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# Local Market Power Mitigation Under Convergence Bidding

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# Local Market Power Mitigation under Nodal Convergence Bidding

- How to modify LMPM in IFM w/virtual supply/demand bids?
- Is LMPM necessary in RUC under convergence bidding?
- Previous DMM documents/references:
  - *DMM Comments and Recommendations on Convergence Bidding Design Options*, presentation at MSC/ Stakeholder Meeting, August 10, 2007.
  - *Convergence Bidding: DMM Recommendations*, November 2007.
  - *Attachment A: Examples of Convergence Bidding and Local Market Power Mitigation* (November 2007).

# Local Market Power Mitigation under Nodal Convergence Bidding

- Mitigation of virtual supply bids under LMPM provisions appears to be infeasible/highly problematic
  - No cost basis for setting Default Energy Bids (DEBs) for virtual bids
  - Approach based on previously submitted bids or market prices would highly problematic:
    - Could be circumvented, and/or
    - Would defeat concept of virtual bidding (bidding based on system/market expectations, risk mitigation, etc.)
  
- How to treat virtual bids in pre-IFM LMPM mitigation
  - Include virtual supply/demand (like other ISOs)?
  - Physical demand vs. demand forecast only?
  - Other Options:
    - Exclude virtual supply, but include virtual demand?
    - Another option may be to run pre-IFM AC run with bids for physical resources mitigated above their dispatch level in CC run.

# Pre-IFM Local Market Power Mitigation Range of Options

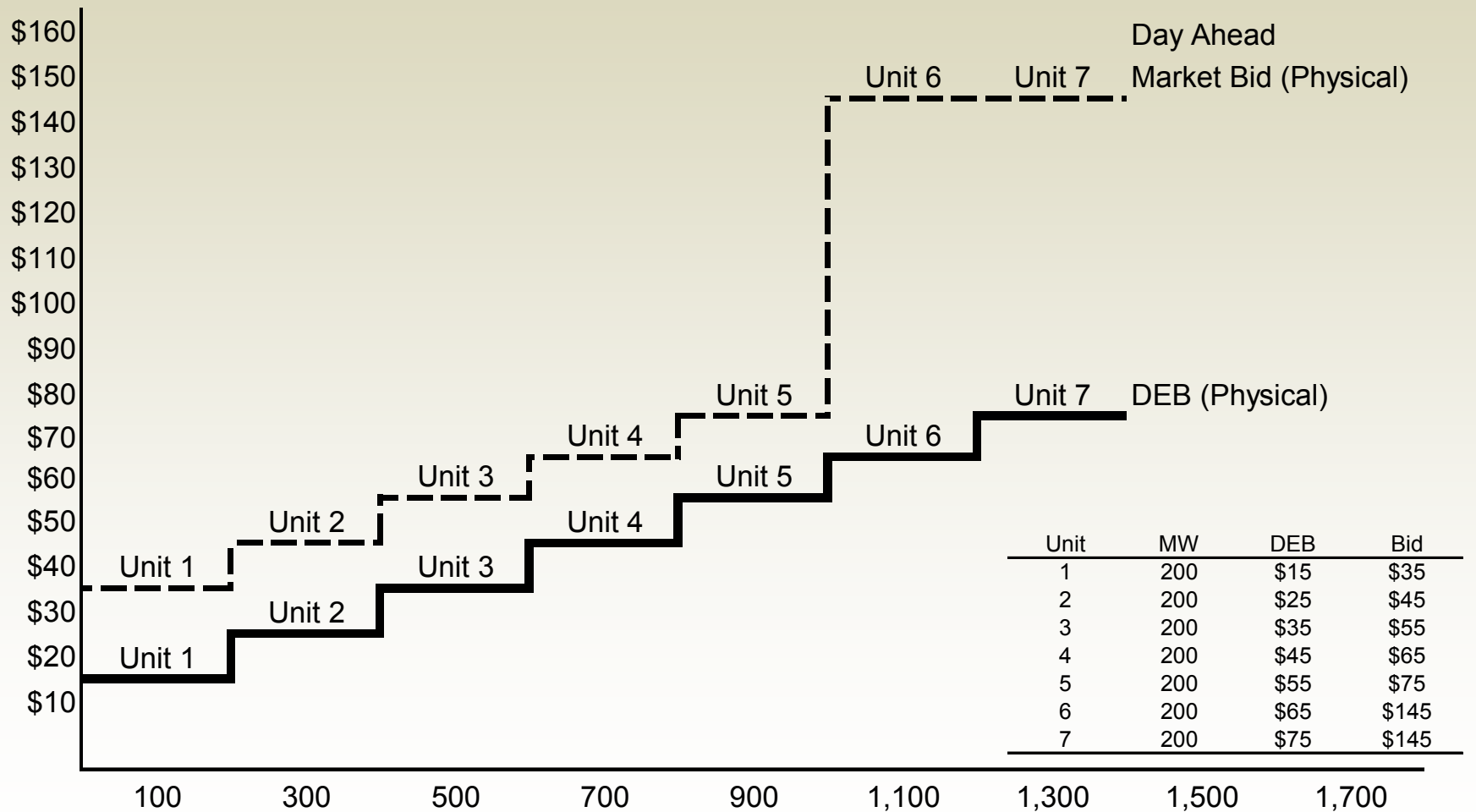
	Forecast Load	Physical Load Bids	Physical Supply Bids	Virtual Load Bids	Virtual Supply Bids
Current	✓		✓		
FERC Requirement (Release II)		✓	✓		
<b>Option 1 (Initial proposal)</b>		✓	✓	✓	✓
Option 2	✓		✓		
Option 3	✓		✓	✓	✓
<b>Option 4 (SCE recommendation)</b>		✓	✓	✓	
Option 5?		✓	✓ (subject to mitigation)	✓	✓

# Illustrative Examples of Nodal Virtual Bidding Issues and Concerns

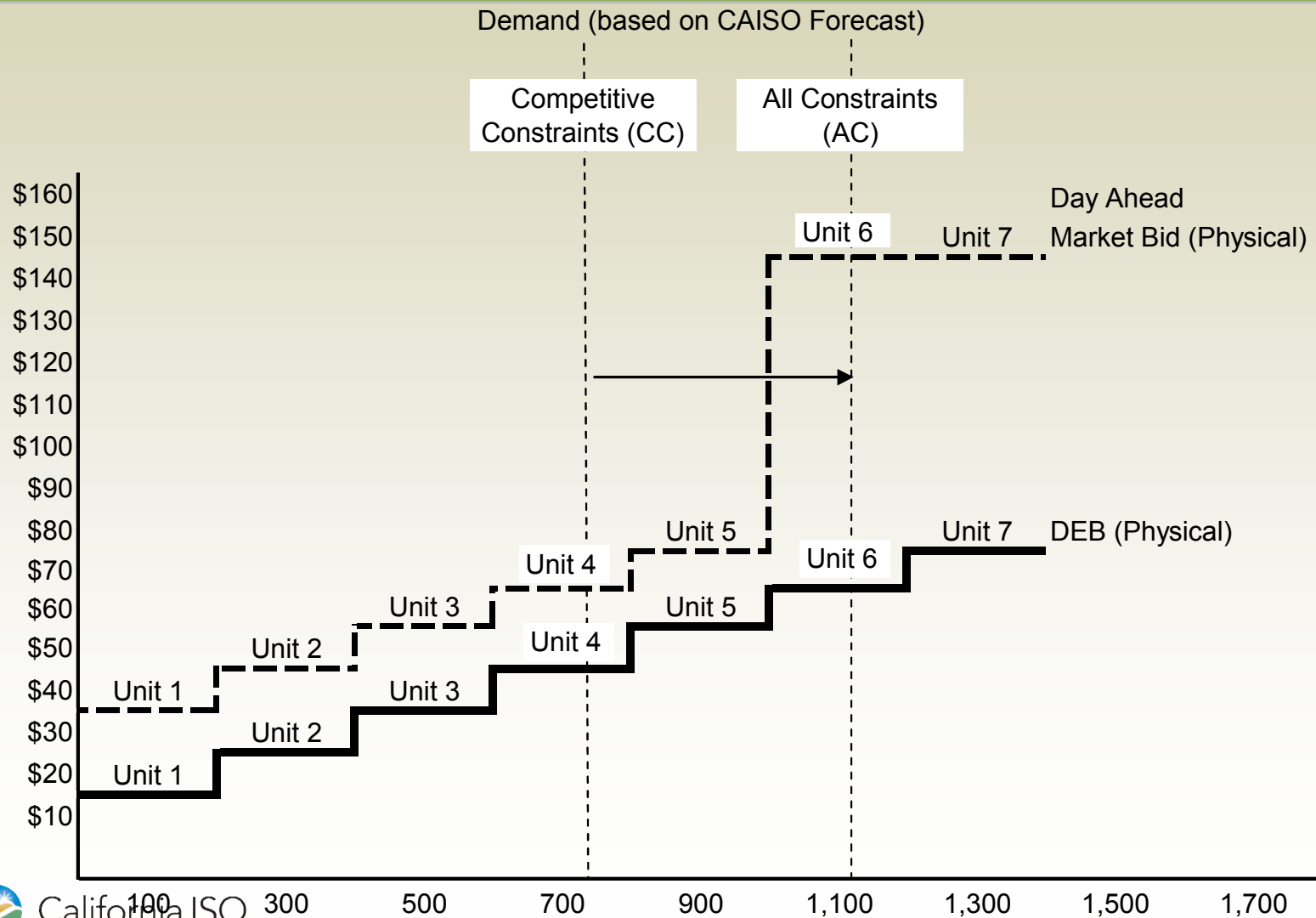
- Base Case
- Example 1: Virtual demand bidding by generators
- Example 2: Virtual supply bidding by generators/other participants
- Example 3: Real time uninstructed deviations

*Note: All examples previously presented DMM documents listed on p.2*

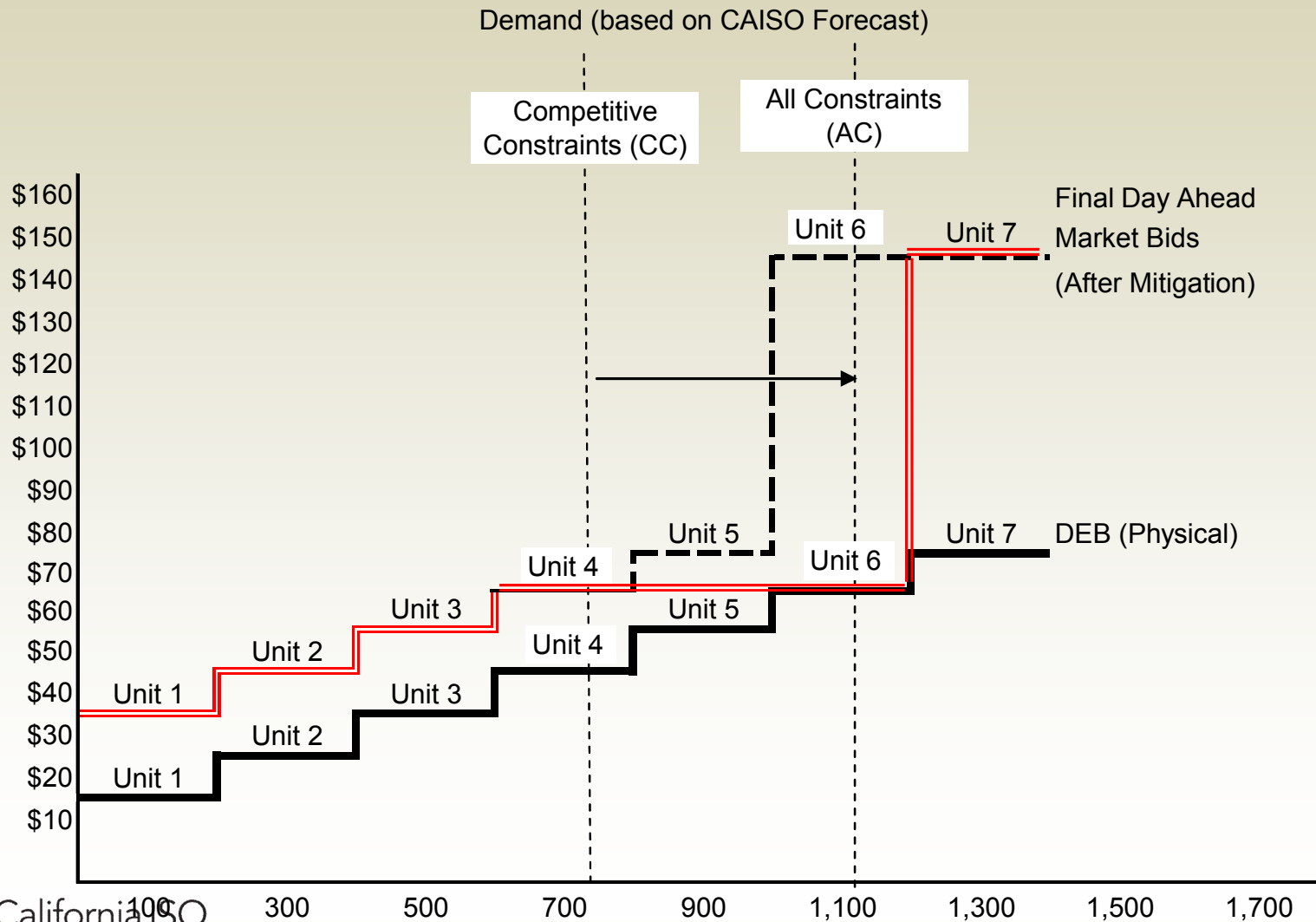
# Base Case (no virtual bids)



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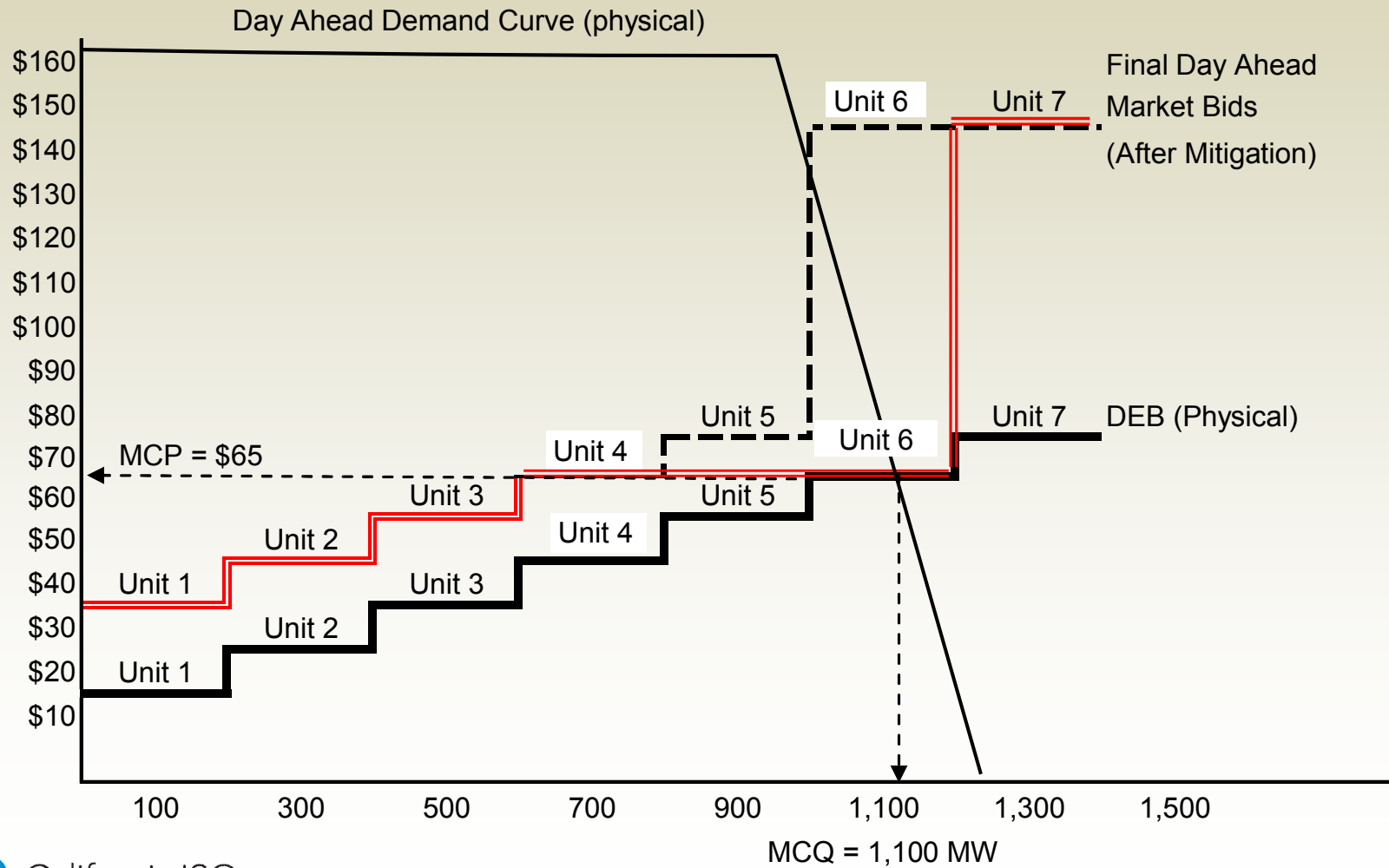


# Base Case (no virtual bids)





# Base Case (no virtual bids)



## Generator's Net Revenues Base Case (no virtual bids)

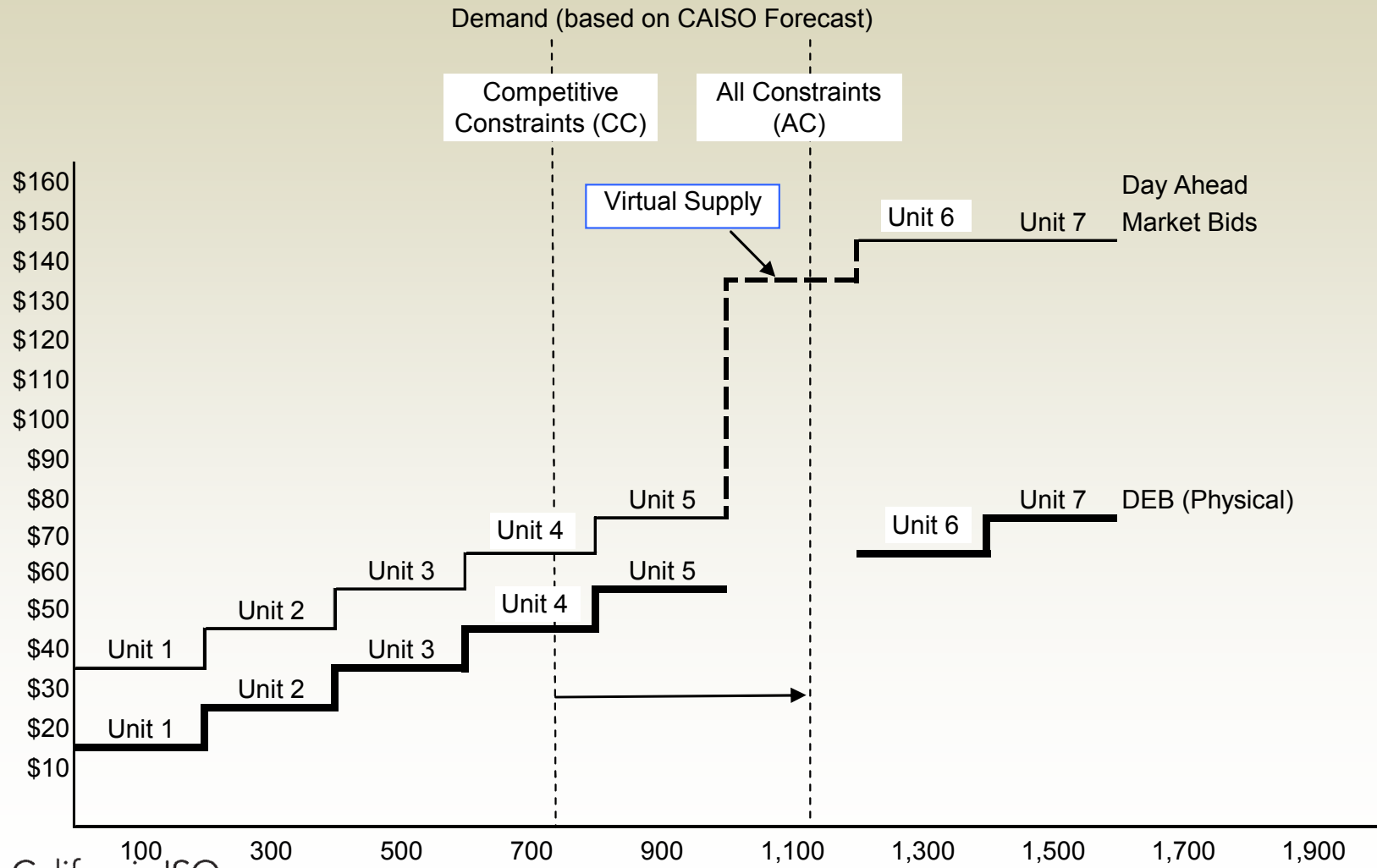
### Day Ahead Market

Unit	MW	DEB	MCP	Net
1	200	\$15	\$65	\$10,000
2	200	\$25	\$65	\$8,000
3	200	\$35	\$65	\$6,000
4	200	\$45	\$65	\$4,000
5	200	\$55	\$65	\$2,000
6	100	\$65	\$65	\$0
7	0	\$75	\$65	\$0
	1,100			\$30,000

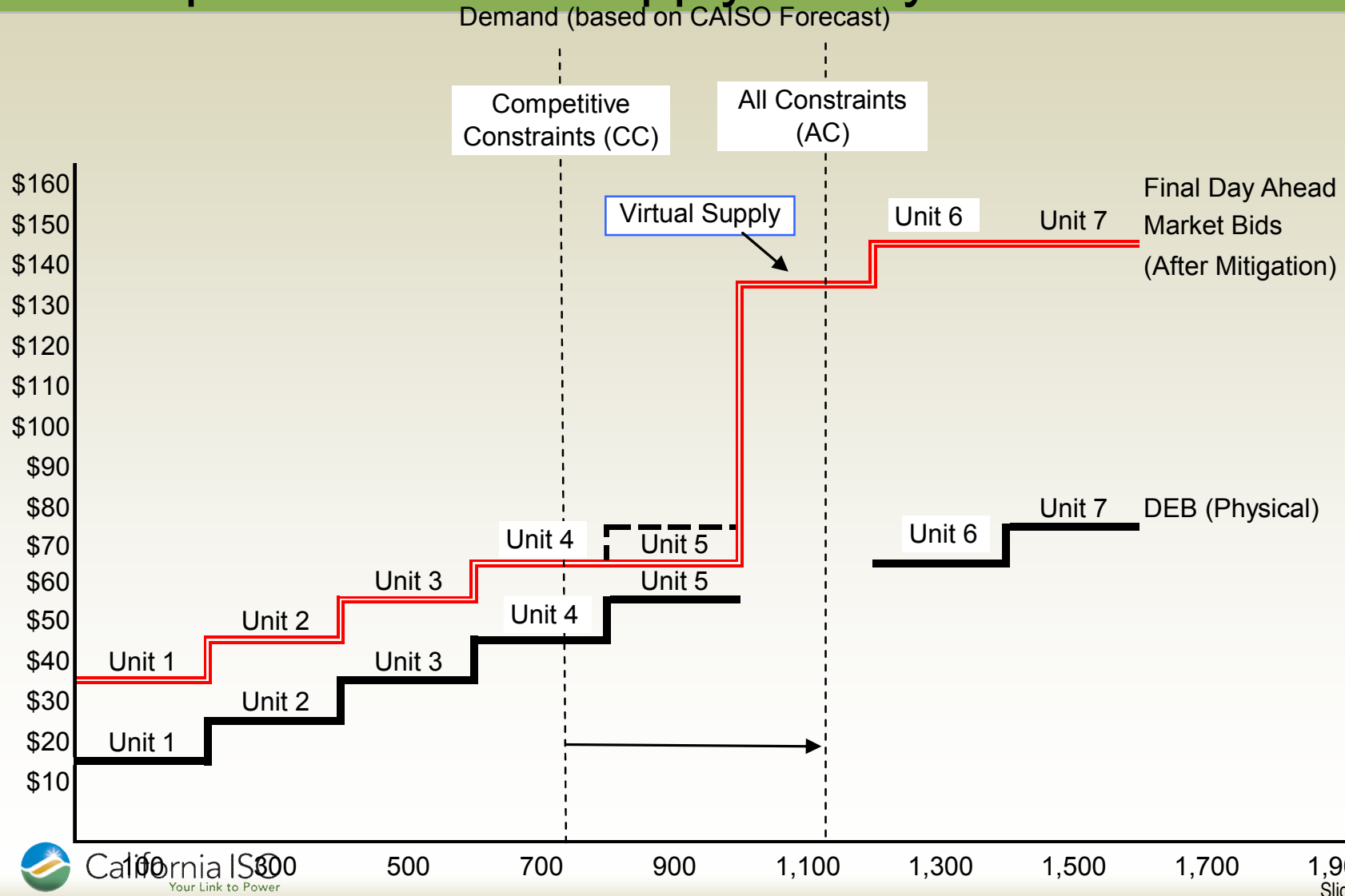
## Example 2: Virtual Supply Bids by Generators

- Virtual supply bids by generators (or other participants) might also be used to circumvent LMPM
- This problem may be mitigated by:
  - Lower priced virtual supply bids from traders
  - Excluding virtual supply bids in pre-IFM LMPM runs
  - Since this would also create divergence in IFM vs. RT price, it may also be mitigated by authority to limit/suspend VB by participants whose bidding contributes to an unwarranted divergence of IFM and RT prices (e.g. as under MISO tariff)

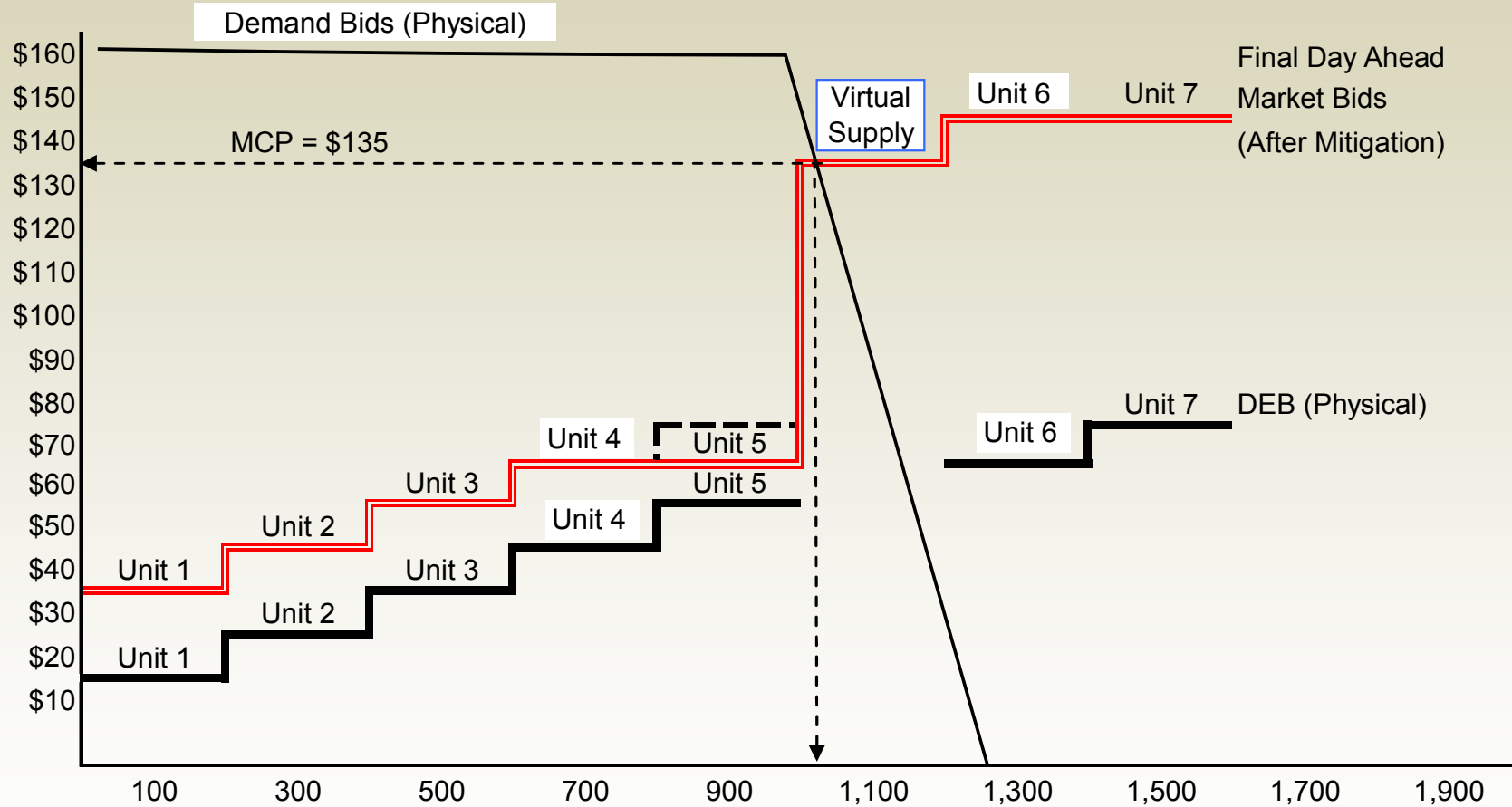
# Example 2a: Virtual Supply Bid by Generator



# Example 2b: Virtual Supply Bid by Generator



# Example 2c: Virtual Supply Bid by Generator



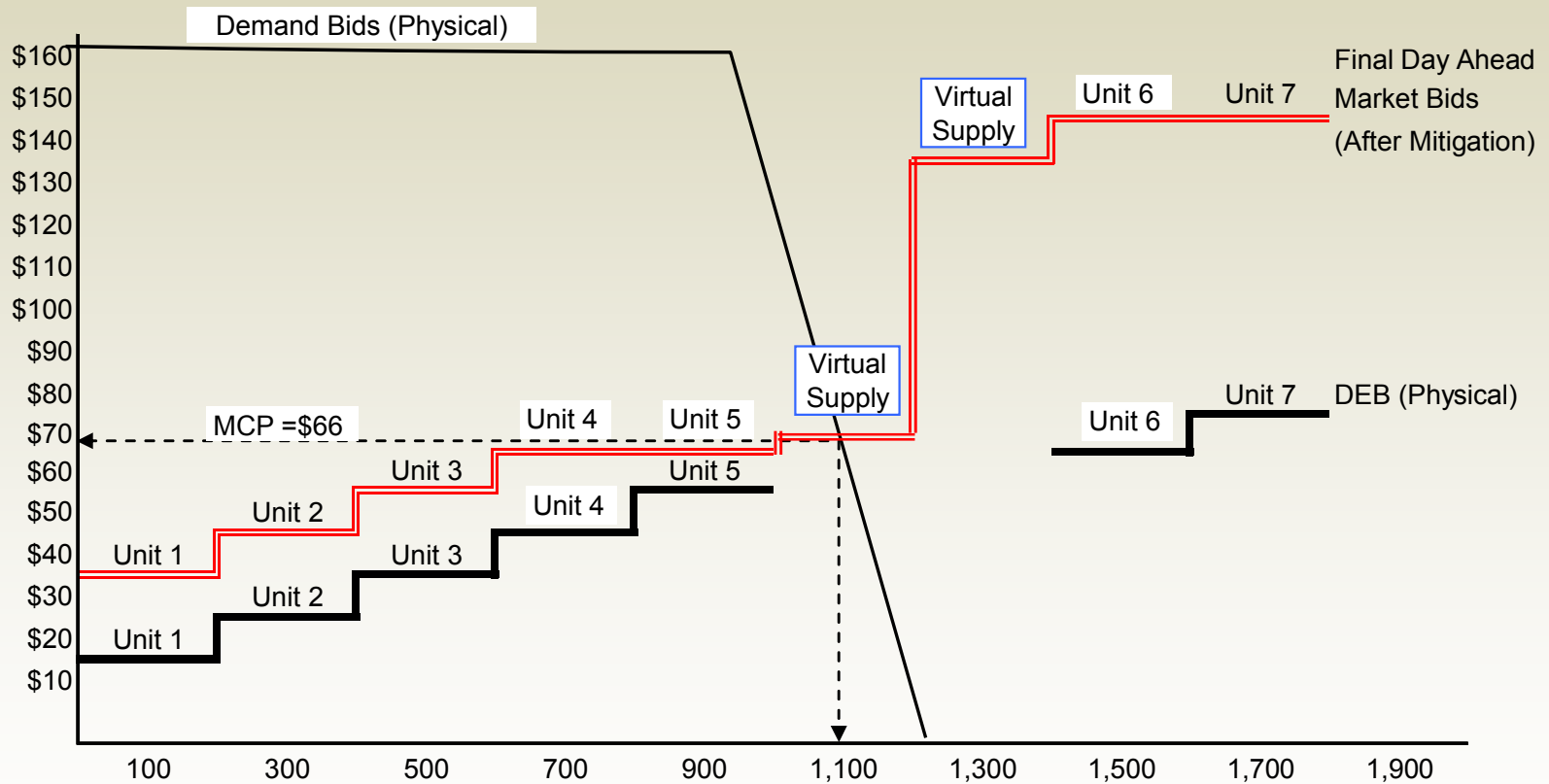
Note: Additional demand not met in IFM is met in RTM. In this example, assume this demand is met by the Unit 6 with DEB \$65, so that RTM MCP = \$65.

## Example 2a: Generator's Net Revenues With Virtual Supply Bid by Generator

### Day Ahead Market

Unit	MW	DEB	MCP	Net
1	200	\$15	\$135	\$24,000
2	200	\$25	\$135	\$22,000
3	200	\$35	\$135	\$20,000
4	200	\$45	\$135	\$18,000
5	200	\$55	\$135	\$16,000
6	0	\$65	\$135	\$0
7	0	\$75	\$135	\$0
	1,000			\$100,000
		DA	RT	
	MW	MCP	MCP	Net
Virtual Supply	25	\$135	\$65	\$1,750
<b>Total</b>				<b>\$101,750</b>

# Example 2b: With Lower Priced Virtual Supply Bid by Trader





## Example 2b: Generator's Net Revenues after Additional Virtual Supply Bid by Trader

### Day Ahead Market

Unit	MW	DEB	MCP	Net
1	200	\$15	\$66	\$10,200
2	200	\$25	\$66	\$8,200
3	200	\$35	\$66	\$6,200
4	200	\$45	\$66	\$4,200
5	200	\$55	\$66	\$2,200
6	0	\$65	\$66	\$0
7	0	\$75	\$66	\$0
1,000				\$31,000

	MW	DA MCP	RT MCP	Net
Virtual Supply	25	\$66	\$65	\$25

Total				\$31,025
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\* Generator's profits are just over base case of \$30,000 due to small increase in DA MCP from \$65 to \$66 in this example.

# Is LMPM in RUC Needed under Nodal Convergence Bidding?

- If virtual supply “crowds out” physical supply in IFM, need for increased reliance on RUC.
- Current mitigation under this scenario:
  - RA requirements set to cover full requirements in local
  - RA unit have must-offer obligation with \$0 RUC bid
  - Startup/min loads bids of all units subject to mitigation
- Potential additional mitigation in RUC
  - Add CC and AC run prior to RUC → units dispatched up in AC RUC run subject to bid mitigation (per PJM)
  - May be needed especially if changes in start-up and minimum load bidding being considered are adopted.
  - May need provide for mitigation of RUC bids for non-RA units with local market power