

Business Requirements Specification

Congestion Revenue Rights Auction Efficiency Track 1A

Document Version: 2

Date Created: 4/5/2018

Initial: Use Initial sign off section

Final: Use Final sign off section

Approvals

Final BRS Signatures: Final BRS only.

Signature indicates approval of the Business Requirements Specification as representing the business need accurately and completely.

Heather Kelley,
Business Unit Manager

Date

Janet Morris
Program Office Oversight

Date

Signature indicates acknowledgment of the Business Requirements Specification as sufficiently detailed to allow the project to be successfully executed. Customer Service sign-off is only required for new initiatives.

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

 LeAnne McLaughlin
 Project Manager

 Date

 Rich Giska,
 Business Analyst

 Date

 Jami Herguth, Director,
 Business Solutions

 Date

 Roberto Bayetti, Director,
 Security, Architecture, Model
 Management, and Quality

 Date

 Hani Alarian, Director,
 Power Systems Technology
 Operations Management

 Date

 Khaled Abdul-Rahman, Executive
 Director,
 Power Systems and Smart Grid
 Technology Development

 Date

Signature indicates acknowledgment of the Business Requirements Specification as sufficiently in alignment with policy vision. Policy signature is only required when project is considered a new initiative.

 Perry Servedio,
 Lead Market Design Policy
 Developer

 Date

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

Initial Business Requirements Specification Approvals:

Initial BRS Signatures: Initial BRS only.

Architect _____ **Indu Nambia** _____ **Date:** _____

Business Analyst _____ **Rich Giska** _____ **Date:** _____

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

Page Turn Reviewers Names added for Initial Reference

In the table below, document the names of those that attended the page turn (filled out as part of the final BRS) from the given groups. Those who attended the 2nd page turn are noted in **BOLD** text.

Project Manager	LeAnne McLaughlin	Business Analyst	Rich Giska
Business Unit Management	Meghna Khatri	Business SME	Jim McClain Denise Walsh Mel Ciubal
Policy	Name	Market Simulation Coordinator	Name
Systems Analyst	Warren Ernst	Architecture	Indu Nambia
PSTD	Name	Development Management	Arul Jayaraman
Production Support Lead (PSTO)	Name	Test Lead	Hydayat Khan
Enterprise Model Management	Name	Tech Lead/Sys Integrator	Indu Nambiar, Jamil Daouk Dave Bennett
Information Security	Name	Training	Name
Corporate Systems	Name	ITPM	Prince Philip, Jami Herguth
Infrastructure and Network Operations	Name	System Operations	Name

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

Distribution

The person assigned to the role below has been informed that this document is completed. Legal is only informed of the BRS should there be a legal impact, but does not require their signature.

- | | | |
|--|--|--|
| <input type="checkbox"/> Legal | <input checked="" type="checkbox"/> Test Lead | <input checked="" type="checkbox"/> Architect |
| <input type="checkbox"/> System Integrator | <input type="checkbox"/> Market Simulation Coordinator | <input type="checkbox"/> Information Modeling Engineer |
| <input checked="" type="checkbox"/> Information Security | <input checked="" type="checkbox"/> Technical Lead | |

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

Location of Document

<https://projectserverpmo.oa.caiso.com/PWA/CRR%20Auction%20Efficiency/Project%20Documents/02%20-%20Planning%20Phase/BRS/CRR%20Auction%20Efficiency%201A%20-%20BRS.docx>

Revision History

Date	Version	Description	Author	Revision Type	
				Scope?	Clarification?
4/05/2018	0.1	Initial Draft	Rich Giska	YES	
4/12/2018	0.2	Updated parts of Section 4	Rich Giska	YES	
4/13/2018	0.3	Updated Section 5 with initial BRQs	Rich Giska	YES	
4/13/2018	0.4	Updated Assumptions and revised draft BRQs in Section 5 based on stakeholder meetings	Rich Giska		
4/16/2018-4/19/2018	0.5	Per feedback during stakeholder meetings with CRR Team and Treasury/Finance: Section 4.4 <ul style="list-style-type: none"> • Modified several Assumptions to align with current and proposed processes for Sell Offers and Credit and Collateral monitoring Section 5.2 <ul style="list-style-type: none"> • Revised process description section • Modified BRQ020 and added related BRQs for UI and rescind functions • Edited BRQ021, BRQ023 and BRQ029 	Rich Giska	YES	

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.



Date	Version	Description	Author	Revision Type	
				Scope?	Clarification?
		<ul style="list-style-type: none"> Deleted BRQ027 Added BRQ030 through BRQ035 for rescinding Sell Offers 			
4/23/2018	0.6	<p>Added:</p> <p>Section 5.4 Load Migration</p> <p>Section 6.0 Context Diagram</p> <p>Updates:</p> <p>Section 5.2 - Revised BRQ027 per discussion with Jim McClain</p> <p>Section 5.5 - Added Process Description Text per discussions with James Lynn and Jim McClain</p>	Rich Giska	NO	
4/24/2018	0.7	<p>Section 4.4 – Revised Assumption #8</p> <p>Section 5.2:</p> <ul style="list-style-type: none"> Revised BRQ027 to remove impact to CTS and Integration Updated BRQ036 to clarify credit exposure requirement Added BRQ037 <p>Section 5.4:</p> <ul style="list-style-type: none"> Revised BRQ070 to reflect correct CRR types associated with Load Migration 	Rich Giska	YES	
4/26/2018	0.8	Provided performance criteria to Section 5.6.	Warren Ernst		
4/27/2018	0.9	Corrected issues with the performance metrics	Warren Ernst		

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.



Date	Version	Description	Author	Revision Type	
				Scope?	Clarification?
05/01/18		Spelling, grammar, punctuation, formatting	LeAnne McLaughlin	No	Yes
5/09/2018 To 5/11/2018	0.91	Added Section 4.1.3 for Load Migration tracking Updated Assumptions and added/modified BRQs based on feedback from CRR Software vendor	Rich Giska	YES	
5/17/2018 To 6/06/2018	0.92	Based on meeting 5/16 with ITPM, Architecture, MSS/CRR Team and Integration made the following changes: Section 5.3 – No changes identified for CTS. Deleted BRQ050, BRQ051, BRQ052 and BRQ053. Business Process description updated. Sections 7.1.and 7.2 – Added DAT001 and associated information Updated Section 8 and 10. Based on vendor feedback on allowance for Sell Offers to be included in Auction Bid submittals/portfolios, made several changes to BRQs in Section 5.2 Section 4.1.2 – Added statement eliminating Counterflow purchases Section 4.4 – Segregated Assumptions and Constraints Based on additional feedback from Jim McClain regarding CRR software functionality, made following changes to BRQs in Section 5.2:	Rich Giska	YES	

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

Date	Version	Description	Author	Revision Type	
				Scope?	Clarification?
		Revised - BRQ020B, BRQ027, BRQ027 and BRQ031 Deleted – BRQ029 and BRQ035 Revised Section 5.2 text for financial exposure treatment of Sell Offers Based on no SRS, details for OASIS were expanded by Indu Nambiar in BRQ040 and BRQ041			
6/06/2018 To 6/14/2018	0.93	Based on feedback from page turn on 6/07/18 and meetings with Settlements, made the following changes: Section 5.2 Added BRQ043 for EDR Section 5.5 <ul style="list-style-type: none"> • Revised text in Business Process description • Added BRQ080, BRQ081, BRQ082 and BRQ083 	Rich Giska	YES	
6/18/2018	0.94	Based on need to address rejection of all Sell and Buy offers in a submittal or portfolio, made the following changes: Section 5.2	Rich Giska	YES	YES

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.



Date	Version	Description	Author	Revision Type	
				Scope?	Clarification?
		<ul style="list-style-type: none"> Revised BRQ020E Added BRQ024A and BRQ034A <p>Clarified the number of Sell Offers and transactions to be included in GMC charges:</p> <ul style="list-style-type: none"> Revised BRQ037 <p>Added Risk #6 to address possible potential increase in CRRs settled daily and impact to performance.</p>			
6/21/2018	1.0	<p>Updates per final page turn 6/19/2018:</p> <p>Section 5.2 - Revised BRQ037 to clarify transaction subject to GMC charge</p> <p>Section 5.5 - Removed BRQ050, BRQ051, BRQ052 and BRQ053 to clarify no requirements exist</p> <p>Sections 7.1.2 and 7.2.2 – Added CRR1A-DAT002 based on vendor XSD change for uploading auction bids/offers</p> <p>ISSUED FOR APPROVAL</p>	Rich Giska	YES	YES
8/13/2018	2.0	<p>Per Change Request #1, made following revisions:</p>	Rich Giska	YES	YES

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

Date	Version	Description	Author	Revision Type	
				Scope?	Clarification?
		Addition of Hedge Type in CRRBidData payload: Added BRQs 40A, 41A and 42A Involvement of Market Clearing System (MCP): Added BRQs 060, 061, 062 and 063 Minor edits to BRQs 038, 039, 040, 041 and 042 to clarify CRRBidData payload Note: Corrected version to 2.0 on 8/14/2018			

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

Table of Contents

1	INTRODUCTION.....	14
1.1	STATUS OF DOCUMENT	14
1.2	PURPOSE	14
1.3	PROJECT BACKGROUND	14
1.4	PROJECT SCOPE.....	15
1.5	REFERENCES	16
2	INTELLECTUAL PROPERTY OWNERSHIP	16
2.1	GUIDELINES	17
2.2	CHECKLIST.....	17
3	DETAILS OF BUSINESS NEED/PROBLEM	17
3.1	DESCRIPTION.....	17
3.1.1	<i>Problem</i>	17
3.1.2	<i>Need</i>	17
4	BUSINESS IMPACTS	18
4.1	HIGH LEVEL DESCRIPTION OF BUSINESS PROCESS	18
4.1.1	<i>Manage Planned Outage Reporting</i>	18
4.1.2	<i>Sell CRRs</i>	18
4.1.3	<i>Manage Load Migration CRRs</i>	19
4.2	VISUAL AIDES	19
4.3	RISKS AND MITIGATION	19
4.4	ASSUMPTIONS & CONSTRAINTS	20
4.5	JUSTIFICATION	21
4.6	BUSINESS PRACTICE MANUAL (BPM)	21
4.7	OPERATING PROCEDURE.....	23
4.8	OTHER.....	23
5	BUSINESS REQUIREMENTS.....	25
5.1	BUSINESS PROCESS: MANAGE SOURCE-SINK PAIRS	25
5.1.1	<i>Business Requirements</i>	25

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

5.2	BUSINESS PROCESS: MANAGE CRR SELL PROCESS	26
5.2.1	<i>Business Requirements</i>	26
5.3	BUSINESS PROCESS: MANAGE CREDIT AND COLLATERAL	35
5.3.1	<i>Business Requirements</i>	36
5.4	BUSINESS PROCESS: MANAGE LOAD MIGRATION	37
5.4.1	<i>Business Requirements</i>	37
5.5	BUSINESS PROCESS: MANAGE SETTLEMENTS	38
5.5.1	<i>Business Requirements</i>	38
5.6	BUSINESS PROCESS: METRICS AND PERFORMANCE CRITERIA.....	40
5.6.1	<i>Business Requirements</i>	40
5.7	BUSINESS PROCESS: INFORMATION SECURITY ADHERENCE	41
5.7.1	<i>Business Requirements</i>	41
5.8	BUSINESS PROCESS: MARKET MONITORING AND REPORTING.....	44
5.8.1	<i>Business Requirements</i>	44
6	SYSTEM CONTEXT DIAGRAM.....	45
7	WEB SERVICES AND DATA REQUIREMENTS	46
7.1	SERVICE ARTIFACTS	46
7.1.1	<i>Internal Web Services</i>	46
7.1.2	<i>External Web Services</i>	46
7.2	SYSTEM IMPACT.....	47
7.2.1	<i>Internal Web Services</i>	47
7.2.2	<i>External Web Services</i>	47
8	INFORMATION MANAGEMENT	47
9	INFORMATION SECURITY NON-FUNCTIONAL REQUIREMENTS	48
10	PROJECT MODEL AND SIZING.....	49

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

1 Introduction

1.1 Status of Document

Sections one through six shall be completed as part of the Initial BRS.

The following items shall be added to the content of the Initial BRS as the basis for the Final BRS:

- Context Diagram
- Data Integration/Web Services Requirement
- Security Requirements

1.2 Purpose

The purpose of this document is to capture and record a description of what the Users and Business Stakeholders of the project wish to obtain by providing high-level business requirements. This document establishes the basis for the agreement between the initiators and implementers of the project. The information in this document serves as input to determining the scope of projects and to all Business Process Modeling and System Requirements Specifications efforts.

Business requirements are what must be delivered to provide value for the Users and Business Stakeholders. Systems, software, and processes are the ways (how) to delivery, satisfy or meet the business requirements (what). The Initial BRS will provide sufficient information to determine the scope of the project and will provide the functional business requirements so that the Architecture Decision can be made. Following the Architecture Decision, the remaining non-functional business requirements, such as data, performance, web services, and security can be added to complete the Final BRS.

1.3 Project Background

Since 2012, congestion revenue rights auction revenues that are allocated to load serving entities were on average \$130 million less than the congestion payments received by entities purchasing these congestion revenue rights. This shortfall shows that auction valuations are consistently lower than eventual payouts on the products. If congestion revenue rights are truly valued as hedging instruments for market participants, then valuations over time should be greater than the observed payouts on those products.

In early 2017, the ISO began its initiative to address the CRR auction efficiency. It is concerned about the large CRR payments made to holders of auction CRRs in comparison to the auction revenues collected when releasing the CRRs through the auctions.

The ISO began its policy stage at a stakeholder working group on December 19, 2017. The policy stage is organized into three tracks: Track 0, Track 1, and Track 2.

- Track 0 - Process, business rules, and operational guidance. Enhancements do not require tariff changes
- Track 1A:
 - Is focused on enhancements to:
 - Information received and used for the CRR allocations and auction

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

- CRR software to support a mechanism to allow market participants to sell previously acquired CRRs into subsequent auctions
 - Enhancements do require changes to the existing ISO tariff.
 - Track 1B:
 - Modify percentage (%) of capacity released for allocations and auction
 - Enhance select Settlements capabilities based on FERC decisions and achievable by 12/31/2018
 - Track 2: Focused on comprehensive design changes, structural matters, and market design rules

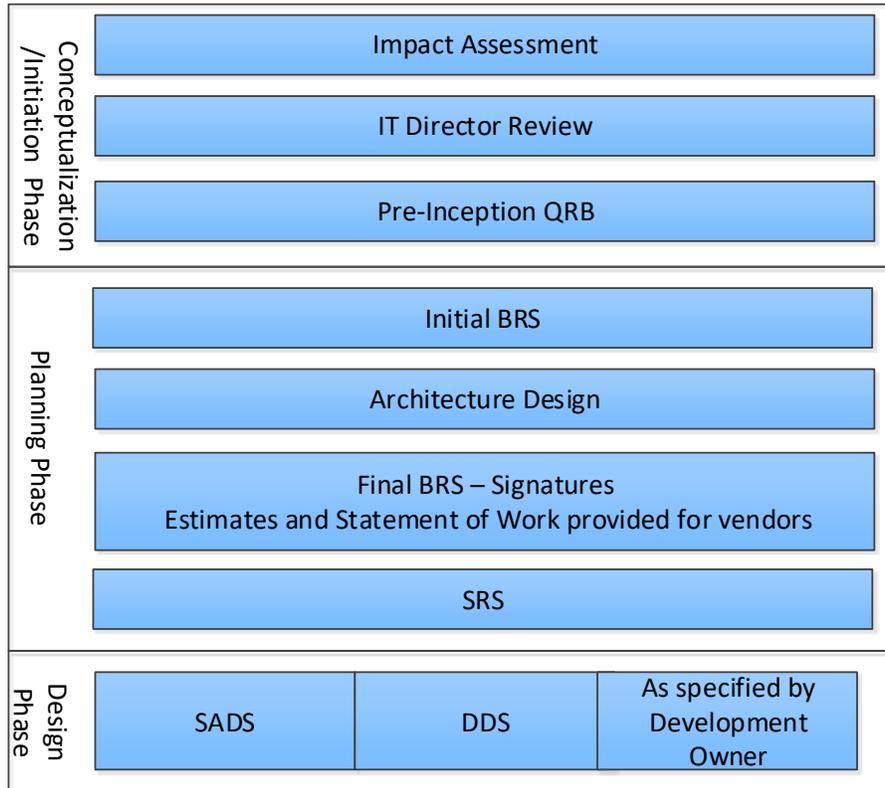
1.4 Project Scope

Only Track 1A is the subject of this Project and BRS

In Track 1A there are three (3) changes related to the congestion revenue rights allocation and auction processes:

1. Create an annual outage reporting deadline to be aligned with the annual congestion revenue rights allocation and auction process to improve the congestion revenue rights model used in the annual process.
2. Limit the congestion revenue right source and sink combinations that market participants can purchase in the auctions to better align the congestion revenue rights product with the purpose of hedging congestion charges associated with supply delivery in the CAISO's locational marginal price-based day-ahead market.
3. Introduce a mechanism to allow market participants to sell previously acquired CRRs into subsequent auctions

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018



1.5 References

All references represent external requirements documents or stakeholder requests developed and submitted by the Business Units.

- Project Plan and other relevant documents that precede the BRS are located in <https://projectserverpmo.oa.caiso.com/PWA/CRR%20Auction%20Efficiency/Project%20Documents/02%20-%20Planning%20Phase>

2 Intellectual Property Ownership

Intellectual property covers a broad array of information and materials, including written works, computer programs, software, business manuals, processes, symbols, logos, and other work products. Determining ownership of intellectual property is very important in preserving rights of the California ISO and helps to avoid intellectual property infringement

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

issues. In considering the business requirements or service requirements to be performed, the business owner of the project must determine intellectual property Ownership.

2.1 Guidelines

Intellectual property ownership must be considered by all applicable stakeholders before the services are performed. The level of analysis is two-fold. One, the business owner must determine if the intellectual property necessary to perform the services is owned by the California ISO or whether it must be obtained from a third party. Once it has been determined that the California ISO has secured the proper intellectual property rights to perform the services (i.e., the intellectual property is owned by the California ISO or we have licensed it from a third party), then the second step in the analysis is to consider whether new intellectual property will be created as a result of the business requirements or service requirements to be performed and how that intellectual property will be owned and protected by the California ISO. In order to assist the business owner in the analysis previously described, refer to the California Intellectual Property Policy available at <http://www.caiso.com/rules/Pages/LegalPoliciesNotices/Default.aspx>, which provides a brief tutorial on what Intellectual Property is and how the California ISO can go about protecting its intellectual property. Please contact the Legal Department if you have any questions regarding intellectual property.

2.2 Checklist

Not Applicable

3 Details of Business Need/Problem

3.1 Description

3.1.1 Problem

Since 2012, congestion revenue rights auction revenues that are allocated to load serving entities were on average \$130 million less than the congestion payments received by entities purchasing these congestion revenue rights. This shortfall shows that auction valuations are consistently lower than eventual payouts on the products. If congestion revenue rights are truly valued as hedging instruments for market participants, then valuations over time should be greater than the observed payouts on those products.

3.1.2 Need

CAISO needs to reduce the shortfall or difference between the Auction revenues and congestion payouts. The approach taken in this Track 1A to achieve the desired reduction includes three (3) core tasks focused on the following:

- a) Having the CRR model for the Annual Auction more accurately reflect projected congestion due to planned outages
- b) Increased valuation of CRRs which reflect true hedging of congestion costs associated with serving loads
- c) Ability of CRR Holders to sell CRR capacity to enhance their respective positions

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

Business Opportunity/Problem Statement –There is a consistent shortfall in CRR Auction Revenues versus Congestion Payouts for CRRs.	
What:	Implement measures to reduce the shortfall amount: a) Process - Require additional outage report by July 1st b) System: <ul style="list-style-type: none"> • Restrict available source-sink pairs for Auctions • System – Add CRR Sell function
When:	a) Process – Revise Outage Management BPM before July 1 st b) System – Have restricted source-sink pairs and Sell function operational before Annual Auction in 2018 for 2019 CRRs
Why do we have this opportunity/problem:	CRR Market design not optimized
Who does this opportunity/problem impact:	Market Participants CRR Team/Market Services Support

4 Business Impacts

4.1 High Level Description of Business Process

4.1.1 Manage Planned Outage Reporting

A new planned outage report is required to be submitted to the CAISO by July 1st of each year. This report will include planned outages that could affect energy flows which should be reflected in the CRR model.

In addition, transmission operators are required to submit annual planned outage reports to the CAISO on or before October 15th for the balance of the current year and all of the following calendar year. This is an existing report and this requirement will not change.

4.1.2 Sell CRRs

Currently, CRR Holders can liquidate their CRR positions through either Bilateral Trades using the Secondary Registration System (SRS) or purchasing a Counterflow CRR for current CRRs which they own.

A new mechanism will be implemented to allow CRR Holders to offer previously acquired CRRs into the Annual and Monthly Auctions.

With the new sell mechanism, the purchase of Counterflow CRRs to liquidate a position will no longer be an option.

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

4.1.3 Manage Load Migration CRRs

Based on load shifts for Load Serving Entities (LSEs), CAISO issues Load Migration CRRs that reallocate MWs for applicable CRRs. There is a need to track the MWs associated with the original allocated CRR to all related CRRs for the effective period of the subject CRRs.

4.2 Visual Aides

N/A

4.3 Risks and Mitigation

	Implementation / Non-Implementation	Description	Mitigation
1	Non-Implementation	If automation for reducing source-sink pairs available in the Annual Auction is not achieved prior to Annual Auction revenue deficiencies could persist.	Manually reduce the number of available source-sink pairs and perform a manual upload process into the CRR Auction System. Notify Market Participants their bids must adhere to the allowable pairs.
2	Non-Implementation	If no Sell Feature is available, CRR Holders will be unable to offer CRRs for sell in the Annual and monthly CRR Auctions.	Continue CRR Holders to buy Counterflow CRRs to offset their positions.
3	Implementation	Vendor may not be able to deliver all required changes to the CRR System in time for Annual Auction.	Develop a contingency plan for a phased approach that focuses on delivery of the restricted source-sink pairs.
4	Implementation	Vendor may not be able to deliver the Sell Feature in accordance with CAISO's specific business requirements included in this BRS in time for the 2018 Annual Auction for 2019 CRRs	Leverage existing capabilities within the vendor's current software and adapt the features/functions necessary to support the 2018 Annual Auction for 2019 CRRs.
5	Implementation	A potential risk is that the number of servers and data storage devices may be inadequate due to an increased volume of transactions during Auctions due to the new Sell Feature. Increase is unknown.	Develop multiple test scenarios each having a different volume of Sell transactions per portfolio submitted. Measure performance during testing and establish baseline for monitoring performance for future monthly and

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

	Implementation / Non-Implementation	Description	Mitigation
			annual Auctions. If auction performance less than acceptable, initiate corrective action plan.
6	Implementation	A potential risk is that the number of CRRs that will result from CRR Sell offers transacted in an auction, and need to be settled daily, will be greater than those currently being processed and possibly impact performance of the Settlements system. The elimination of Counterflow CRRs will reduce the number of CRRs; however, there is a potential increase in volume but it is unknown.	Establish a baseline performance metric for the current volume of CRRs being settled daily. After first auction involving Sell Offers, monitor performance against established baseline metrics. If performance is less than acceptable, initiate corrective action plan.

4.4 Assumptions & Constraints

CONSTRAINTS	
1.	All offers to sell CRRs will be made and designated for a specified market in a CRR Auction (Annual or Monthly).
2.	Offers to sell not cleared in the designated CRR Auction will expire at the end of that Auction cycle.
3.	Only a single Sell Offer for a given CRR ID will be allowed per auction.
4.	Purchase of Counterflow CRRs will be eliminated per Tariff.

ASSUMPTIONS	
1.	CRR Team will use July 1 st Outage Report data to update the CRR Model prior to Annual Auction.
2.	CRR Team will provide criteria for restricted Source-Sink pairs for Bids in CRR Software.
3.	CRR holders can offer to sell CRRs for the Annual and Monthly CRR Auctions.
4.	Sell Offers can be submitted and rescinded during the full term of the Auction window.

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ASSUMPTIONS	
5.	Sell Offers will be evaluated within the CRR software for each submittal (portfolio).
6.	Sell Offers that are submitted and have credit approval at the time the auction window closes will be made available for the applicable auction.
7.	Offers submitted before the auction window closes but are in the credit monitoring process after the auction window closes will be made available for the auction if approved.
8.	Processes for credit monitoring of Auction Bid Portfolios will be the same.
9.	If Seller submits a negative price indicating willingness to pay to have CRR taken in auction, that offer will be included in the CRR software's financial exposure calculations.
10.	Processes for collateral management will not change.
11.	CRRs offered for sale in a CRR Auction and cleared with a new CRR Holder will have ownership changes made in the CRR Software system.
12.	Load migration tracking requirements will be addressed in BRQs.
13.	The increase in volume of transactions per auction will not be significantly different than currently processed.

4.5 Justification

Since 2012, the CRR market has experienced significant shortfalls in that congestion payments have been on average \$130 million more than revenues received from CRR auctions. This shortfall has placed the burden the expenses on the load serving entities. This CRR Auction Efficiency initiative is aimed at reducing these shortfalls through mechanisms that will drive greater valuation of CRRs and produce greater auction revenues: thus, reducing the financial shortfalls and burdens on the load serving entities.

4.6 Business Practice Manual (BPM)

BPM	Description of Impact(s)
Managing Full Network Model	N/A
Congestion Revenue Rights	YES: <ul style="list-style-type: none"> • Sell option to be added. • CRR-related July Outage Report to be added

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

BPM	Description of Impact(s)
	POC: Jim McClain
Market Instruments	YES: Section 12.7 to add Buy/Sell Indication POC: Jim McClain, Jamal Batakji
Outage Management	YES: <ul style="list-style-type: none"> • CRR-related July Outage Report to be added • Criteria for information to report to be added POC: Guillermo Bautista-Alderete, Dede Subakti, Gautham Katta
Reliability Requirement	N/A
Market Operations	N/A
Compliance Monitoring	N/A
Metering	N/A
Scheduling Coordinator Certification & Termination	N/A
Rules of Conduct Administration	N/A
BPM Change Management	N/A
Definitions & Acronyms	YES: <ul style="list-style-type: none"> • Definition of Sell Offer • Possibly others POC: Jamal Batakji, Jim McClain, David Zlotlow
Settlements & Billing	YES – Document only change
Credit Management & Market Clearing	N/A
Candidate CRR Holder	N/A
Transmission Planning Process	N/A
Direct Telemetry	N/A
Distributed Generation for Deliverability	N/A

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

BPM	Description of Impact(s)
Energy Imbalance Market (EIM)	N/A
Generator Interconnection Procedure (GIP)	N/A
Generator Interconnection and Deliverability Allocation Procedures	N/A
Generator Management	N/A
Managing Full Network Model	N/A

4.7 Operating Procedure

ISO Operating Procedures can be referenced at:

<https://records.oa.caiso.com/sites/opsprocedures/SitePages/Home.aspx>

Operating Procedure	Description of Impact(s)
Day Ahead Balancing Operations - 1000	N/A
Real Time Balancing Operations - 2000	N/A
Transmission Operations - 3000	YES: Procedure 3210 will need to be updated to reflect new CRR Outage submittals and CAISO Reviews. Sections potential affected include: <ul style="list-style-type: none"> • 3.1 – Outage Coordination and Request Timeframes • 3.3 – Review and Approval of Outage Requests POC: Licheng Jin
Emergency Operations - 4000	N/A
Communications/ Administrative – 5000	N/A
Bulk/ TOP-007 Paths - 6000	N/A
Regional - 7000	N/A
Other PTOs/ BAs - 8000	N/A

4.8 Other

Impact:	Description: (optional)
Market Simulation	YES: CRR System
Market Participant Impact	YES: CRR System Use
User Acceptance Testing (UAT)	YES: CRR System – CAISO with Vendor
Internal Training	YES: CRR System Configuration

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

Impact:	Description: (optional)
External Training	YES: CRR System for UI Access & New mechanism to allow market participants to sell previously acquired CRRs into subsequent auctions
Policy Initiative	YES
Vendor	YES: Nexant
Architectural Framework and Roadmap	NO – Existing architectural infrastructure will be used

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

5 Business Requirements

The sections below describe the Business Processes and the associated Business Requirements involved in the project. These may represent high level functional, non-functional, reporting, and/or infrastructure requirements. These business requirements directly relate to the high level scope items determined for the project.

5.1 Business Process: Manage Source-Sink Pairs

The CAISO will identify the source-sink pairs that will be made available for the Annual and Monthly CRR Auctions. The allowed sources and applicable sink locations will be in accordance with the Tariff and Congestion Revenue Rights Business Practice Manual (BPM).

5.1.1 Business Requirements

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ001	System shall provide a User Interface that enables CASIO to specify valid locations to be identified as sources for CRR Source-Sink Pairs available for each CRR Auction	Core	MSS ITPM	CRR Software
CRR1A-BRQ002	System shall provide a User Interface that enables CASIO to specify valid locations to be identified as sinks for CRR Source-Sink Pairs available for each CRR Auction	Core	MSS ITPM	CRR Software
CRR1A-BRQ003	System shall provide the capability for CAISO to specify the allowable combinations of Source-Sink Pairs available for each CRR Auction	Core	MSS ITPM	CRR Software
CRR1A-BRQ004	System shall use the allowable Source-Sink Pairs for CRR Source-Sink Pairs available in CRR Auctions to validate Bid Offers	Core	MSS ITPM	CRR Software
CRR1A-BRQ005	System shall have the ability to validate source-sink pairs by market name	Core	MSS ITPM	CRR Software

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

5.2 Business Process: Manage CRR Sell Process

CRR Holders will have the opportunity to sell CRRs in both the Annual and Monthly CRR Auctions. These Sell Offers must be made in accordance with the requirements of the Congestion Revenue Rights BPM.

CRR Holders will have the opportunity to submit and rescind Sell Offers during the Auction window identified by the CAISO.

Sell Offers can be made in submittals dedicated to Selling CRRs or they can be included with Auction Bid submittals. In either case, rescinding a Sell Offer will require that all Sell and Bid Offers in the submittal/portfolio in which the original Sell Offer was included be rescinded.

Only one (1) Sell Offer for a given CRR ID can be submitted for each auction. Bid curves should be used for presenting options for offering optional MW values within the same Sell Offer.

CRRs offered for sale in the Secondary Registration System (SRS) and not cleared will be restricted from being submitted in an Auction.

5.2.1 Business Requirements

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ020A	System shall provide a User Interface (UI) to enable CRR Holders to submit offers to sell CRRs. Sell Offers submittals: <ul style="list-style-type: none"> • Can be isolated from Auction Bids submittals. • Can be combined with Auction Bid submittals 	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ020B	System shall provide a User Interface (UI) to enable CRR Holders to rescind previously submitted and accepted offers to sell CRRs during an Auction.	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ020C	System to restrict CRR Holders to submit and rescind single offers to sell any CRR ID during an Auction.	Core	Market Participants MSS ITPM	CRR Software

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ020D	Window of time to submit or rescind Sell Offers to be the same as for Bid Offers.	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ020E	<p>If a CRR has been offered for sale in the Secondary Registration System (SRS) and not cleared during an auction window:</p> <ul style="list-style-type: none"> System will reject a Sell Offer submittal for that CRR ID System will also reject all Sell and Buy Offers in the same submittal/portfolio System will present error message to user indicating basis for rejection 	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ020F	<p>If a CRR has been offered for sale in the Secondary Registration System (SRS) and the CRR clears during an auction window:</p> <ul style="list-style-type: none"> System will calculate the remaining MWs available for the CRR ID System will allow submittal of a Sell Offer for the CRR ID the day after the SRS transaction has cleared 	Core	Market Participants MSS ITPM	CRR Software

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ021	<p>System shall validate that CRR Holders have included, but not limited to, the following information in each Sell Offer.</p> <p>All fields are required to be completed:</p> <ul style="list-style-type: none"> • CRR Holder • CRR ID • MWs offered are within the available range of the CRR ID as recorded in the CRR system • Price: <ul style="list-style-type: none"> ○ Price Curve must be monotonically non-decreasing 	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ022	System shall validate that CRR Holders have offered CRRs that they hold.	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ023	System must validate CRR Sell Offers for acceptance using the specific market Auction effective period and comparing that period to the effective period of the offered CRR.	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ024	System shall reject the submitted Sell Offer if offer does not meet all requirements noted in BRQ021, BRQ022, and BRQ023.	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ024A	If a submittal Sell Offer is rejected per BRQ024, all other Sell and Buy Offers in the same submittal/portfolio will be rejected.	Core	Market Participants MSS ITPM	CRR Software

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ025	If a submittal is rejected per BRQ024, an error message shall be provided to the user indicating the rejection and including applicable information regarding the rejection.	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ026	<p>Upon validation of all requirements for Sell Offers noted in BRQ021, BRQ022 and BRQ023, system shall retain for audit purposes each Sell Offer record which shall include, but not be limited to, the following attributes:</p> <ul style="list-style-type: none"> • Designated CRR Auction for the Sell Offer • Date the Sell Offer was accepted in the system • If applicable, date the Sell Offer was rescinded 	Core	Market Participants MSS ITPM	CRR Software

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ027	<p>System shall include accepted Sell Offers in each submittal/portfolio and send relevant data to CAISO system for credit monitoring as required:</p> <ul style="list-style-type: none"> • If Sell Offer includes a Sell Price equal to or greater than \$0.00, system: <ul style="list-style-type: none"> ○ Will consider the Sell Offer at \$0.00 in the financial exposure calculations for the associated submittal/portfolio sent to the CAISO system for credit status ○ Will include the Sell Offer in auction inventory upon credit status approval from CAISO system per BRQ027A • If Sell Offer includes a Sell Price less than \$0.00, i.e., Seller is willing to pay for a Bidder to take the CRR, system: <ul style="list-style-type: none"> ○ Will include the Sell Offer in the financial exposure calculations for the associated submittal/portfolio sent to the CAISO system for credit status ○ Will include the Sell Offer in auction inventory upon credit status approval from CAISO system per BRQ027A 	Core	Market Participants MSS ITPM ITPD TFA	CRR Software
CRR1A-BRQ027A	<p>System to receive and process credit status response from CAISO system for Sell Offers included in submittals/portfolios:</p> <ul style="list-style-type: none"> • If submittal/portfolio credit acceptance, include all Sell Offer and Bids in auction inventory • If submittal/portfolio credit rejected, reject all Sell Offer and Bids in the associated submittal/portfolio. • An error message shall be provided to the user indicating the rejection and including applicable information regarding the rejection. 	Core	Market Participants MSS ITPM TFA	CRR Software

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ028	All accepted and recorded Sell Offers that do not clear during the designated CRR Auction shall expire and will not be available for a subsequent CRR Auction.	Core	Market Participants MSS	CRR Software
CRR1A-BRQ030	<p>When a CRR Holder rescinds a Sell Offer, system shall validate that the CRR Holder has included, but not limited to, the following information in each submittal rescinding a Sell Offer during an Auction.</p> <p>All fields are required to be completed:</p> <ul style="list-style-type: none"> • CRR Holder • CRR ID • Submittal/portfolio ID in which the Sell Offer being rescinded was included 	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ031	System shall validate the submittal/portfolio ID that included the Sell Offer being rescinded as noted in BRQ030	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ032	System shall reject the rescind submittal if it does not meet all requirements noted in BRQ030 and BRQ031.	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ033	If a rescind submittal is rejected per BRQ032, an error message shall be provided to the user indicating the rejection and including applicable information regarding the rejection.	Core	Market Participants MSS ITPM	CRR Software

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ034	<p>Upon validation of all requirements for rescinding a Sell Offer noted in BRQ030 and BRQ031, system shall retain for audit purposes each rescind submittal record which shall include, but not be limited to, the following attributes:</p> <ul style="list-style-type: none"> • Designated CRR Auction for the rescinded Sell Offer • Date the rescind submittal was accepted in the system • The submittal/portfolio ID in which the original Sell Offer was made 	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ034A	<p>Upon validation of all requirements for rescinding a Sell Offer noted in BRQ030 and BRQ031, system shall reject all other Sell and Buy Offers included in the same submittal/portfolio.</p>	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ036	<p>For Sell Offers:</p> <ul style="list-style-type: none"> • Maximum bid exposure to be calculated based solely on the bid curve submitted by the selling entity • System to determine where on the bid curve maximum bid exposure would be derived <p>The credit margin piece of the calculation:</p> <ul style="list-style-type: none"> • Only applies to an entity that is offering to pay another entity to take the CRR being offered • Does not apply to an entity offering CRRs for sale in the auction 	Core	Market Participants MSS ITPM	CRR Software

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ036A	For purposes of calculating the CRR credit holding requirement, system will: <ul style="list-style-type: none"> • Use the netted MW value after accounting for any MWs sold in the auction • Retain to the account of the selling entity the netted MW value in the netting CRR group to which it was originally assigned • Assign the new CRR acquired by the buying entity to the Auction group CRR, regardless of the type of CRR that was offered for sale 	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ036B	For CRR Sell transactions in the auction, system will process the transactions as follows: <ul style="list-style-type: none"> • For sold CRR: <ul style="list-style-type: none"> ○ If no available MWs remain for the CRR, close/terminate the CRR ○ If available MWs remain for the CRR, identify and record the available amount and retain the same CRR Type ○ If the CRR was a seasonal CRR but only one month of the CRR was sold, create and manage required subsets of the original CRR to enable clear indication of MWs available for remaining effective period of the CRR • For CRRs purchased: <ul style="list-style-type: none"> ○ Retain current practice of assigning Auction Type to all purchased CRRs, regardless of the Type of CRR that was sold ○ Record MW amount purchased and available in the new CRR 	Core	Market Participants MSS ITPM	CRR Software

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ037	Upon close of the auction market, system shall include Sell Offers in the number of bid transactions identified for GMC Charges per BAID	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ038	System to include Sell Offers available for auction in <u>CRRBidData</u> auction bid data payload submitted to OASIS	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ039	System to submit bid data <u>CRRBidData</u> payload to OASIS after all Sell Offers have completed the credit checking process and disposition received from CAISO system	Core	Market Participants MSS ITPM	CRR Software
CRR1A-BRQ040	System to include indicator in auction bid data <u>CRRBidData</u> payload submitted to OASIS that provides differentiation between Sell and Buy transactions resulting from auction. A new element called TransactionType shall be added to the <u>CRRBidData</u> XSD to support this.	Core	Market Participants MSS ITPM	CRR Software
<u>CRR1A-BRQ040A</u>	<u>System to include indicator in CRRBidData payload submitted to OASIS that provides indication of CRR Hedge Type, i.e., Obligation or Option. A new element called HedgeType shall be added to the CRRBidData XSD to support this.</u>	<u>Core</u>	<u>Market Participants</u> <u>MSS</u> <u>ITPM</u>	<u>CRR Software</u>
CRR1A-BRQ041	System to add Column for identifying individual transactions as BUY or SELL. <u>Data for ¶</u> this additional column called Transaction Type shall be received from CRR in the <u>CRRBidData</u> payload. The additional column of transaction <u>Transaction type-Type</u> shall be included in the CRR public bid data report which is available only using the API.	Core	Market Participants MSS ITPM ITPD	OASIS

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ041A	System to add Column for identifying individual transactions as BUY or SELL. Data for this additional column called Hedge Type shall be received from CRR in the BidData payload. The additional column of Hedge Type shall be included in the CRR public bid data report which is available only using the API.	Core	Market Participants MSS ITPM ITPD	OASIS
CRR1A-BRQ042	System to receive bid data-CRRBidData payload from CRR Software and process payload transactions to: <ul style="list-style-type: none"> Discern type of transaction, i.e., either BUY or SELL Insert transaction type in new Column identified in BRQ041 	Core	Market Participants MSS ITPM ITPD	OASIS
CRR1A-BRQ042A	System to receive CRRBidData payload from CRR Software and process payload transactions to: <ul style="list-style-type: none"> Discern Hedge Type, i.e., either OBLIGATION or OPTION Insert hedge type in new Column identified in BRQ041A	Core	Market Participants MSS ITPM ITPD	OASIS
CRR1A-BRQ043	System to update data tables and data retrieval mechanism to align with updated table structure in CRR Software system		ITPM ITPD	EDR

5.3 Business Process: Manage Credit and Collateral

All Bid Portfolios submitted by a Market Participant for each CRR Auction must be reviewed to determine if the bidder's current credit status is sufficient to allow the bids to be accepted in the CRR Auction.

Sell Offers submitted by a Market Participant for each CRR Auction and having a sell price of \$0.00 or greater will be considered as \$0.00 exposure and included in portfolio-based exposure calculations submitted to CAISO for review of credit status.

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

Sell Offers submitted by a Market Participant for each CRR Auction and having a sell price of less than \$0.00 (i.e., Seller will pay Bidder to take CRR) must be included in portfolio-based exposure calculations submitted to CAISO for review of credit status.

After the CRR Auction runs and all bids are cleared in the CRR Software system, the Award Portfolio for each Market Participant is reviewed and the credit status of the respective Market Participant is updated as required.

NOTE: CRR Software system will perform required exposure calculations, generate portfolio-based bid exposures and submit them to CAISO system in same manner as done currently. Thus, no new requirements are imposed on CAISO's Credit Tracking System (CTS)

5.3.1 Business Requirements

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
<u>CRR1A-BRQ060</u>	<u>System to deliver CRRAuctionData payload to CAISO Market Clearing system with the following data related to CRRs sold in the Auction:</u> <ul style="list-style-type: none"> • <u>.mrid for CRR will be ID of original CRR offered for sale</u> • <u>.mrid for Organisation will be SELLER BAID</u> • <u>roleType in Organisation will be SELLER</u> • <u>Sign convention for indicating revenue to be assigned to SELLER for CRR sold will be (+)</u> <u>Sign convention for indicating payment due from SELLER for CRR sold at a negative price will be (-)</u>	<u>Core</u>	<u>MSS</u> <u>Corp Systems</u> <u>Credit</u>	<u>CRR Software</u>
<u>CRR1A-BRQ061</u>	<u>For CRRs sold in an Auction, system to receive and process CRRAuctionData payload considering details included in BRQ060</u>	<u>Core</u>	<u>MSS</u> <u>Corp Systems</u> <u>Credit</u>	<u>Market Clearing (MCP)</u>

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ062	<p><u>System to deliver CRRAuctionData payload to CAISO Market Clearing system with the following data related to CRRs purchased in the Auction:</u></p> <ul style="list-style-type: none"> • <u>.mrid for CRR will be ID of new CRR offered for sale</u> • <u>.mrid for Organisation will be BUYER BAID</u> • <u>roleType in Organisation will be BUYER</u> • <u>Sign convention for indicating cost to be assigned to BUYER for CRR purchased will be (+)</u> <p><u>Sign convention for indicating payment due to BUYER for purchase of CRR sold at a negative price will be (-)</u></p>	<u>Core</u>	<u>MSS</u> <u>Corp Systems</u> <u>Credit</u>	<u>CRR Software</u>
CRR1A-BRQ063	<p><u>For CRRs purchased in an Auction, system to receive and process CRRAuctionData payload considering details included in BRQ062</u></p>	<u>Core</u>	<u>MSS</u> <u>Corp Systems</u> <u>Credit</u>	<u>Market Clearing (MCP)</u>

5.4 Business Process: Manage Load Migration

Load migration CRRs are assigned by CAISO as Counterflow CRRs associated with Allocated CRRs held by an LSE. A Counterflow CRR (LM_CNT) is associated with a new CRR allocated to another LSE (LM_LSE) with equivalent MWs. Trading Hub Counter-flow CRRs (LSE_THCNT) are also issued.

CAISO must track and account for all MWs assigned to the original Allocated CRRs through the effective period of each Allocated CRR. Any selling of Load Migration-related CRRs must not affect the ability to track all the MWs assigned to the original Allocated CRR.

5.4.1 Business Requirements

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ070	System to Track Allocated CRRs and associated Load Migration-related CRRs through their entire effective period. CRR Types: <ul style="list-style-type: none"> • LSE – Regular allocation CRRs • LMT_CNT CRRs – Load migration Counter-Flow direction CRRs • LSE_LMT CRRs – Load migration flow direction CRRs • LSE_THCNT – Trading Hub Counter-Flow CRRs Tracking to enable maintenance and ability to retrieve all MWs associated with allocated type CRR	Core	Market Participants MSS ITPM	CRR Software

5.5 Business Process: Manage Settlements

Current process for settlement of Auction results addresses “buy” transactions and includes financial results in applicable SC Settlement statements.

Inclusion of Sell transactions will not change the overall process involved with the CRR Software providing the Auction Results to Settlements. However, it will require the CRR Software system to provide an indication of a Buy versus a Sell transaction in the Auction Results data which will need to be received and processed by Settlements accordingly.

5.5.1 Business Requirements

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ080	System to deliver CRR AuctionData payload to CAISO Settlements system with the following data related to CRRs sold in the Auction: <ul style="list-style-type: none"> • .mrid for CRR will be ID of original CRR offered for sale • .mrid for Organisation will be SELLER BAID • roleType in Organisation will be SELLER • Sign convention for indicating revenue to be assigned to SELLER for CRR sold will be (+) • Sign convention for indicating payment due from SELLER for CRR sold at a negative price will be (-) 	Core	ITPM MSS	CRR Software
CRR1A-BRQ081	For CRRs sold in an Auction, system to receive and process CRR AuctionData payload considering details included in BRQ080	Core	ITPM ITPD MSS Corp Systems	DReAMS Market Clearing (MCP)

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ082	System to deliver CRR AuctionData payload to CAISO Settlements system with the following data related to CRRs purchased in the Auction: <ul style="list-style-type: none"> • .mrid for CRR will be ID of new CRR offered for sale • .mrid for Organisation will be BUYER BAID • roleType in Organisation will be BUYER • Sign convention for indicating cost to be assigned to BUYER for CRR purchased will be (+) • Sign convention for indicating payment due to BUYER for purchase of CRR sold at a negative price will be (-) 	Core	ITPM MSS	CRR Software
CRR1A-BRQ083	For CRRs purchased in an Auction, system to receive and process CRR AuctionData payload considering details included in BRQ082	Core	ITPM ITPD MSS Corp Systems	DReAMS Market Clearing (MCP)

5.6 Business Process: Metrics and Performance Criteria

5.6.1 Business Requirements

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ100	System performance shall not be degraded as a result of implementing this project's functionalities.	Core	MSS	CRR

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
CRR1A-BRQ101	System availability shall not be degraded as a result of implementing this project's functionalities to support the Sell feature	Core	MSS	CRR

CRR	UI				
Application Use Case	Peak # of Concurrent Users (is defined as 10% of Max Users as performing an action concurrently)	Max # of Users (registered in the system)	Peak Transaction Rate (per Minute)	Display size (Record count/rows)	Expected Max Response Time (seconds).
	20	200	5	N/A	<10 seconds
MUI Uploads	2	N/A	5	N/A	<30 Seconds
Submittal of Sell Offers	20	200	2	N/A	<30 Seconds

5.7 Business Process: Information Security Adherence

5.7.1 Business Requirements

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
IS-BRQ001	The ISO shall adhere to the existing <u>B2B Integration Security Specification</u> when exchanging information with external entities or within the ISO itself.	Core		
IS-BRQ-002	The ISO shall adhere to the existing <u>Corporate Oracle Database Administration Standards, Guidelines, and Procedures</u> when facilitating the consistent implementation and management of Oracle databases throughout the California ISO.	Core		
IS-BRQ-003	The ISO shall adhere to the existing <u>Malicious Software Prevention Program and Procedures</u> when implementing, administering, and managing the malware prevention program.	Core		
IS-BRQ-004	The ISO shall utilize the existing <u>Required Security Monitoring</u> document when considering: <ul style="list-style-type: none"> 1. what security standards to monitor, 2. the minimum security standards, 3. which operating systems to monitor, Which application components to monitor, and how to monitor each of the above.	Core		

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
IS-BRQ-005	The ISO shall adhere to the existing Cyber Systems Security Management Program when determining the security standards used to measure and ensure the reliable/ secure operation of ISO systems.	Core		
IS-BRQ-006	The ISO shall adhere to the existing <u>Enterprise Information Security Policy</u> when instituting controls and standard security policy elements across the California ISO.	Core		
IS-BRQ-007	The ISO shall adhere to the existing <u>Corporate Information Security Standards</u> when facilitating the implementation and management of the Enterprise Information Security Policy.	Core		
IS-BRQ-008	The ISO shall adhere to the existing <u>CAISO Information Security Vulnerability Management Program</u> when integrating vulnerability management processes.	Core		
IS-BRQ-009	The ISO shall adhere to the existing <u>Information Security Risk Management Program</u> when performing risks analysis.	Core		

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
IS-BRQ-010	The ISO shall adhere to the existing <u>Security Patch Management Procedure</u> when tracking threats to cyber assets in the absence of asset-specific security patches.	Core		

5.8 Business Process: Market Monitoring and Reporting

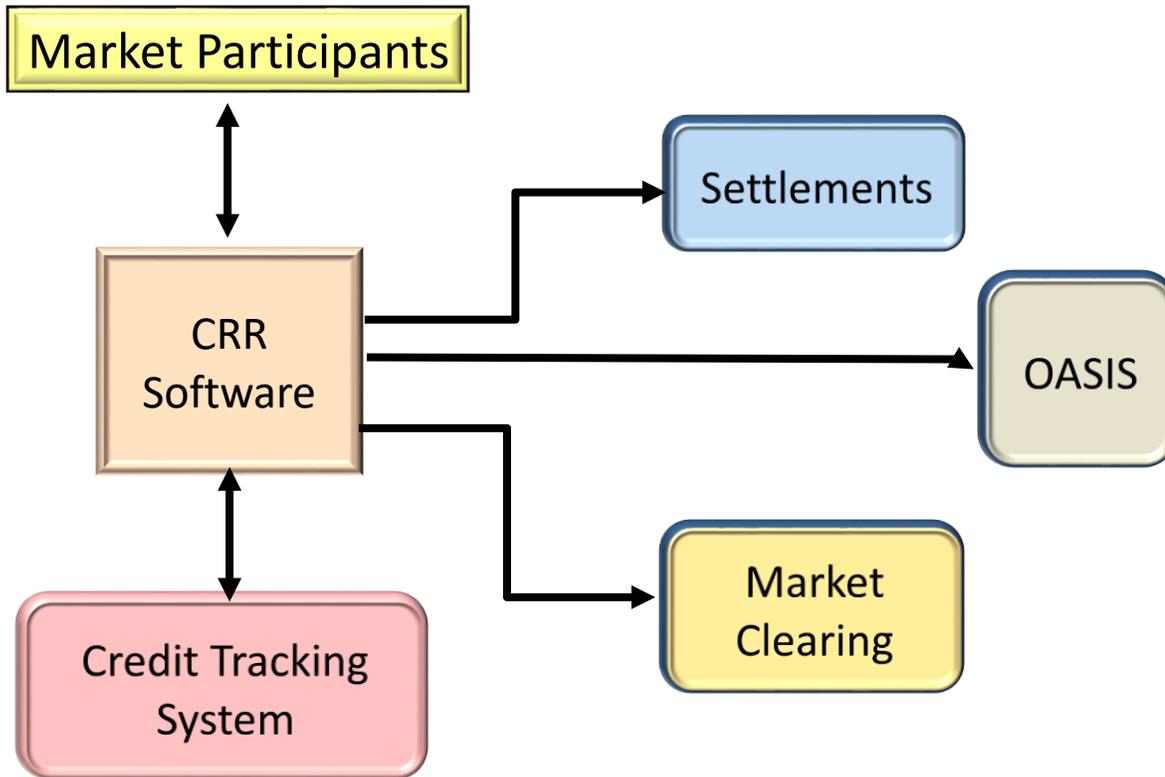
5.8.1 Business Requirements

Market Monitoring currently has access to CRR Auction data to perform required monitoring. For the new Sell functions, access to the CRR Software and Auction data will be available.

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Application(s) Impacted
N/A	N/A	N/A	N/A	N/A

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

6 System Context Diagram



 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

7 Web Services and Data Requirements

7.1 Service Artifacts

The tables below define the Data requirements and its respective impacted artifacts. Each Data requirement is assigned a unique ID starting with the system acronym plus a prefix of “DAT” followed by a 3 digit number with leading zeros if necessary.

7.1.1 Internal Web Services

This table lists the web services between CAISO internal systems:

Data ID	Data Set Name	Description of Data Set/Context of the data set/Use case	Link to data requirements spreadsheet	Trigger Event/Frequency
CRR1A-DAT001	CRRBidData	Data set contains results of CRR Monthly and Annual Auctions	WSDR-CRRBidData.xlsx	Automatically triggered at close of each auction

7.1.2 External Web Services

This table lists the web services between systems external to the CAISO (market participants) and CAISO-based systems:

Data ID	Data Set Name	Description of Data Set/Context of the data set/Use case	Link to data requirements spreadsheet	Trigger Event/Frequency
CRR1A-DAT002	Portfolio Data	Upload of Sell Offers	Vendor Provided	Upon portfolio submission

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

7.2 System Impact

The tables below map the Data requirements and its respective impact on a system level. Each data requirement must reference at least one Business Requirement, Functional Requirement or Use Case. Requirement(s) ID(s) will be listed in the second left column.

7.2.1 Internal Web Services

This table identifies the provider and consumer system/s impacted by the data requirement:

DATA ID	Data Set Name	Provider System (Source Application)	Consumer System (Sink Application)
CRR1A-DAT001	CRRBidData	CRR Software	OASIS

7.2.2 External Web Services

This table identifies the provider and consumer system/s impacted by the data requirement:

DATA ID	Data Set Name	Provider System (Source Application)	Consumer System (Sink Application)
CRR1A-DAT002	Portfolio Data	Market Participant	CRR Software

8 Information Management

Information Management applies to new and existing systems that anticipate the storage of all information. This section will be used to communicate functional requirement development of data retention requirements.

The Records Retention Schedule can be found here:

<https://records.oa.caiso.com/sites/GCA/CBO/Records/Records%20Program/Retention/Schedule/RecordsRetentionSchedule.xls>

- Does the system have an existing [Retention Schedule](#) aligned with the records management policy? In other words, is the system disposing of data or information regularly as prescribed by the retention schedule? If unsure, please contact Information Governance at recordsmanagement@caiso.com.

Yes OPR13-240 Ten (10) Years

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

No

2. Has the retention schedule been considered a scope item if no known retention schedule exists?
If No, this must be escalated to [Information Governance](#).

Yes N/A

No

3. If the retention schedule has been considered out of scope, has a plan been set up to address this as a future initiative or enhancement?

Yes N/A

No

If No, contact [Information Governance](#).

9 Information Security Non-Functional Requirements

Please see the documents for "Information Security, Policies and Standards" located on the ECURRENT Website at:

<https://ec.oa.caiso.com/Pages/PoliciesAndProcedures.aspx>

Also see the document on Application Security, "CAISO Application Development Standards," located on the ECURRENT Website at:

<https://records.oa.caiso.com/sites/technology/qaedm/IS/Records/Forms/AllItems.aspx?RootFolder=%2Fsites%2Ftechnology%2Fqaedm%2FIS%2FRecords%2FPolicies%20and%20Procedures%2FWebPostings%2FApplication%20Security&&InitialTabId=Ribbon%2EDocument&VisibilityContext=WSSTabPersistence>

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

10 Project Model and Sizing

This section will help identify the project model and size. The Project Manager/Initiative Manager/Business Analyst Lead will contribute to the information captured within the tables. The estimated project end date should be assumed to be the same as the implementation date set in the Pre-Inception QRB. This information from the impact assessment should be re-evaluated as needed based upon the potential systems identified within the BRS.

1. Enter the model type; identify the impacted development team(s) based on the estimated impacted systems:

Development Team(s)	Model Type
PSTD and IT Product Development	PSTD and IT Prod Dev
IT Product Development	IT Prod Development
PSTD	PSTD Dev
Corporate Systems	Corporate Systems Dev
Corporate Systems and IT Prod Development	Corporate Systems and IT Prod Dev
PSTO	PSTO Dev
PSTO and PSTD Dev	PSTO and PSTD Dev
Unique	PSTO only, Architecture, etc.

Model Type = Unique (ITPM and Vendor = Nexant)

2. Enter the model size based on the estimated total project duration (all phases from Initiation to Close Out):

Total Project Duration	Size
< 3 mon	Small
3 – 6 months	Medium

Owner: Giska, Rich

Program Office

California ISO INTERNAL USE. For use by all authorized California ISO personnel. Do not release or disclose outside the California ISO.

 California ISO	Technology	Template Version:	4.3
		Document Version:	2
Congestion Revenue Rights Auction Efficiency Track 1A Business Requirements Specification - Planning		Date Created:	4/5/2018

Total Project Duration	Size
6 – 12 months	Large
12 + months	Very large

Size = Medium

3. Enter the estimated project model start date; it is the same as the date the impact assessment was started:

Estimated Project Model start date = 3/01/2018

4. Enter the estimated project model finish date; the release the project is targeted for or the targeted completion timeframe.

Estimated Project Model end date = 11/01/2018