California ISO
Shaping a Renewed Future

Local Market Power Mitigation Enhancements

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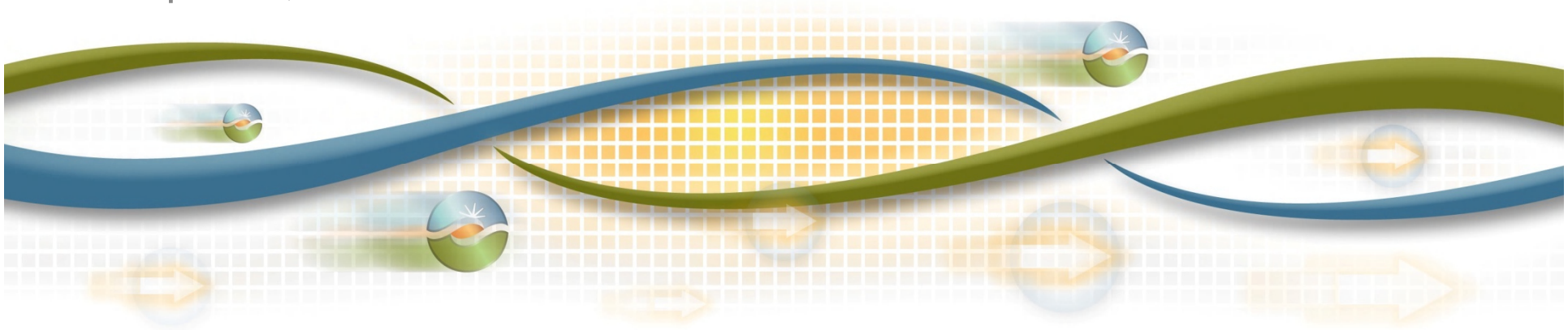
Market Surveillance Committee Meeting
General Session
April 29, 2011



Goal of the LMPM straw proposal

- Meet the FERC requirement to use bid-in demand
- Incorporate design elements to reflect the implementation of:
  - Convergence bidding
  - Proxy demand resource
- Improve accuracy of mitigation in real-time market
- Provide the opportunity to incorporate inline competitive path designation

Straw Proposal – Locational Marginal Price (LMP) Decomposition process overview

1. Perform all constraints (AC) run
2. Decompose the LMP for each location
   a. Energy component
   b. Loss component
   c. Congestion cost component
      i. Competitive constraint component
      ii. Non-competitive constraint component
3. If the non-competitive component of a physical supply bid > 0, it potentially has market power and requires mitigation.

Straw Proposal –LMP Decomposition process overview (continued)

4. A physical supply bid will be mitigated to the higher of:
   a. Its default energy bid (DEB)
   b. Its competitive LMP (analogous to the LMP produced in today's competitive constraints run) if that is lower than its unmitigated bid
5. Virtual supply bids are not mitigated
6. Run IFM with mitigated bids

Straw Proposal –LMP Decomposition details

For location *i*:

$$LMP_i = LMP_i^{EC} + LMP_i^{LC} + LMP_i^{CC} + LMP_i^{NC}$$

Where:

EC = the energy component

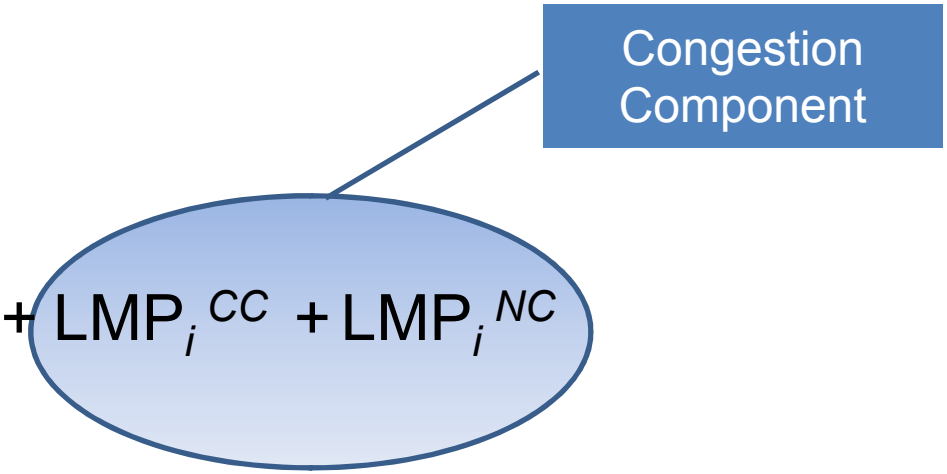
LC = the loss component

CC = the competitive constraints congestion component

NC = the non-competitive constraints congestion component

Straw Proposal –LMP Decomposition details (continued)

For location *i*:



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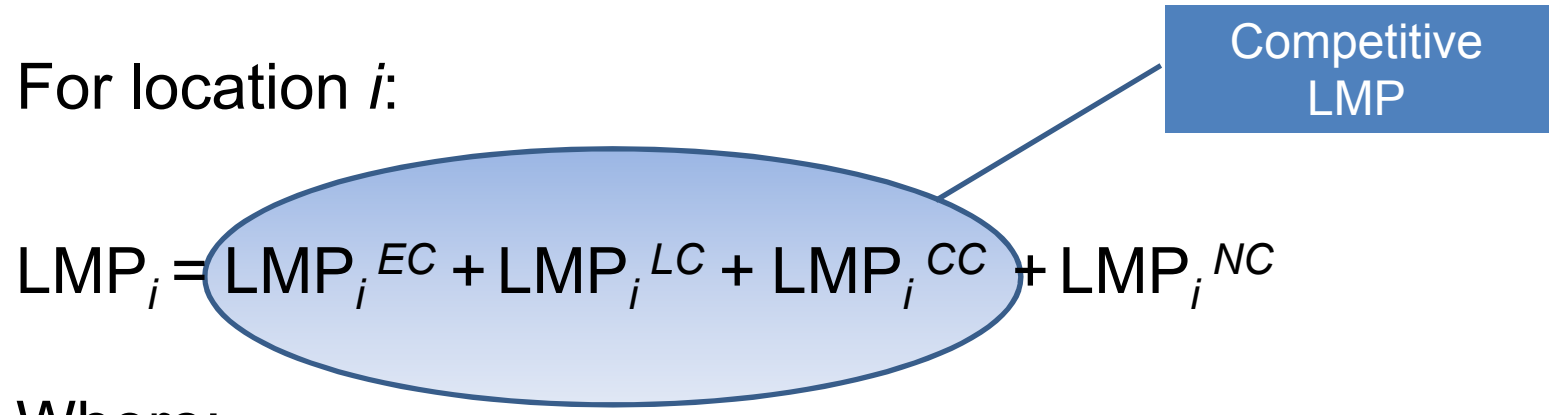

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Straw Proposal – RMR Condition 1 & Condition 2 Mitigation

- Concern - Use of bid-in demand and virtual bids could cause over or under commitment of RMR resources
- Proposed solution –
  - Condition 1 units - market bids will be utilized in the AC run and RMR proxy bids will be used in place of DEBs. The same LMP decomposition will be used to determine when RMR proxy bids replace market bids.
  - Condition 2 units – ISO operators will manually dispatch these resources if needed and RMR proxy bids will be utilized in the market.
- For 2011, there is only 1 RMR contracted resource

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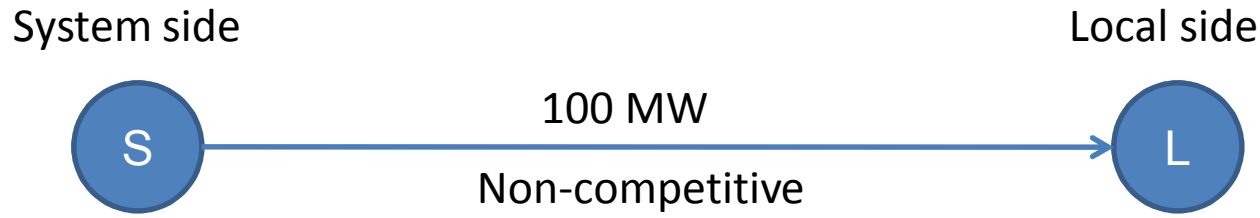
Supplemental Deck
Examples

2 Bus Example



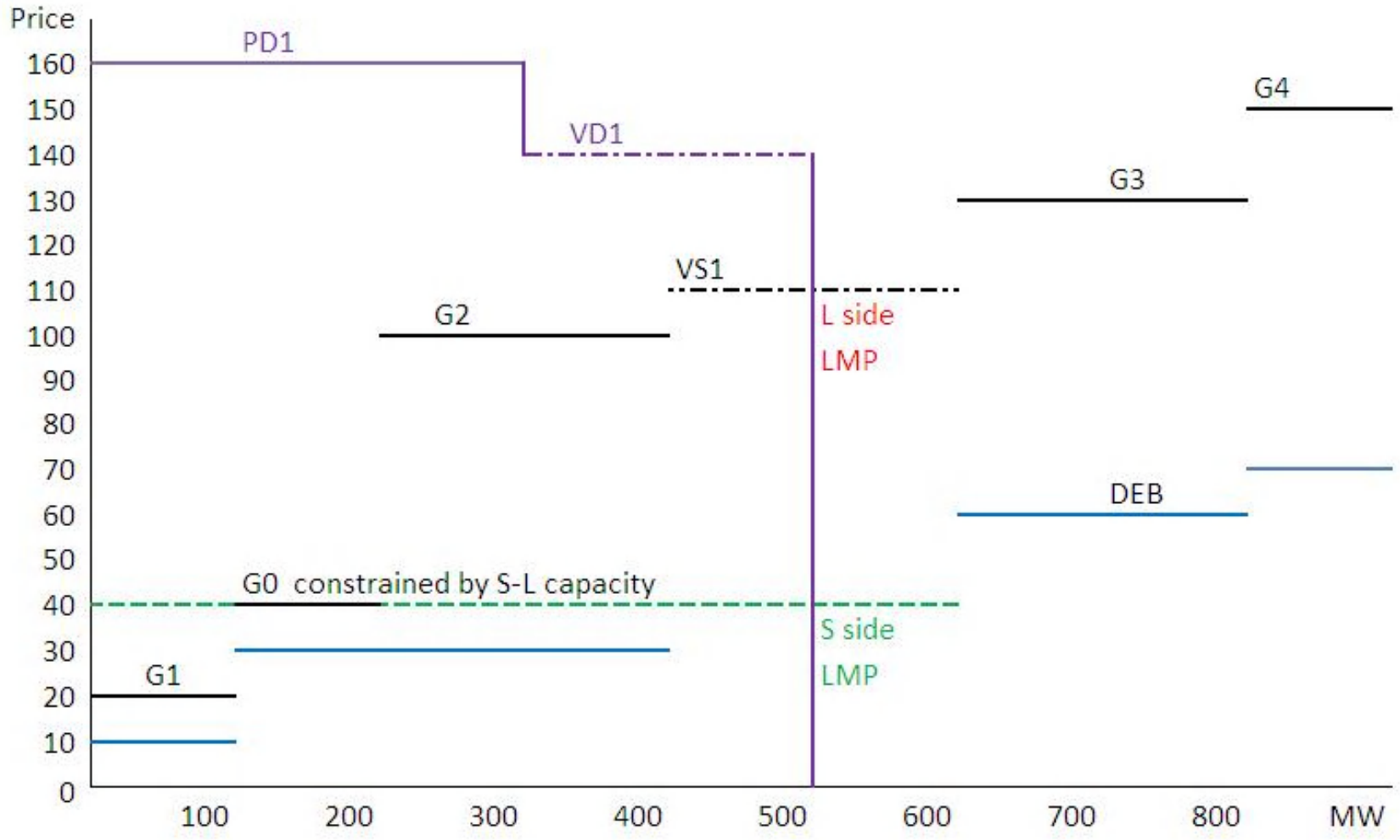
G0: 600MW at $40/MWh

G1: 100MW at $ 20/MWh
G2: 200MW at $100/MWh
G3: 200MW at $130/MWh
G4: 100MW at $150/MWh

VS1: 200MW at $110/MWh
VD1: 200MW at $140/MWh

PD1: 300MW at $160/MWh

2 Bus Example (Continued)



2 Bus Example - LMPM under current approach

Supply	CC run (MW)	AC run (MW)	CC LMP	AC LMP	DEB	LMPM	Mit. Bid
G0	400	100	$40	$40	$30	N	$40
G1	100	100	$40	$110	$10	N	$20
G2	0	200	$40	$110	$30	Y	$40
G3	0	0	$40	$110	$60	N	$130
G4	0	0	$110	$110	$70	N	$150
VS1	0	100	$110	$110	N/A	N	$110

Terminology:

CC run – Competitive constraints run

AC run – All constraints run

LMP – Locational marginal price

DEB – Default energy bid

LMPM – Local market power mitigation

Mit. Bid – Mitigated bid

2 Bus Example - LMPM under current approach

Dispatched up in AC run

Supply	CC run (MW)	AC run (MW)	CC LMP	AC LMP	DEB	LMPM	Mit. Bid
G0	400	100	$40	$40	$30	N	$40
G1	100	100	$40	$110	$10	N	$20
G2	0	200	$40	$110	$30	Y	$40
G3	0	0	$40	$110	$60	N	$130
G4	0	0	$110	$110	$70	N	$150
VS1	0	100	$110	$110	N/A	N	$110

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G4	0	0	$110	$110	$70	N	$150
VS1	0	100	$110	$110	N/A	N	$110

Bypasses mitigation due to VS1 "crowd out"

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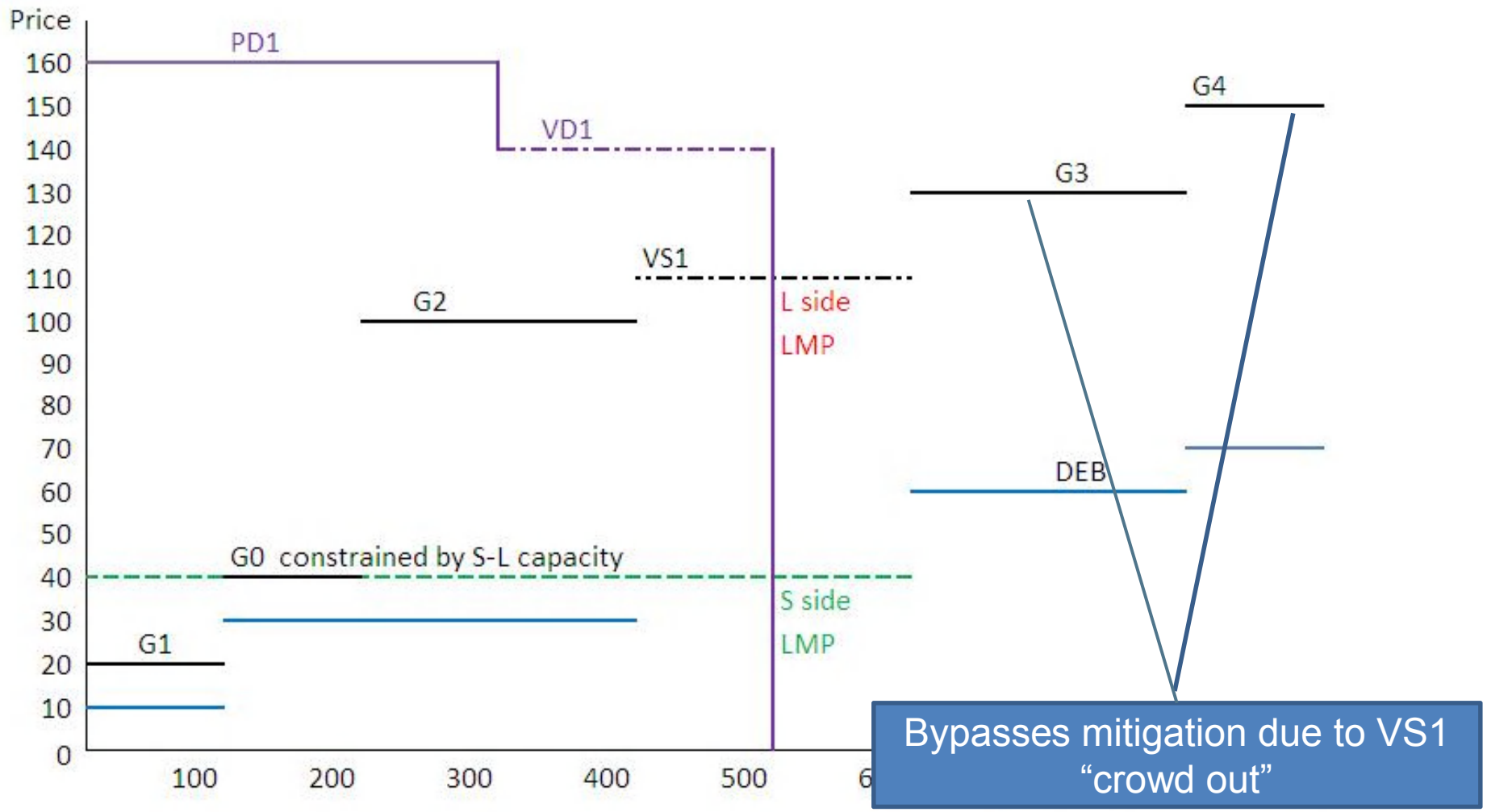
2 Bus Example (Continued)



2 Bus Example - LMPM straw proposal – System side as reference bus

Supply	Sched. (MW)	LMP	EC	CC	LC	NC	UB	DEB	LMPM	Mit. Bid
G0	100	$40	$40	$0	$0	$0	$40	$30	N	$40
G1	100	$110	$40	$0	$0	$70	$20	$10	Y	$20
G2	200	$110	$40	$0	$0	$70	$100	$30	Y	$40
G3	0	$110	$40	$0	$0	$70	$130	$60	Y	$60
G4	0	$110	$40	$0	$0	$70	$150	$70	Y	$70
VS1	100	$110	$40	$0	$0	$70	$110	N/A	N	$110

Terminology:

Sched. – Schedule

EC – Energy component

CC – Competitive constraint congestion Component

LC – Loss component

NC – Non-competitive constraint congestion component

UB – Unmitigated bid

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Supply	Sched. (MW)	LMP	EC	CC	LC	NC	UB	DEB	LMPM	Mit. Bid
G0	100	$40	$40	$0	$0	$0	$40	$30	N	$40
G1	100	$110	$40	$0	$0	$70	$20	$10	Y	$20
G2	200	$110	$40	$0	$0	$70	$100	$30	Y	$40
G3	0	$110	$40	$0	$0	$70	$130	$60	Y	$60
G4	0	$110	$40	$0	$0	$70	$150	$70	Y	$70
VS1	100	$110	$40	$0	$0	$70	$110	N/A	N	$110

NC > 0 = potential market power

Terminology:

Sched. – Schedule

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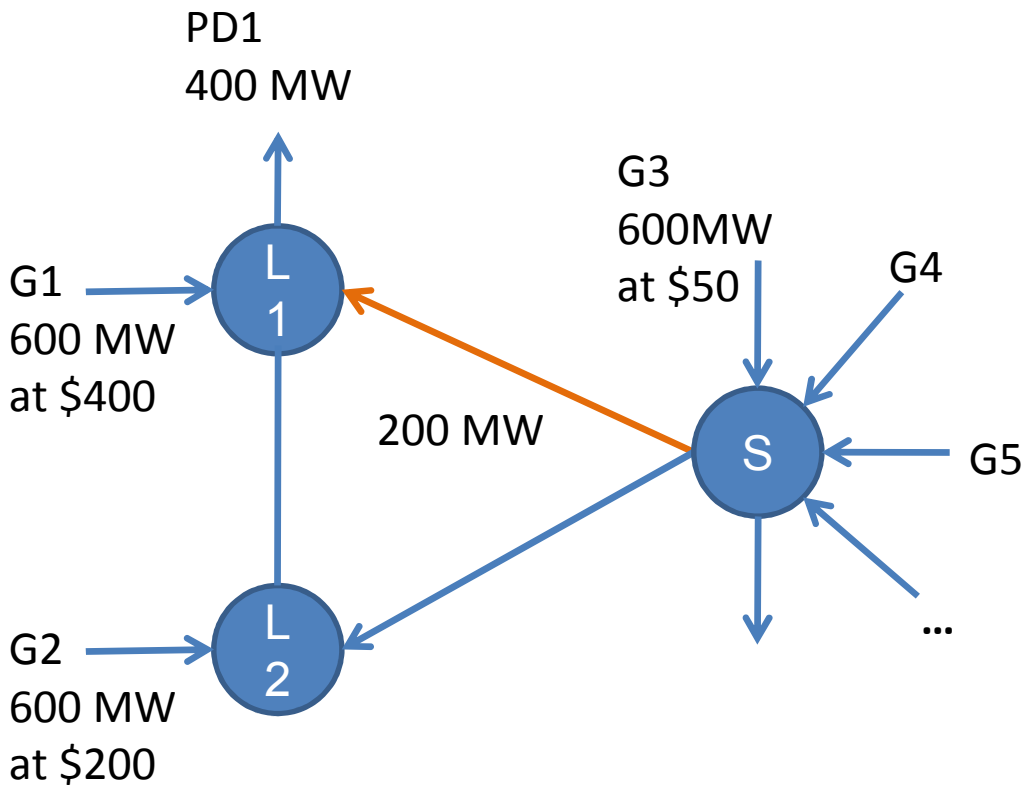
3 Bus Example



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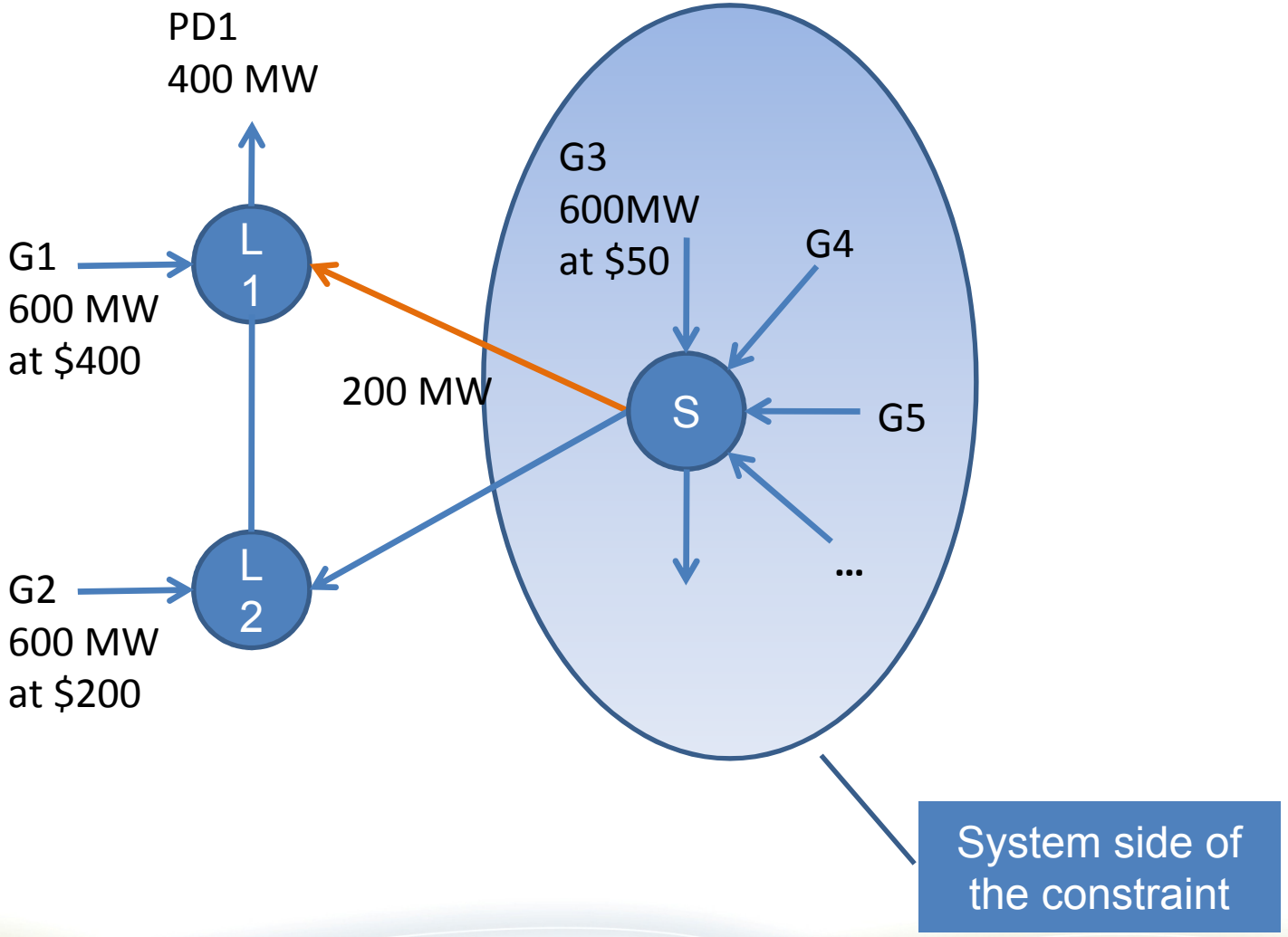

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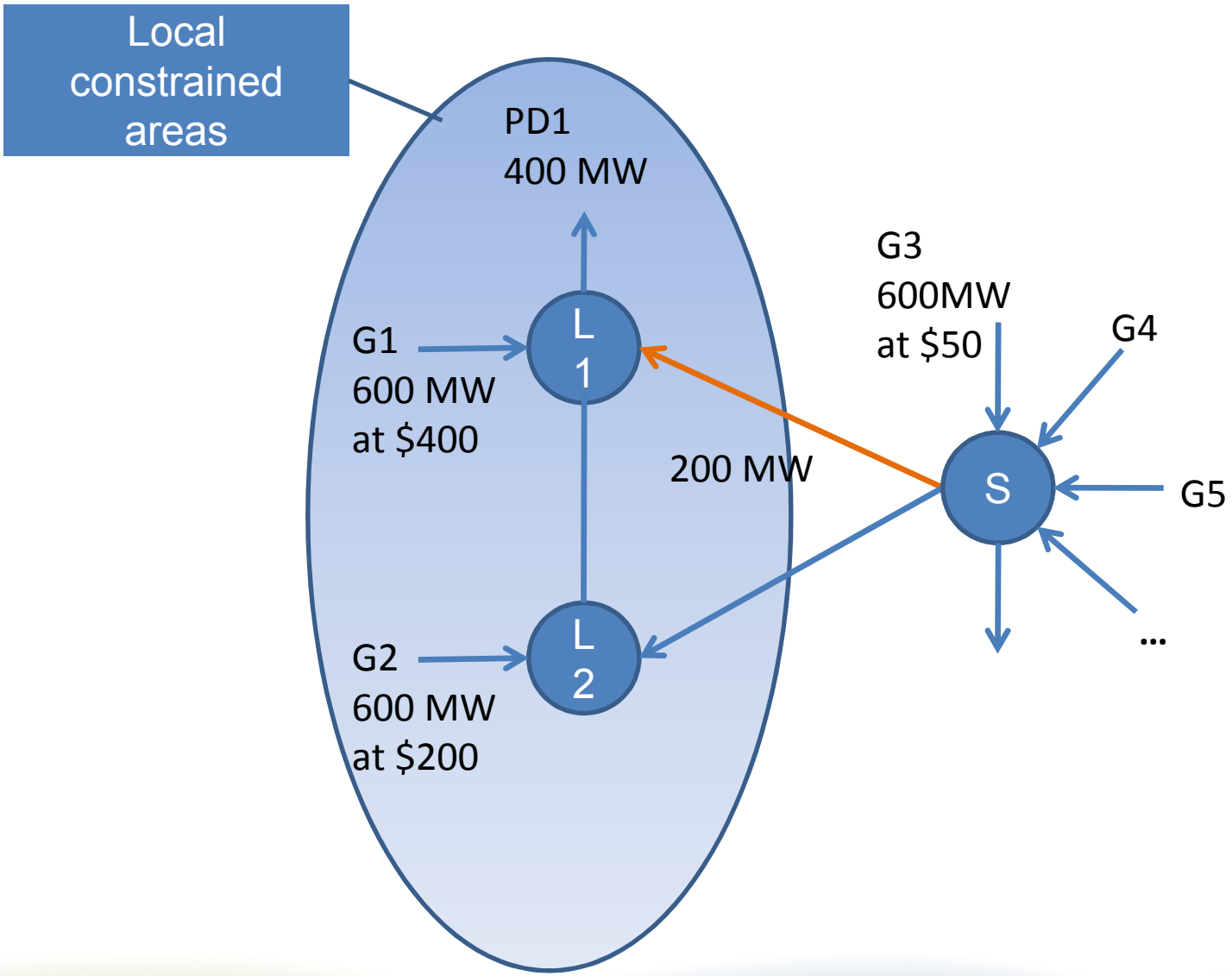

3 Bus Example - LMPM under current approach

Supply	CC run (MW)	AC run (MW)	Bid	CC LMP	AC LMP	DEB	LMPM	Mit. Bid
G1	0	0	$400	$50	$350	$50	N	$400
G2	0	200	$200	$50	$200	$80	Y	$80
G3	400	200	$50	$50	$50	$45	N	$50

Terminology:

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G2	0	200	$200	$50	$200	$80	Y	$80
G3	400	200	$50	$50	$50	$45	N	$50

Dispatched up in AC run

$200 X 2-$50= $350
1 extra MW of load at L1 will be served by dispatching G2 up by 2 MW and G1 down by 1 MW

Terminology:

CC run – Competitive constraints run

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LMP – Locational marginal price

DEB – Default energy

LMPM – Local market power mitigation

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G1	0	$350	$50	$0	$0	$300	$400	$50	Y	$50
G2	200	$200	$50	$0	$0	$150	$200	$80	Y	$40
G3	200	$50	$50	$0	$0	$0	$50	$45	N	$60

Terminology:

Sched. – Schedule

EC – Energy component

CC – Competitive constraint congestion Component

LC – Loss component

NC – Non-competitive constraint congestion component

UB – Unmitigated bid

NC > 0 = potential market power