Regulation Clearing Process Enhancement

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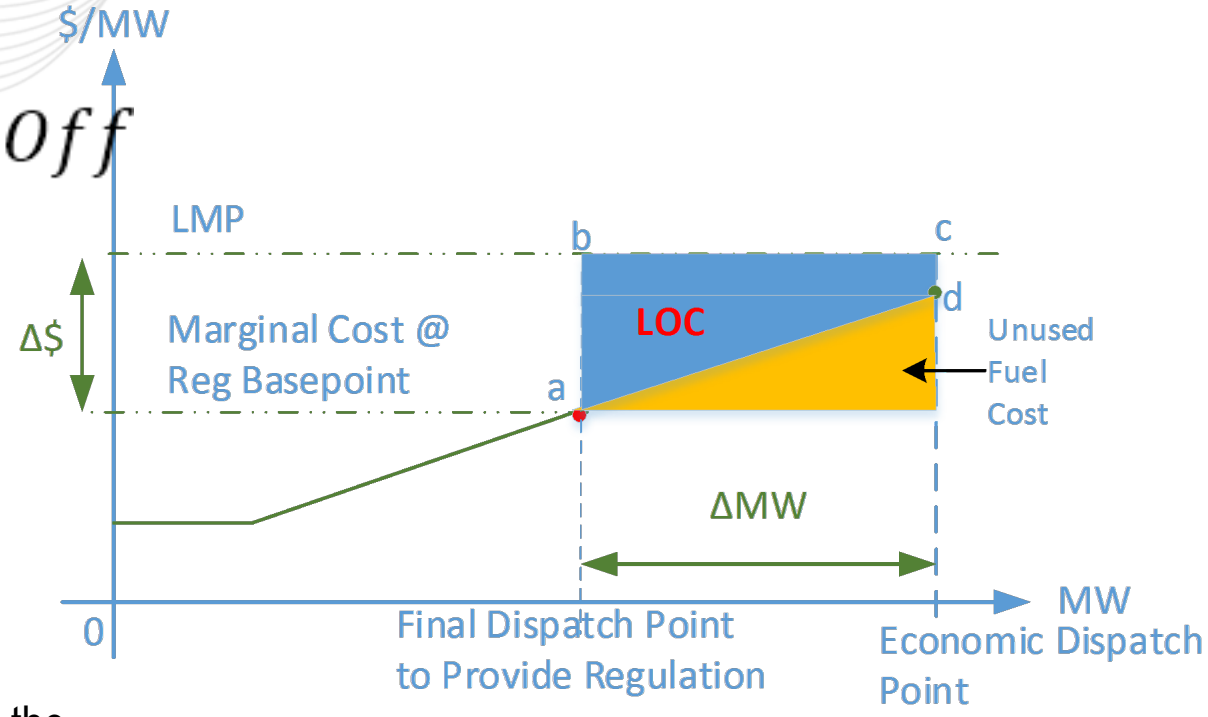
Regulation Opportunity Cost or Uplift

RegLOC or Uplift – The difference in net compensation from the Energy Market between what a resource receives when providing Regulation service and what it would have received for providing energy only.

- Calculated only for resources providing energy along with regulation service
- Calculated only for pool scheduled regulation resources
- Is $0 for DSR, and self-schedule and Non-Energy Regulation resources
- Can only be positive, else zero
- Calculated only within Eco limit range
  - ➢ Economic Minimum to Economic Maximum range
- RegLOC or Uplift is a component of the Regulation Market Clearing Price

Regulation LOC or Uplift Formula

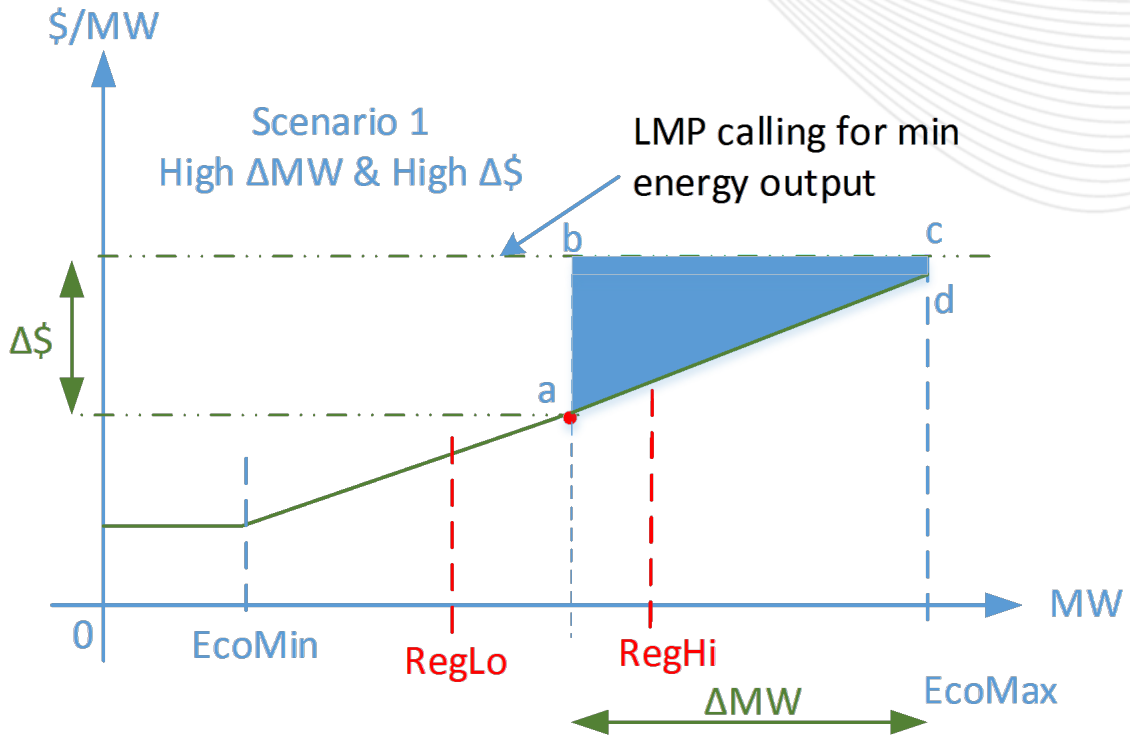
$$LOC\ or\ Uplift\ (\$) = |LMP\ -MC| * Gen\ Off$$

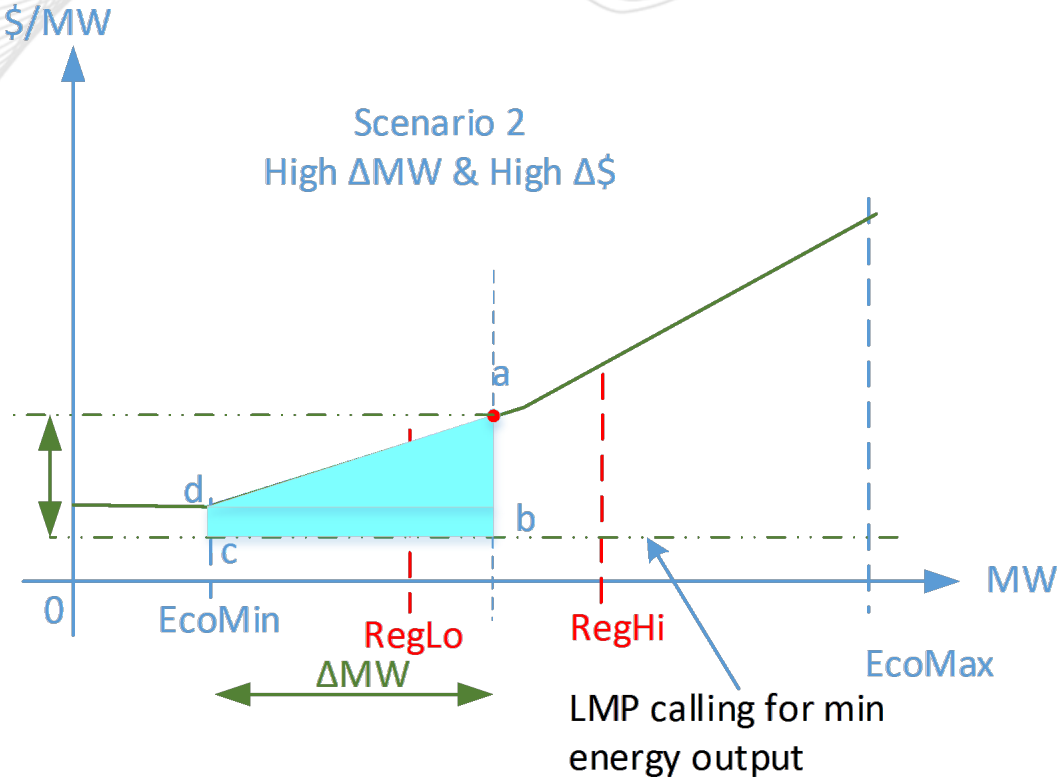


Where:

- LMP – is the LMP at the unit pnode;
- MC – is the unit cost at the regulation basepoint;
- Gen Off – is the MW deviation from the Economic Dispatch and the Regulation basepoint
- RegMW – Unit's Reg MW

Large Separation Between Eco-Range and Reg-Range





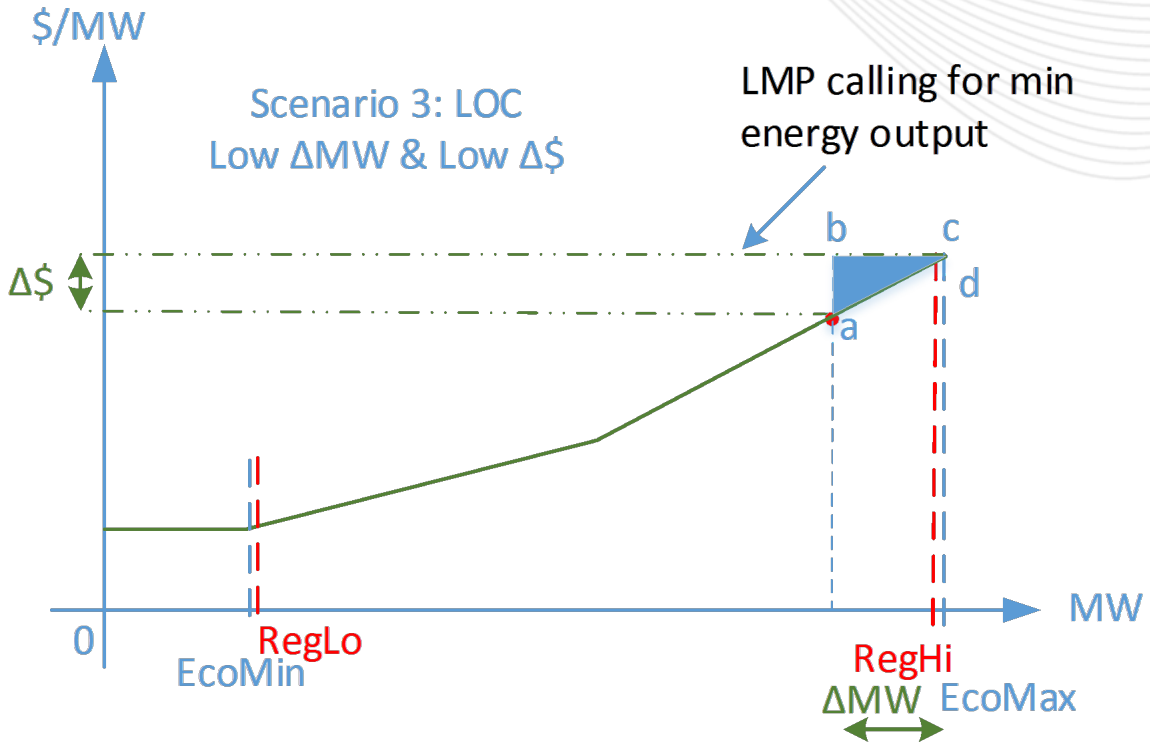
Reg Basepoint = RegHi - RegMW

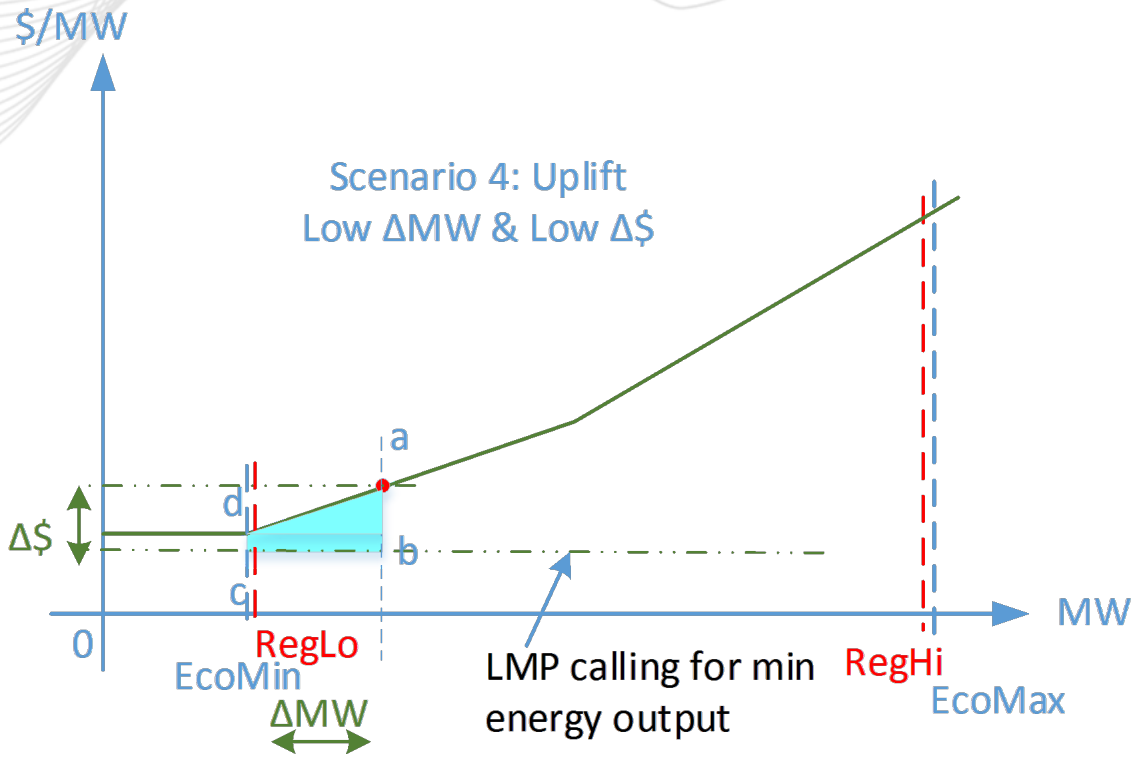
Unit lowered uneconomically from point ‘d’ to point ‘a’ to provide regulation service

Reg Basepoint = RegLo + RegMW

Unit raised uneconomically from point ‘d’ to point ‘a’ to provide regulation service

Small or No Separation Between Eco-Range and Reg-Range





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Unit lowered uneconomically from point ‘d’ to point ‘a’ to provide regulation service

Reg Basepoint = RegLo + RegMW

Unit raised uneconomically from point ‘d’ to point ‘a’ to provide regulation service

Discussion & Takeaways

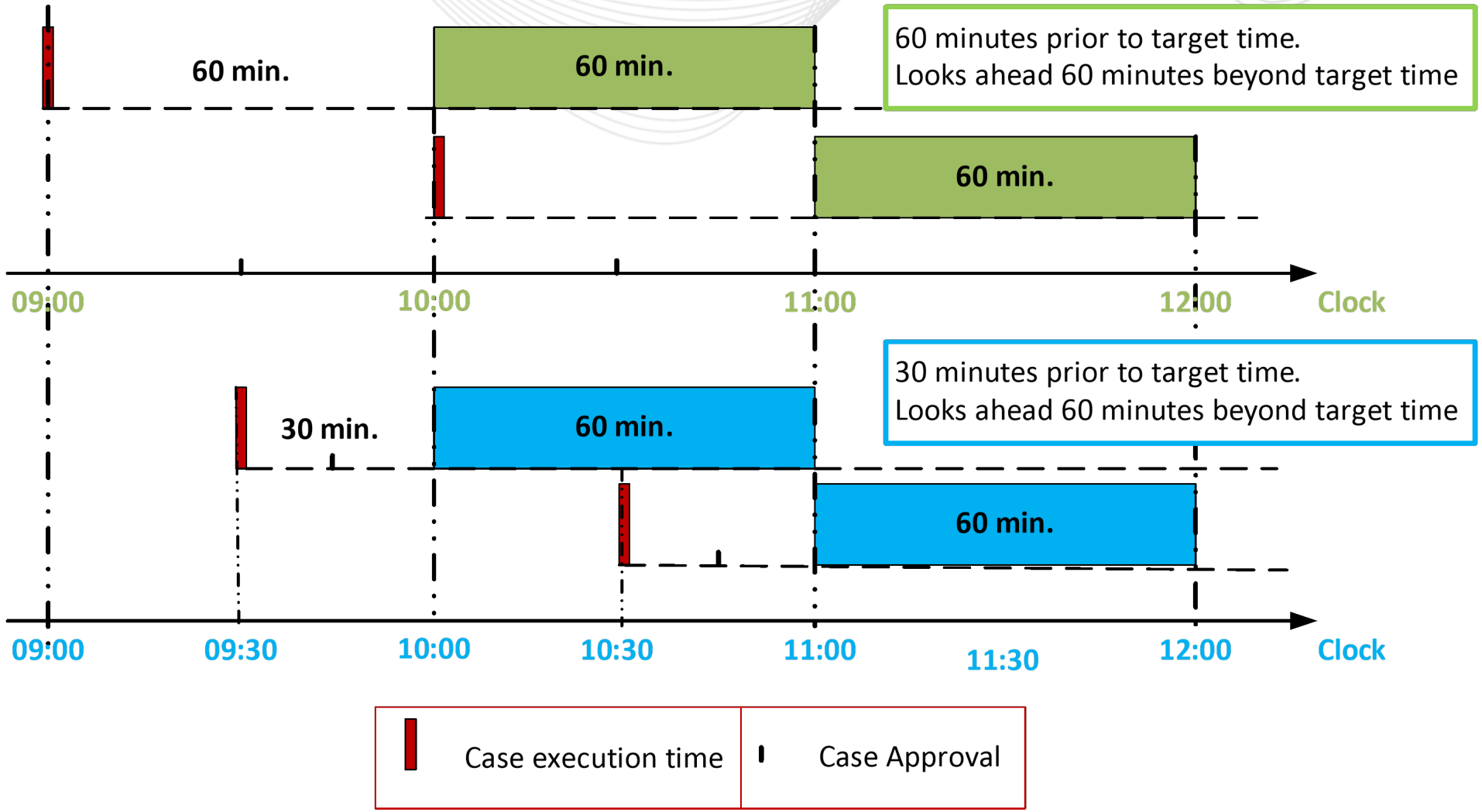
- Resources with large separation between Eco-range and Reg-range incur higher LOC or uplift - reduced clearing opportunity
- Resources with small or no separation between Eco-range and Reg-range incur low or no LOC - increased chance of clearing

- **Is there operational limitations to removing (or minimizing) Reg-range?**

Proposed Change to Regulation Clearing Time

- Currently Regulation clears once every hour, one hour prior to target time and for one hour duration
- The resources cleared to provide regulation may end up not being the least cost set due to change in the system condition
  - Increase in LOC or Uplift in real-time pricing compare to clearing
- Propose clearing closer to real-time

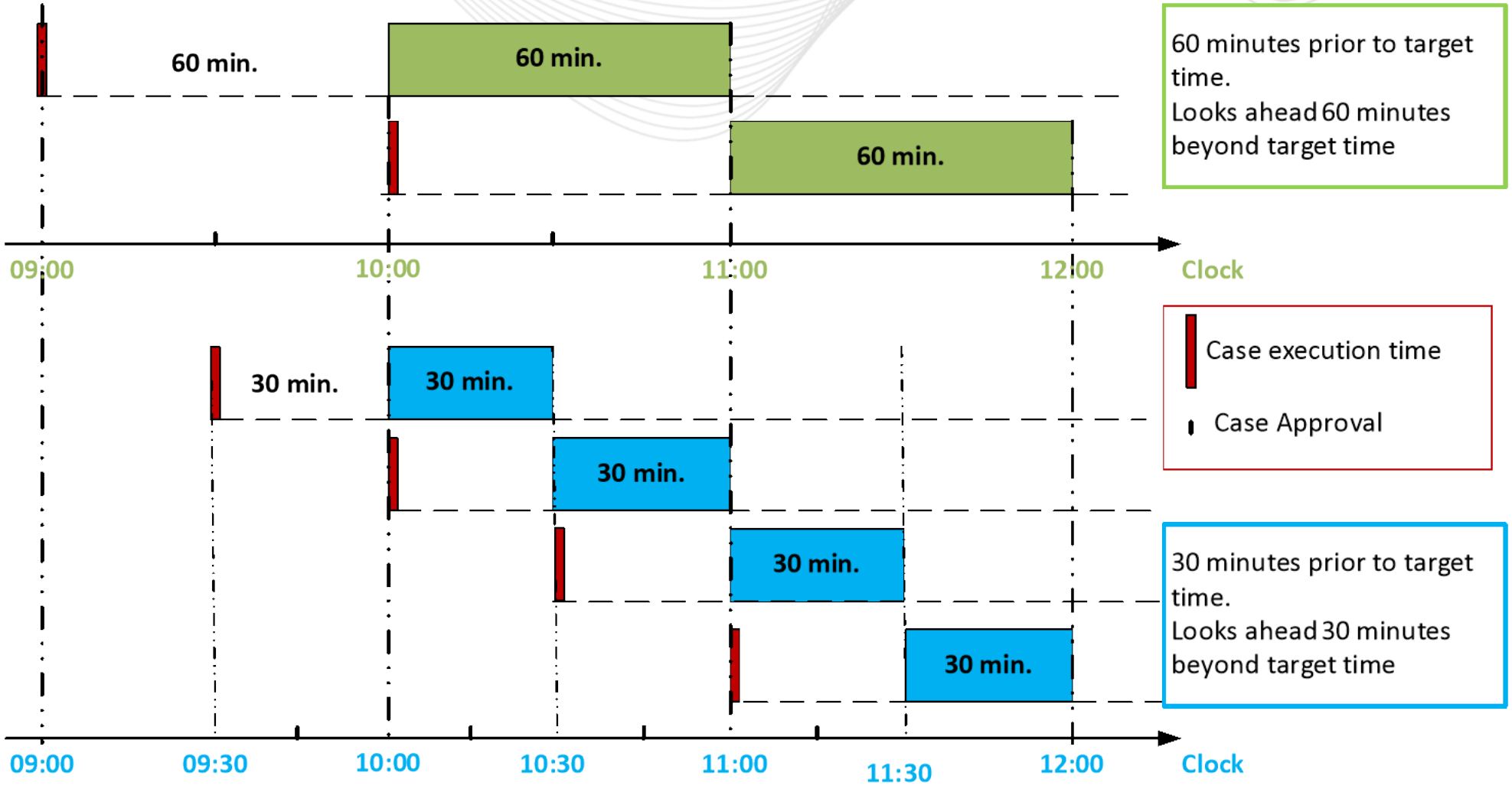
Option 1: Case Runs 30 min. Before & Commitment for 60 min.



Proposed Change to Regulation Clearing and Commitment Time

- Currently Regulation clears once every hour, one hour prior to target time and for one hour duration
  - The resources cleared to provide regulation may end up not being the least cost set due to change in the system condition
    - ❖ Increase in LOC or Uplift in real-time pricing compare to clearing
    - ❖ Propose clearing closer to real-time
- Regulation Signal changing from two to one and with removal of neutrality
  - Possible increase in the dropout of the limited energy resource and interfering with Dispatcher's operation
    - ❖ Propose shortening commitment duration

Option 2:Case Runs 30 min. Before & Commitment for 30 min.



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