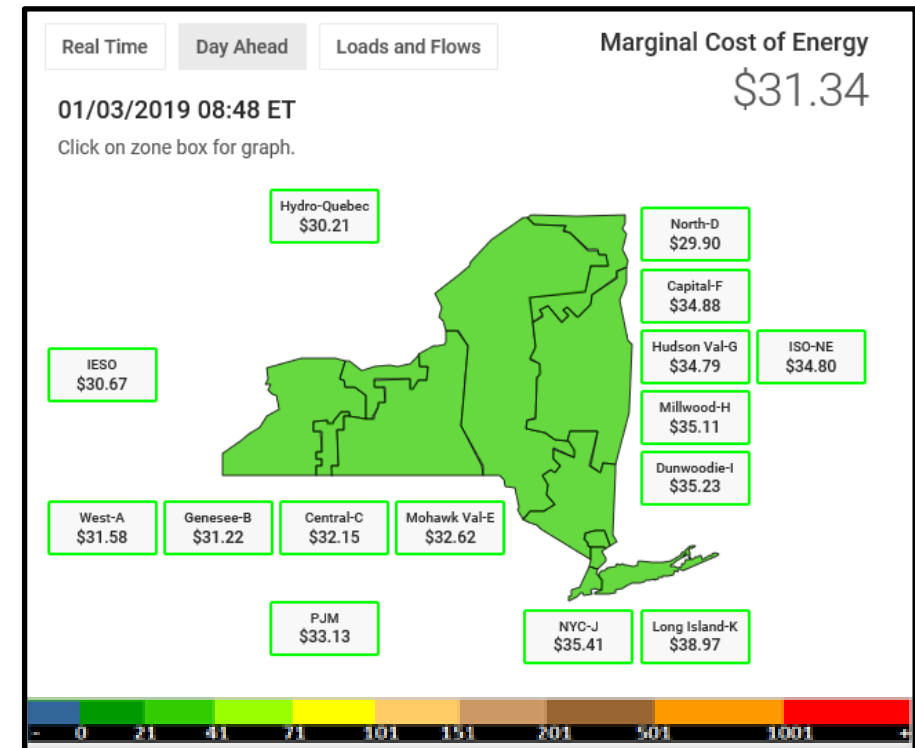
- Buy and sell the difference during the consumption day
- Real Time Market balances DAM schedule to actual usage

Scheduling and Pricing Process Overview



LBMP - Established

- **System is bid-based**
 - Offers/Bids are Confidential
 - LBMPs are published
 - Keeping market visible



LBMP – Established

■ Summary of Steps:

- System establishes load
- Generation offers evaluated
- Transmission constraints taken into account
- Economic generation dispatched
- Cost of next MW of load is Market Clearing Price

LBMP Components

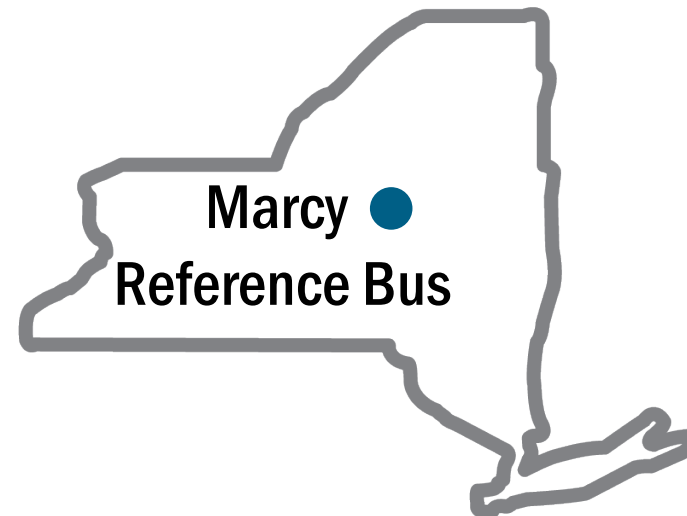
- **Three Components Comprise the LBMP**
 - Marginal Energy Price Component
 - Marginal Loss Price Component
 - Marginal Congestion Price Component

$$\text{LBMP} = \text{Energy} + \text{Loss} - \text{Congestion}$$

LBMP Components - Energy

■ Marginal Energy Price Component

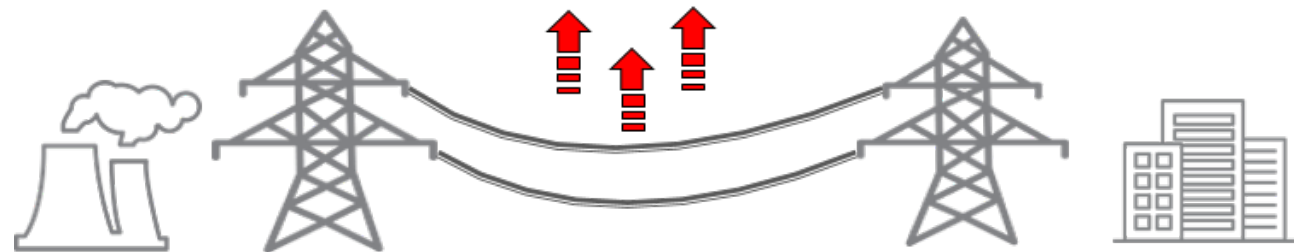
- Basic component of the LBMP at all buses in system – NYISO Reference Bus (Marcy), posted on NYISO site as: “NYISO_LBMP_Reference”



LBMP Components - Losses

■ Marginal Loss Price Component

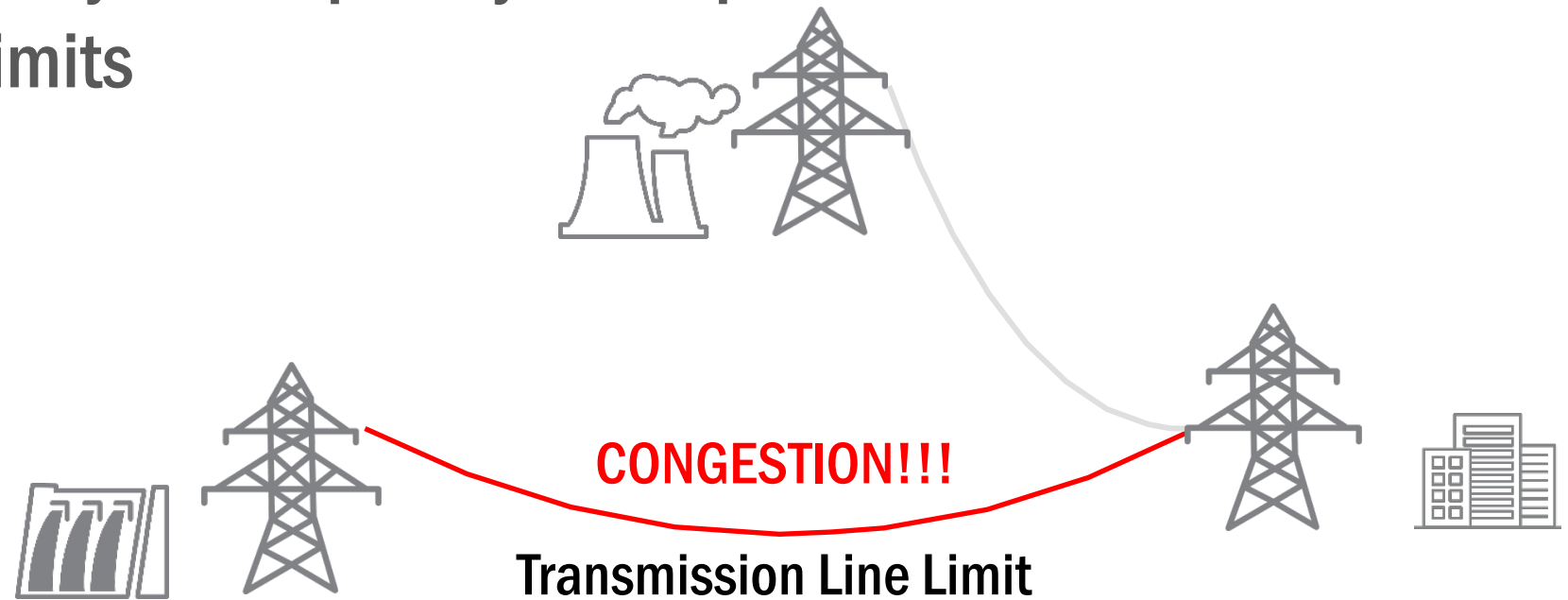
- Some amount of generation will be lost along path to load due to heat dissipation
- Marginal Loss Component takes this into account
- If Losses were zero, Loss \$ Component would be zero as well



LBMP Components - Congestion

■ Marginal Congestion Price Component

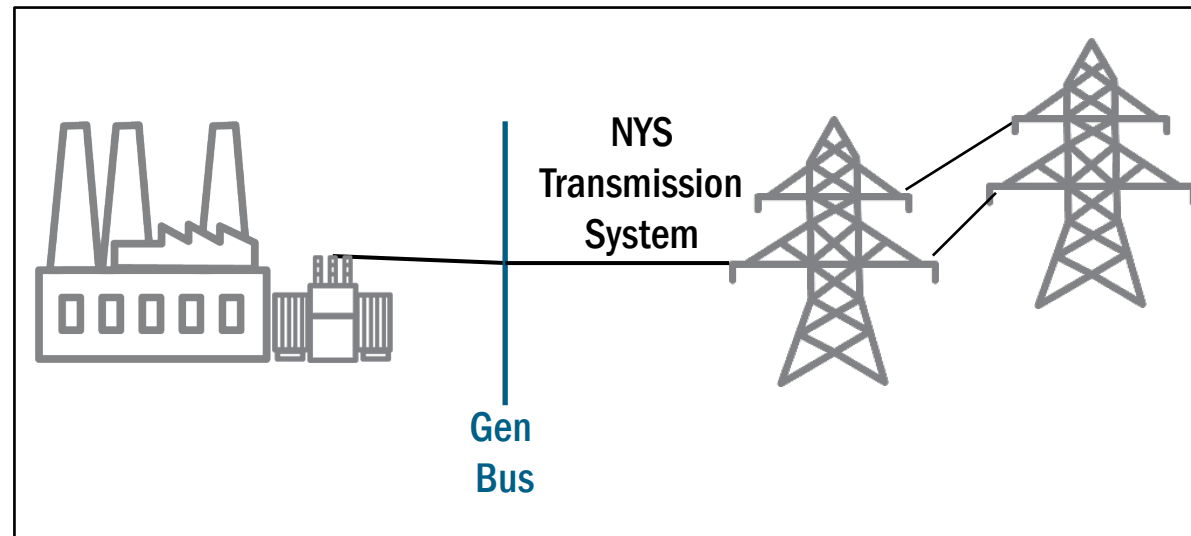
- In some instances, dispatching least costly generation may exceed line limitations
- More costly units may subsequently be dispatched to avoid exceeding those limits



Generators – Gen Bus LBMP

■ LBMP for Generators

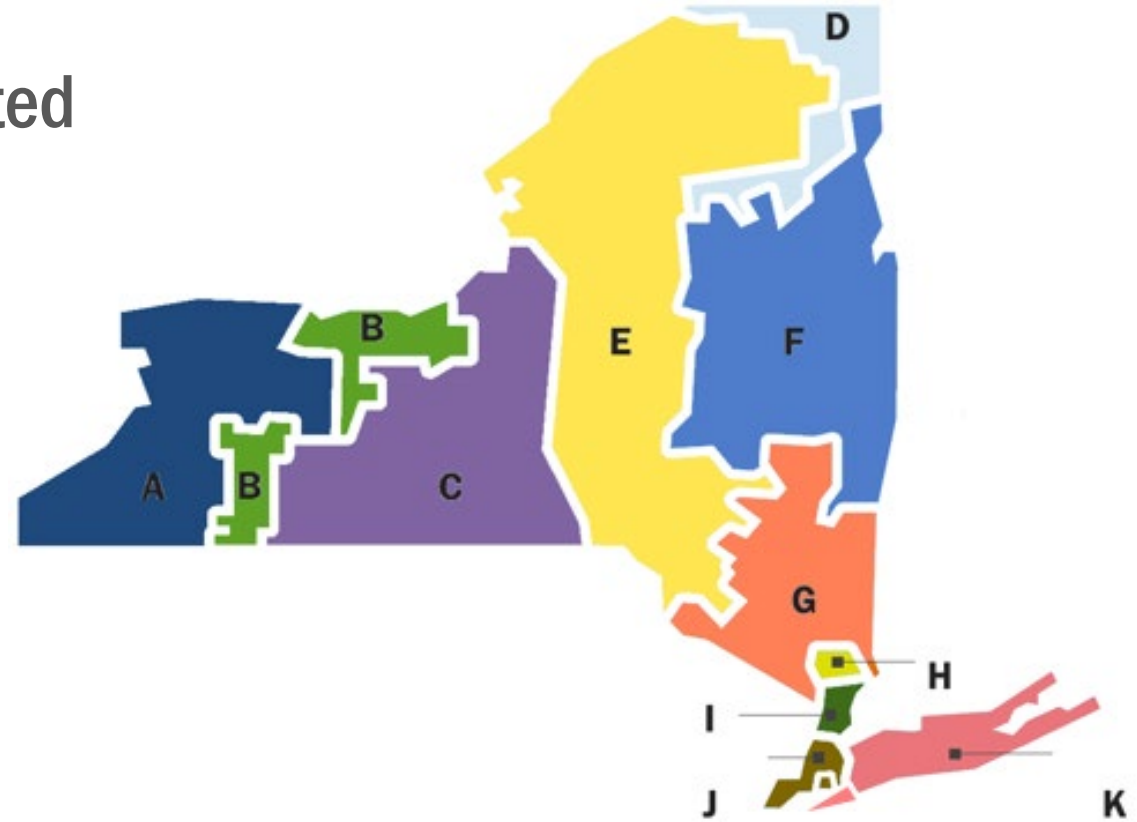
- Based on Generator Bus
- LBMP calculated at Bus where Generator injects power



Load Serving Entity – Zonal LBMP

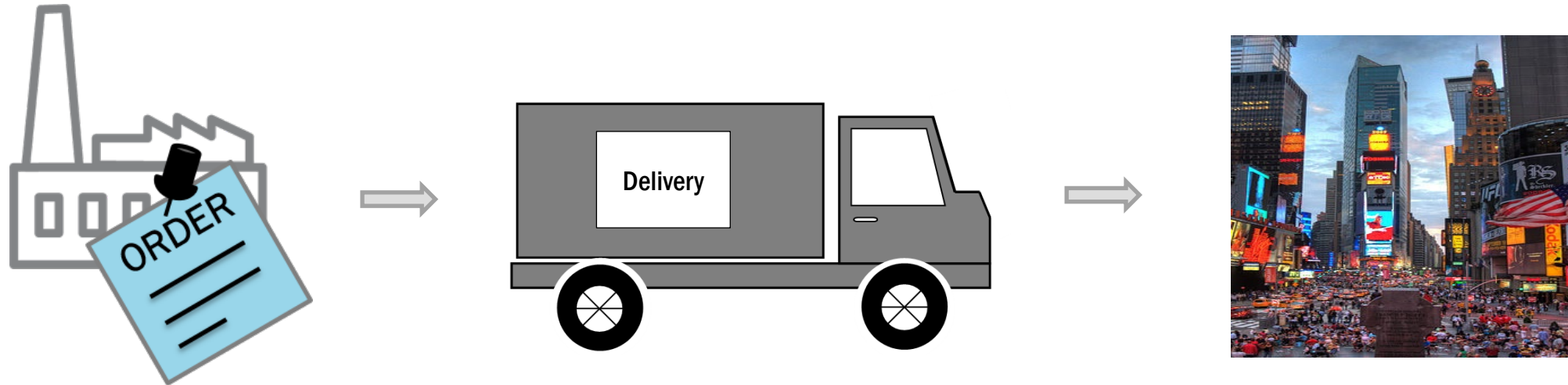
- **LBMP for Load**

- Based on Zone where Load is Located
- One Zonal LBMP for entire Zone
- Load Weighted Average



<u>NYCA Load Zones</u>		
A- West	E- Mohawk Valley	I- Dunwoodie
B- Genesee	F- Capital	J- NYC
C- Central	G- Hudson Valley	K- Long Island
D- North	H- Millwood	

LBMP Components - Summary Analogy



Associated Cost	\$ Amount Capital - Zone F	\$ Amount NYC - Zone J	Similar to
Base price to make Billboard (cost to manufacture sign)	\$40	\$40	Energy Price Component (cost to produce power)
Shipping and Handling (cost to deliver the billboard)	\$2	\$1	Loss Price Component (cost to get energy to destination)
Potential for added cost (cost to purchase/rent a location)	\$20	\$45	Congestion Price Component (cost to ensure load need is met)
Total Cost for Product	\$62	\$86	LBMP

Additional Resources

- **Tariffs - OATT & MST**
- **Day Ahead Scheduling Manual**
- **Transmission and Dispatching Operations Manual**
- **Market Participant User's Guide**
- **Technical Bulletins**