

Linked Wheel Economic Dispatch (MR-00338)

MR-00338 Working Group
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- Objective Function: words and math
- Linked wheels congestion pricing
- Stylized examples

- Maximize economic gain from trade (market rules ch 7 section 4.3)
- Economic gain from trade defined as “value of electricity produced *minus* cost of producing the electricity”
- Maximizing gain from trade means quantities and prices determined such that no MP would be better off producing or withdrawing more or less

$$C = C_1L_1 + C_2L_2 - C_3P_1 - C_4P_2 \dots\dots\dots$$

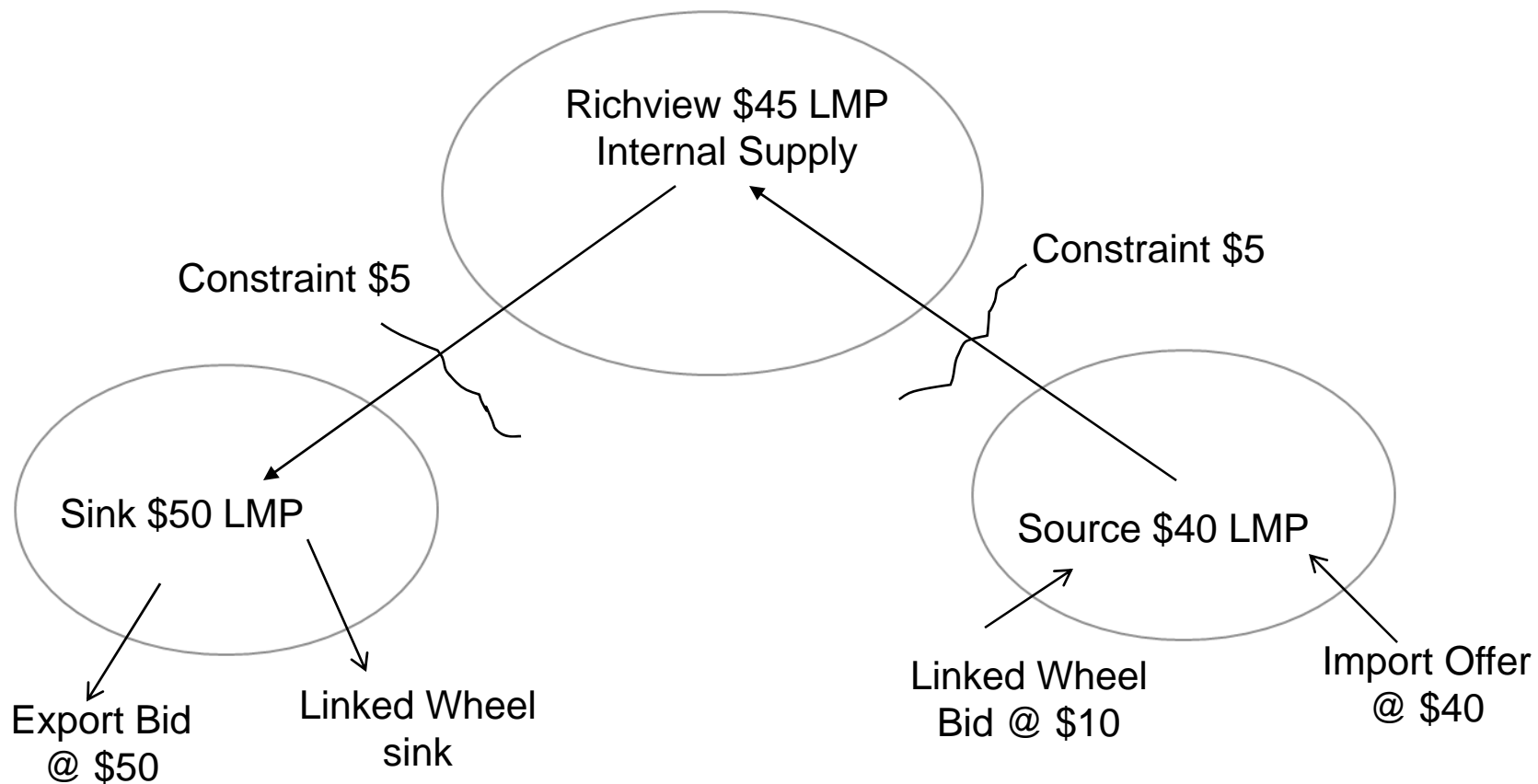
Subject to numerous constraints:

- $\sum P = \sum L + \text{NDL} + \text{Tx losses}$
- P_x does not exceed capability of generator “x”
- Transmission constraints: internal and interties
- etc

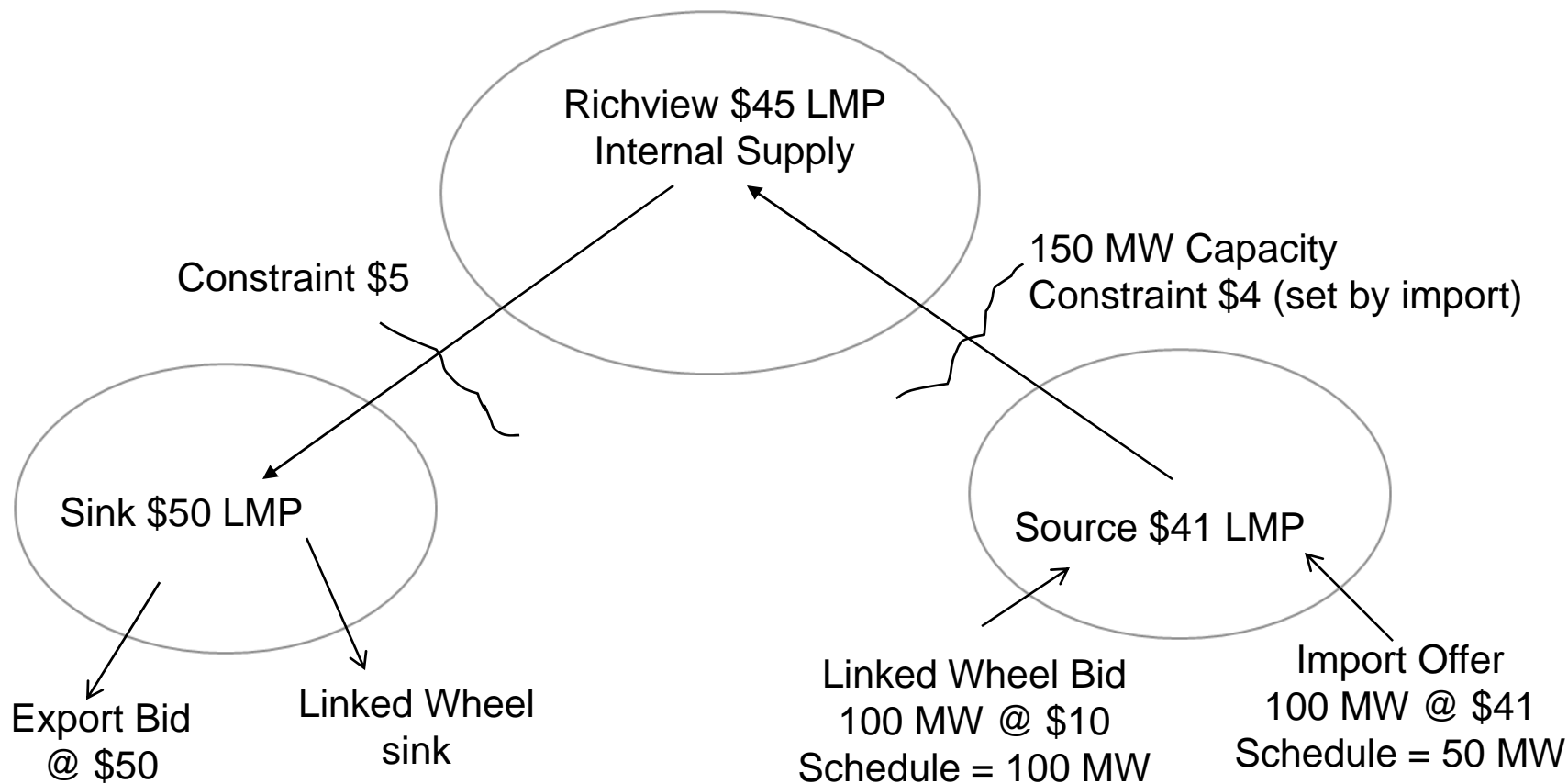
Linked Wheel Congestion Pricing

- Import leg: $Cw_1^1W_1$
Where Cw_1^1 = source shadow price
 W_1 is MW of import leg of wheel
- Export leg: $Cw_2^1\underline{W}_1$
Where Cw_2^1 = sink shadow price
 \underline{W}_1 is MW of import leg of wheel
- New Constraint: $W_1 = \underline{W}_1$
- $Cw_2^1\underline{W}_1$ minus $Cw_1^1W_1 = Cw_1W_1$
Where Cw_1 = linked wheel bid price
- Objective function now becomes:
 $C = C_1L_1 + C_2L_2 + Cw_1W_1 - C_3P_1 - C_4P_2 \dots\dots$

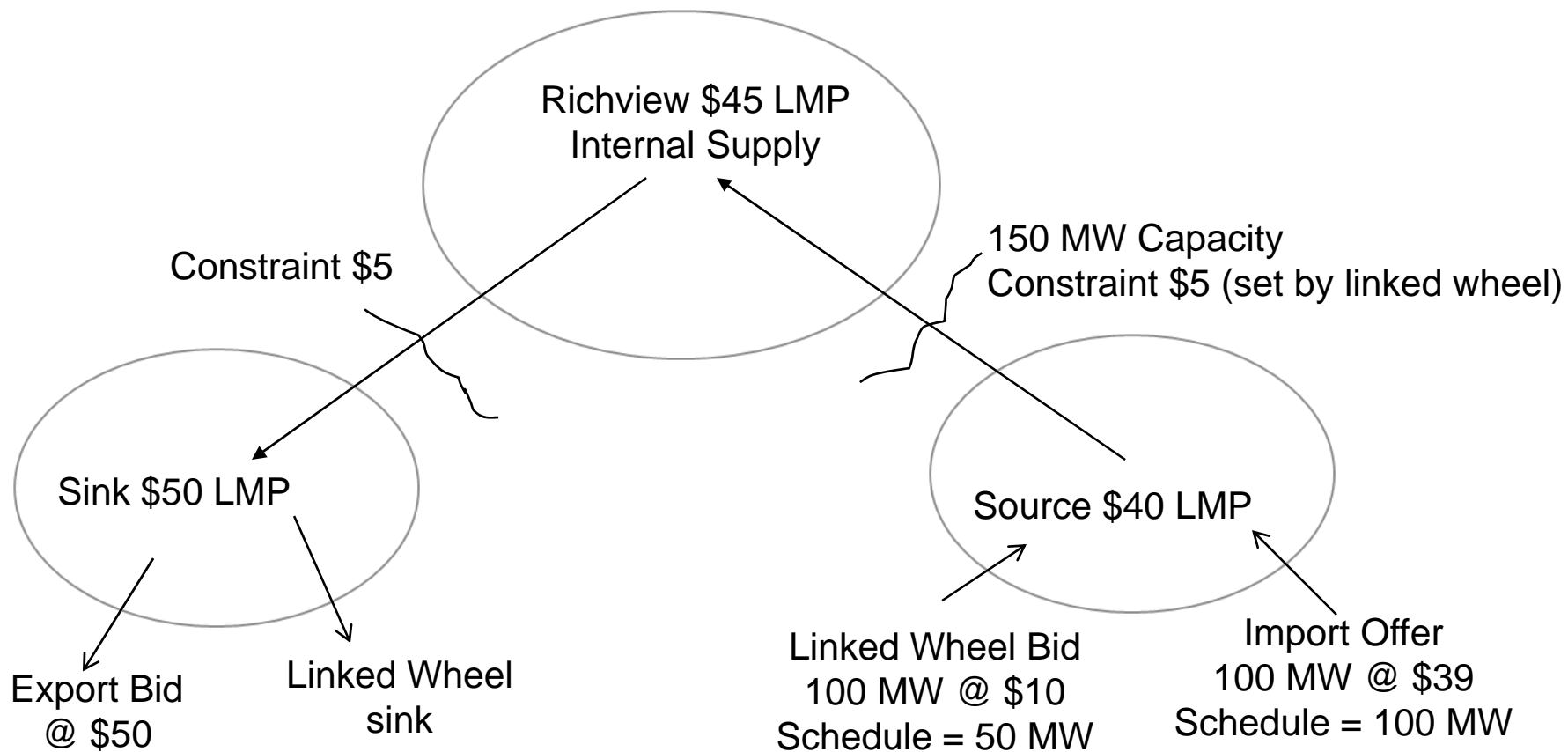
Stylized Example – Import, Export and Linked Wheel Marginal



Stylized Example - Source LMP Set by Import



Stylized Example - Source LMP Set by Linked Wheel



Stylized Example – Only Linked Wheel at Source

