

ENABLING SYSTEM FLEXIBILITY

Meeting #5

October 23, 2017

Agenda

- Engagement recap
- Proposed interim solution
- Analysis - Using OR for flexibility
- Responses to feedback
- Next steps

Engagement Recap

Engagement Recap

- Objective: to determine potential solutions that can enable and achieve flexibility to meet evolving system needs
- Discussion from last meeting
 - Pricing outcomes and flexibility
 - Near term solutions acting as bridging mechanisms to Market Renewal elements enabling flexibility
 - Proposed use of 30-minute operating reserve (OR) for flexibility as an interim measure

Proposed Interim Solution Using OR

Uses for Operating Reserve

NPCC definition¹ - “*Operating capacity in excess of that required for actual load is commonly referred to as reserve*”

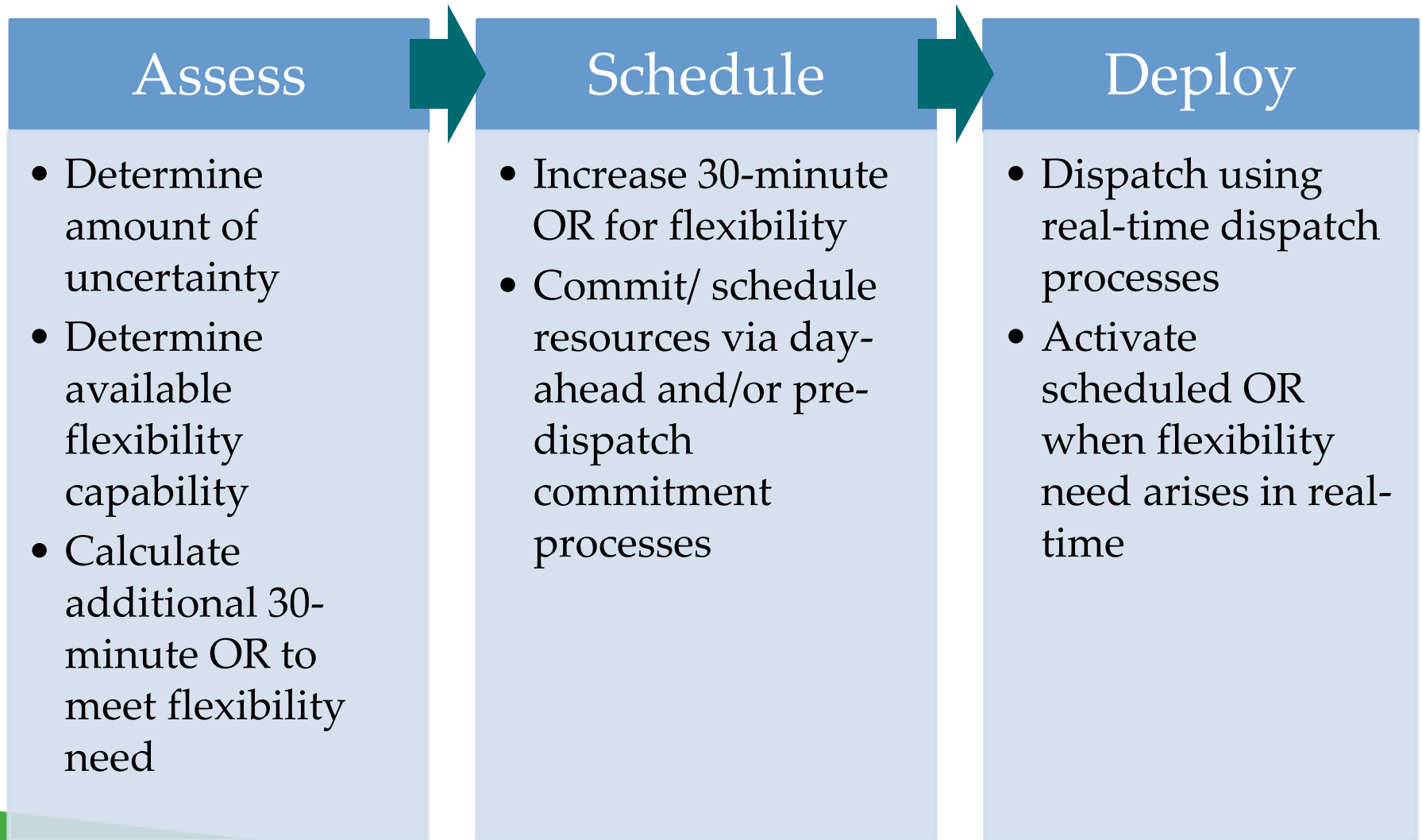
Purpose	NPCC Requirement and Usage
<u>Contingency</u> – unexpected loss of system elements	<ul style="list-style-type: none">• 10-minute reserve to cover largest contingency• 30-minute reserve to cover 1/2 of 2nd contingency• Not frequently activated
<u>Regulation</u> – second to second balancing and frequency control within dispatch interval	<ul style="list-style-type: none">• Sufficient amounts to meet NERC Control Performance Standards (CPS)• Automatic within dispatch process
<u>Flexibility</u> – variability and uncertainty in future dispatch intervals	<ul style="list-style-type: none">• No prescribed standard• Potentially deployed regularly• Used by other ISOs in various forms (e.g. Ramp Capability Product, 30-minute reserve)

¹ Northeast Power Coordinating Council (NPCC)
Regional Reliability Reference Directory #5

Rationale for Proposed Solution

- Consistent with Market Renewal Principles of
 - Efficiency: Use/enhance current market processes for economic assessment
 - Transparency: Send early signals to market participants indicating system need and the value of flexibility
 - Competition: Enable market participants to offer more capability from existing resources
- Reduce the need for manual intervention

High-Level Concept



Can Contingency or Regulation Reserves Be Used For Flexibility?

- Flexibility need occurs more frequently than contingencies (i.e. forced outages)
 - Therefore, not appropriate to use current contingency reserves for flexibility
- In contrast, flexibility need occurs much less than the constant use of regulation for load balancing and frequency response
 - Regulation reserve is used for intra-interval fine tuning of supply/demand balancing on a second-by-second basis

Using Extra 30-Minute OR For Flexibility

Additional 30-minute OR more appropriate for flexibility

- VG forecast significantly improves in dispatch hour
- Response of resources within 1/2-hour is generally sufficient
- Proposed mechanism will only schedule additional OR when a need is identified

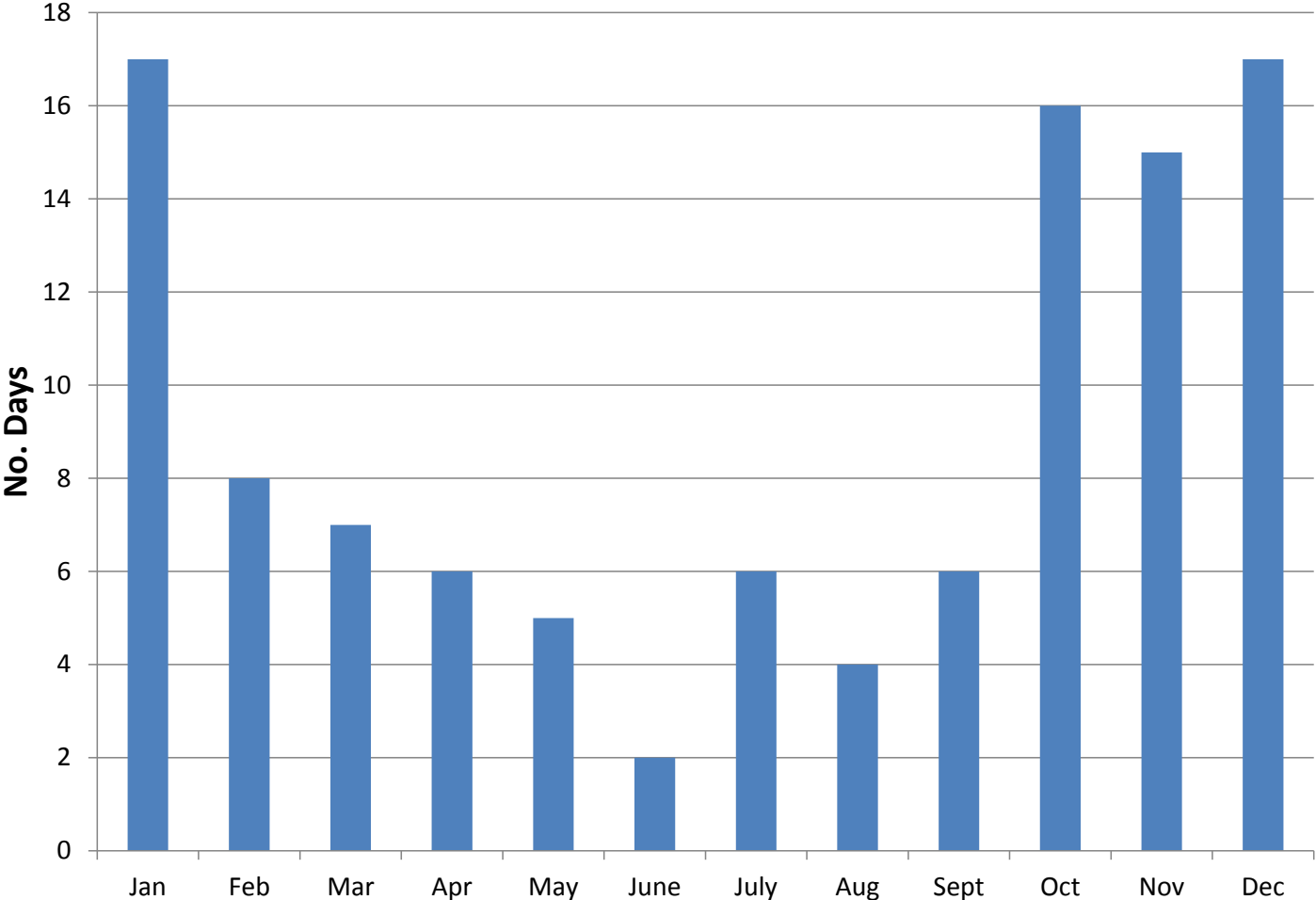
Analysis – Using OR for Flexibility

Using OR for Flexibility

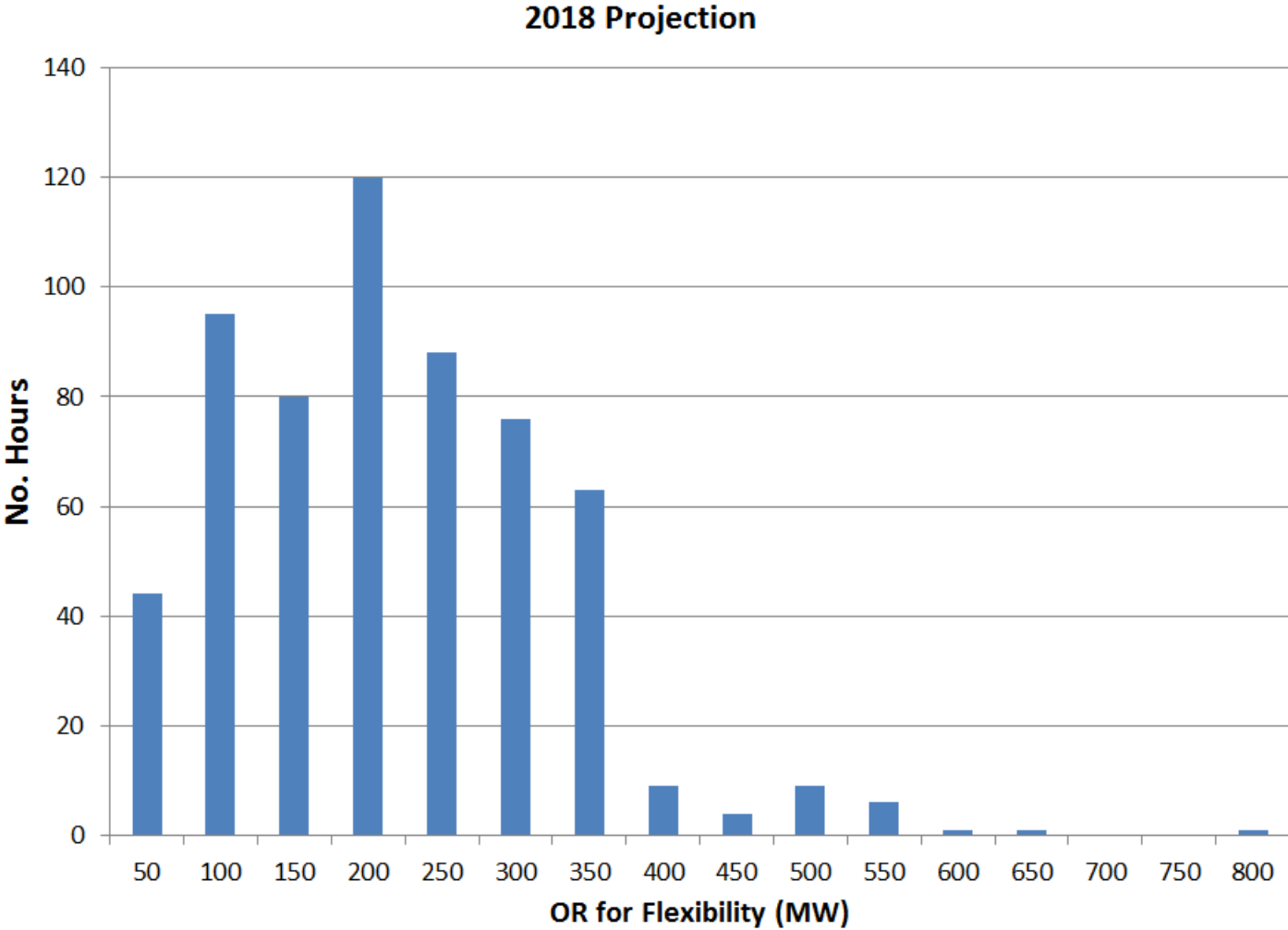
- Simulations done to estimate the frequency, amount, and duration of scheduling extra 30-minute OR for flexibility
- Assumptions:
 - 2018 forecasts of demand and resource availability
 - High wind profile
 - Current assumptions on forecast uncertainty

Days Requiring Extra OR for Flexibility

2018 Projection

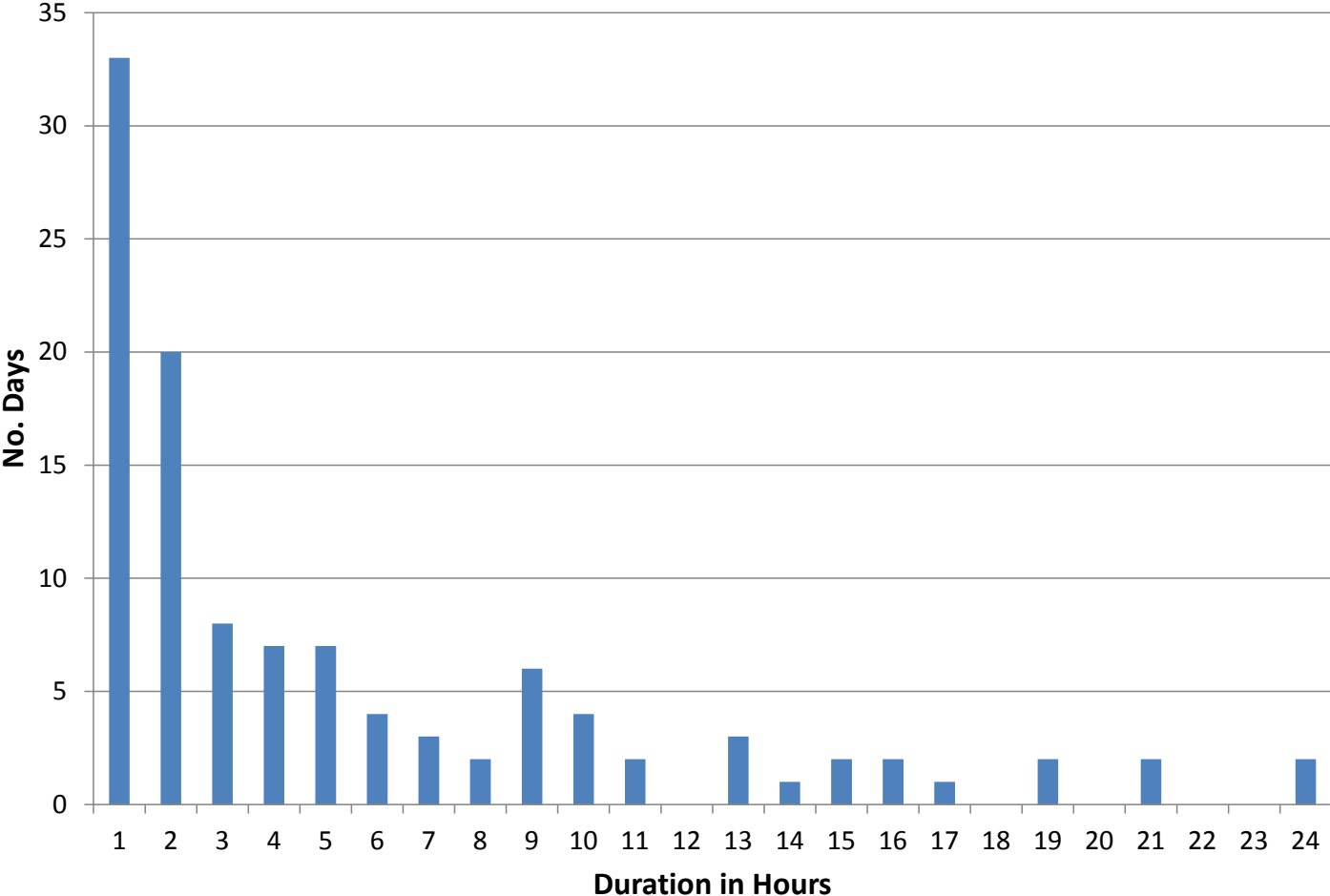


Extra OR Needed for Flexibility



Duration of Extra OR Needed for Flexibility

2018 Projection



Summary of Analysis

Using a high wind profile for 2018, the estimates calculated indicate an upper boundary for using additional 30-minute OR for flexibility.

Number of days requiring extra OR for flexibility	~110 days
For each day requiring extra OR for flexibility, average hourly MW amount	<200 Mw
For each day requiring extra OR, average duration of need (may be non-consecutive)	~5 hours

Current Mechanisms Used to Enable Flexibility Are Not Sustainable

- Currently we may manually commit additional resources in advance of periods with risks of significant uncertainty
- These commitments are not without cost
- Manual commitments are not transparent, may not be efficient, and not sustainable long term
- Based on a high wind scenario, we could potentially be required to make manual commitments for as many as 110 days in 2018

Using 30-Minute Reserve for Flexibility

By representing flexibility need as an additional 30-minute reserve requirement

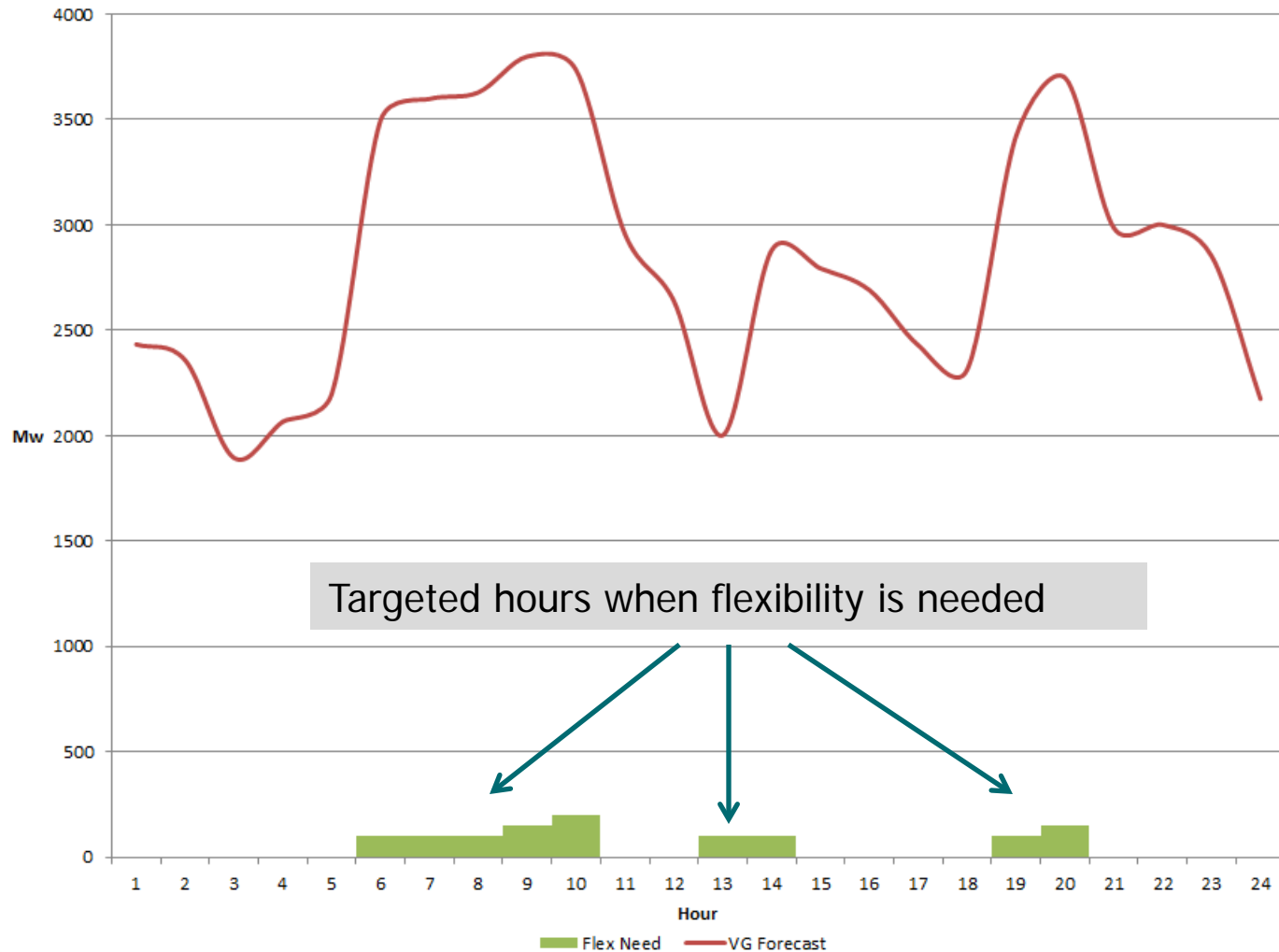
- Market processes are used to evaluate the most economic resource commitments and schedules
- The number of commitments for flexibility may be reduced because of targeted scheduling of OR for hours when flexibility is needed
- Transparency of flexibility need and value increases – drives more resources to provide OR

Impact on 30-Minute OR Prices

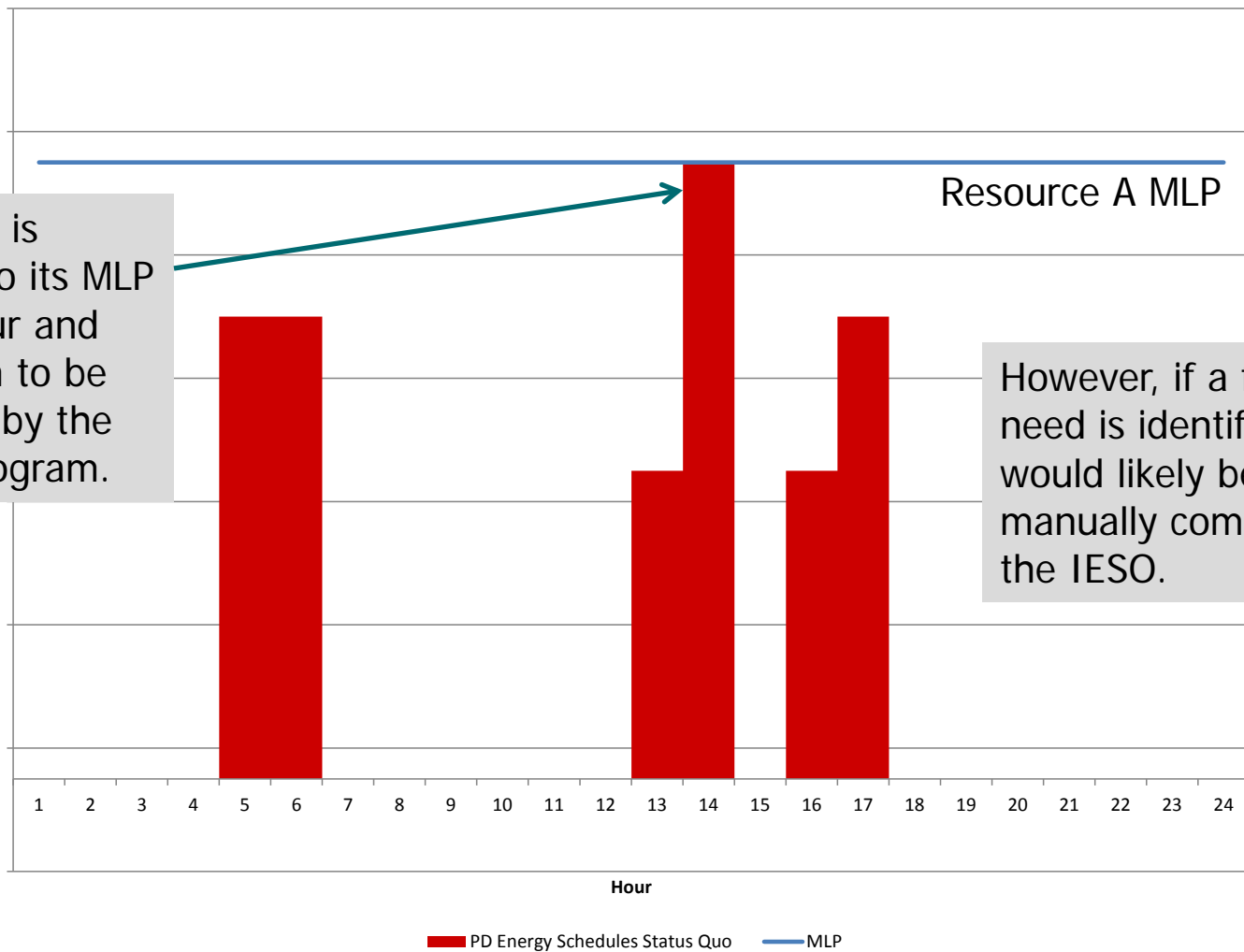
- The need for 30-minute OR for flexibility would be determined in advance for the commitment/pre-dispatch scheduling processes
- During the commitment/pre-dispatch time frames, there are historically sufficient 30-minute OR offers
- The increase of 30-minute OR for flexibility would result in OR clearing prices converging
 - I.e., 30-minute OR prices would increase directionally towards 10-minute OR prices

Examples – Using OR for Flexibility

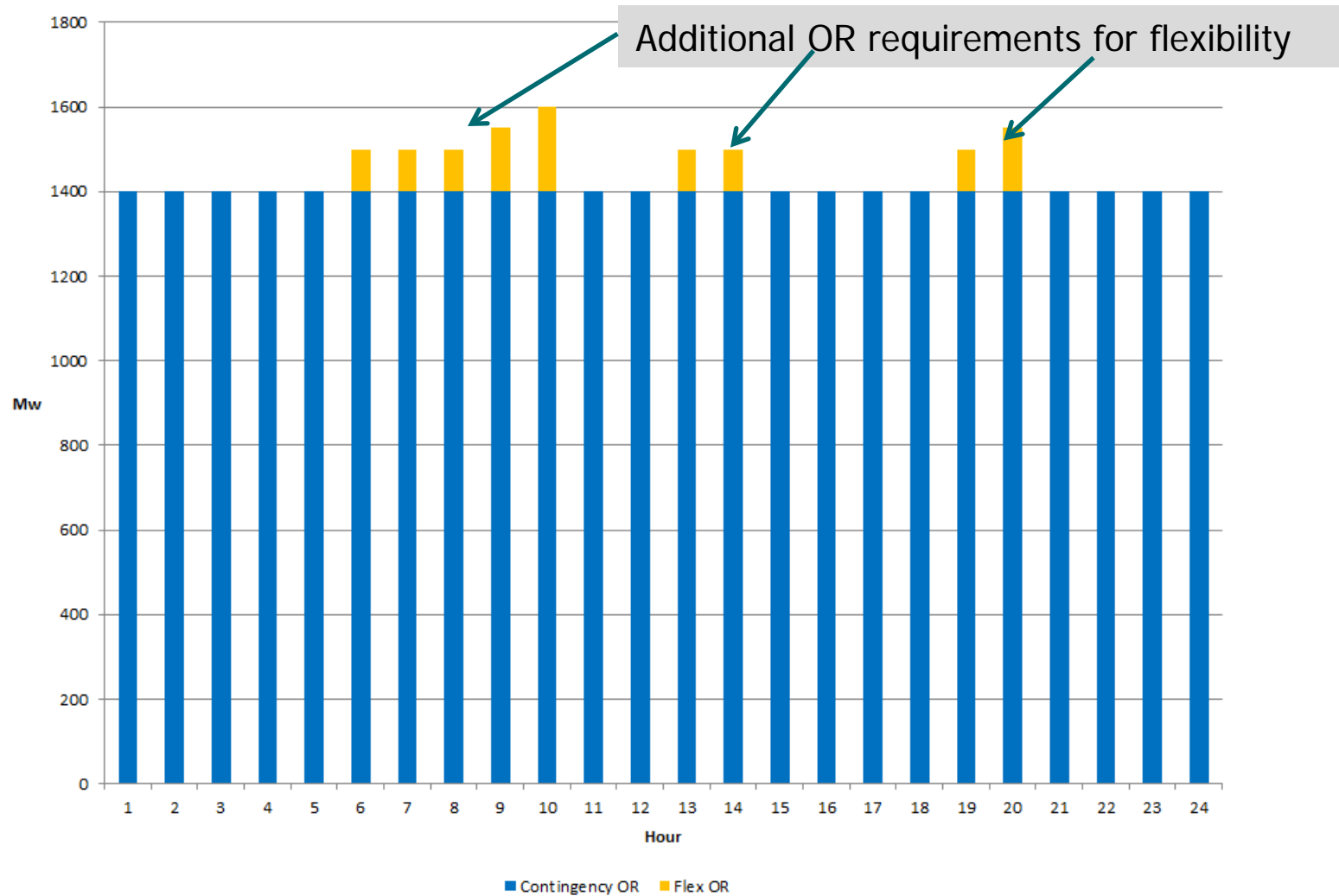
Example 1: Flexibility Need in Multiple Hours



Current Mechanisms to Manage Flexibility

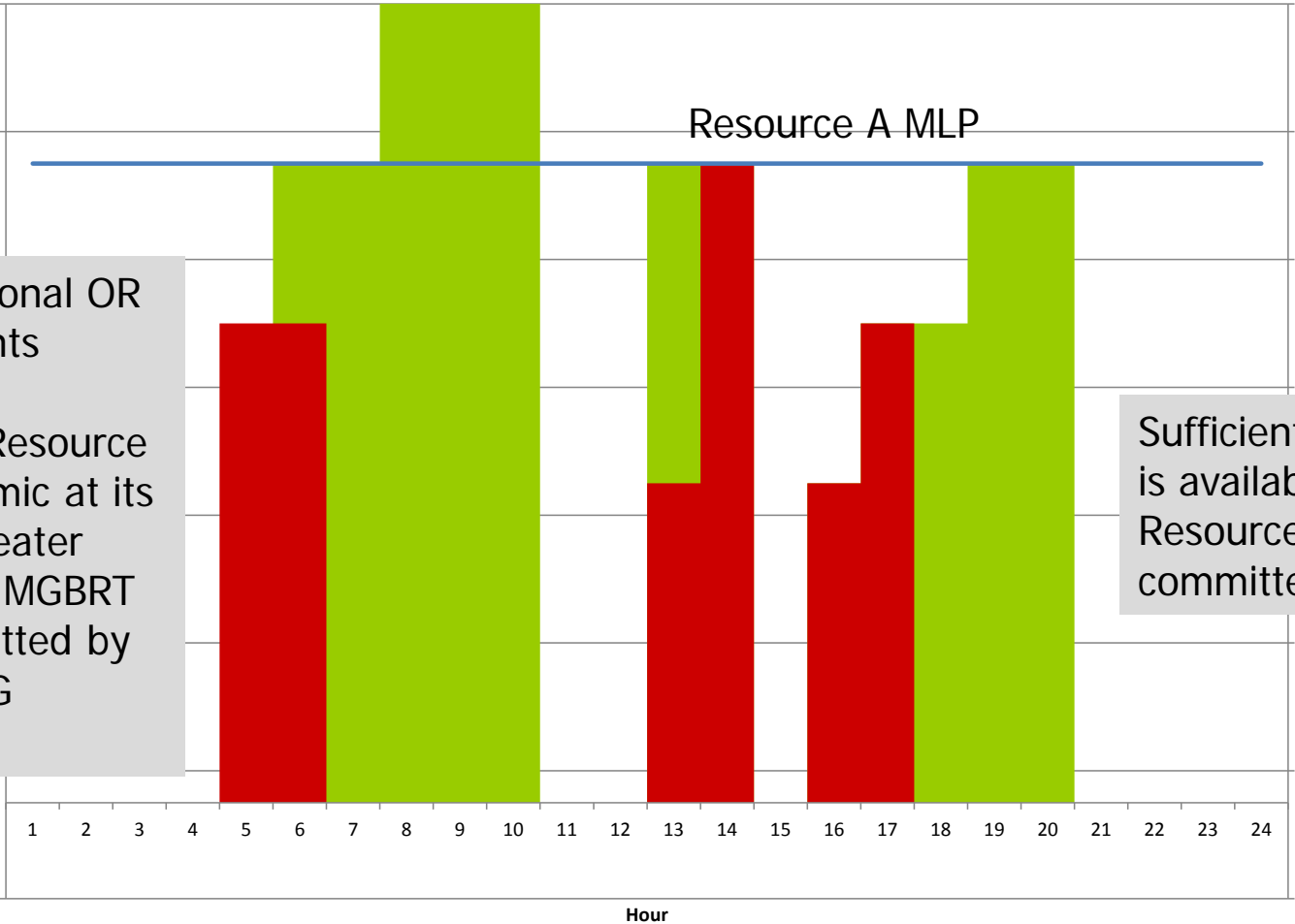


Scheduling Extra OR for Flexibility



Resource Commitment for Flexibility

With additional OR requirements needed for flexibility, Resource A is economic at its MLP for greater than 1/2 its MGBRT and committed by the RT-GCG program.



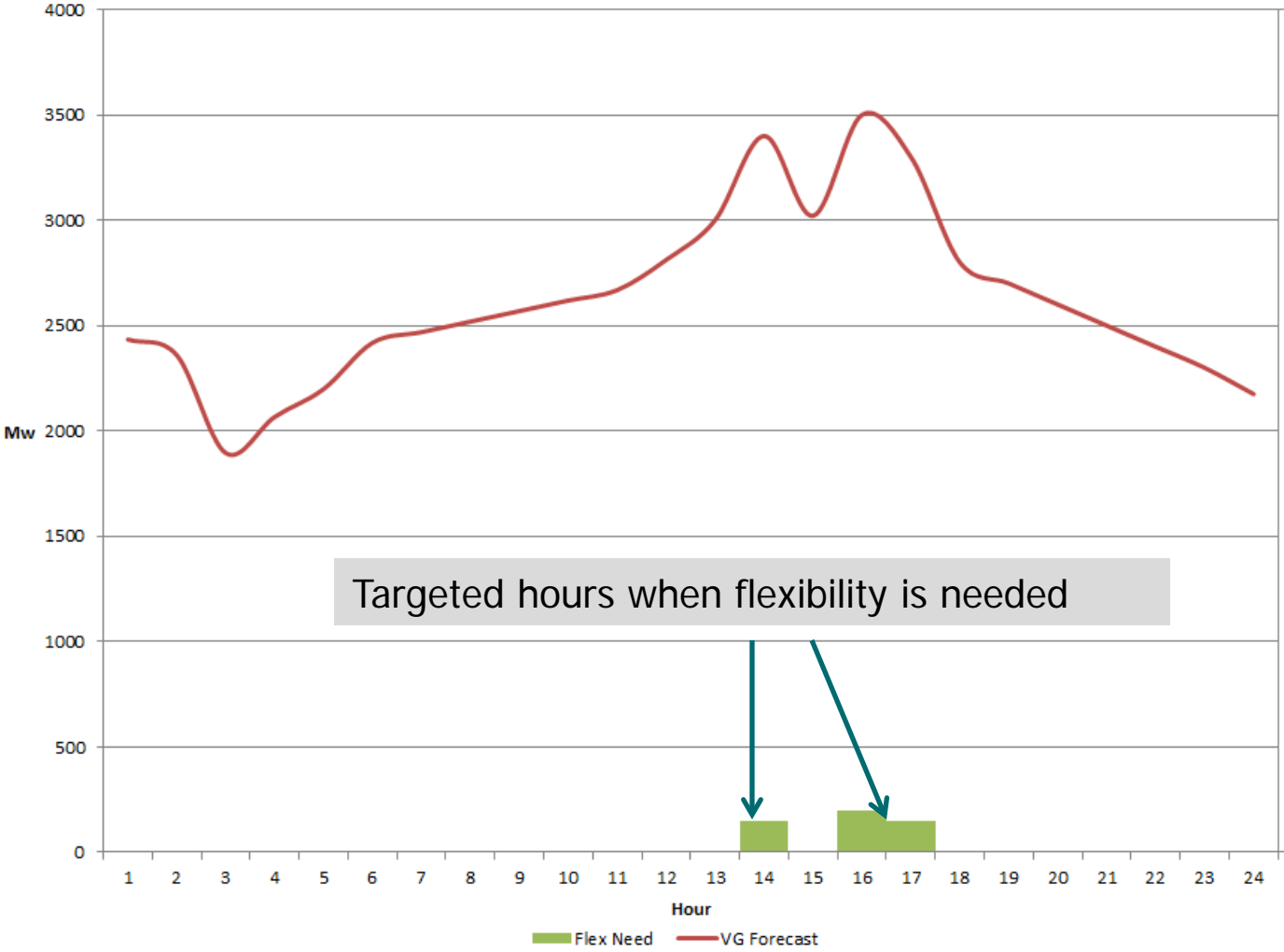
Sufficient flexibility is available with Resource A committed.

■ PD Energy Schedules with Flex OR
 ■ PD Energy Schedules Status Quo
 — MLP

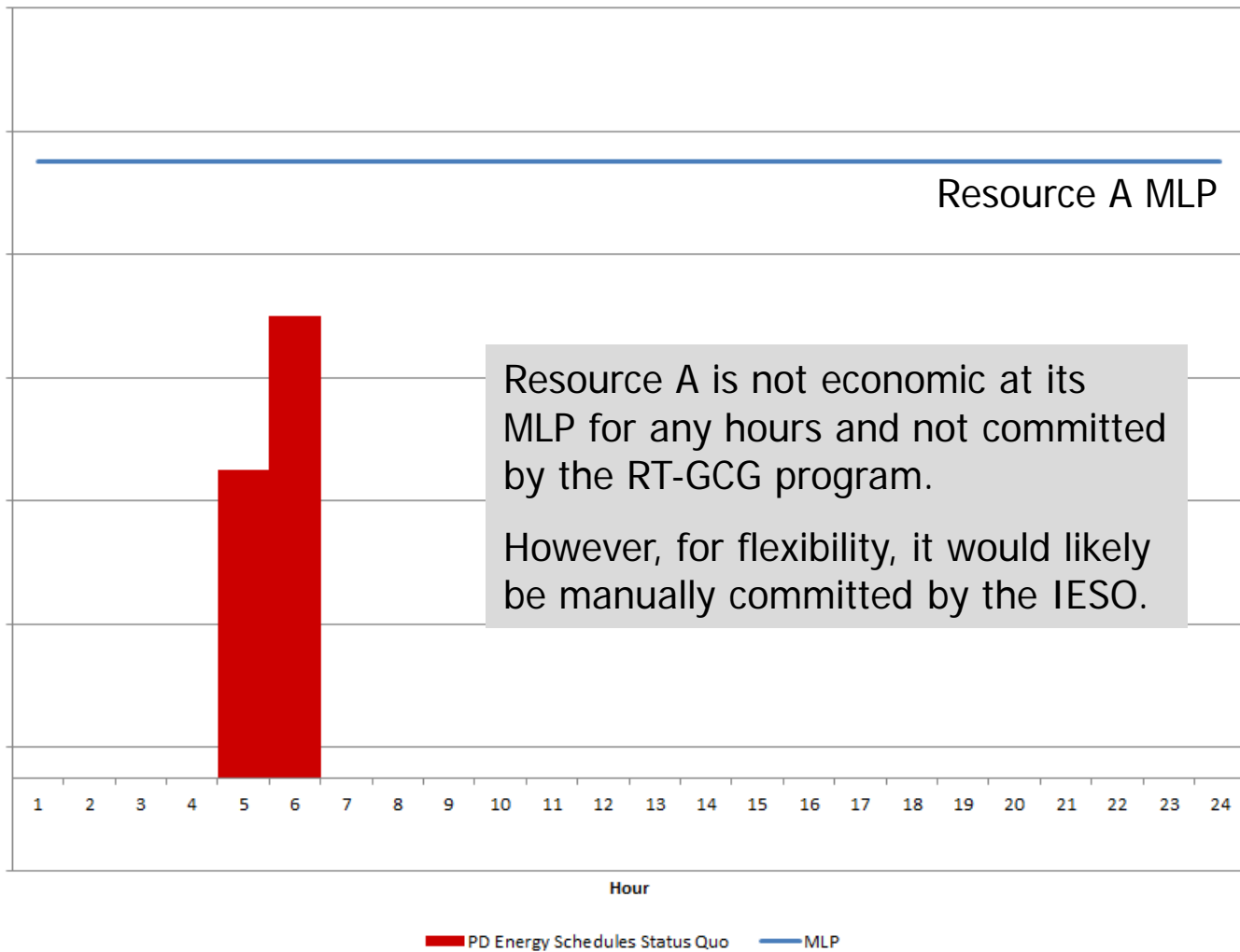
Example 1: Discussion

- The RT-GCG program is used evaluate most economic resource to commit for flexibility
- More transparent and potentially more efficient than manually committing a resource
- When on-line, the committed resource can provide flexibility

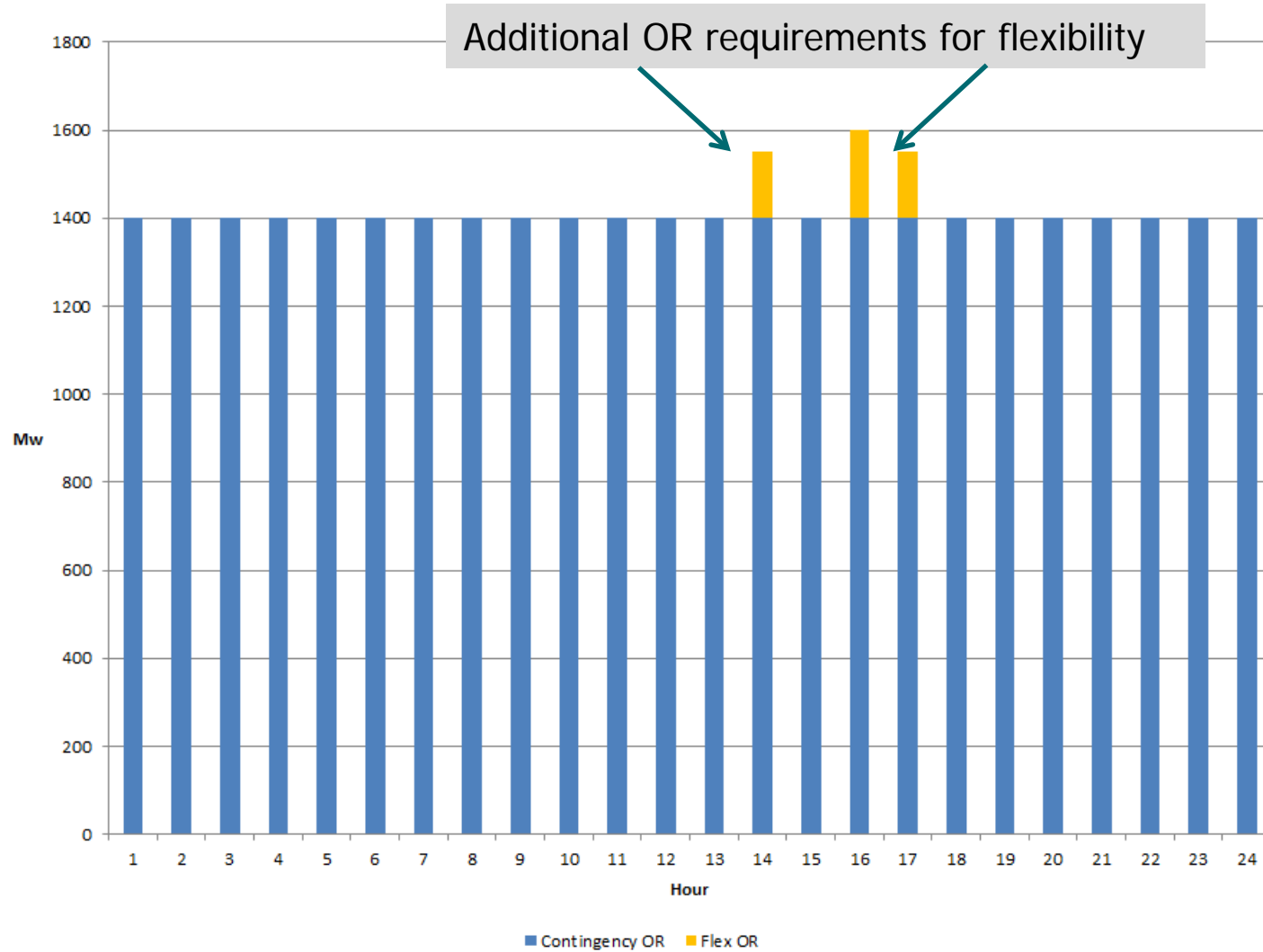
Example 2: Flexibility Need in Fewer Hours



Current Means to Manage Flexibility



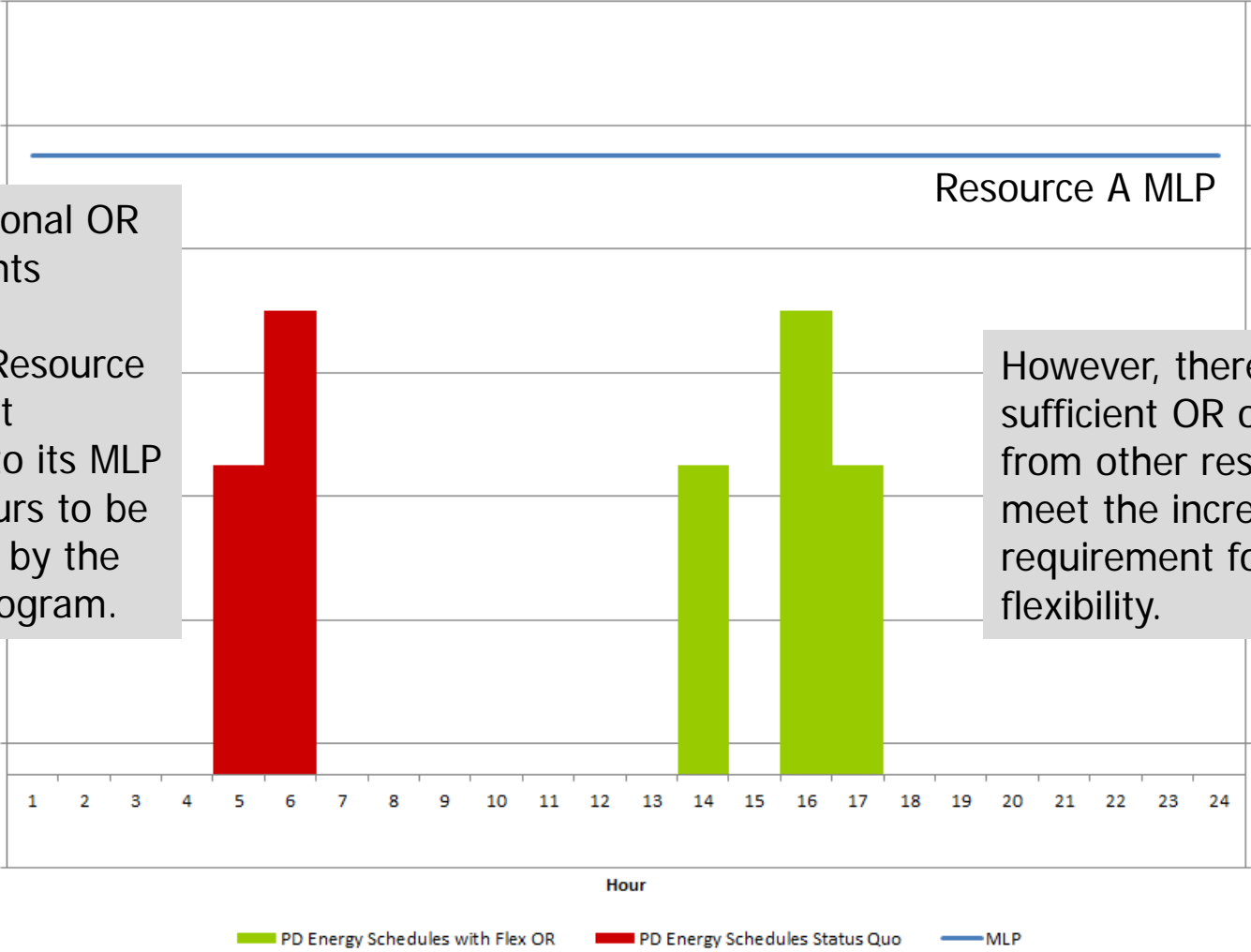
Scheduling Extra OR for Flexibility



No Resource Commitment for Flexibility

With additional OR requirements needed for flexibility, Resource A is still not economic to its MLP for any hours to be committed by the RT-GCG program.

However, there are sufficient OR offers from other resources to meet the increased OR requirement for flexibility.



Example 2: Discussion

- The additional OR requirement for flexibility did not yield an additional commitment
- A net saving may be achieved by not committing a resource for flexibility
- Additional reserve is scheduled and may be activated for flexibility if needed

Response to Feedback

Feedback – OR From Imports

Additional OR from imports can be provided if intertie limits are upgraded.

IESO response

- *Currently OR can be provided by imports on a limited basis*
- *To remove limitations, OR activation at the interties need to be enhanced*

Feedback – Operational Considerations

Resource operational needs should be considered when scheduling a resource for flexibility OR.

IESO response

- *The proposed interim solution intends to leverage existing resource commitment programs to commit and schedule resources for flexibility OR*
- *Resource Minimum Loading Points (MLP) and Minimum Generation Block Run Times (MGBRT) will be respected*

Feedback – Use of RT-GCG Program

Use a process similar to RT-GCG methodology to recover costs. Ensure OR revenues are not deducted from the recovery of costs.

IESO response

- *The proposed interim solution intends to leverage existing commitment/scheduling processes including RT-GCG*
- *Currently revenues from OR and energy scheduled above MLP are not deducted from the settlement of RT-GCG*

Feedback – Additional Market Analysis

Additional analysis is required to help inform market participants of the potential opportunities for market participants to provide flexibility OR.

IESO response

- *An estimation of the frequency, amount and duration of flexibility need has been presented*

Feedback – Reconsideration of Proposal

The IESO should reconsider the proposed interim solution because:

1. It does not address the root cause of price spikes
2. OR is not used for its intended purpose
3. It will reduce efficiency

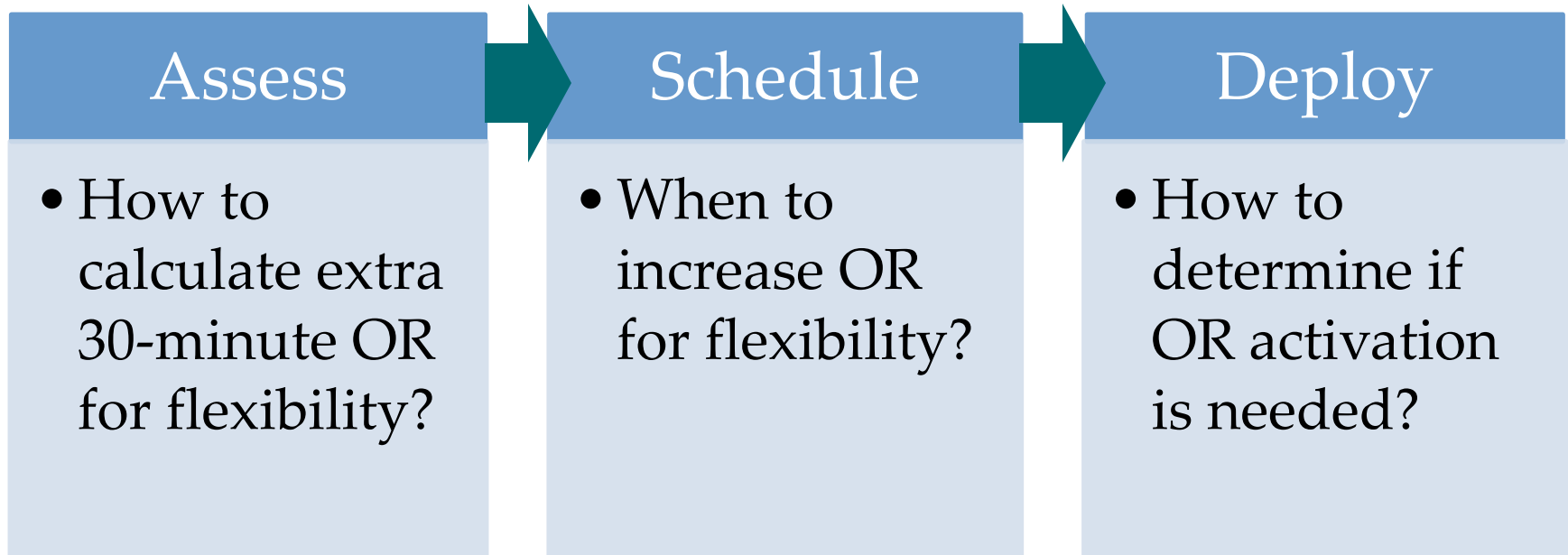
Feedback – Reconsideration of Proposal

IESO response

- 1. Price spikes indicate the value of providing system needs. The objective of this stakeholder engagement is to determine solutions that enable and achieve the system need for flex.*
- 2. Reserve can be carried for multiple purposes beyond contingency and regulation uses. Market Rules Chapter 5 section 4.5.1.3 allows use of OR for uncertainty.*
- 3. Currently, costs are already incurred for system flexibility. The proposed interim solution aims to improve efficiency, reduce costs, and increase transparency of flexibility need and value.*

Next Steps

Determine Details of Processes



- Review impact to existing market processes, market manuals and rules
- Continue to monitor flexibility developments at other ISOs

Feedback and OR Initiatives

Participant Feedback

- Please submit written feedback related to meeting topics by November 8th to engagement@ieso.ca

OR Initiatives

- Several OR-related initiatives recently launched or will commence this year and in 2018
- Initiatives consider market improvements that may be implemented in the near-term and are compatible with the longer-term Market Renewal Program

Upcoming Dates for OR Initiatives

