Storage Bid Cost Recovery and Default Energy Bid Enhancements

Issue Paper & Straw Proposal for Track 1

July 26, 2024

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Issue Paper & Draft Final Proposal

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1. Introduction

Grid-scale energy storage assets have been quickly deployed onto the California ISO's footprint in recent years, going from about 500 MW in 2020, to approximately 10,000 MW by July 2024. These assets have the potential to advance California's goals to further renewable integration by absorbing excess renewable energy during periods of low demand in order to later inject that energy back into the grid when demand increases.

Energy storage has unique operational characteristics compared to conventional thermal generators and variable energy resources (VERs). The nature of energy storage assets is defined by their flexibility, responsiveness, and by the fact that they are energy-limited resources whose fuel availability is endogenous to the electric market. As such, the ability of energy storage resources to provide energy products and services when scheduled is determined by its ability to secure the state of charge (SOC) needed to support its awards and schedules. Energy storage resources' bids reflect these unique operational characteristics. Energy storage resources' bids do not result merely from their costs to produce energy in a given interval. Rather, they also reflect storage resources' desire to be dispatched at a given time based on their opportunity costs in future intervals.

In 2022, the ISO noted that the then-applicable provisions related to bid cost recovery (BCR) for energy storage did not align with the overall objectives and intent of the BCR construct. Specifically, the ISO noted that a combination of ancillary service awards or self-provisions for regulation-down in the real-time market, coupled with relatively high energy bids, resulted in unusually high BCR payments to storage resources.[1] The ISO found, and Federal Energy Regulatory Commission (FERC) agreed, that storage resources' high bids reflected economic unwillingness to discharge, essentially avoiding energy dispatches in certain intervals. The bids did not represent the resources' actual bid costs. Further, the absence of bid cost recovery payments for providing ancillary services would not create incentives for these resources to bid in ways that would undermine the market's efficiency. If anything, the opportunity to receive bid cost recovery payments drove the incentive for high bids that undermines market efficiency.[2]

In filing for this change, the ISO noted that it would initiate a stakeholder process after the FERC filing to assess whether other potential changes may be more appropriate to address [the BCR] issue.[3] This position was then echoed by FERC, which noted the ISO offered to monitor the impacts of the bid cost recovery provisions to electric storage resource settlements and continue to engage with stakeholders to examine whether any other longer-term enhancements might be made to the tariff to address this issue.[4]

As the penetration of energy storage resources continued to grow within the ISO's footprint, additional concerns related to how BCR provisions apply to energy storage resources were raised by stakeholders. In 2023, the Department of Market Monitoring (DMM) published a special report on battery storage,

[1] CAISO, "Tariff Amendment to Prevent Unwarranted Bid Cost Recovery Payments to Storage Resource, and Request for Effective Date One Day After Filing" ("ASSOC Filing"), September 2022, at 10.

[2] CAISO, ASSOC Filing, September 2022, at 12.

[3] CAISO, ASSOC Filing, September 2022, at 13.

[4] *California Independent System Operator Corp.*, 181 FERC ¶ 61,146 at P 14 (2022).

which noted that there are a number of situations where batteries may receive inappropriate or inefficient BCR.[5]

Earlier this year, the ISO committed to initiate a stakeholder process to consider enhancements to bid cost recovery as it applies to storage resources because the concerns about unwarranted bid cost recovery payments to storage exist regardless of the recently proposed changes to allow energy storage resources to bid above the soft energy cap under certain circumstances.[6] As such, this initiative seeks to address this matter expeditiously given the ISO's commitment to its Board, the WEIM Governing Body, and FERC. A detailed description of this issue is included in section 3.1. Proposals relative to this issue are outlined in section 4.1.

The deployment of energy storage in paired configurations also has uncovered other concerns related to the current BCR construct, particularly as it relates to resources with multiple scheduling coordinators (SCs) and those behind aggregate capability constraints or using the off-grid charging indicator (OGCI). A detailed description of these issues is included in section 3.2. In addition to issues related to the BCR provisions as they apply to energy storage resources, both in standalone and paired configurations, stakeholders have underscored the need to enhance the storage default energy bid (DEB) as well as develop a DEB for hybrid resources. A detailed description of these issues is included in sections 3.3 and 3.4.

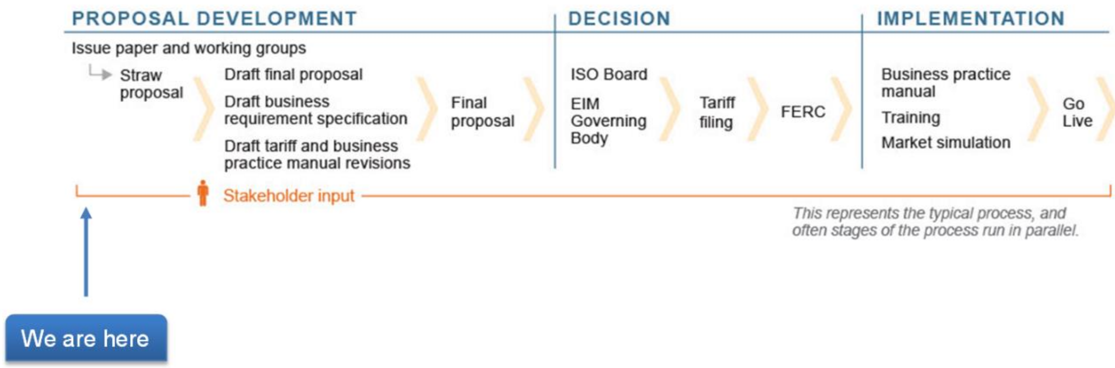
Given the complex issues highlighted above, this initiative's primary goal will be to address the issues related to unwarranted storage BCR payments in an expedited manner and then provide a venue for discussing the policy development relative to the co-located BCR, enhancements to the storage DEB, and the development of a hybrid DEB. Given the differentiated urgency across topics, the ISO proposes to split the present initiative into two tracks: Track 1 - Addressing Unwarranted Storage BCR, and Track 2 - Co-located BCR and Storage DEB Enhancements.

[5] DMM, "Special Report on Battery Storage", July 2023, at 20.
[6] CAISO, Board of Governors Memo regarding the Tariff Amendment on Price Formation Enhancements, May 2024, at 6.

2. Stakeholder Process

With the publication of these materials, the ISO is at the Issue Paper & Straw Proposal stage in the Storage BCR & DEB Enhancements Initiative. Figure 1 shows the typical process for a stakeholder initiative.

Figure 1: Stakeholder Process Milestones



The purpose of this Issue Paper & Straw Proposal is to identify, define, and prioritize the issues within the scope of this initiative, and provide examples for those included within Track 1 - Addressing Unwarranted Storage BCR. In addition, this Issue Paper & Straw Proposal includes an initial description of the ISO's proposed solution to the issues within Track 1 of this initiative. After the publication of this Issue Paper & Straw Proposal, the ISO will hold a stakeholder meeting to discuss the posted materials, allow for clarifying questions, and engage with stakeholders through the policy design process so as to refine and enhance the proposed solutions. As appropriate, the ISO will post updated materials based on the feedback put forth by stakeholders and the discussions held within the aforementioned stakeholder meetings. Given the ISO's commitment to address issues related to unwarranted BCR payments to storage resources in an expeditious manner, the overall schedule for Track 1 seeks to allow for continuous stakeholder feedback and policy development. Table 1 offers an overview of the expedited schedule for Track 1 - Addressing Unwarranted Storage BCR.

Table 1. Track 1 Expedited Timeline [7]

Milestone	Date
Workshop issue slides posted	July 1, 2024
Stakeholder workshop on issue	July 8, 2024
Workshop stakeholder comments due	July 18, 2024
Second Stakeholder workshop on issue	July 22, 2024
Issue Paper & Straw Proposal (IPSP) posted	July 25, 2024
Stakeholder meeting on IPSP	August 5, 2024
IPSP stakeholder comments due	August 8, 2025
Draft Final Proposal (DFP) posted	August 14, 2024
Stakeholder meeting on DFP	August 19, 2024
DFP stakeholder comments due	August 23, 2024
Final Proposal (FP) published	August 30, 2024
FP comments due	September 6, 2024
Joint Board of Governors and Governing Body Meeting	September 26, 2024

3. Issues in Scope

As noted in the introduction, the scope of the present initiative currently contemplates four issues, which have been divided in two Tracks, as follows:

- Track 1- Addressing Unwarranted Storage BCR
  - Refining BCR provisions for energy storage
- Track 2 - Co-located BCR and Storage DEB Enhancements
  - BCR provisions unique to energy storage in co-located configurations
  - Enhance the estimation of opportunity costs within the DEBs applicable to energy storage assets
  - Develop a DEB applicable to hybrid resources

The subsections herein provide a detailed description for each of these issues.

[7] All dates are tentative until confirmed through a notice in the ISO's Daily Briefing.

3.1. Unwarranted Storage BCR

As underscored in section 1, the ISO is aware of some issues of the current BCR construct as it applies to battery energy storage. These issues warrant expeditious resolution.

BCR is the process by which the ISO ensures Scheduling Coordinators (SCs) are able to recover Start-Up Costs (SUC), Minimum Load Costs (MLC), Multi-Stage Generator Resource Transition Costs (TC) and Energy Bid Costs. In order to recover SUC and MLC, a unit must be committed by the CAISO. For purposes of determining BCR eligibility, the ISO uses a concept called Commitment Period. A Commitment Period consists of the consecutive time periods within a Trading Day when a resource is on-line, synchronized to the grid, and available for dispatch. A Commitment Period is comprised of the Self-Commitment Period and CAISO Commitment Period. The portion of a Commitment Period where a resource submits Energy Self-Schedule or Ancillary Services (AS) self-provision is called a Self-Commitment Period. Resources are not eligible for BCR of SUC, MLC, or TC during Self-Commitment Periods, but are eligible for BCR of awarded Energy and AS. The portion of a Commitment Period that is not a Self-Commitment Period is called a CAISO Commitment Period. Resources are eligible to receive BCR for SUC, MLC, TC, awarded Energy and AS during a CAISO Commitment Period.

To calculate BCR, the commitment costs and the energy and AS bid costs are used as inputs to calculate a resource's net difference between costs and revenues in separate pre-calculations for the Integrated Forward Market (IFM), the Residual Unit Commitment (RUC) process, and the Real-Time Market (RTM) (*i.e.,* IFM Net Amount, RUC Net Amount, and RTM Net Amount). If the difference between the total costs and the market revenues is positive in the relevant market, then the net amount represents a Shortfall. If the difference is negative in the relevant market, the net amount represents a Surplus. For each resource the IFM, RUC, and RTM Shortfalls and Surpluses are then netted over all hours of a Trading Day, with the IFM Shortfalls and Surpluses netted separately from the RUC and RTM Shortfalls and Surpluses. Thus, RUC or RTM surpluses over the entire Trading Day are used to offset a RTM or RUC shortfall, respectively, incurred over the entire Trading Day. For either IFM or the combined RUC and RTM netting, if the net amount over the Trading Day is positive (a Shortfall), then the resource receives a BCR Uplift Payment equal to the net Trading Day amount.

As such, BCR is designed to provide "uplift payments" to a resource when revenues from the sale of energy and AS do not cover the resource's SUC, MLC, and energy bid costs over the course of a day.[8] The rationale behind BCR is to incentivize efficient bidding by allowing for the recovery of commitment costs. Without BCR, resources would have an incentive to add a risk premium to their offers, leading to inefficient market outcomes, with higher overall costs for energy.[9]

BCR was initially designed with conventional thermal assets in mind. For conventional thermal assets, commitment costs include SUC and MLC, among others. This is because when a thermal power plant starts up, it incurs certain costs such as fuel costs to reach the desired output level. In addition, thermal resources may also have minimum load requirements, meaning that they have a limited turndown range that requires them to run at a specific percentage of their maximum continuous rating. Since conventional resources with a DA schedule may incur in some costs prior to the intervals when they are

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[8] CAISO, ASSOC Filing, September 2022, at 3.
[9] *Ibid.*

expected to generate electricity (*i.e.,* during the Commitment Period), BCR is a necessary mechanism to recover those costs over the Trading Day.

Storage resources, in contrast, are fundamentally different from conventional thermal assets; as recognized by FERC in its Order Accepting the ASSOC Constraint filing, storage resources have neither SUC nor MLC, and generally have fast ramp rates, thus lacking the conventional drivers for BCR (*i.e.,* commitment). Although they may have other opportunity costs, they generally lack the intertemporal constraints that warrant bid cost recovery. Energy storage resources' bids do not result merely from their costs to produce energy in a given interval; instead, they also reflect storage resources' desire to be dispatched at a given time based on their opportunity costs in future intervals. As a result, the bids submitted by storage resources are not equivalent to those submitted by conventional thermal assets as they do not only represent actual bid costs but also include an implied opportunity cost.

Despite the fundamental differences of storage resources relative to conventional thermal generators, the BCR construct, in general, does not adequately consider attributes common among storage resources, such as state of charge (SOC) constraints, which determine whether an asset can support its awards and schedules. This results in materially different treatment with regards to conventional generators. For example, if a conventional thermal asset is unable to perform and fulfill its DA schedule due to unavailability (*i.e.,* an outage), the expected energy from that asset is categorized as Uninstructed Imbalance Energy (UIE), thus making it ineligible for BCR. In contrast, when a storage resource is unable to meet its DA schedule due to physical limitations, like having a SOC that cannot support the schedule, the market instructs the storage asset to a 0 MW dispatch due to the SOC being binding, resulting in the energy to be categorized as Optimal Energy (OE) which is eligible for BCR.

This differentiated treatment of unavailable energy between conventional and storage assets creates two concerns. First, storage assets are not exposed to RT prices for deviating from DA schedules. Second, it creates incentives for resources to bid inefficiently to maximize the combined BCR and market payment. Given these conditions, some BCR payments to storage resources have materialized despite not being aligned with the intent of BCR. In particular, the ISO is aware of a significant rise in BCR payments related to the buy- and sell-back of day-ahead (DA) schedules when SOC constraints are binding.

A buy-back of a discharge DA schedule can occur when a storage asset's real-time SOC is too low to support it. For the periods in which the buy-back is triggered, the BCR shortfall/surplus considers the difference between the locational marginal price (LMP) and the charging bid. This dynamic is highlighted in a simplified manner, only looking at the discharge range, below.

Consider a resource that submits DA discharge bids for $75 for all hours of the DA market. In the DA market, LMPs are in the range of $50-$100. This results in the battery asset having a discharge schedule for most of the period covering HE 18 – HE 22. In real-time, the battery asset submits only slightly higher bids to discharge; specifically submitting $80 bids for all intervals of the RTM in a manner aligned with its DA bids. In the RTM, grid conditions are materially different, with prices going above $80 earlier in the day relative to the storage asset's DA schedule. This results in premature dispatch of the asset, triggering a buy-back for the DA discharge awards during the period of HE 18 – HE 22. In this circumstances, the buy-back effectively eliminates exposure to RT conditions, resulting in BCR that fully makes the resource whole. Importantly, under this bidding strategy, the BCR does not attribute the asset additional revenue for not following the DA schedule, but it does make it whole despite the fact that it was not able to perform due to its submission of bids that did not reflect or consider RTM conditions. This, however, could change by pursuing a bidding strategy that seeks to maximize the amount of BCR paid out when triggering the buy-back.

Figure 1 ***Simplified Buy-Back Example (static bids): LMPs***

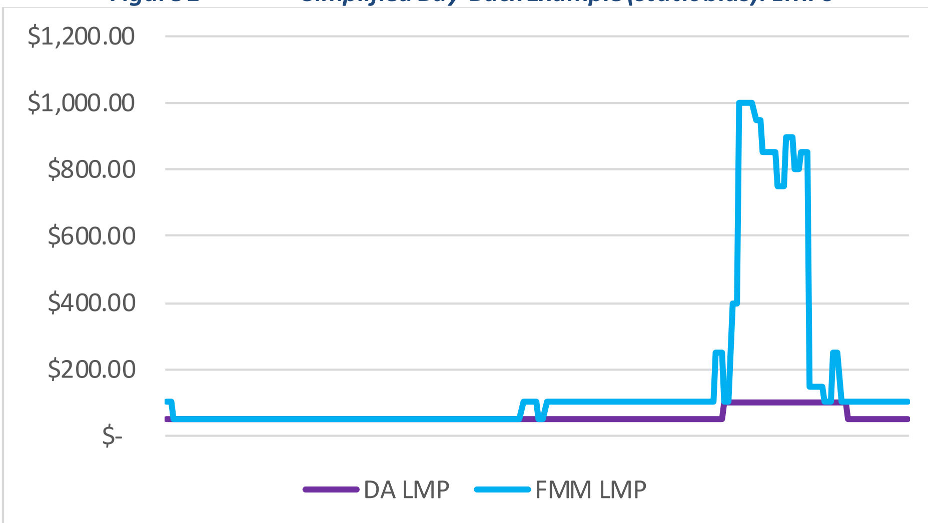


Figure 2 ***Simplified Buy-Back Example (static bids): Discharge bids***

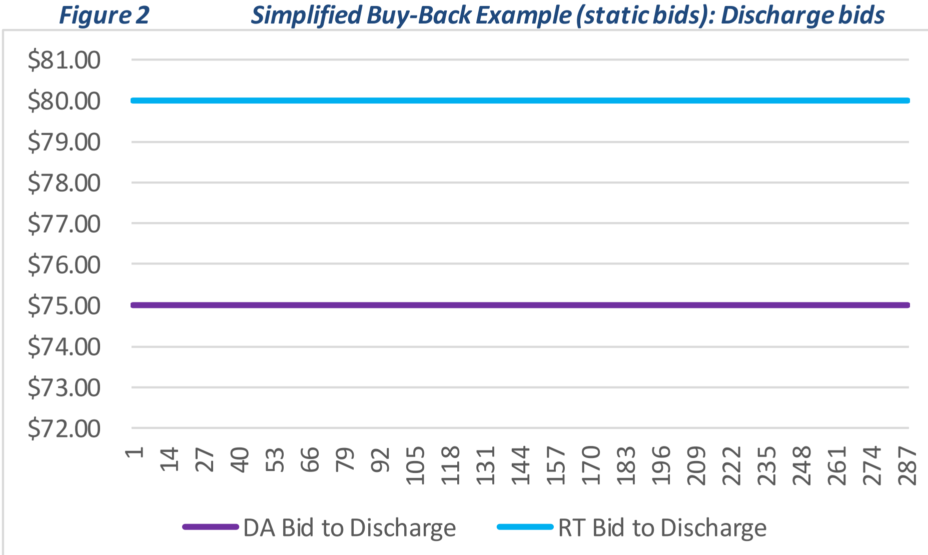


Figure 3 Simplified Buy-Back Example (static bids): Schedules and Dispatch

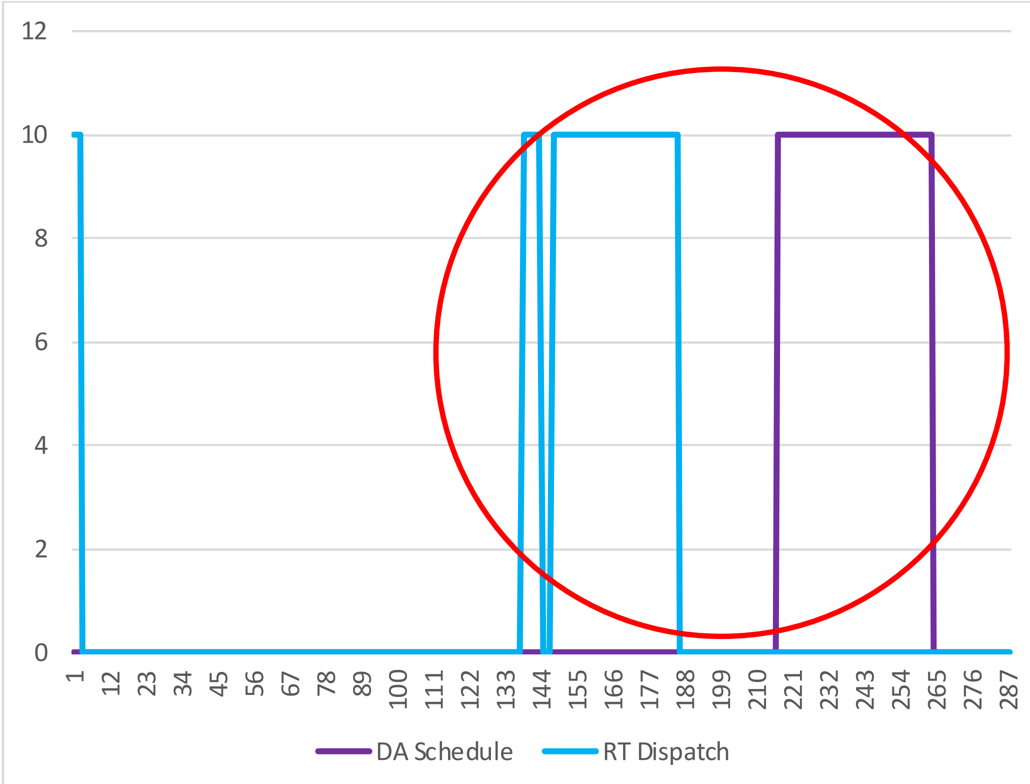
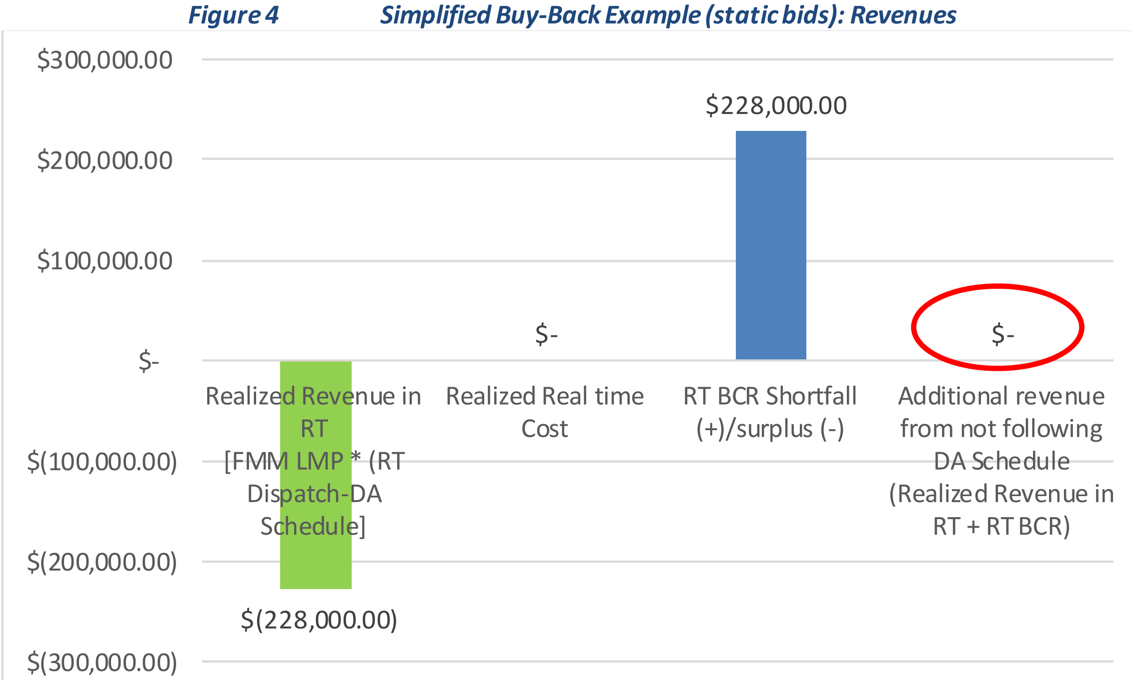


Figure 4 Simplified Buy-Back Example (static bids): Revenues



Consider the same resource under the same circumstances decides to modify its bids to -$150, the bid floor, for the intervals when it had a discharge DA schedule. Given that the asset has been discharged prematurely, the DA schedule is bought back but now with consideration of the -$150 bid within the calculation. This bidding strategy does result in additional revenues from not following the DA schedule, amounting to just over $110,000 for the Trading Day, as shown below. This underscores that the current BCR framework not only disincentives the consideration of RTM conditions for RT bidding by unduly eliminating exposure to RT prices, but also presents the opportunity to pursue a bidding strategy that could result in additional, unwarranted revenue.

Figure 5 Simplified Buy-Back Example (dynamic bids): LMPs

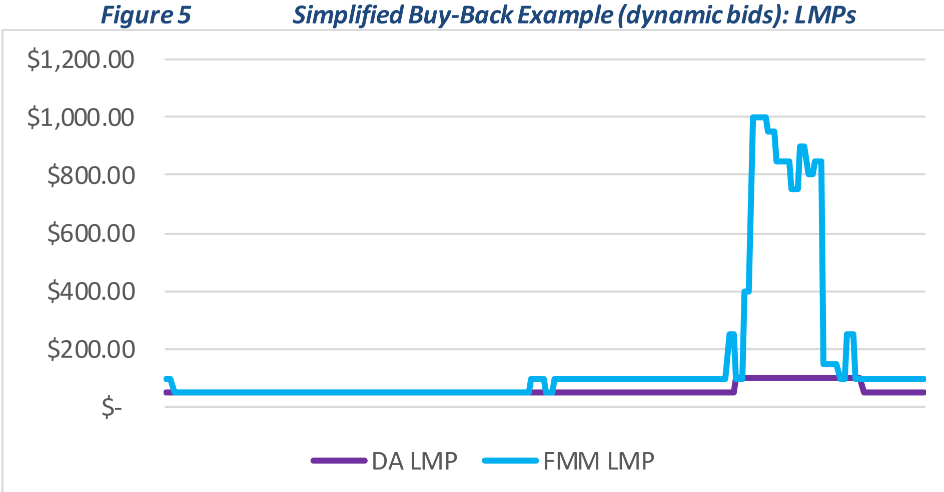


Figure 6 Simplified Buy-Back Example (dynamic bids): Discharge Bids

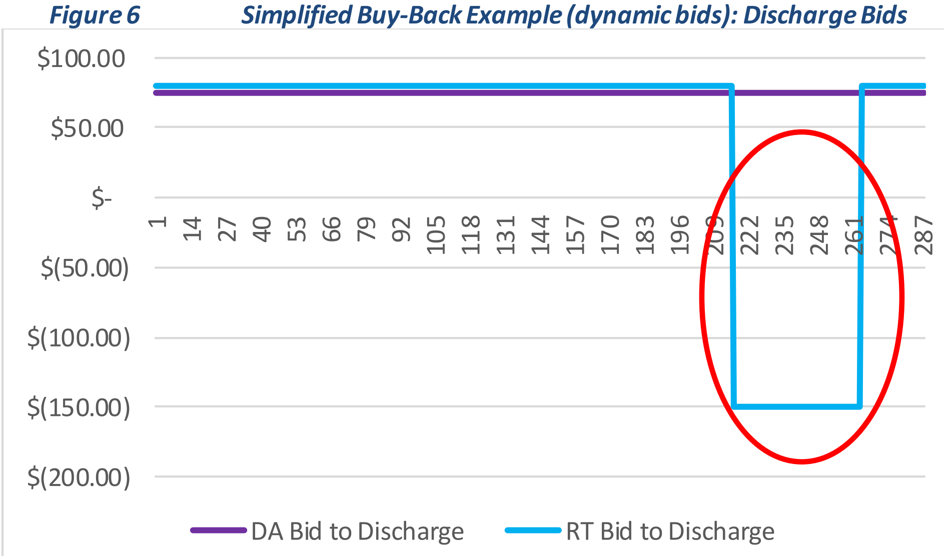


Figure 7 Simplified Buy-Back Example (dynamic bids): Schedules and Dispatch

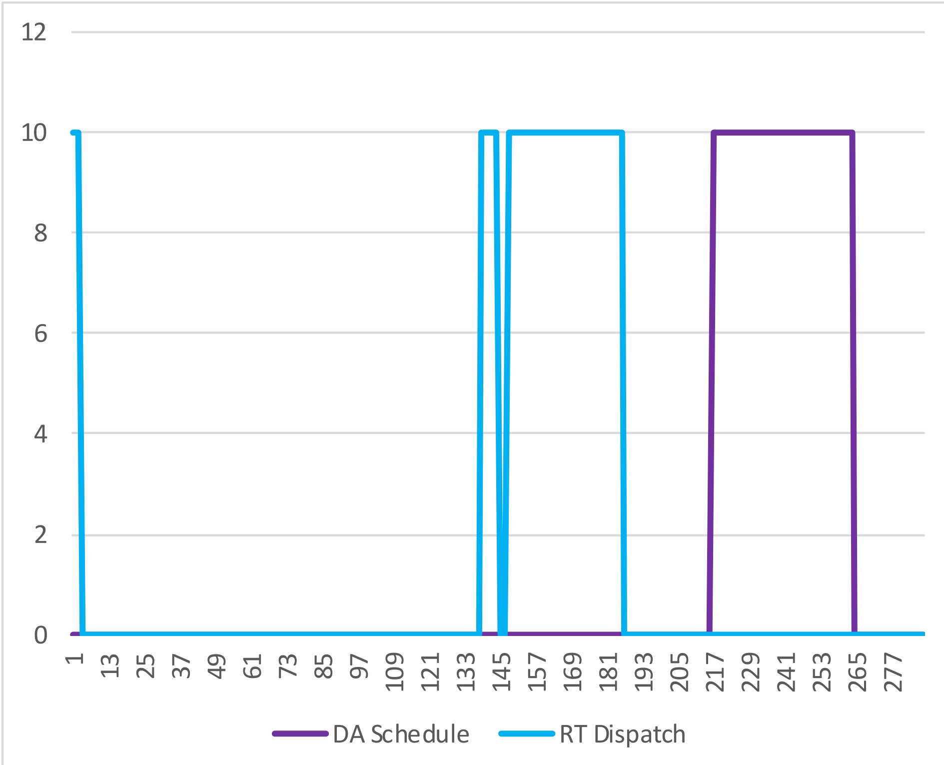
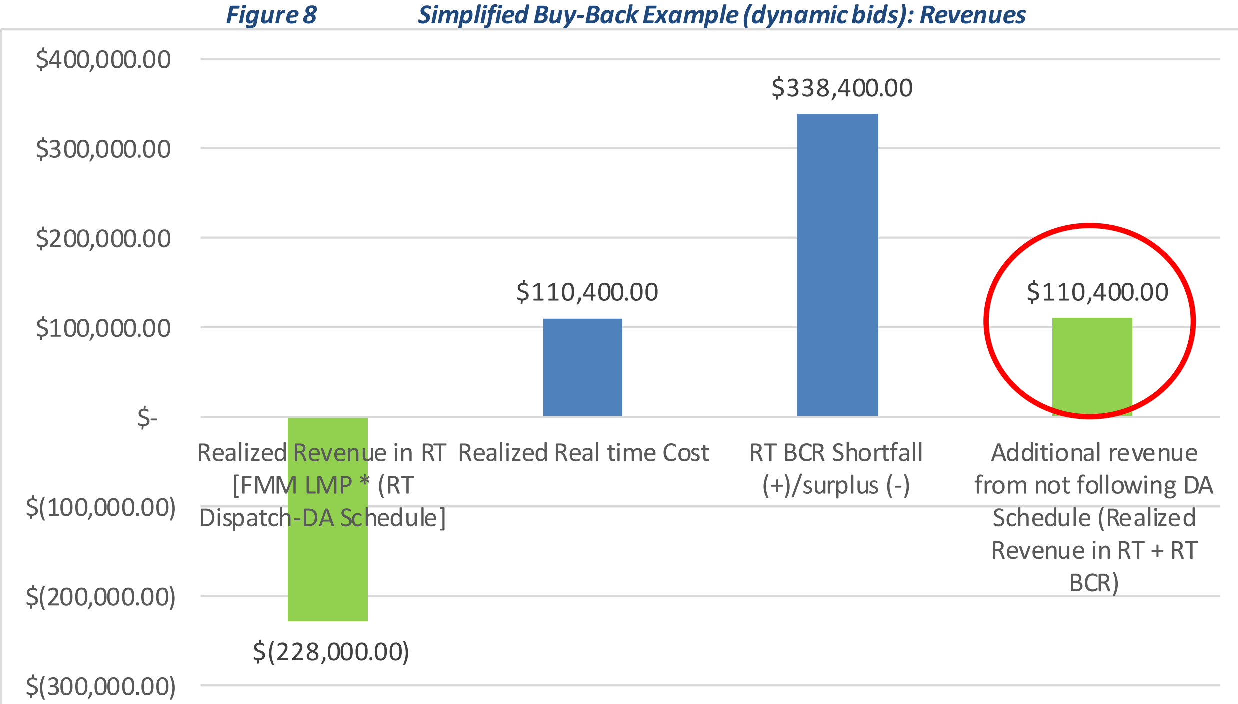


Figure 8 Simplified Buy-Back Example (dynamic bids): Revenues



Conversely, a sell-back of a charge DA schedule can occur when a storage asset's real-time SOC is too high to support it. For the periods in which the sell-back is triggered, the BCR shortfall/surplus considers the difference between the LMP and the discharging bid.[10] This scenario is described in a simplified manner below, focusing solely on the charging range. Consider a resource that submits DA charge bids for $10 for all hours. In the DA market, the LMPs reach a level equal or lower than $10 around HE 12 through HE 15, resulting in a DA charging schedule for that period. In the RTM, grid conditions are different, with LMPs being equal or less than $10 earlier in the day relative to the storage asset's DA schedule. Since the storage asset does not have an incentive to modify its bids given the changing system conditions, the asset continues to submit $10 charge bids. This results in the asset being charged prematurely relative to its DA schedule during HE 10 – HE 13. Given this premature charging, a sell-back of the charging schedule occurs, triggering BCR that makes the resource whole without attributing it additional revenues. This, nevertheless, just like the buy-back example, can change by pursuing a bidding strategy focused on maximizing the BCR paid out as a result of the sell-back.

Figure 9 Simplified Sell-Back Example (static bids): LMPs

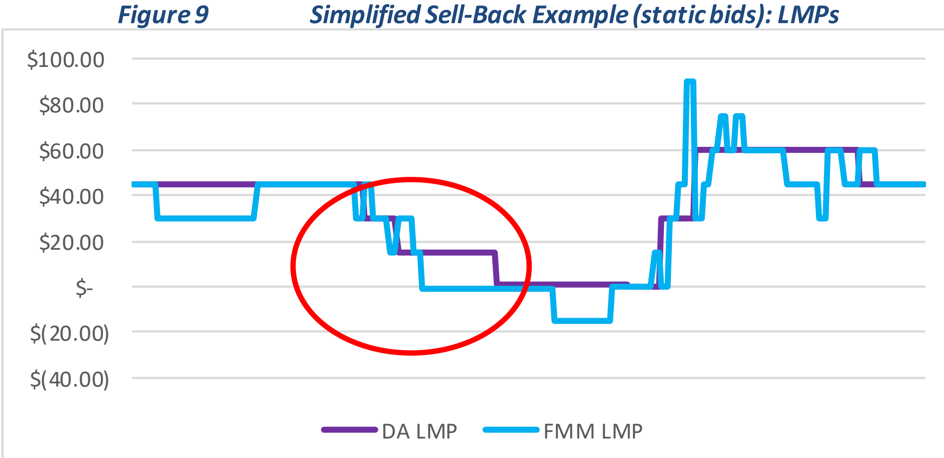
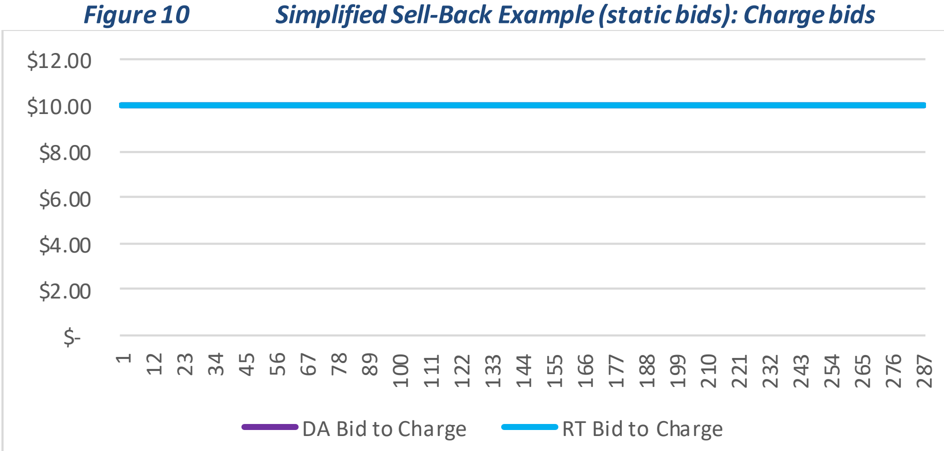


Figure 10 Simplified Sell-Back Example (static bids): Charge bids



[10] Notably, the risks associated with this issue can be exacerbated by changes relative to FERC Order No. 831.

Figure 11 **Simplified Sell-Back Example (static bids): Schedules and Dispatch**

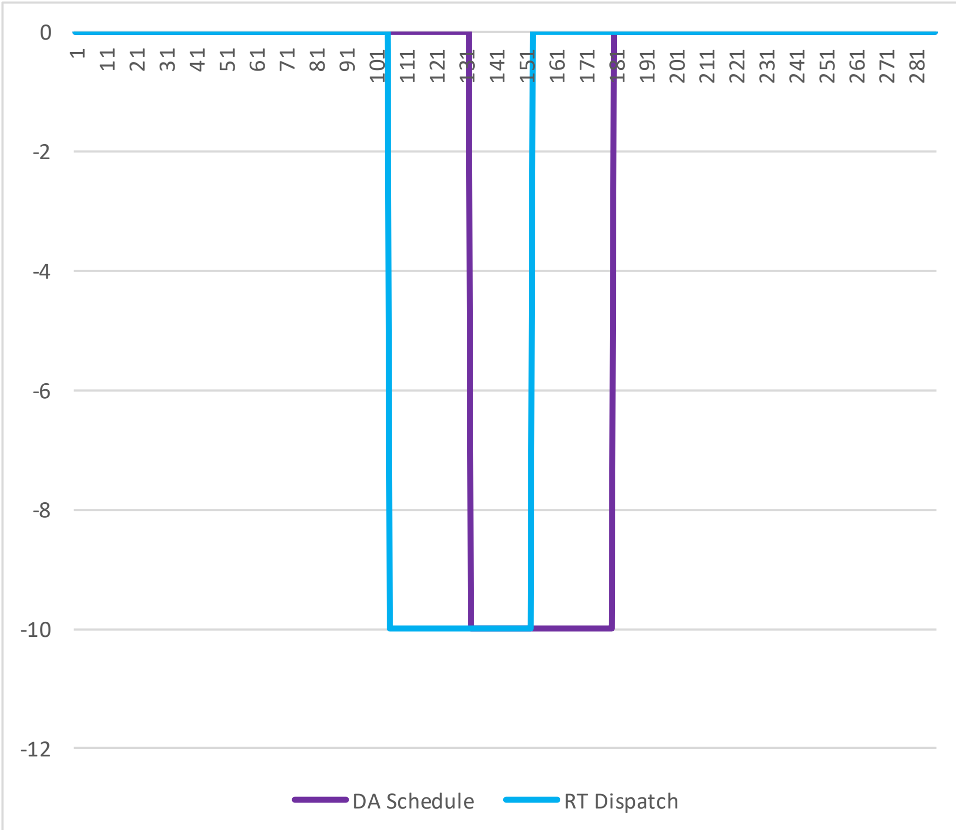
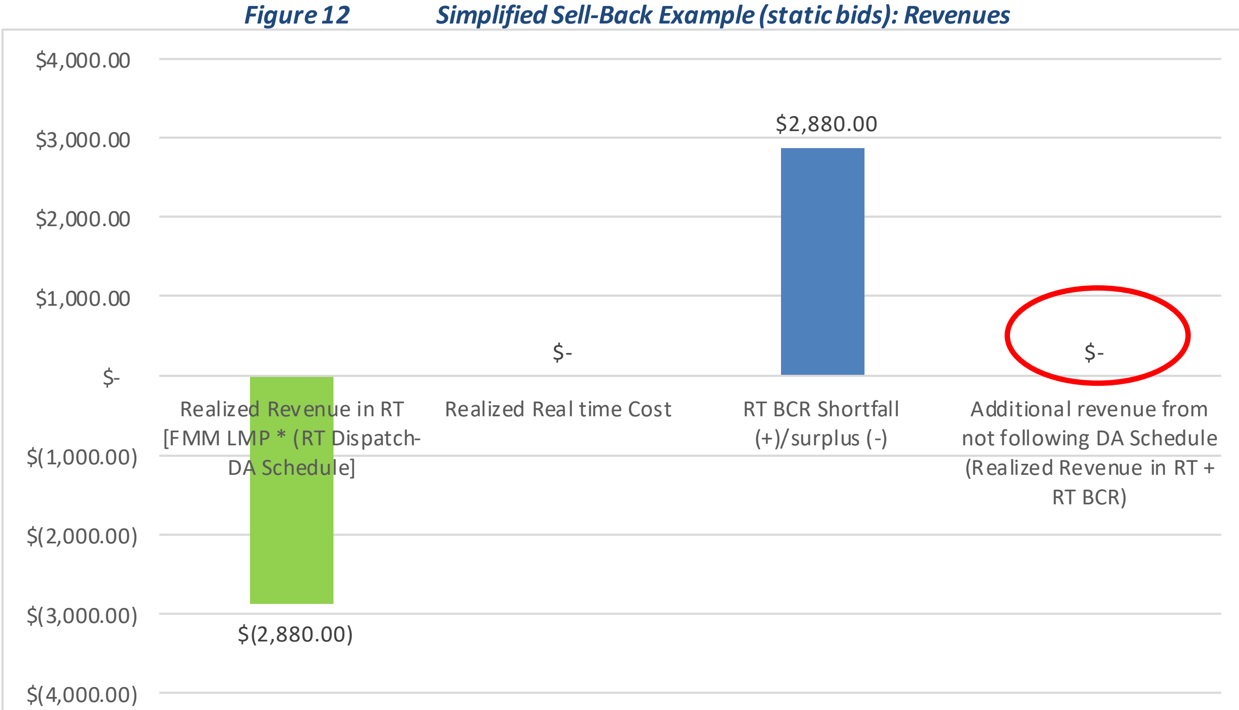


Figure 12 **Simplified Sell-Back Example (static bids): Revenues**



Consider the same resource under the same circumstances decides to modify its bids to the hard offer cap, $2,000, for the intervals when it had a charge DA schedule. Given that the asset has been charged prematurely, the DA schedule is sold back but now with consideration of the $2,000 bid within the calculation. This bidding strategy does result in additional revenues from not following the DA schedule, amounting to over $537,000 for the Trading Day, as shown below. This highlights, once more, that the BCR framework today both disincentives the consideration of RTM conditions for RT bidding by unduly eliminating exposure to RT prices, and presents the opportunity to pursue a bidding strategy that could result in additional, unwarranted revenue.

Figure 13 Simplified Sell-Back Example (dynamics bids): LMPs

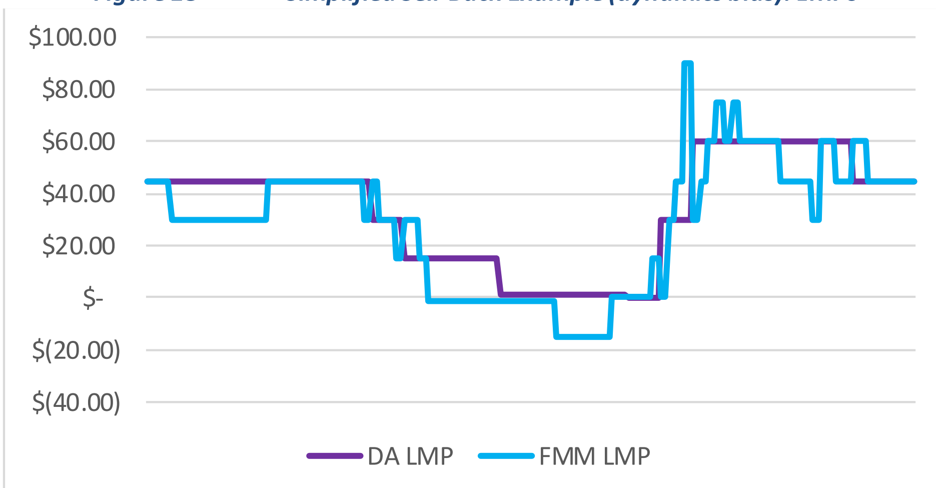


Figure 14 Simplified Sell-Back Example (dynamics bids): Charge Bids

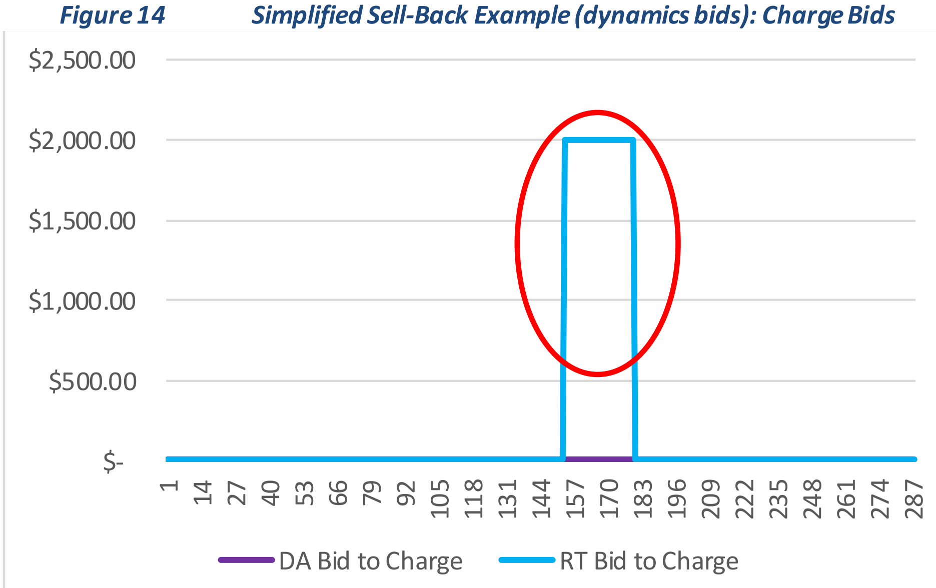


Figure 15 Simplified Sell-Back Example (dynamics bids): Schedules and Dispatch

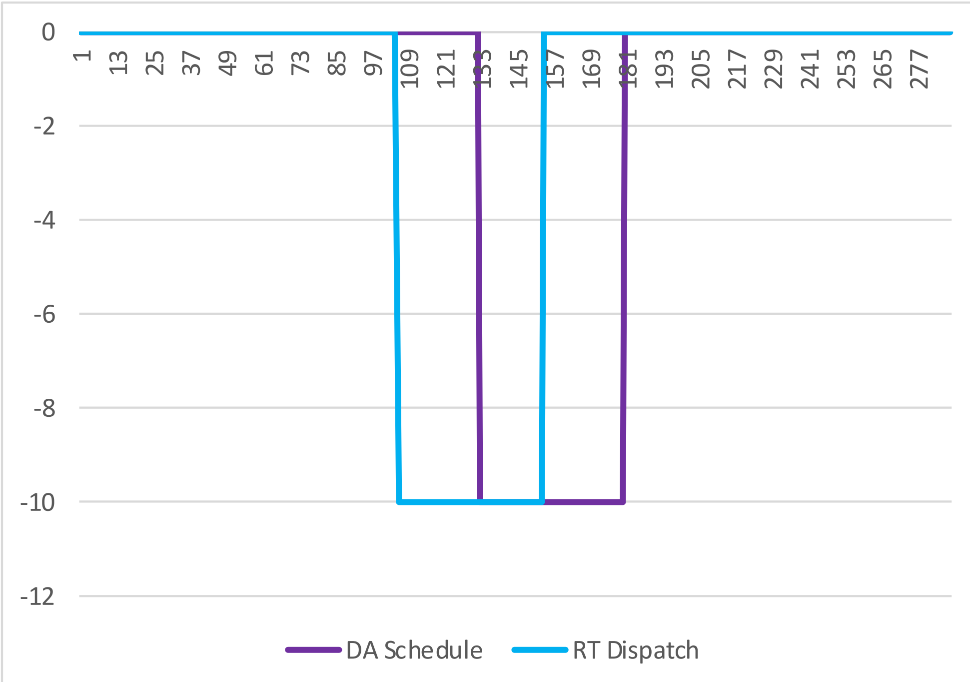
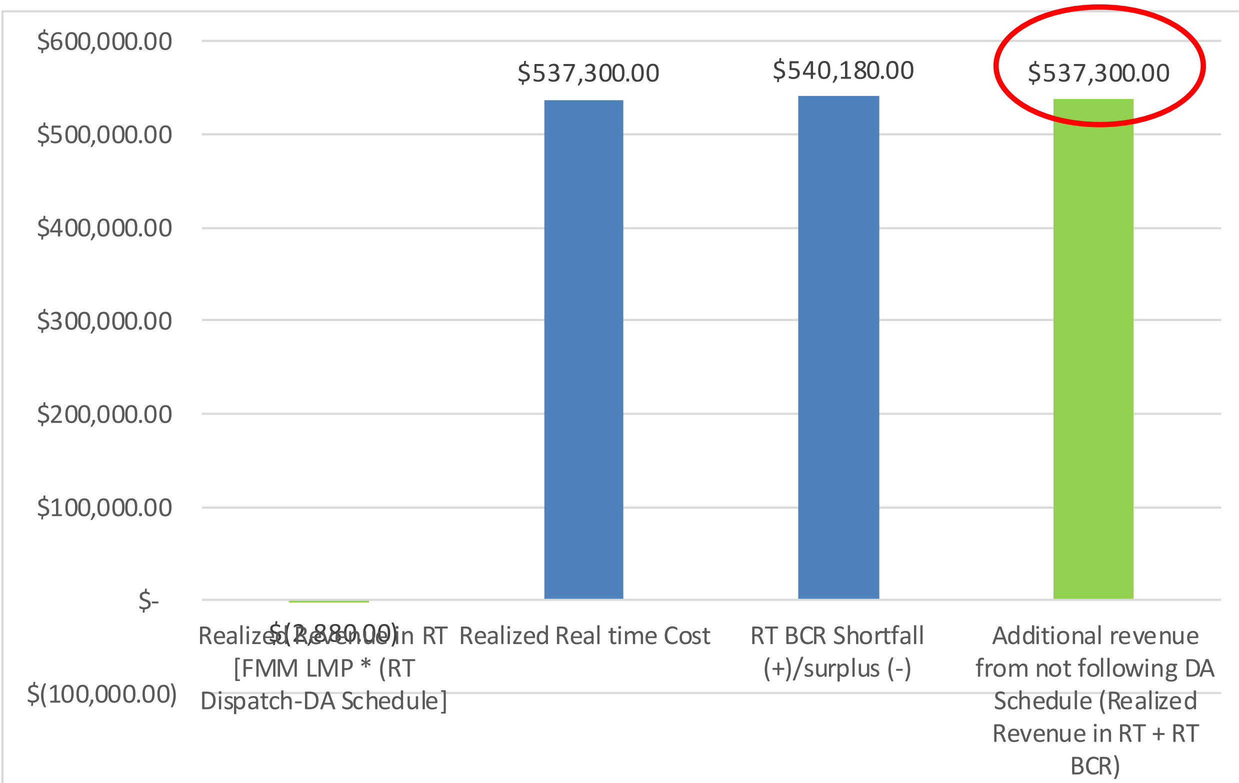


Figure 16 Simplified Sell-Back Example (dynamics bids): Revenues



The dynamics described above create incentives that are not aligned with the intent of BCR, as assets might be incentivized to bid and operate in the RT market in a manner that would trigger buy- or sell-backs of their DA energy schedules in order to capture outsized BCR payments. In addition, the current BCR construct as it applies to energy storage assets results in inefficient outcomes that could materially hinder the reliability of the ISO's grid. The BCR construct results in inefficiency as it removes exposure to real-time prices, thus minimizes incentives to reflected real-time market conditions in supply offers while also potentially creating incentives to pursue unwarranted real-time BCR revenue at the expense of DA awards without any exposure to RT conditions and prices. Given the issues posed by the current BCR construct as it applies to storage, the ISO seeks to work with stakeholders to develop a robust set of BCR provisions that recognize the unique characteristics of storage resources.

Considering the sensitive nature of the information contained herein, the ISO is actively monitoring storage BCR impacts to ensure unwarranted payments do not increase to untenable levels following the dissemination of this information or any of the examples contained in these materials.

3.1.1. Examples of Unwarranted Storage BCR

EXAMPLE 1 – Buy-Back Triggered by Asset Discharging Prior to DA Schedule due to Lack of Incentives to reflect RT Conditions in Discharge Bids

Consider a resource with a DA discharge schedule over the net load peak hours of HE 19 through HE 22. The highest DA LMP for this resource was about $90. In real-time, the resource submits discharge bids for most of the day at $80, in a manner generally aligned with the peak net load hour price from DA; however, real-time conditions indicate that real-time prices may be much higher than in day-ahead in the net load peak hours.

The resource continues to submit bids aligned with DA LMPs because it has no incentive to reflect updated expectations in real-time energy bids given the current BCR provisions. As a result, the resource is discharged economically in HE 13 through HE 17, thus leaving the resource with limited recharge opportunities before reaching the peak net load hours with the aforementioned DA discharge schedules.

Because the SOC of the resource has been depleted, the resource bought-back most of the DA discharge schedule at LMPs near $1000/MWh during tight supply conditions. This outcome is a suboptimal use of the resource that potentially hinders system reliability since these energy –limited resource as not available when RT LMPs were near $1000 during the later hours. In addition, as noted previously, the application of current BCR provisions prevented the resource from realizing the losses associated with non-performance. Today’s BCR rules as they apply to storage do not offer storage resources a strong financial incentive to be available in those high priced hours, which would be aligned with system needs. Instead, it removes all exposure from RT conditions and prices, setting an undue risk floor for storage assets. As a result, the BCR construct fully prevented the resource from realizing the losses associated with this buy-back, potentially allowing the resource to be better off as dispatched than if it had delivered its DA schedule, depending on BCR and bids. In this example, the resource realized approximately $200,000 in RT BCR due to the buy-back during high LMPs.

Figure 17 Example 1: Market awards and telemetered output

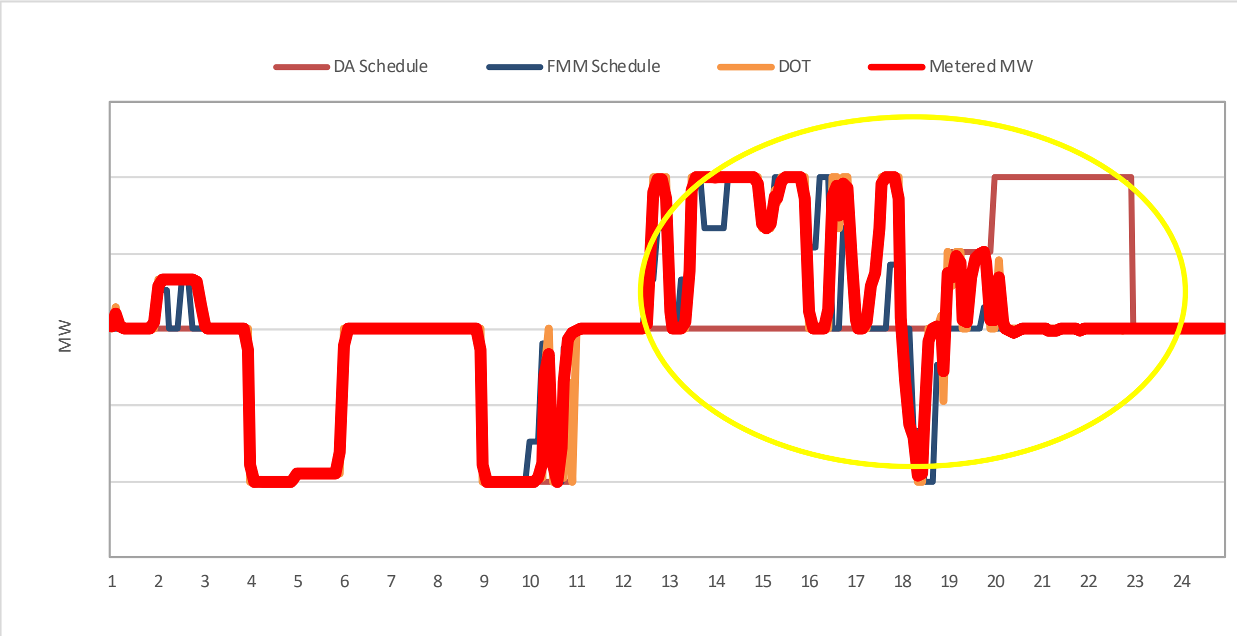


Figure 18 Example 1: State of charge

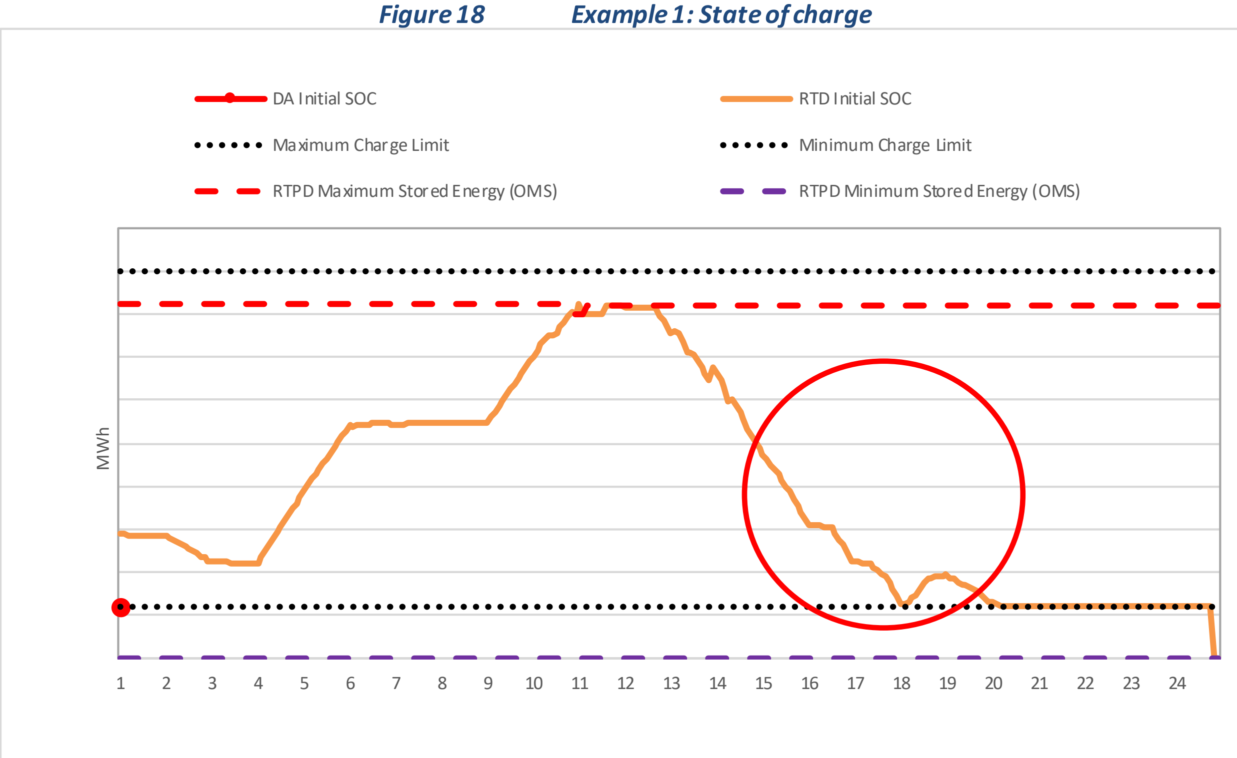


Figure 19 Example 1: Locational marginal prices

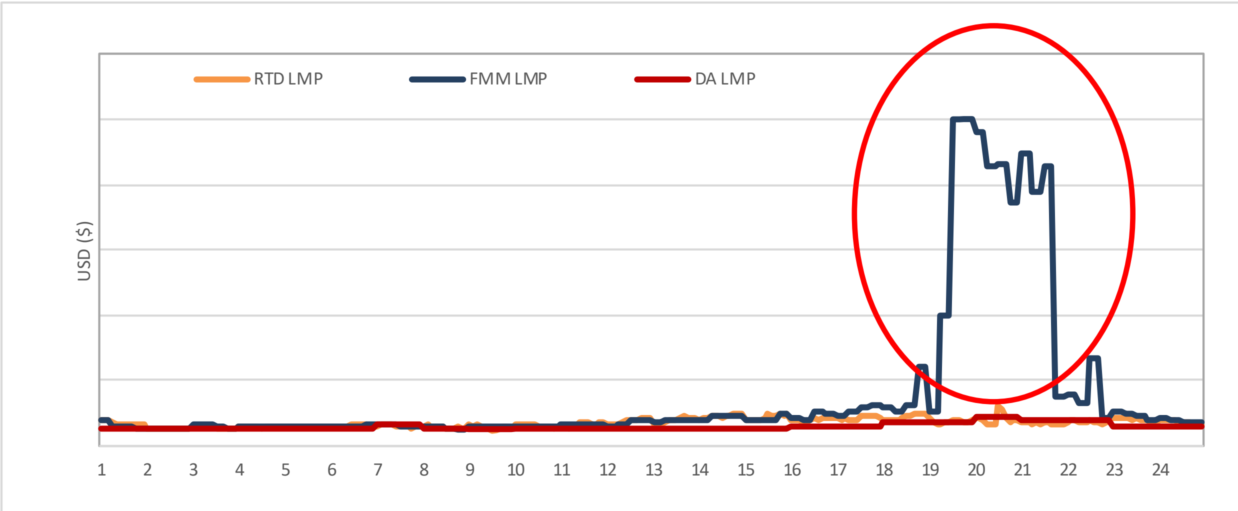
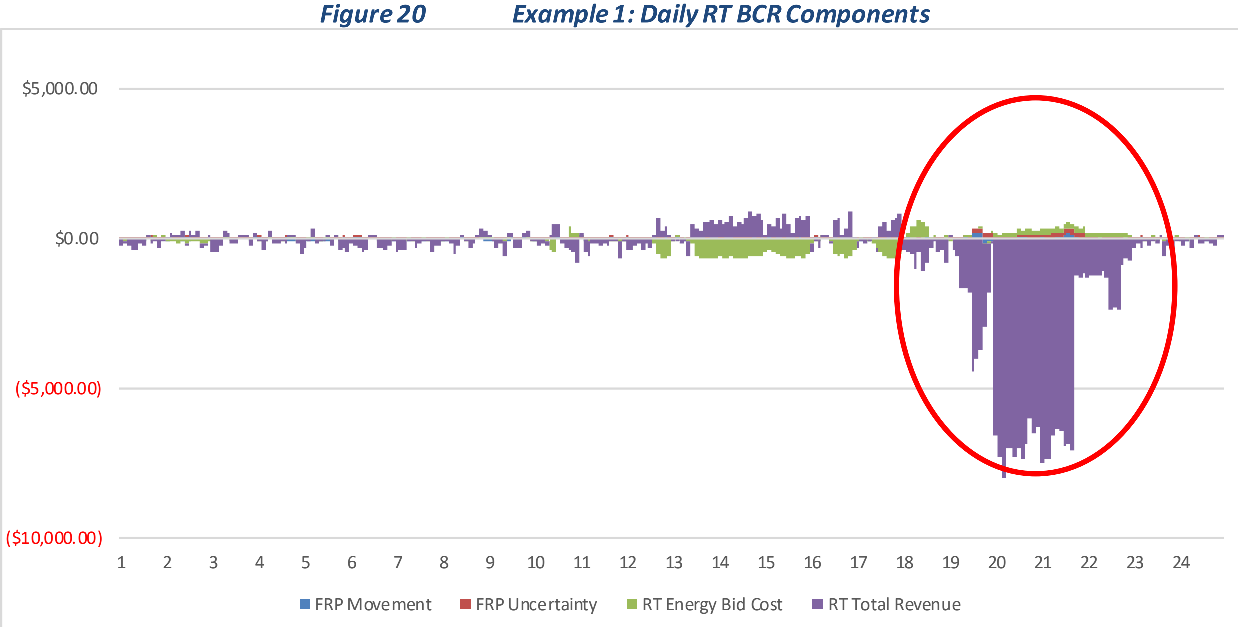


Figure 20 Example 1: Daily RT BCR Components



EXAMPLE 2 – Sell-Back Triggered by Asset Charging Prior to DA Schedule due to Lack of Incentives to reflect RT Conditions in Charge Bids

In this example, the energy storage resource enters the real-time market with SOC significantly higher than what was specified for the beginning of the DA market. The resource then conducts additional charging as a result of real-time market awards, before reaching the hours of DA charging awards. By the time day-ahead charging awards are reached, the resource is at 100% SOC and further charging is not possible, leading to the buyback of DA charging awards. In this example, the asset realized approximately $15,000 in RT BCR due to the sell-back.

Figure 21 Example 2: Schedules, DOT and Metered MW

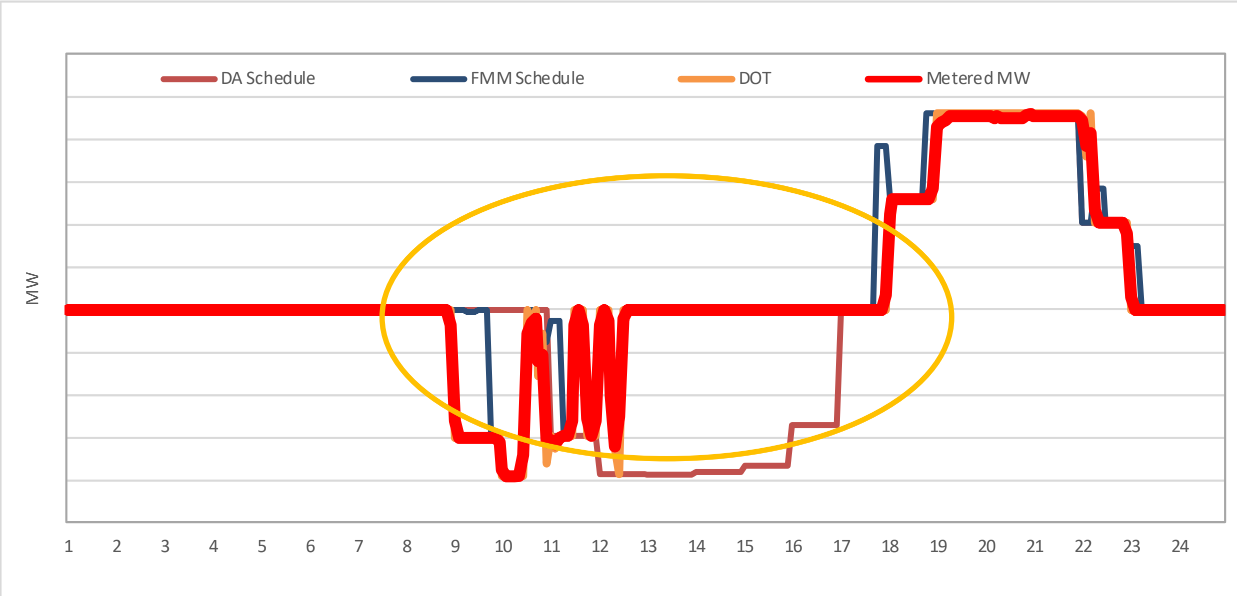


Figure 22 Example 2: State of Charge

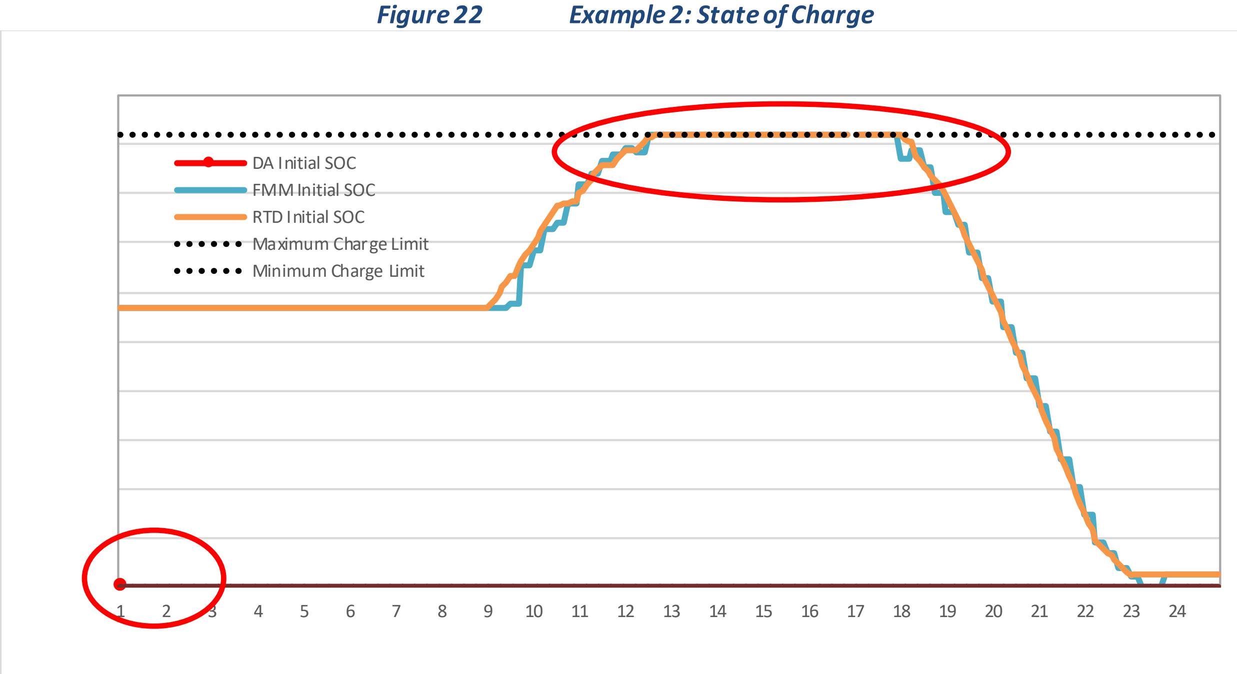
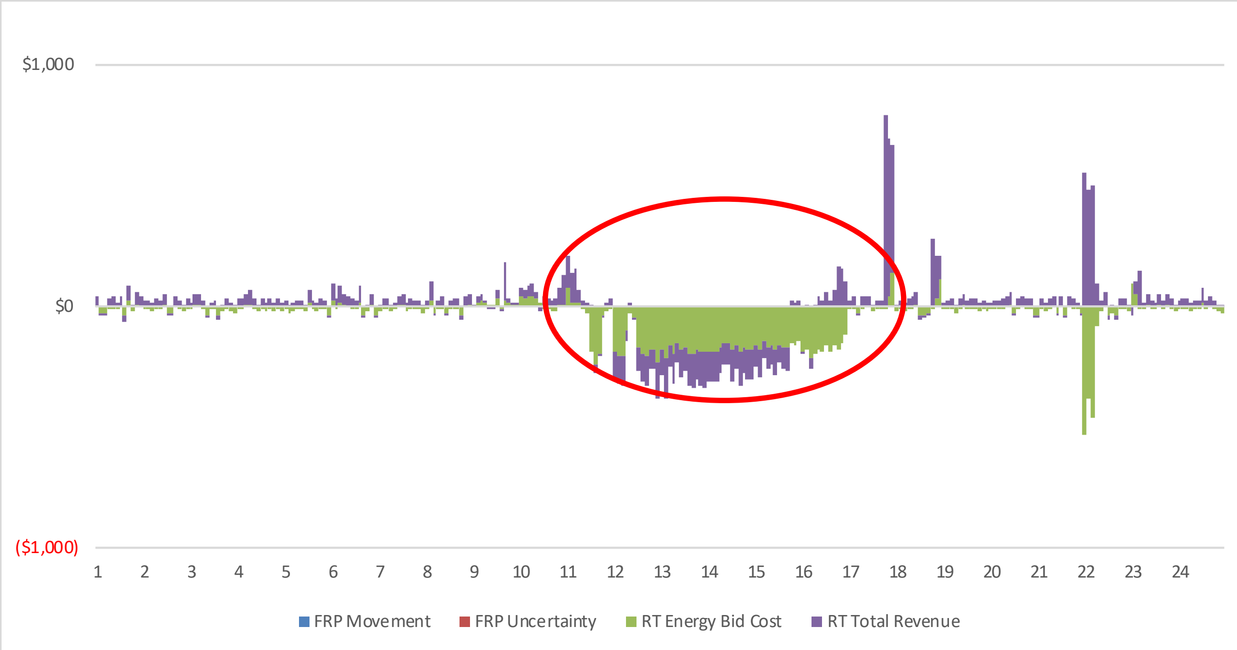


Figure 23 Daily RT BCR Components



EXAMPLE 3 – Buy-Back Triggered by Infeasible Discharge Schedule

In this example, the scheduling coordinator submits an initial DA SOC at approximately 25% of the battery's capacity. This allowed a DA discharge schedule for one hour in the morning before any charging occurs in the day. However, in real-time, the battery started the operating day with much lower SOC. Therefore, the energy discharge award in the morning hours was infeasible in real-time and contributed to real-time bid cost recovery payments. This example highlights a strategy that does not result in incredibly high BCR in a given day but could be systematically replicated across multiple days to accrue significant BCR.

Figure 24 Example3: Schedules, DOT, and Metered MW

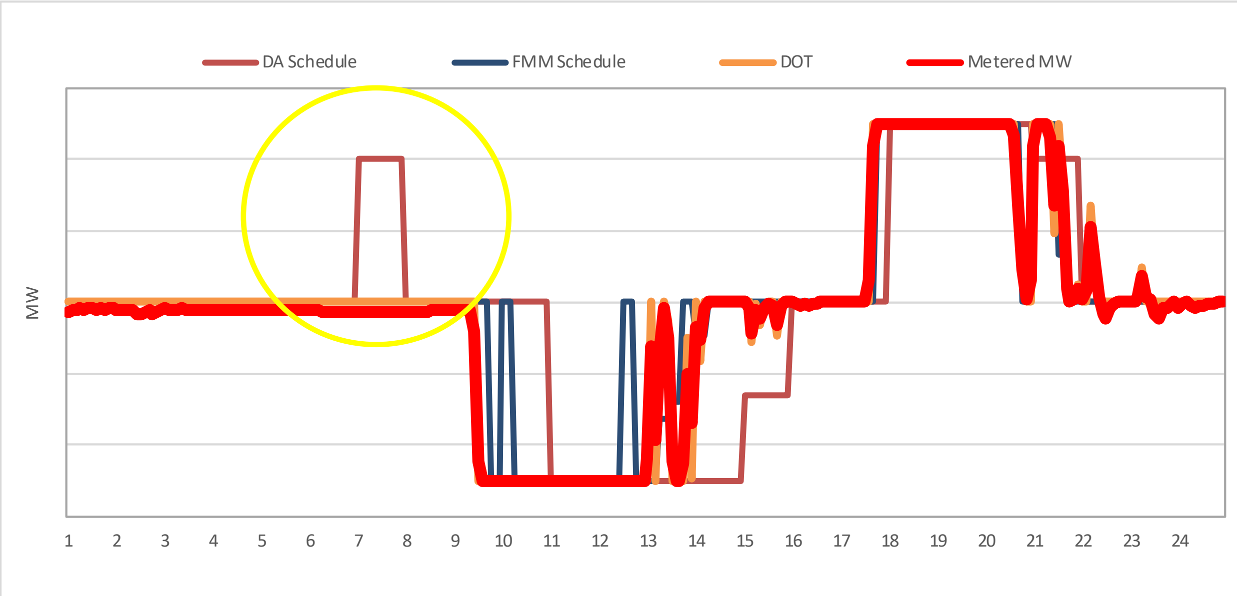


Figure 25 Example 3: State of Charge

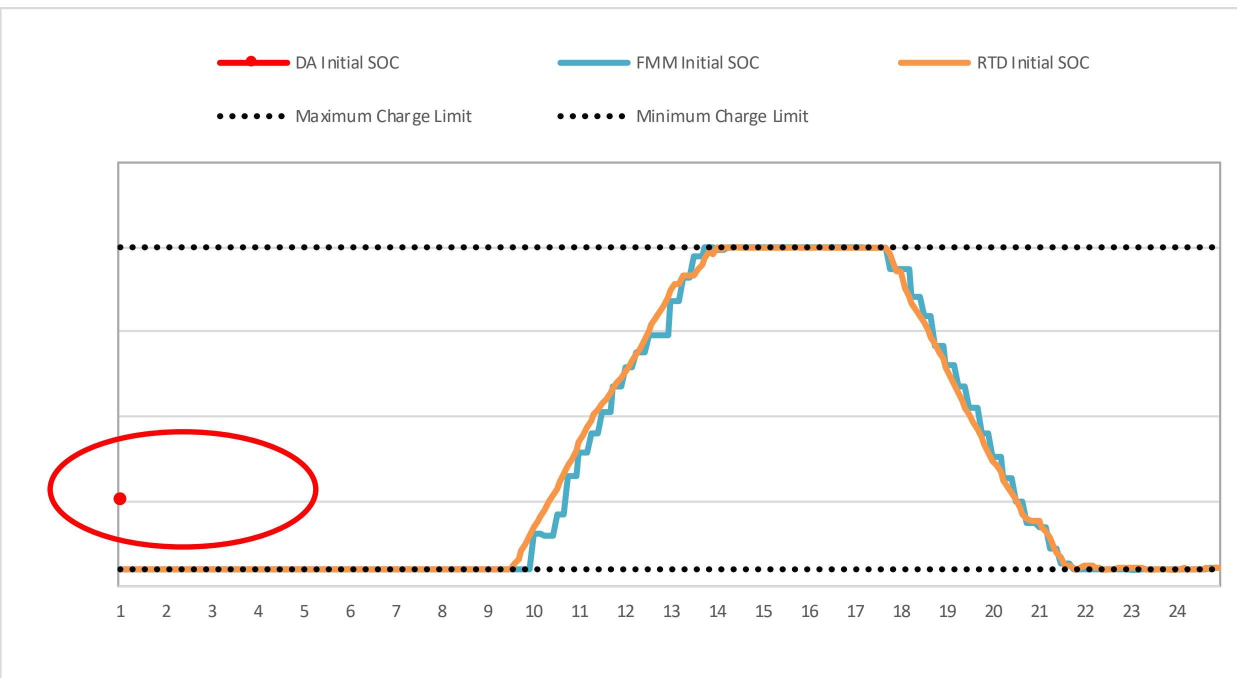
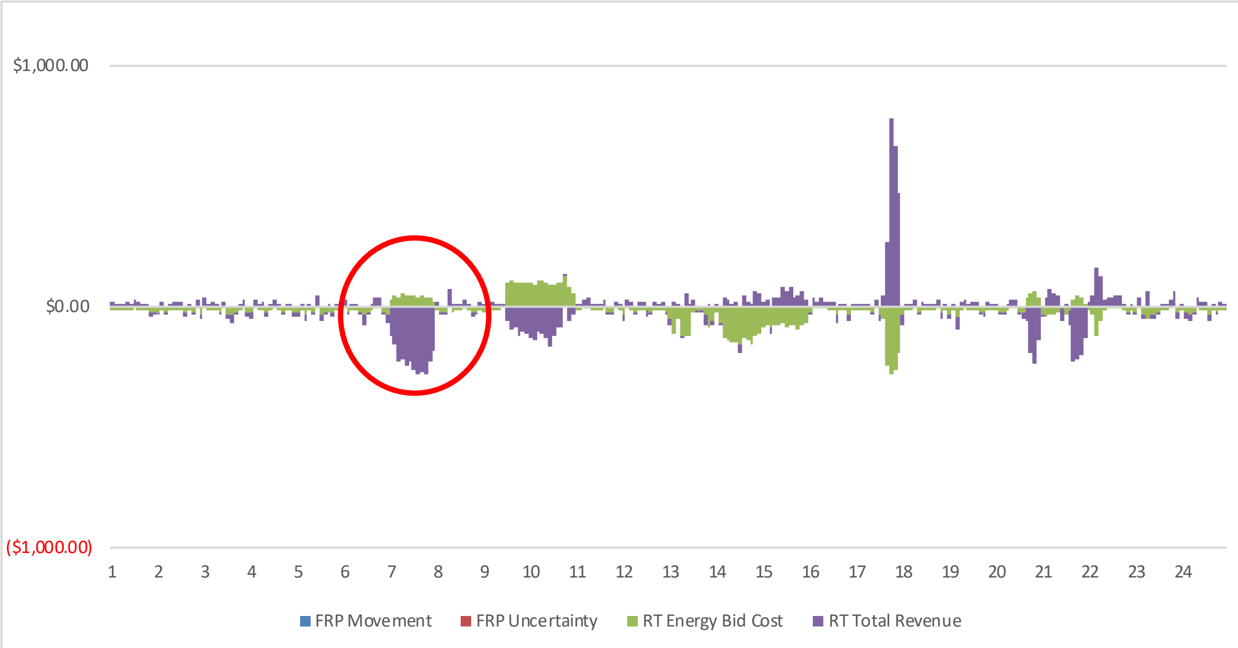


Figure 26 Example 3: Daily RT BCR Components



3.2. BCR Provisions for Energy Storage in Co-Located Configurations

Co-located configurations are relatively new within the ISO's footprint but are rapidly growing. Under a co-located configuration, different assets, usually a storage and a VER, are located behind a single Point of Interconnection (POI). In order to flexibly maximize the utilization of the POI, many co-located resources use an Aggregate Capability Constraint (ACC). Sub-ACCs also may be used if the co-located resource has multiple off-takers and SCs. In addition, in order to allow co-located resources to restrict their charging to the co-located VER as many stakeholders requested, the ISO developed the Off-Grid Charging Indicator (OGCI), which is an hourly biddable parameter.

Just like the BCR construct was not designed with standalone energy storage assets in mind, it also was developed prior to the deployment of co-located resources and the inclusion of ACCs, sub-ACCs and the OGCI. For these reasons, the ISO is seeking to address the interaction between these constraints and BCR provisions for energy storage assets.

3.3. Estimation of Opportunity Costs within Storage DEB

Although stakeholders unanimously supported the storage DEB when developed, some recently have advocated for revisions to the storage DEB. Discussions regarding enhancing the opportunity cost element of the storage DEB formulation also took place within the Price Formation Enhancements (PFE) initiative, specifically in the context of the proposed changes relative to FERC Order No. 831, as these interact with the storage DEB. In that initiative, the ISO noted that even if the default energy bid is not capped at $1,000 MW, the opportunity cost used to calculate storage default energy bids may not be a sufficient proxy for real-time opportunity costs on days that differ significantly from what was considered when the day-ahead market was run. The storage DEB being based on the fourth highest hourly day-ahead price is predicated on the assumption that real-time prices are roughly equivalent to day-ahead prices which may not hold true on most high priced days. Given the ISO's commitment to monitoring the effects of modifying the bid cap applicable to storage,[11] evaluating changes to the formulation of the storage DEB to more accurately estimate intra-day opportunity costs is timely and warranted.

3.4. DEB for Hybrid Resources

In the context of the PFE initiative, stakeholders argued that hybrid resources also should be allowed incremental bidding flexibility under Order No. 831 circumstances in order to preserve their position in the supply stack and allow for the retention of SOC for the net peak hours. In response to these arguments, the ISO noted that the modifications sought for energy storage assets were based on the existence and utilization of the storage DEB.[12] Because hybrid resources have different costs than those reflected in the storage DEB, and because hybrids do not have their own bespoke DEB at this time, the modifications developed as part of PFE could not be readily extended to hybrid assets.[13] The present initiative seeks to develop a DEB for hybrid assets.

4. Straw Proposal Relative to Track 1 – Addressing Unwarranted Storage BCR

4.1. Reclassification of Energy Associated with SOC constraints during Binding Interval as Non-Optimal due to Physical Limitations

As noted previously, when a storage resource is unable to meet its DA schedule due to physical limitations, like having a SOC that cannot support the schedule, the market instructs the storage asset to a 0 MW dispatch due to the SOC being binding, resulting in the energy to be categorized as Optimal Energy (OE), which is eligible for BCR. The ISO's proposed solution to the issue discussed in Section 3.1 involves redefining dispatch unavailable due to SOC constraints in the binding interval as "non-optimal energy," which would be ineligible for BCR. The ISO proposes to identify whether storage resources can support their awards and schedules in the real-time binding interval on a resource-by-resource basis.

[11] CAISO, Board of Governors Memo regarding the Tariff Amendment on Price Formation Enhancements, May 2024, at 5.
[12] CAISO, Rules for Bidding above the Soft Offer Cap – Final Proposal, May 2024, at 14.
[13] *Ibid.*

If a given storage resource's SOC at the start of the binding interval is equal to its minimum or maximum value, with consideration of the ASSOC constraint, the End-of-Hour SOC constraint, upper and lower charge limits, and the attenuated SOC constraint, then the market would rerate or derate the PMax or PMin to 0 in order to capture that the asset is completely full or empty. This, in turn, would lead to the reclassifying any energy associated with buy-backs or sell-backs in that binding interval as non-optimal due to physical limitations as it is not available for dispatch. As a result the ISO would exclude the energy from BCR.

The proposed solution would materially limit the chances of unwarranted BCR derived from DA schedule buy- and sell-backs. In addition, the proposed solution would align the treatment of unavailable energy from a storage asset to that of a conventional thermal asset, which has its expected energy categorized as UIE when it is unable to perform and fulfill its DA schedule due to unavailability (*i.e.,* an outage), thus making it ineligible for BCR.

5. Governance Classification: Joint Authority

This initiative proposes changes to "California ISO Settlements and Billing", "Bid and Self-Schedule Submission in California ISO", and "Market Power Mitigation Procedures" in the ISO tariff as they relate to bid cost recovery and default energy bid provisions for storage resources. The ISO believes that the WEIM Governing Body has joint authority with the ISO Board of Governors over the proposed tariff rule changes.

The ISO Board of Governors and the WEM Governing Body have joint authority over any:

> proposal to change or establish a tariff rule applicable to the WEIM/EDAM Entity balancing authority areas, WEIM/EDAM Entities, or other market participants within the WEIM/EDAM Entity balancing authority areas, in their capacity as participants in the WEIM/EDAM. The WEIM/EDAM Governing Body will also have joint authority with the Board of Governors to approve or reject a proposal to change or establish any tariff rule for the day-ahead or real-time markets that directly establishes or changes the formation of any locational marginal price(s) for a product that is common to the overall WEIM or EDAM markets. The scope of this joint authority excludes, without limitation, any other proposals to change or establish tariff rule(s) applicable only to the CAISO balancing authority area or to the CAISO-controlled grid. Note: For the avoidance of any doubt, the joint authority definition is not intended to cover balancing authority-specific measures, such as any parameters or constraints, the CAISO may use to ensure reliable operation within its balancing authority area. [14]

All of the tariff rule changes proposed in this initiative would be "applicable to the WEIM/EDAM Entity balancing authority areas, WEIM/EDAM Entities, or other market participants within the WEIM/EDAM Entity balancing authority areas, in their capacity as participants in the WEIM/EDAM." None of the proposed tariff rules would be applicable "only to the CAISO balancing authority area or to the CAISO-controlled grid." Accordingly, this initiative falls entirely within the scope of joint authority.

This proposed classification reflects the current state of this initiative and could change as the stakeholder process proceeds. Stakeholders are encouraged to submit a response to this proposed decisional classification in their written comments, particularly if they have concerns or questions.

[14] Charter for EIM Governance § 2.2.1

6. Next Steps

The ISO will hold a stakeholder meeting on this Issue Paper & Straw Proposal on August 5, 2024. Comments on this Issue Paper & Straw Proposal, as well as the August 5, 2024 stakeholder meeting, will be due August 8, 2024.