



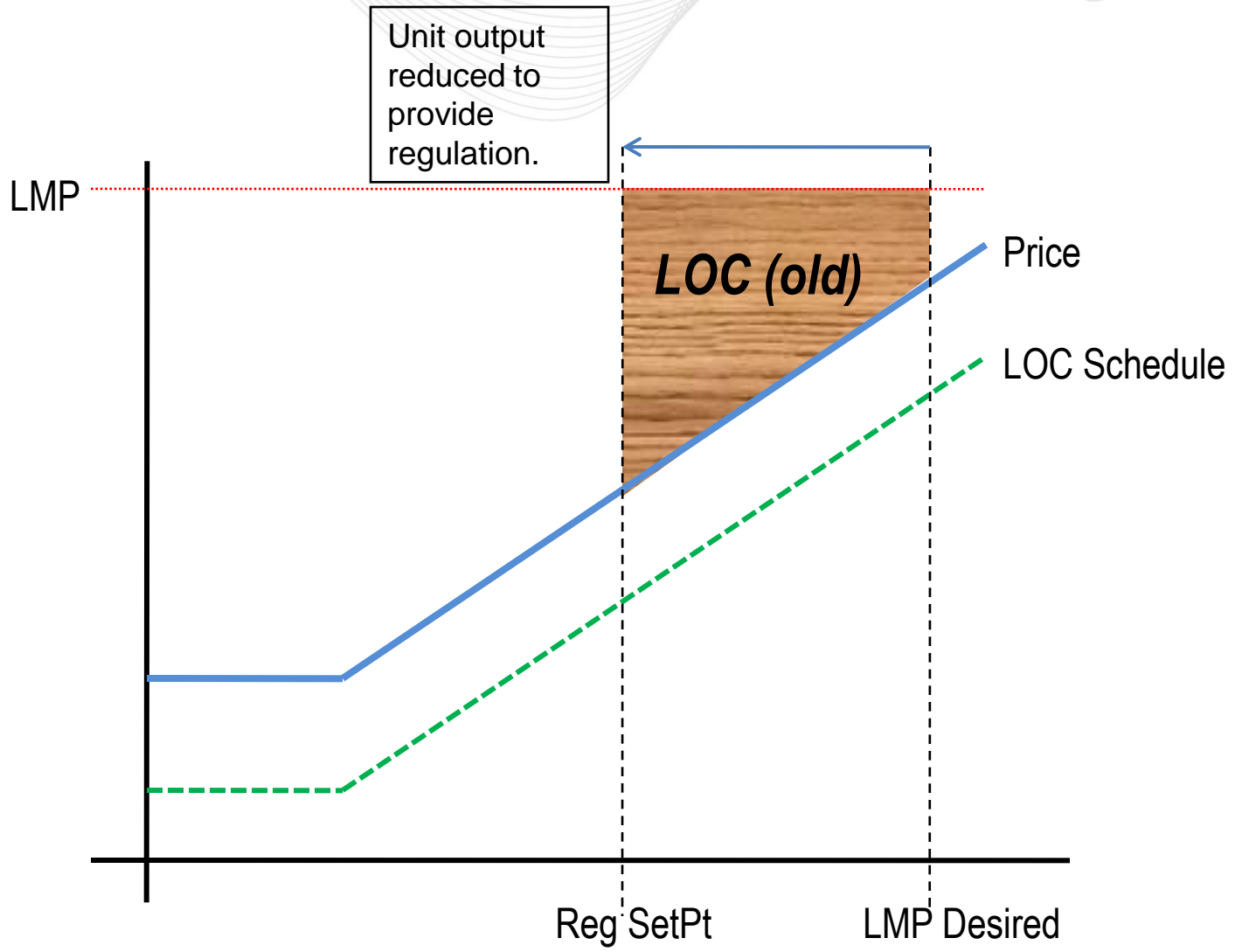
# Regulation Market Clearing Prices

20100322 SPWG – ITEM 4

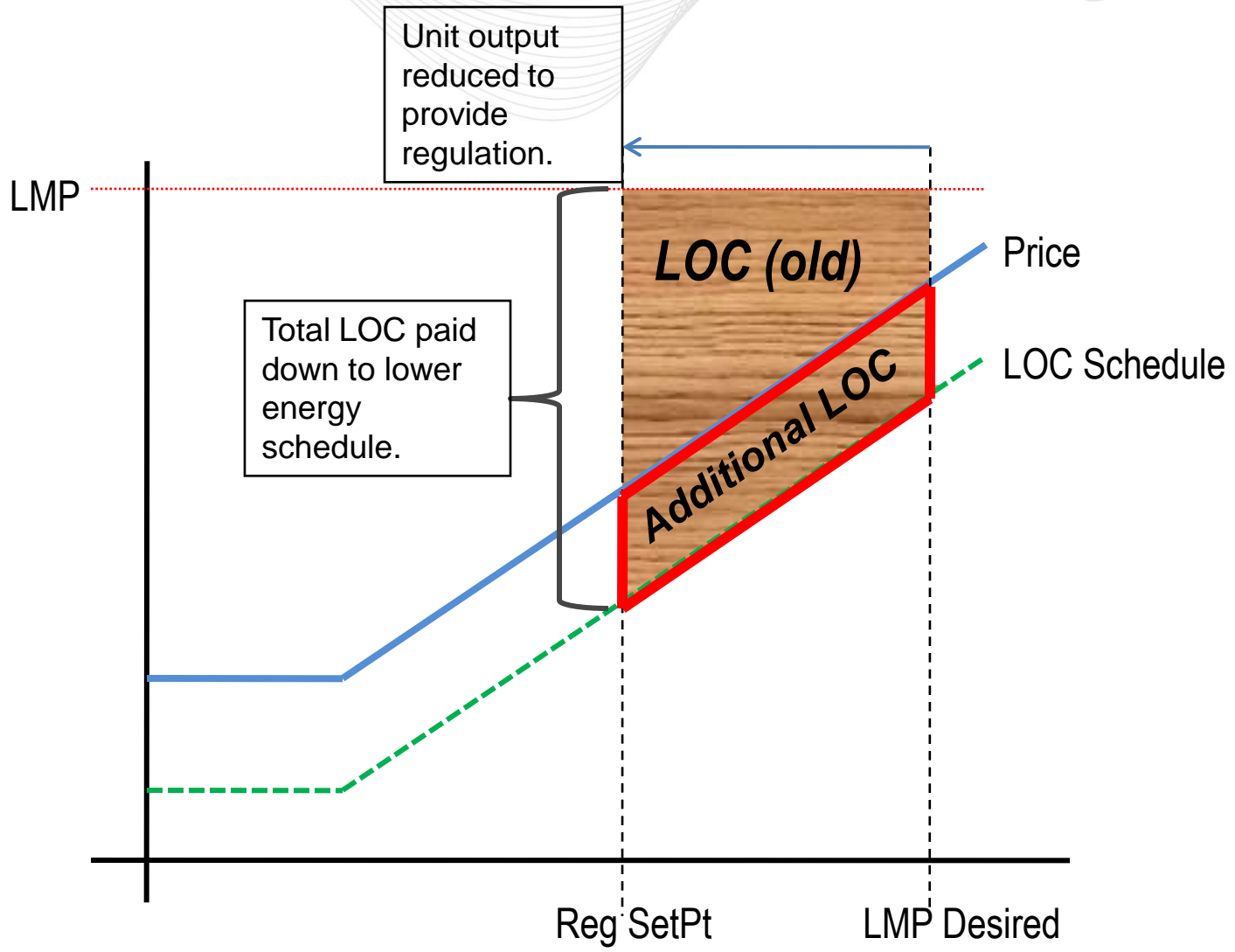
- 5-minute MCPs for AS will be calculated as part of a joint optimization with energy and regulation
- Similar to LMP, AS MCPs will be calculated as the cost to serve the next MW of demand for each reserve product
- Although regulation MWs will not be jointly optimized to the extent that reserves are, the 5-minute RMCPs will be calculated simultaneously with energy and reserves
- PJM sees the need to make changes to the existing provisions that govern the RMCP calculation

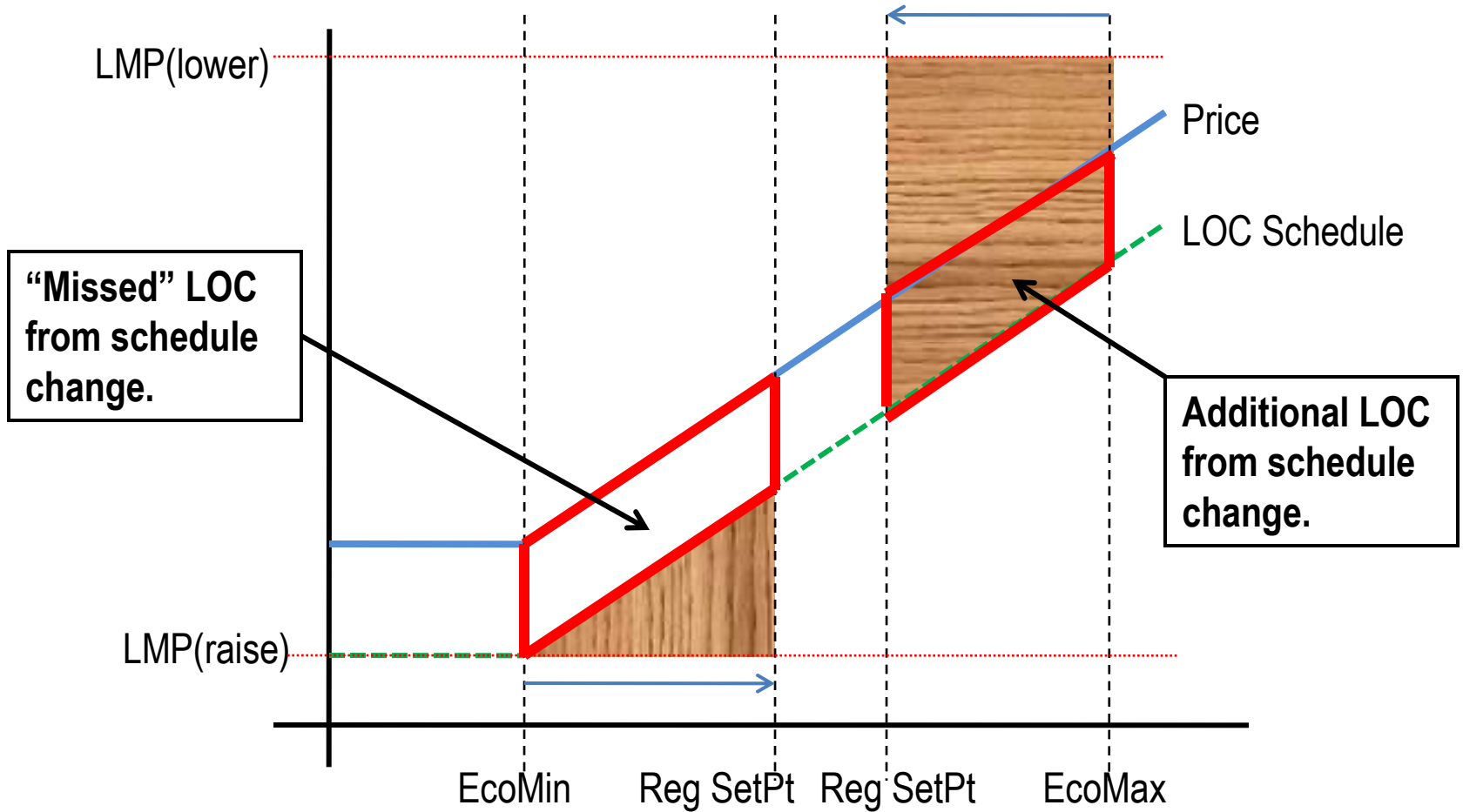
- As part of the stakeholder compromise for implementing the TPS test in the regulation market, a change was made to alter the energy schedule that regulation LOC would be calculated in reference to
- Prior to this change regulation LOC was always calculated in reference to the energy schedule the generator was committed on
- The TPS test compromise changed this schedule to the lesser of the most expensive cost or price-based schedule (LOC schedule)

# Regulation Opportunity Cost Schedule



# Intended Result of Schedule Change

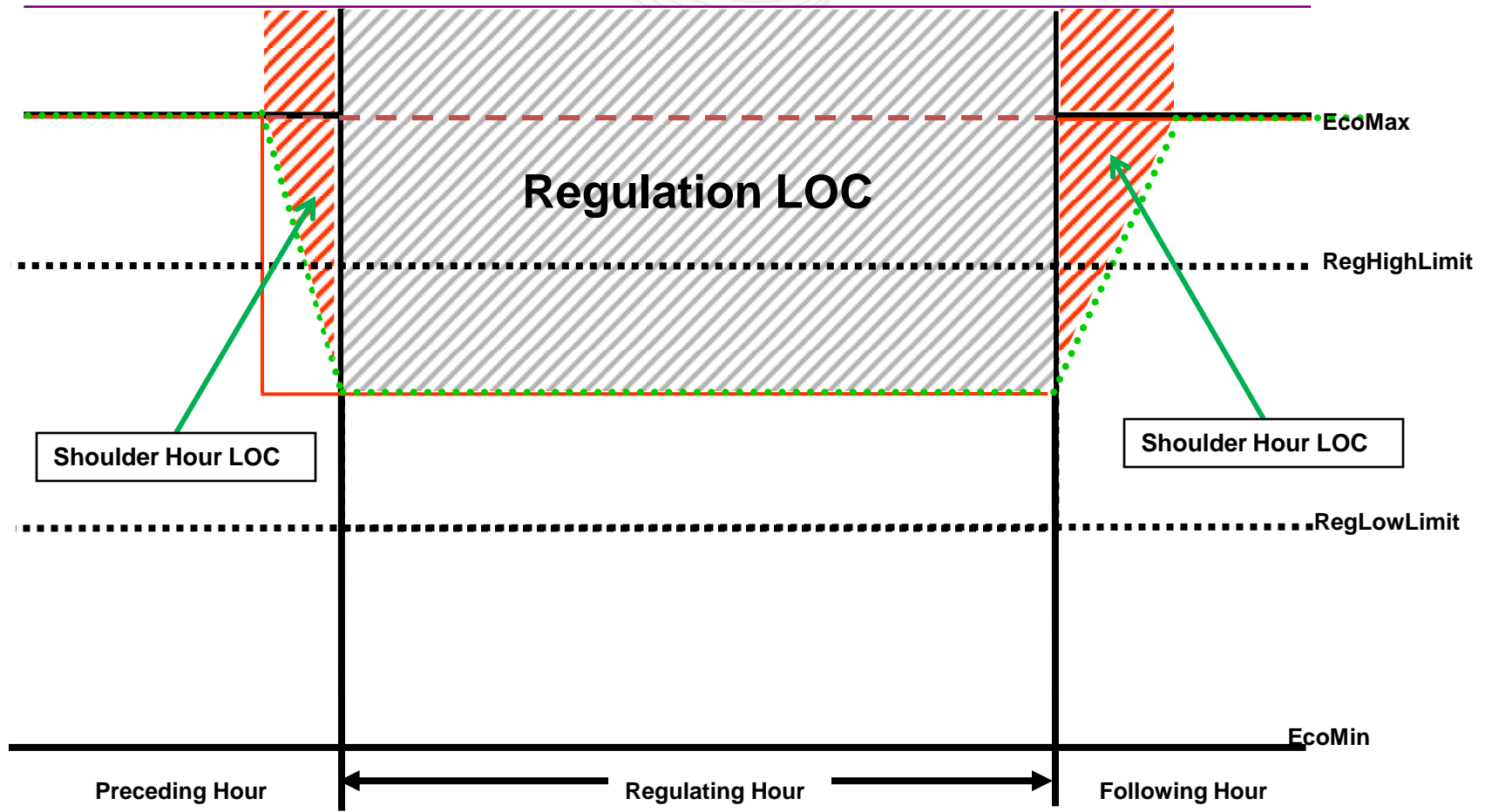




- The change in opportunity cost schedule only has the potential to increase regulation LOC when a unit is being reduced from EcoMax to provide regulation
- If a resource is raised from EcoMin for regulation, it actually reduces the amount of LOC calculated and therefore the clearing price if such unit is marginal
- Units whose schedule was changed for the LOC calculation only set the RMCP about 5% of the time
- It is unclear whether this change is currently functioning as intended given that under some conditions it may reduce

- Continuing this practice in the new mechanism will break the link between real-time dispatch and pricing and result in regulation prices that are inconsistent with energy and reserve dispatch and prices
- Today's hour ahead prices are based on the best forecasted LMPs PJM can derive but are not directly linked to real-time operation or RTLMPs
- Forecasted clearing prices do not carry the same operational incentives as real-time prices and therefore may be constructed administratively. This is not acceptable for real-time prices.
- In real-time, it is imperative that energy, regulation and reserve prices are calculated using the same information to ensure consistency and that the appropriate incentives remain in tact

- In May 2009 PJM implemented a “shoulder hour” opportunity cost component into the RMCP calculation and regulation market settlement
- The intent was to ensure regulation resources were being compensated for uneconomic operation in shoulder hours in order to prepare and recover from regulation assignments



- PJM is proposing that the shoulder hour LOC calculation not be included in the 5-minute RMCP calculation but remain a part of the hour ahead regulation commitment and market settlement
- The shoulder hour calculation won't apply to the real-time prices because they will be calculated based on the cost of the resources are currently regulating and will not incorporate regulation commitment changes from hour to hour
- For 2009, the shoulder hour opportunity cost calculation only accounted for about \$500K of the entire regulation market (\$250M)

- PJM believes this LOC calculation should still remain part of the commitment and settlement for regulation
- The value will be calculated and used by the ASO during the hour ahead commitment
- Real-time prices will not include it
- After-the-fact settlement will include this as a portion of the resource's cost to provide regulation and compensate for it via opportunity cost credits as in today's mechanism