

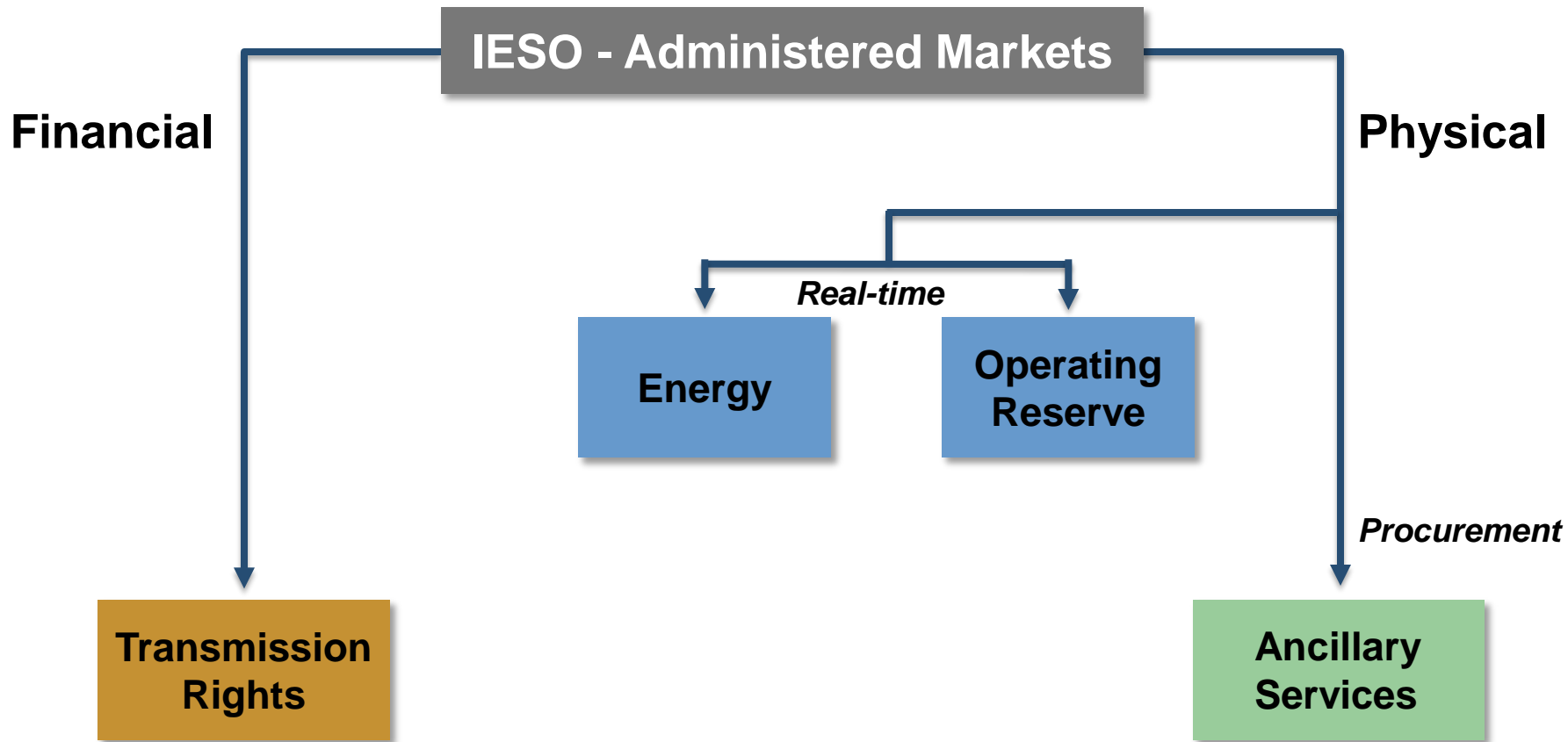
The Electricity Market

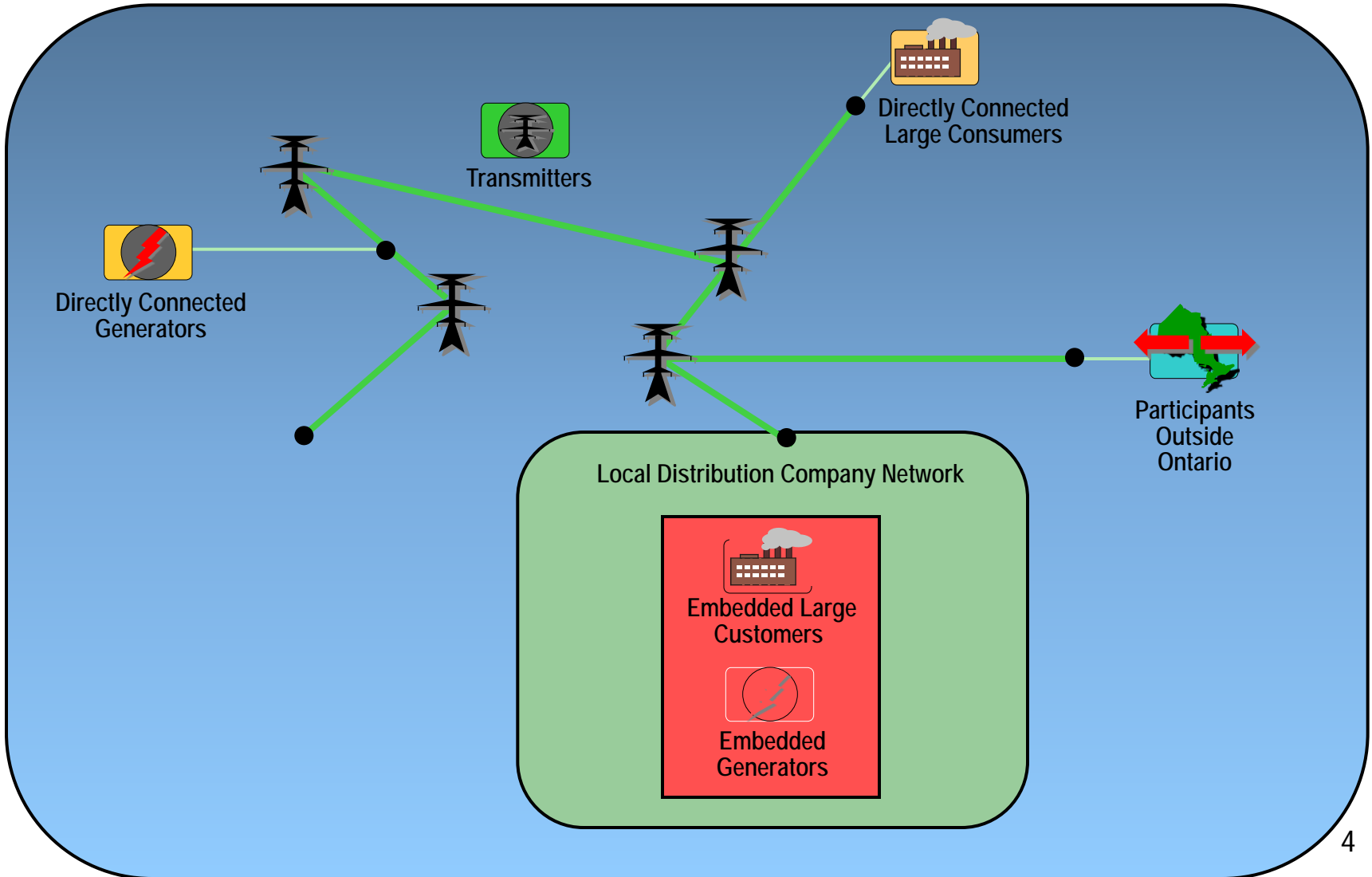
Demand Response Public Meeting

Rhonda Wright Hilbig, Manager – Market Change Initiatives

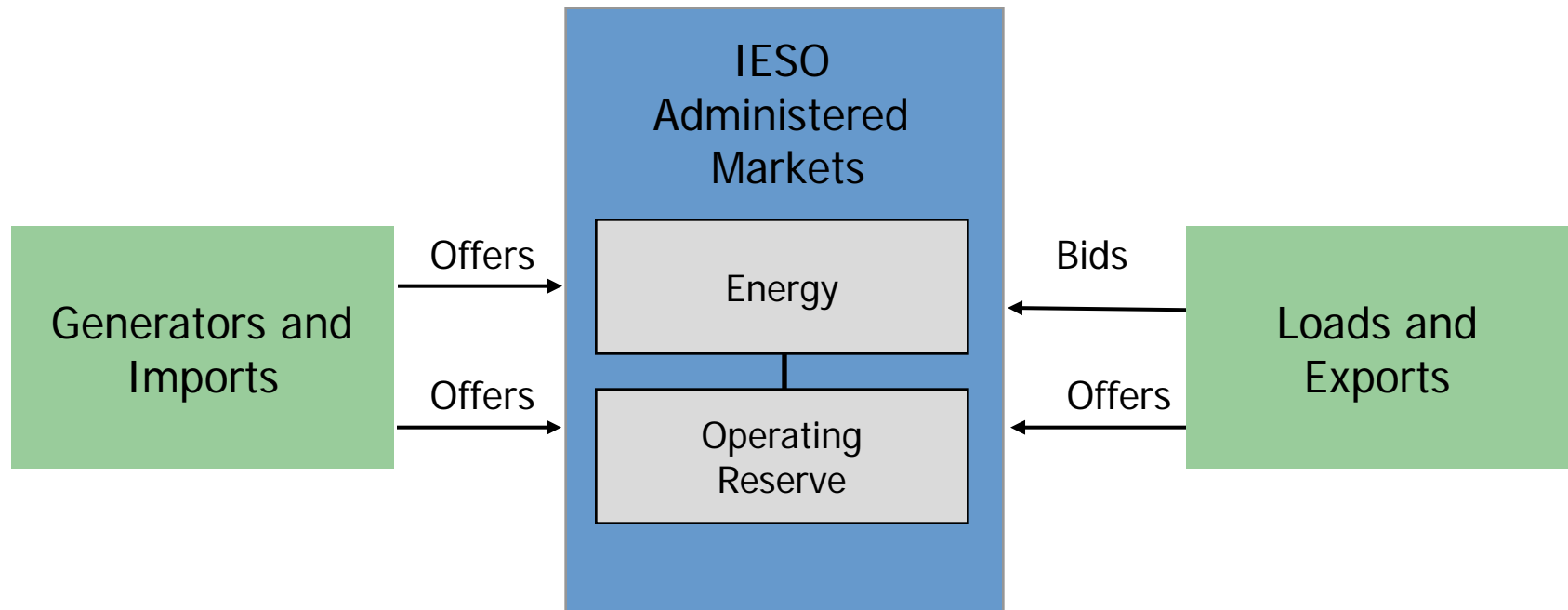


- The IESO Markets
- Market Participants
- How we dispatch the market
 - Dispatch Data
 - Determining Dispatch Instructions
- Dispatch Example





Dispatch Data - Offers and Bids

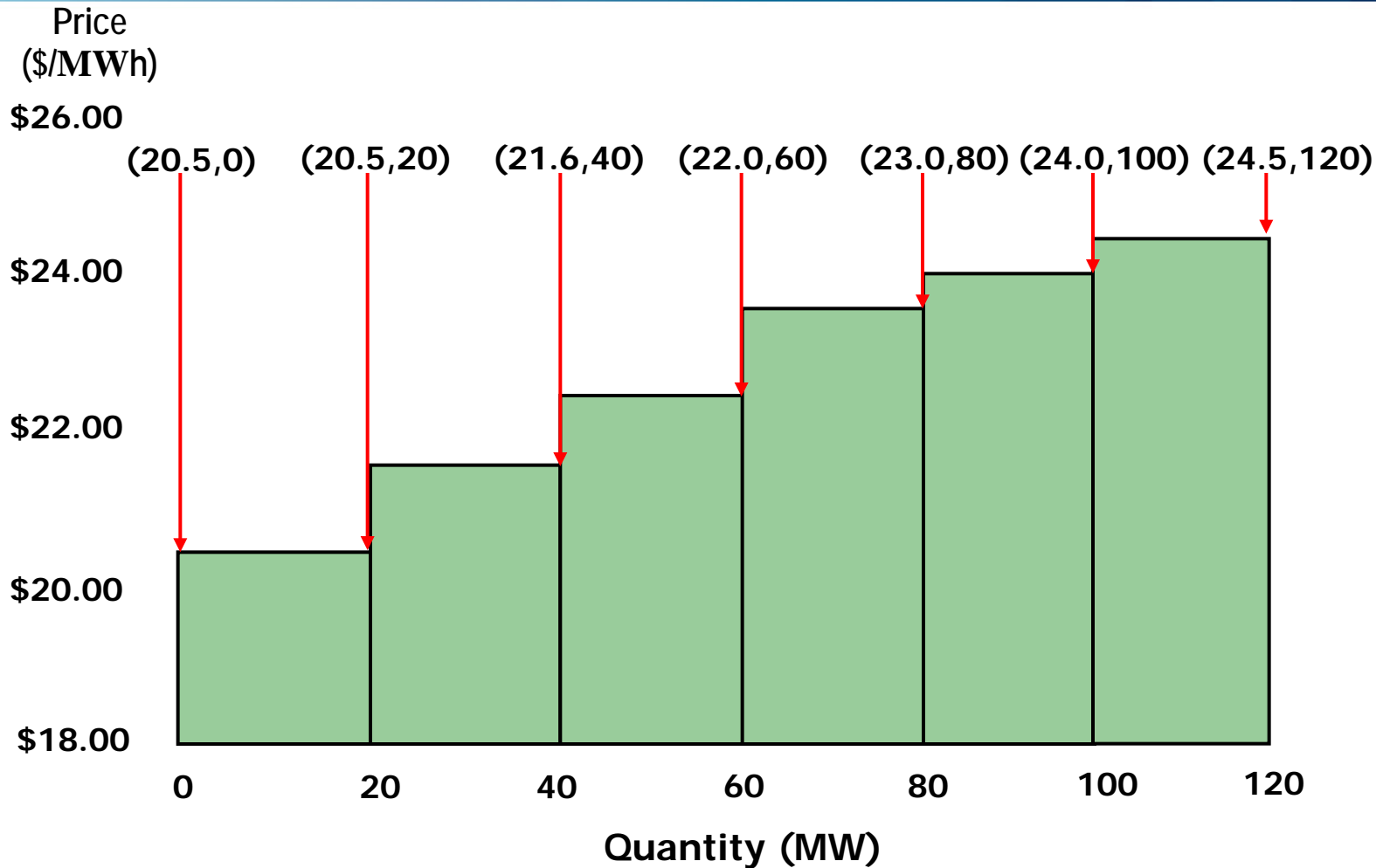


Dispatch Data



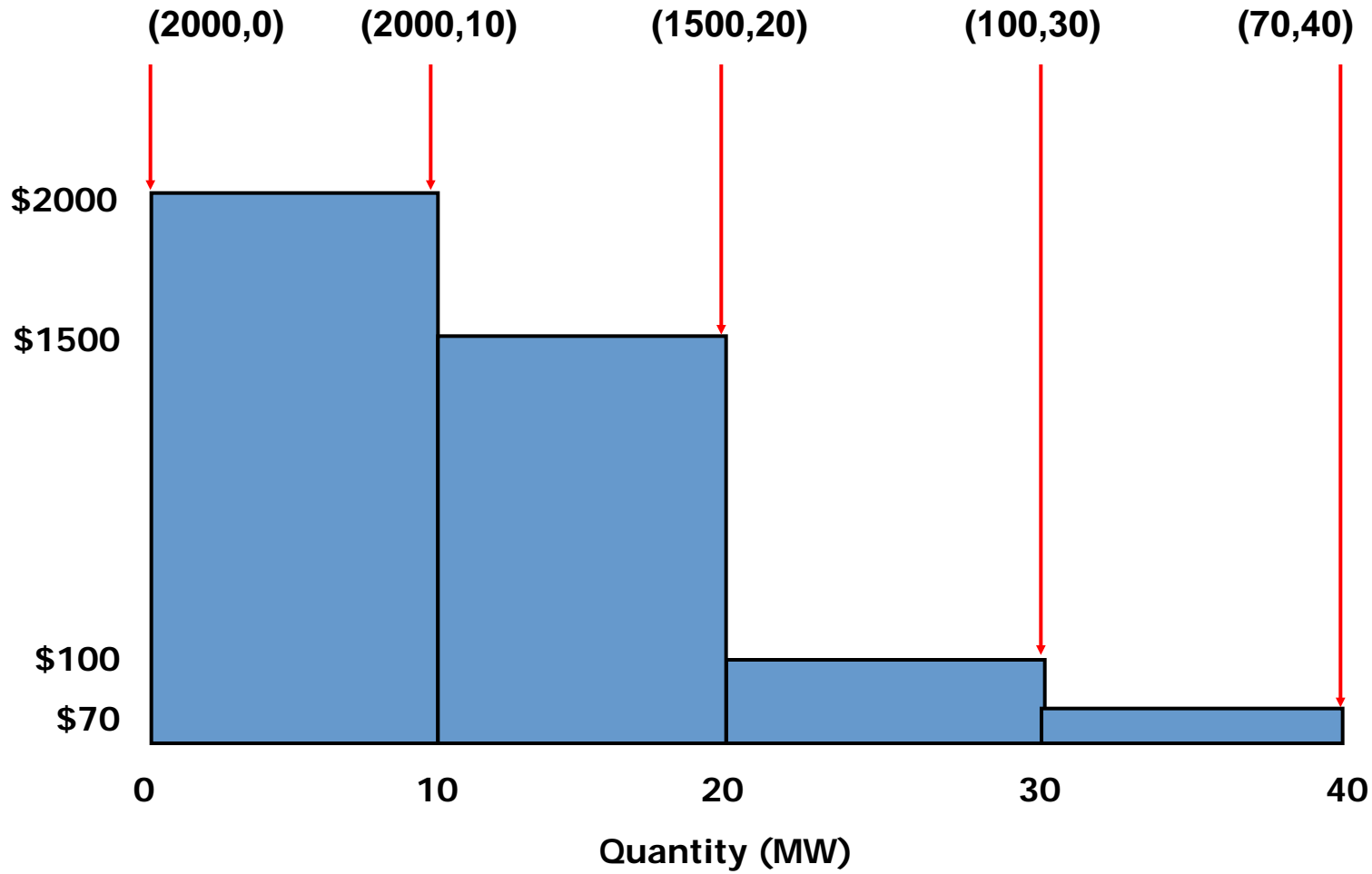
- Dispatchable participants submit offers and bids that reflect their price sensitivity:
 - A load might want to buy more electricity if the price is lower
 - A generator may find it economical to produce more electricity if the price is higher
- Bids and offers include price/quantity pairs such as: \$40, 20 MW; \$50, 40 MW
- Can submit up to 20 price/quantity pairs for energy for a single facility for any given hour

Price/Quantity Pairs - Offers



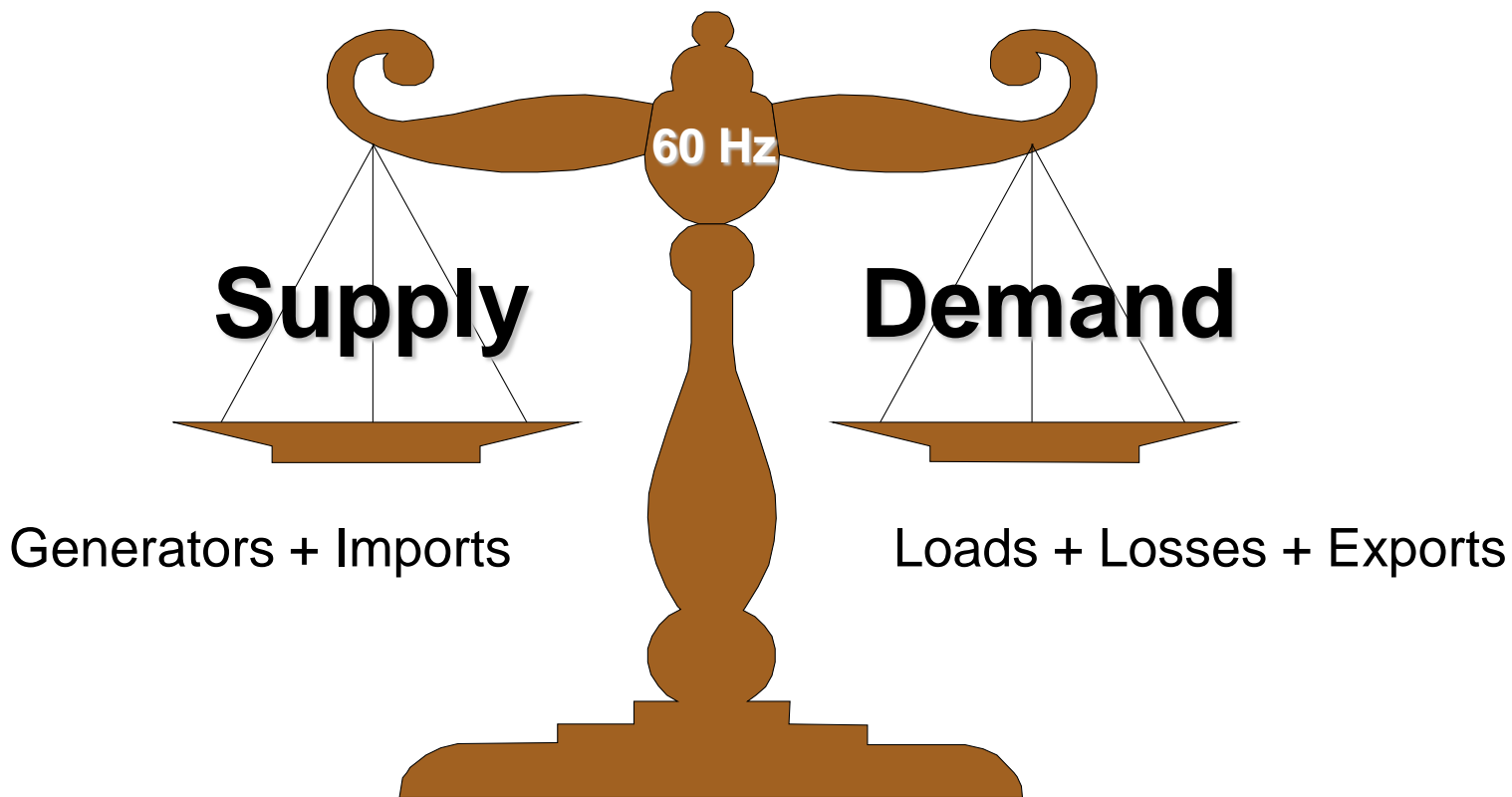
- The IESO forecasts non-dispatchable load and dispatches the system to balance supply and demand
- Dispatchable Loads submit bids identifying the price at which they will reduce their consumption
- May be dispatched off for their dispatchable portion if the cost of supplying energy to them exceeds their bid:
 - If the market clearing price is \$35, a bid of \$40 will generally mean you will be scheduled to consume, unless system constraints mean it is more economic to “constrain off” your facility (in this case you may be compensated through settlement credits)

Price/Quantity Pairs - Bids



Determining Dispatch Instructions





Ensure that supply meets demand
within system limits

- Security limits are the reliability envelope in which the market operates; they protect our grid and our neighbours' grids from disturbances
- Energy will take all available paths to get from supply point to consumption point
- Transmission lines do not control or limit the amount of energy they convey
- Energy flows are managed by dispatching generator output
- Different limits are used under different operating conditions

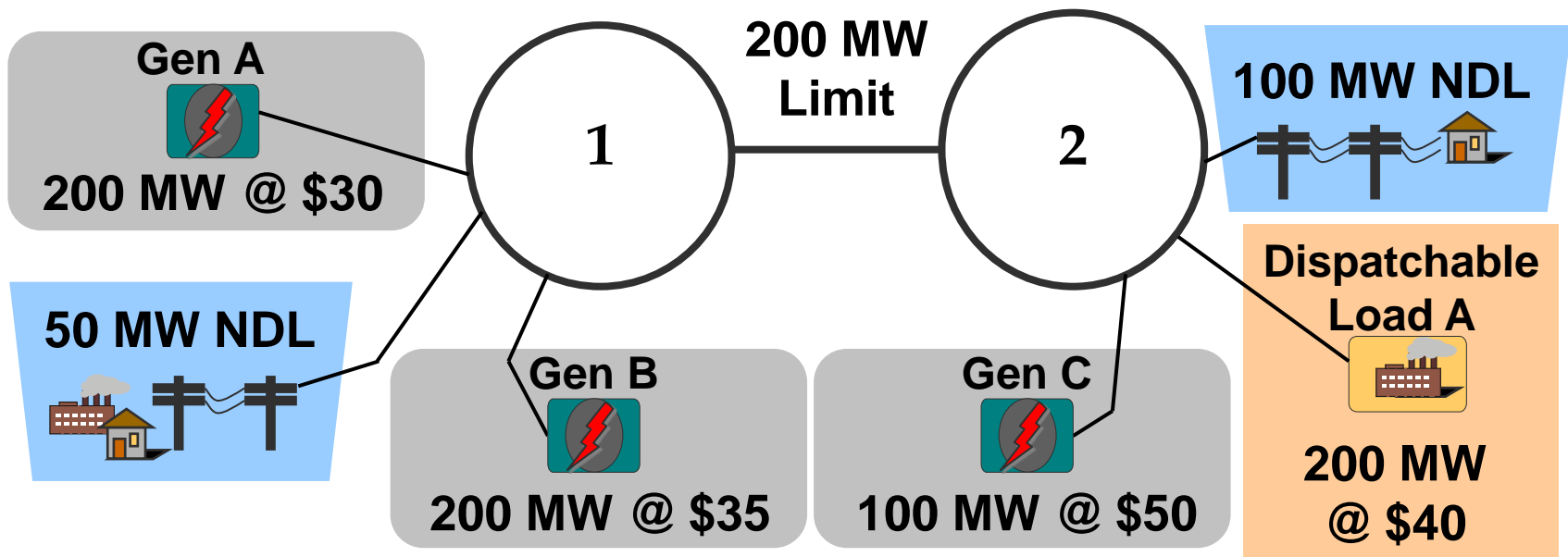
- Dispatch follows economics as closely as possible
- Can't dispatch based purely on economics
 - The *unconstrained* mode of the dispatch algorithm determines market clearing prices and “market schedules” in the absence of transmission constraints
 - “copper plate” model of the grid
 - Assumes resources can ramp at three times their offered ramp rates (September 12, 2007)
 - The *constrained* mode of the dispatch algorithm determines dispatch schedules (i.e., dispatch instructions)
 - Respects transmission losses, transmission system limits, ramp restrictions on resources
- When a difference in MW occurs between the economic “market schedule” and the practical “constrained schedule” market participants are held whole through Congestion Management Settlement Credits (CMSC)
- The cost of CMSC is recovered through the IESO uplift to loads

- Dispatch instructions:
 - Primary method for controlling the balance of supply with demand
 - Indicate operating point at the end of a 5-minute interval
 - Sent only if there is a required change in operating point
 - Can be refused for reasons of public or worker safety, equipment damage, or legal requirements

Dispatch Example

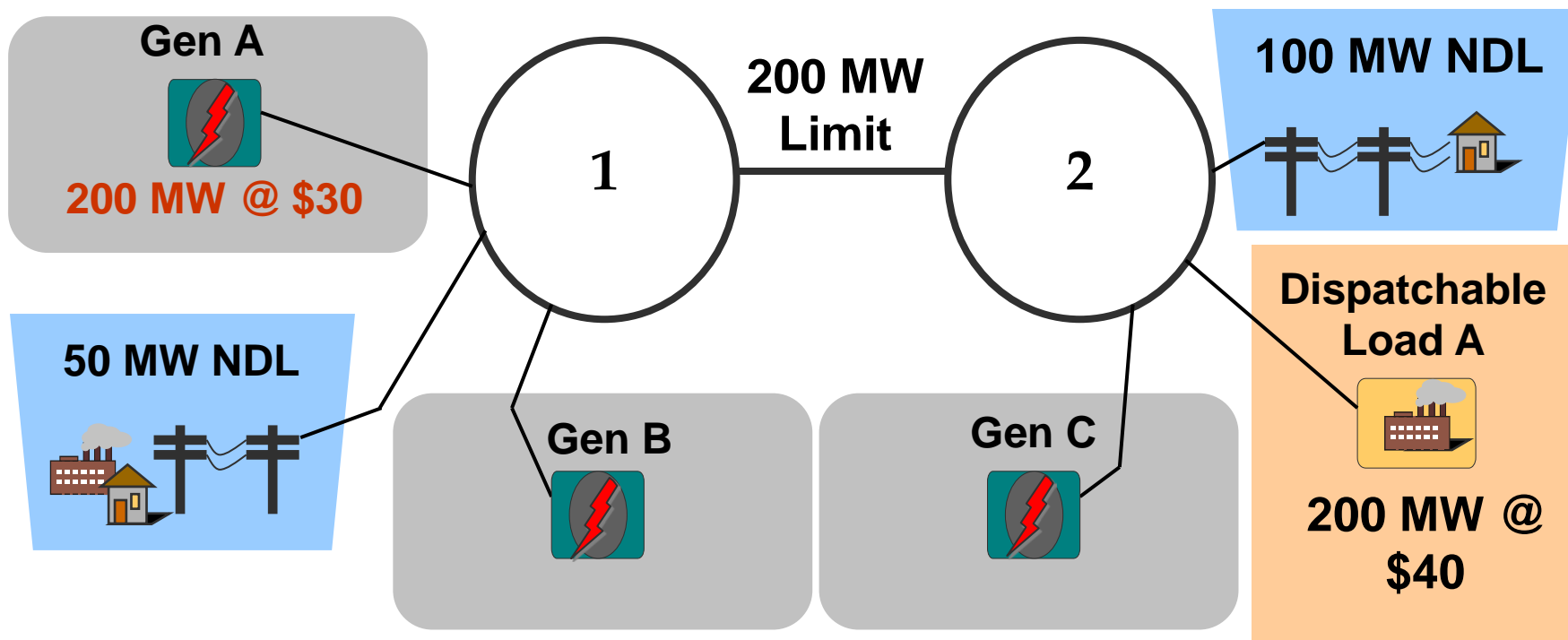


Transmission Impact on Dispatch



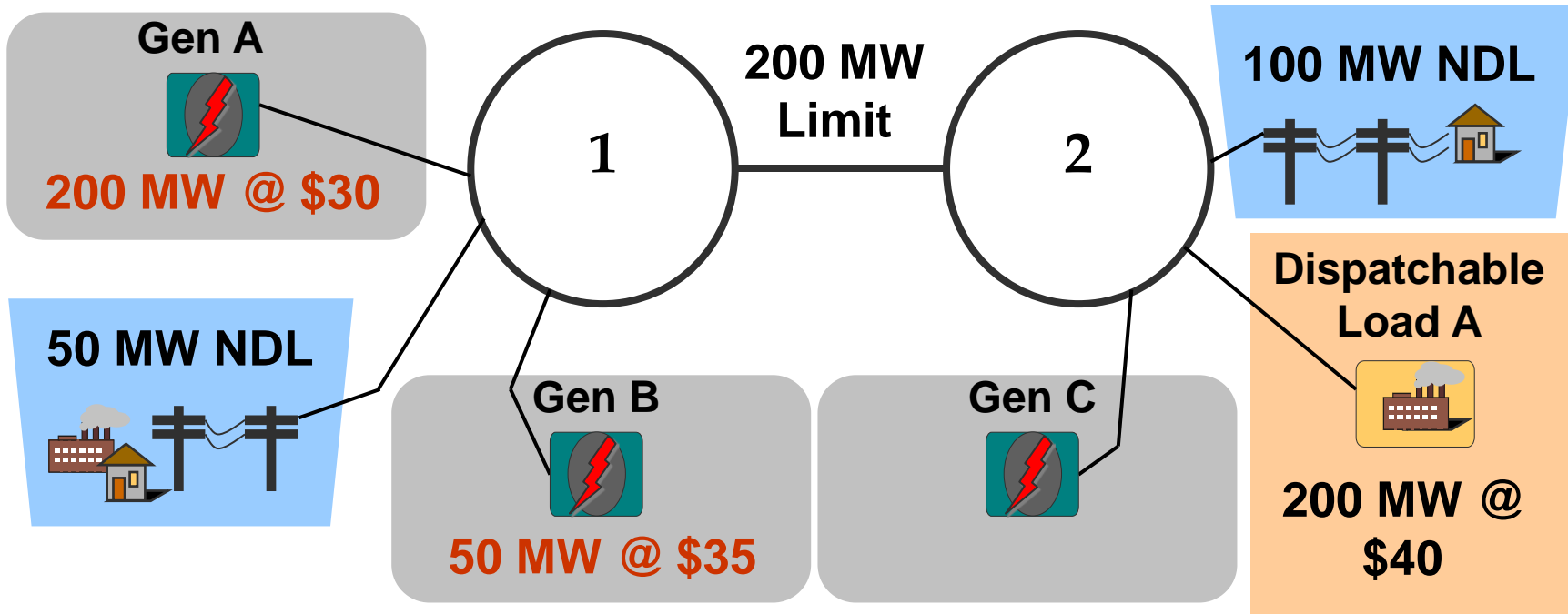
- NDL (Non-Dispatchable Load) (150 MW) is served first
- DL (Dispatchable Load) (200 MW) served if economic (bid \$40/MW)
- Generation is dispatched from least to most expensive within system limits

Transmission Impact on Dispatch



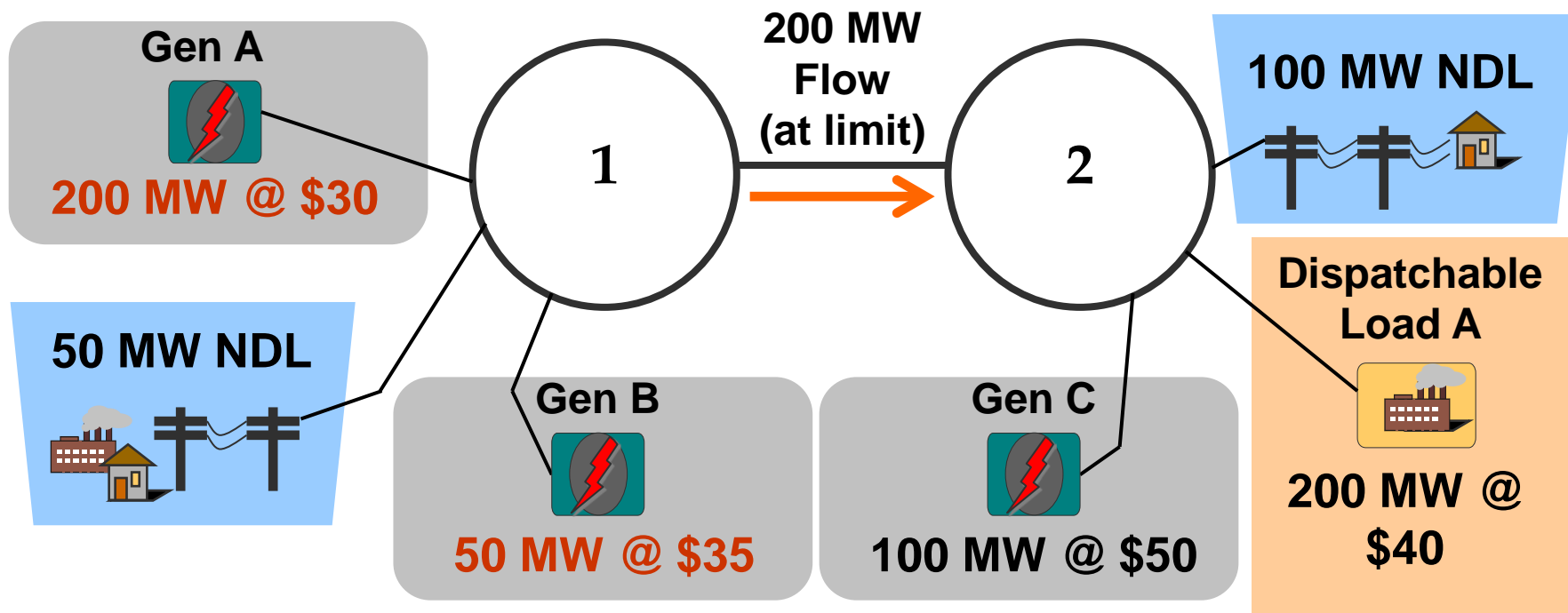
- **Gen A, with the lowest offer price, will be dispatched to 200 MW**

Transmission Impact on Dispatch



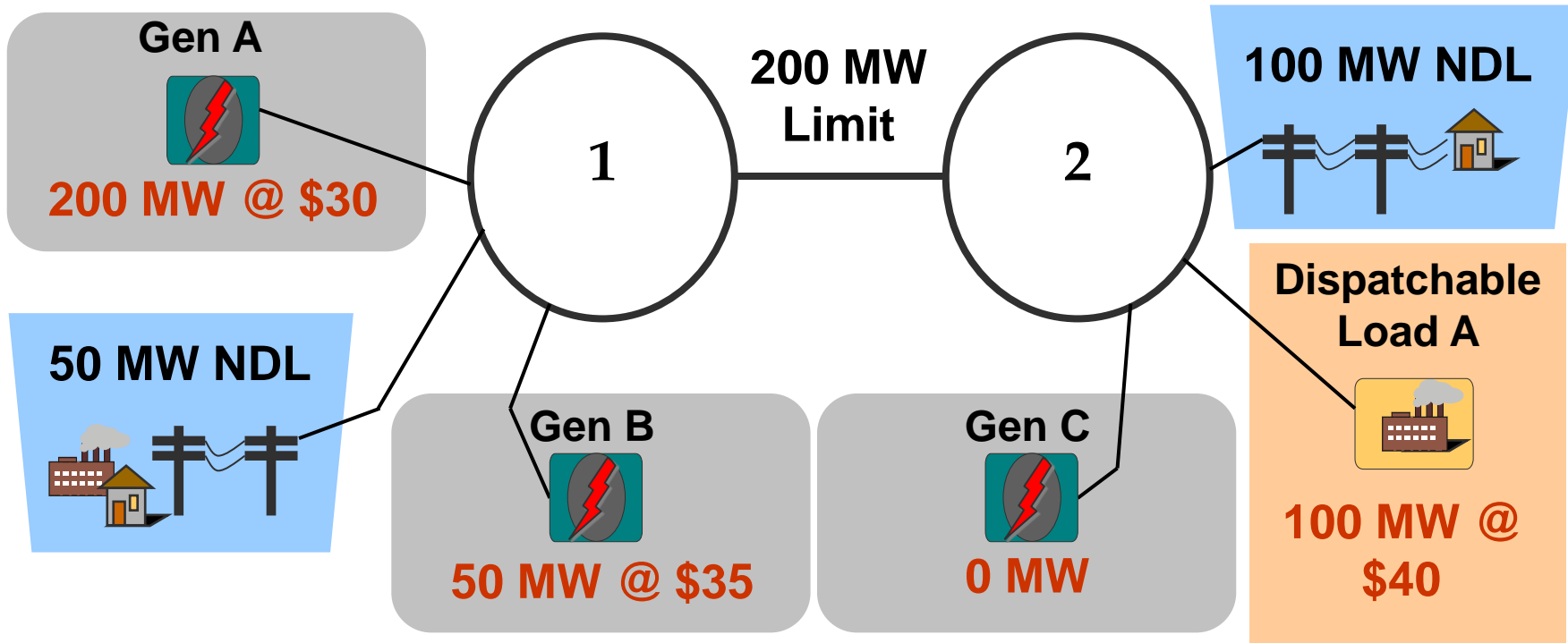
- We would like to dispatch Gen B to 150 MW of its 200 MW offer to serve all load, including the DL
- Gen B can only be dispatched to 50 MW due to transmission limits

Transmission Impact on Dispatch



- There is 200 MW moving into Region 2
- There is 100 MW left after serving NDL
- Serving all 200 MW of Load A means dispatching \$50 generation
- Load A only bid \$40/MW

Transmission Impact on Dispatch



Dispatch Schedules

- Gen A to 200 MW
- Gen B to 50 MW
- Load A to 100 MW
- Gen C to 0 MW

Questions?