Energy Price Component

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LBMP In Depth Course

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Session Objectives

- **Upon completion of this module, trainees will be able to:**
  - Describe the concept of economic dispatch
  - Identify the price setting unit in module examples
  - State the role of the NYISO Reference Bus

LBMP Components

- **The cornerstone of the NYISO Market Operation is the use of LBMP.**

LBMP = Energy + Loss - Congestion

NYISO Energy Market Operation

- The principle of efficient economic operation suggests that, in the absence of any transmission losses and transmission constraints, the least costly way of producing electric energy is achieved when all generators supply energy at a MW level such that the price of one more MW of output is the same for all unconstrained units.

LBMP Components

- In real power networks, the presence of losses and network constraints on the flow of electricity requires a departure from this dispatch to satisfy the most efficient, reliable operation.

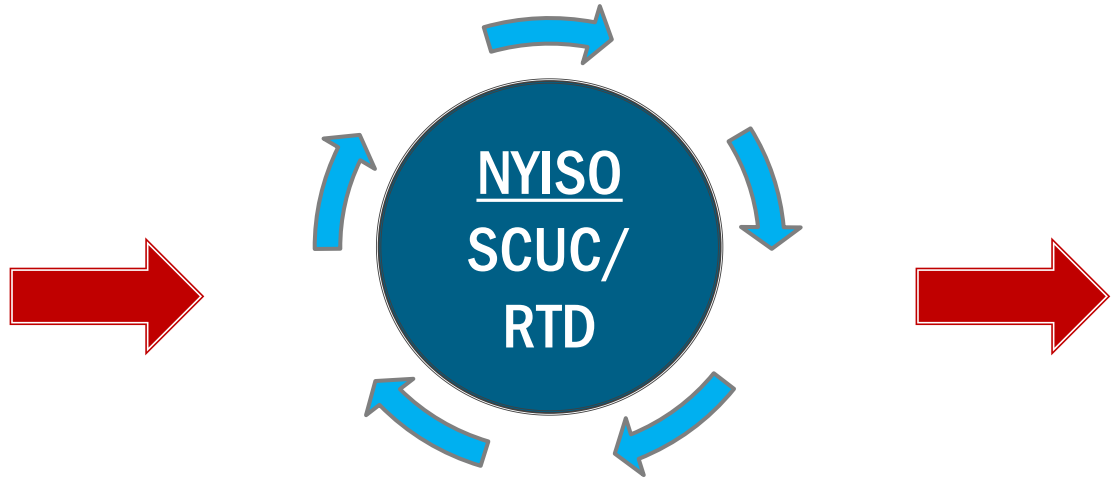
LBMP Components - Energy

- Actual cost of energy needed to meet load
- Same price for all generators and loads for given time-period
- Ideal operating condition is known as “equal lambda” dispatch

Economic Dispatch

LBMP: Co-Optimization Based on Bids and Offers

- Demand
- Reliability Requirements
- Energy and Ancillary Service Offers from Resources
- Virtual offers and bids
- Constraints

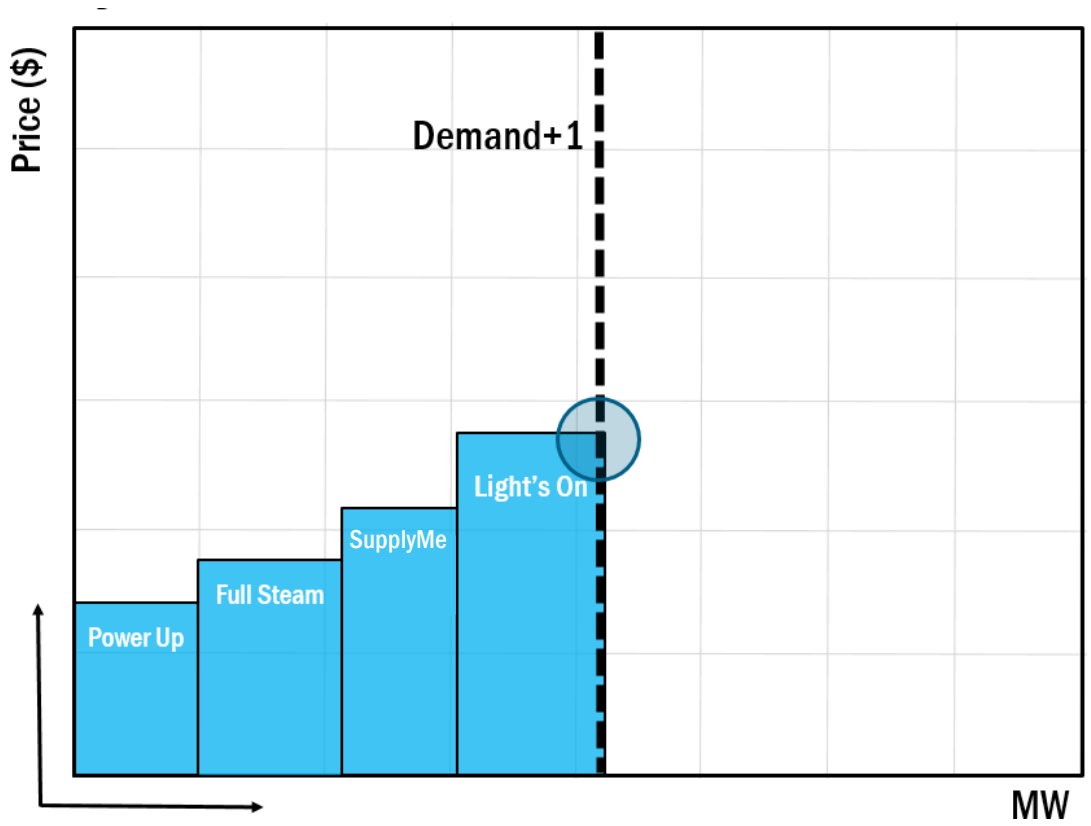


Co-Optimization for lowest total production cost

- DAM and RT Prices
- DAM and RT Schedules

System Demand

- **Software solves for total demand on system**
  - Determine pool of resources (offers & parameters)
  - Create a bid stack
  - Least cost solutions (w/ parameters)

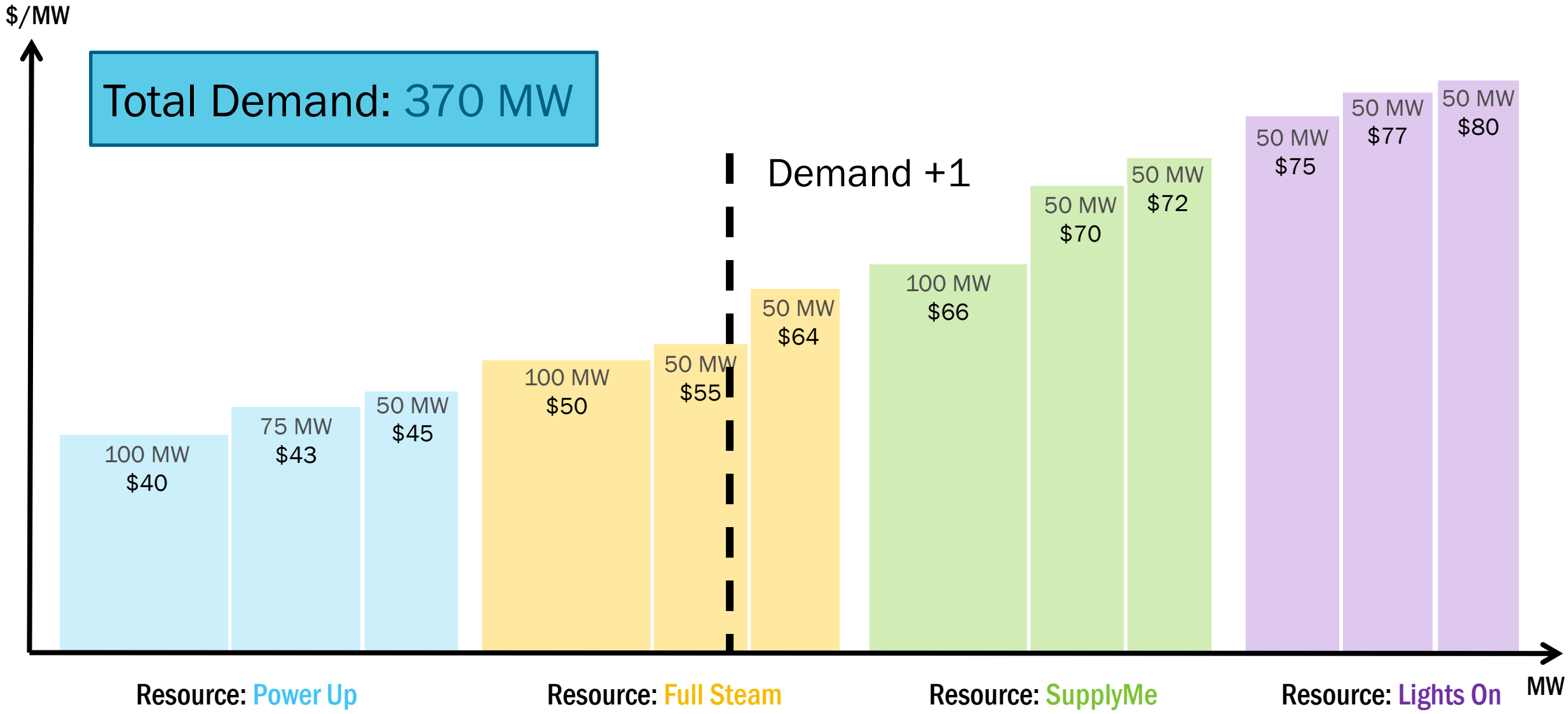


NOTE

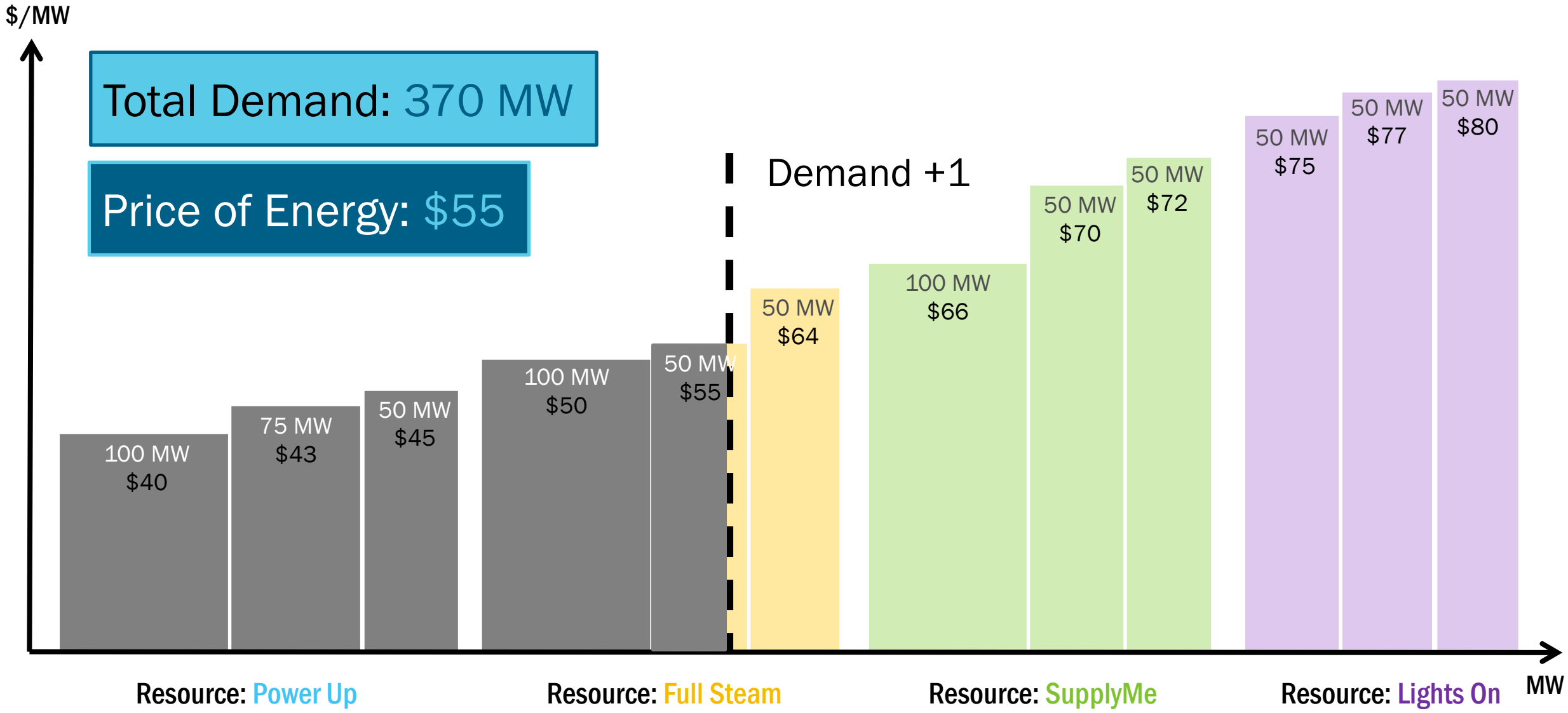
This applies to both DA and RT Markets

Price Setting Unit

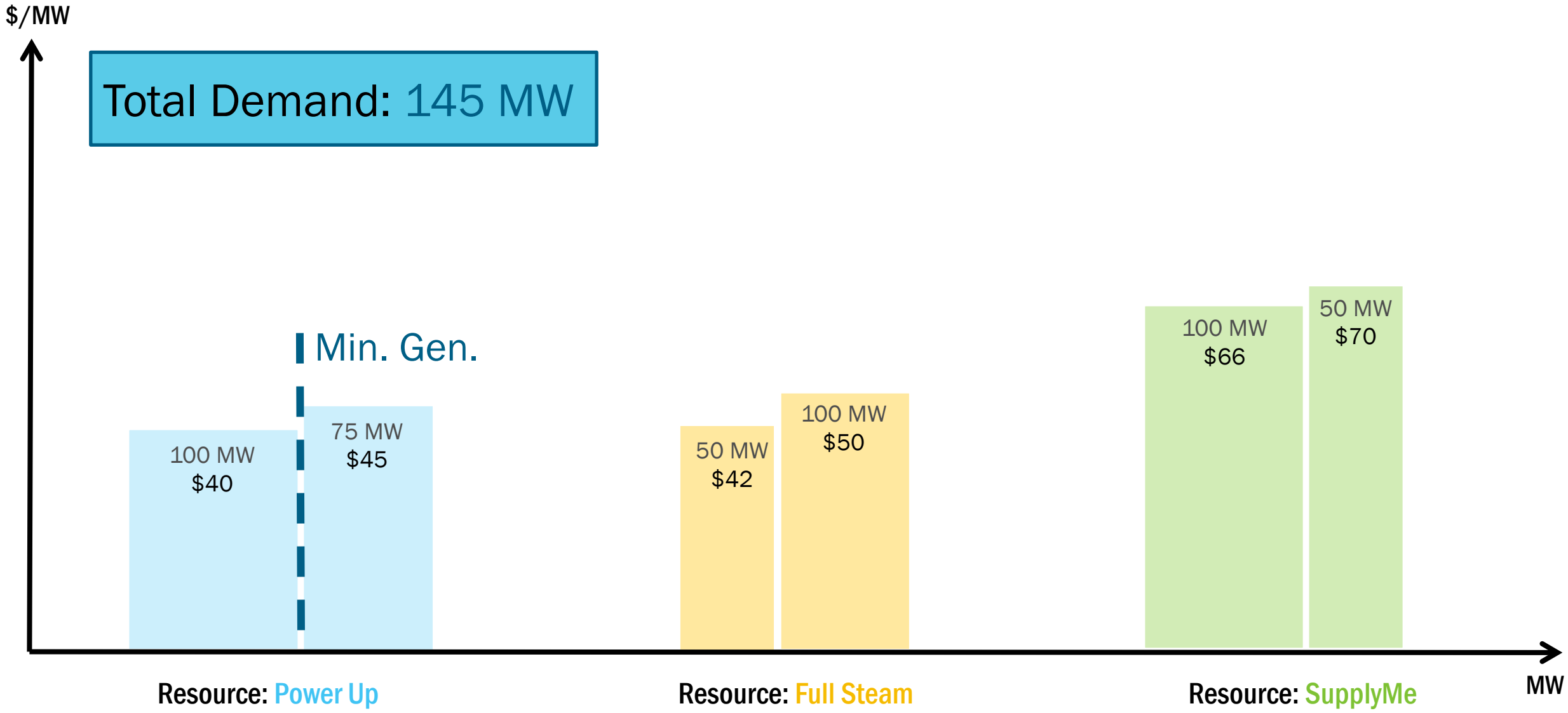
Example 1 - Demand



Example 1 - Demand



Example 2 – Min Gen



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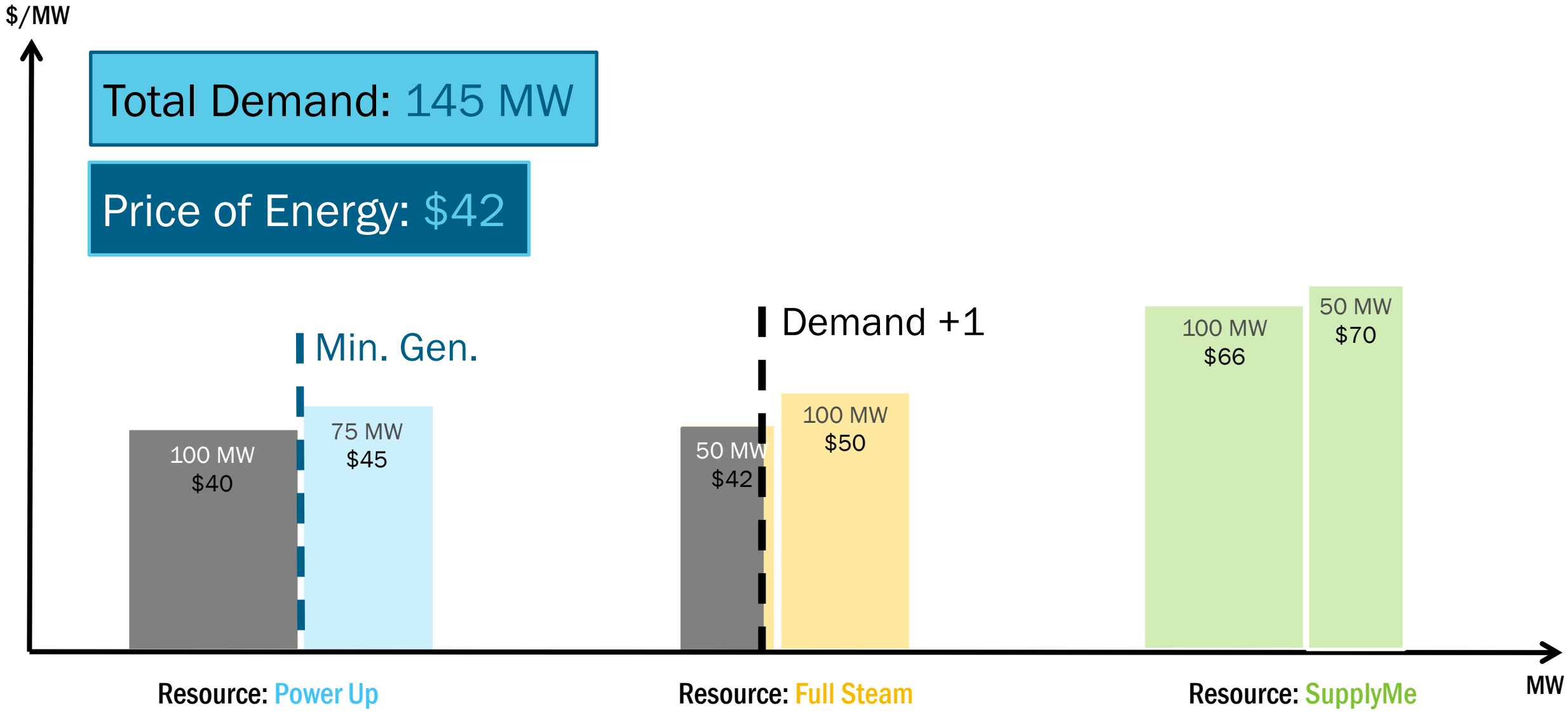
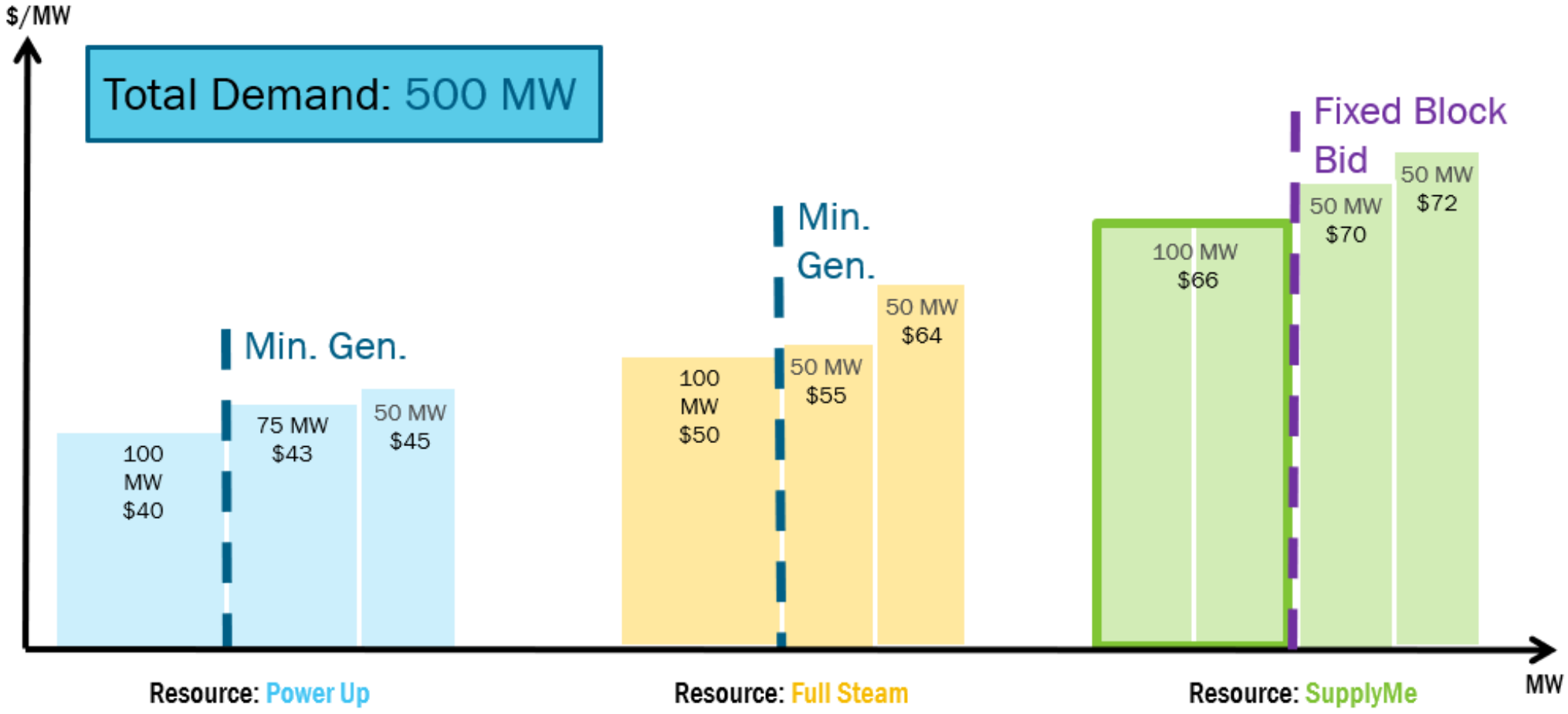
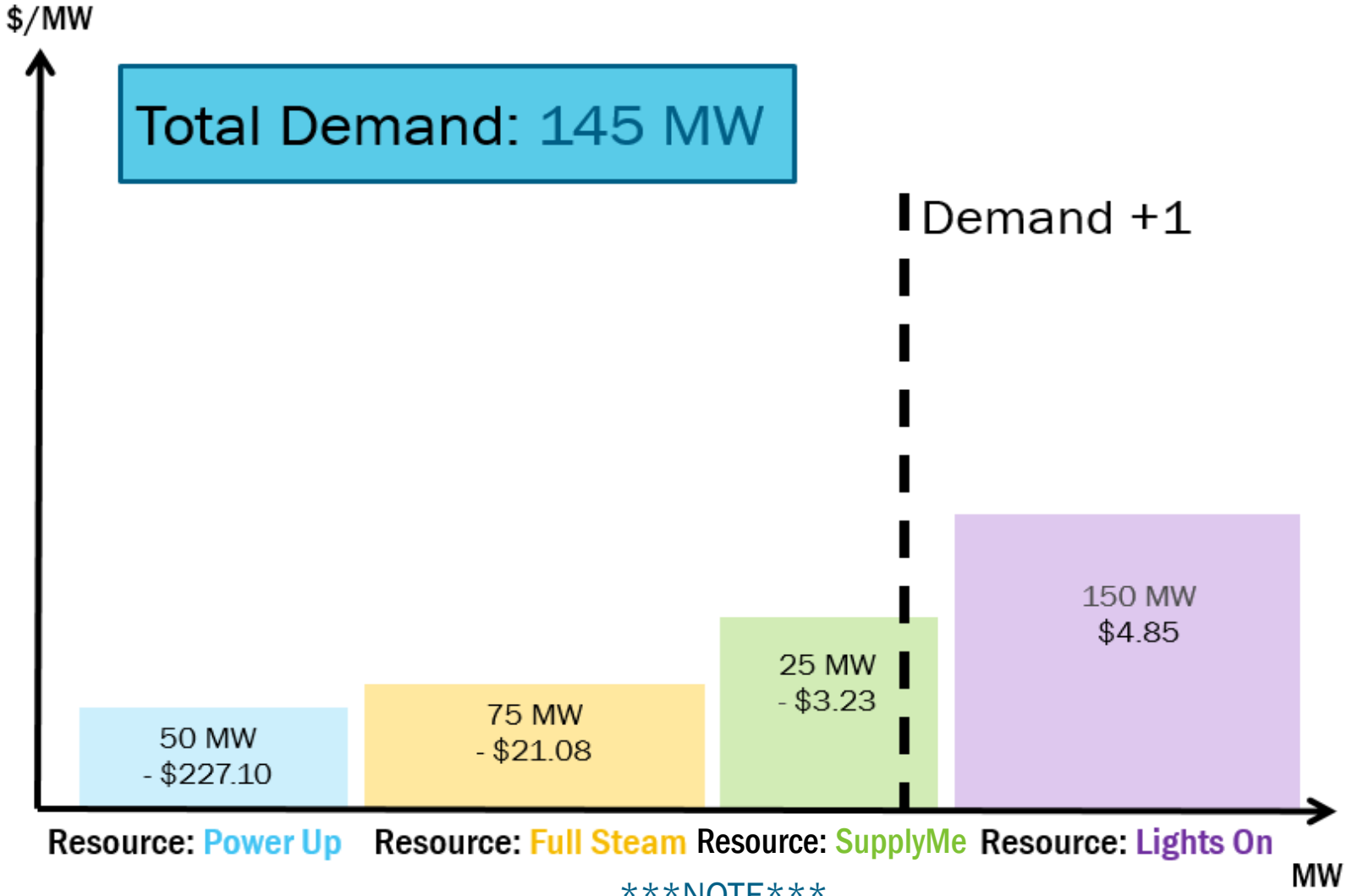


Let's Review

What would be the price of energy in this example?



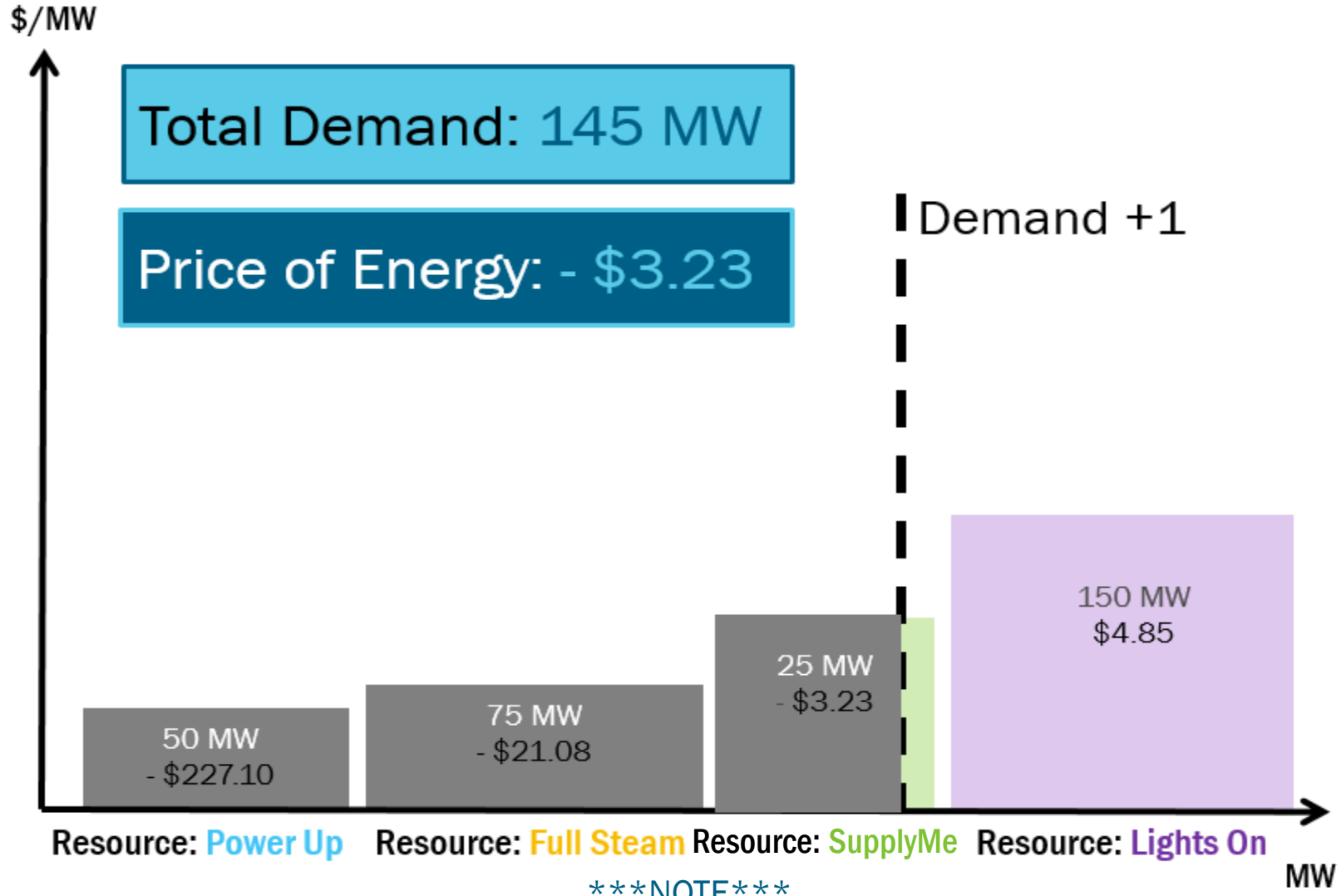
Example 3 – Negative Bid



NOTE

RT Data from 3/13/2020

Example 3 – Negative Bid



NOTE

RT Data from 3/13/2020

Equal Lambda

Role of NYISO Reference Bus

- Marginal cost of energy needed to meet load
- Same price for all generators and loads for given time-period
- Central reference point within the NYCA
- LBMPs are always defined with respect to a NYISO-selected reference bus
- Loss and congestion components at NYISO-selected reference bus is zero
- LBMP at Marcy Reference Bus = Marginal Cost of Energy

Energy Price Component Summary

- Describe the concept of economic dispatch
- Identify the price setting unit in module examples
- State the role of the NYISO Reference Bus

Let's Review

True or False: The price of energy is the same for all generators and loads for a given time-period

TRUE

FALSE

Additional Resources

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