

Business Requirements Specification

Reliability Demand Response Resource Bidding Enhancements – Track-1

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Revision History

Date	Version	Description
3/4/2022	1.0	Initial Document Release.

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1 Introduction

1.1 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 determine the scope of projects and 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 deliver, satisfy or meet the business requirements (what).

The purpose of this initiative is to align Reliability Demand Response Resource (RDRR) real-time bidding with FERC Order No. 831.

1.2 Conventions

- None

1.3 Overview and Scope

This project enhances real-time bidding for the Reliability Demand Response Resource (RDRR) model by aligning RDRR bidding rules with real-time price conditions consistent with FERC Order No. 831 by requiring that RDRRs must bid at least 95% of the hard energy bid cap (\$1,900/MWh) when the conditions are satisfied to raise the soft energy bid cap to \$2,000/MWh without requiring additional cost-justification support to substantiate their bids.

Additionally, this project maintains the positioning of RDRRs in the market consistent with the terms of the CPUC settlement. Further, the CAISO will preserve the existing bidding structure for RDRRs when the \$1,000/MWh soft energy bid cap is in place.

It maintains that in the real-time market, RDRRs are treated as emergency response resources with limited availability and are only released for dispatch when an EEA 2 notice is issued.

To implement this, the CAISO will automatically adjust the submitted RDRR bids based on the change in energy bid cap by maintaining the percentage of the bid cap originally submitted by the Scheduling

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Coordinator. This automatic adjustment will occur after the market close and will only apply if no action is taken by the close of each hour's real-time market by the Scheduling Coordinator.

* Under FERC Order No. 831, the bid cap is raised from \$1,000/MWh to \$2,000/MWh only during periods when either:

- Resource-specific resources have submitted a cost-verified energy bid greater than \$1,000/MWh, or
- The CAISO-calculated maximum allowable import bid price is greater than \$1,000/MWh.

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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 the rights of the California ISO, and helps to avoid Intellectual Property infringement 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 Checklist

All information in this document is the Intellectual Property (copyright, trademark, patent, and/or trade secret) of the California ISO.

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3 Acronym and Terms Definitions

Refer to **Appendix-A – Acronym Definition**

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4 Details of Business Need/Problem

4.1 Description

<i>Business Opportunity/Problem Statement:</i>	
<i>What:</i>	<ul style="list-style-type: none"> • Track-1 <ul style="list-style-type: none"> • Enhances real-time bidding for the Reliability Demand Response Resource (RDRR) model by aligning RDRR bidding rules with real-time price conditions consistent with FERC Order No. 831 by requiring that RDRRs must bid at least 95% of the hard energy bid cap (\$1,900/MWh) when the conditions are satisfied to raise the soft energy bid cap to \$2,000/MWh without requiring additional cost-justification support to substantiate their bids.
<i>When:</i>	<ul style="list-style-type: none"> • Track-1 by Summer, 2022 • Track-2 Fall 2022 or later (out of scope of this BRS).
<i>Why do we have this opportunity/problem:</i>	<ul style="list-style-type: none"> • FERC Order 831 compliance. • Better RDRR reflection to the market. • Address customer concerns over the impact of 2021 Summer Readiness RDRR changes.
<i>Who does this opportunity/problem impact:</i>	<ul style="list-style-type: none"> • Real-Time Operations • Market Analysis & Forecasting • Market Participants • Customer Service • Policy • Legal

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5 Business Impacts

5.1 Business Practice Manual (BPM)

BPM	Description of Impact(s)
Market Instruments	<ul style="list-style-type: none"> Appendix P: Additional information will be added to describe RDRR bidding with respect to the bid cap changes. BPM edits for sections that reference RDRR.
Market Operations	<ul style="list-style-type: none"> BPM edits for sections that reference RDRR; potentially remove the RDRR bidding references.

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5.2 Other

Impact:	Description: (optional)
Market Simulation	Yes CAISO will setup scenarios for the bid cap changes.
Market Participant Impact	Yes SCs with RDRR
External Training	Yes
Policy Initiative	Yes
Tariff Modifications	Yes

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6 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.

6.1 Business Process: Manage RTM

- **Manage Real Time Operations**

6.1.1 Business Requirements

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
RDRRBE1-BRQ-01020	<p>Revising Bid Floor & Ceiling for RDRRs in Real-Time when Conditions are Satisfied</p> <ul style="list-style-type: none"> • System shall automatically revise RT RDRR bid floor and ceiling for RDRR resources, using same existing logic and timing as revision of RT intertie bid ceiling. • System shall automatically synchronize RT RDRR bid floor with the bid ceiling, at a value of 95% of the bid ceiling. <p>Notes:</p> <ul style="list-style-type: none"> • This shall include raising the RDRR bid ceiling to 2,000 \$/MWh or lowering it to \$1,000\$/MWh for RDRRs in real-time as conditions are satisfied. • RT RDRR bid floor applies to RDRRs only. • RT RDRR bid floor and ceiling is hourly attribute. 	Core	• SIBR
RDRRBE1-BRQ-01040	<p>RDRRs Bid Prices are Required to be between Revised RDRR Bid Floor and Ceiling</p> <p>System shall provide the capability for RDRRs' SCs to submit their RT bids with bid prices between revised RDRR bid floor and ceiling, following existing bidding rules and timeline.</p>	Core	• SIBR
RDRRBE1-BRQ-01060	<p>Automatic Adjustment of RDRR RT Bid Prices for the Revised RDRR Bid Floor & Ceiling</p> <ul style="list-style-type: none"> • To account for scenarios where revisions to RDRR bid floor and ceiling are made, after RT bid submission time window is closed for each hour, System shall add a new validation rule that the submitted bid prices, that were previously validated using existing rules, are between the currently-applicable RDRR bid floor and ceiling. 	Core	• SIBR

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
	<ul style="list-style-type: none"> • If validation fails, system shall automatically adjust RDRR RT bid prices which are outside the bid floor and ceiling to be at same % relative to revised RDRR bid ceiling. • This shall cover revising RDRR bid ceiling from \$1,000\$/MWh to \$2,000\$/MWh or vice versa. <p>Example-1:</p> <ul style="list-style-type: none"> • An RTM RDRR bid has been submitted at 97% of the original RDRR bid ceiling (\$970/MWh). • Conditions are satisfied to raise the RDRR bid ceiling to \$2,000/MWh and the SC who submitted the \$970/MWh RDRR RT bid takes no action to resubmit their bid. • SIBR will automatically increase their RT bid price to 97% of the revised RDRR bid ceiling (\$1,940/MWh) after market close. <p>Example-2:</p> <ul style="list-style-type: none"> • In DAM, for a specific trade date, the bid ceiling is set to \$1,000/MWh because the conditions have not been satisfied to raise the bid ceiling to \$2,000/MWh. • However, in RTM for the same trade date, there was one cost-verified energy bid submitted from a resource greater than \$1,000/MWh. • This condition satisfies raising the bid ceiling in the RTM to \$2,000/MWh (and hence RDRR bid floor and ceiling). • An RTM RDRR bid has been submitted for \$1,960/MWh (which is 98% of the revised RDRR bid ceiling). • In the rare instance, the resource with the cost-verified energy bid greater than \$1,000/MWh has decided to withdraw their bid, and the conditions are no longer satisfied to maintain the \$2,000/MWh energy bid ceiling, the energy bid ceiling is lowered again to \$1,000/MWh at a later time prior to market close. • At this point the SC for the RDRR bid takes no action or is unable to take action and SIBR will automatically decrease the SC's RDRR bid to 98% of the RDRR bid ceiling (\$980/MWh) after market close. 		

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
RDRRBE1-BRQ-01080	Do not Consider RDRR Bids as Cost-Verified Bids System shall have the capability to enforce the following rule: <ul style="list-style-type: none"> • RDRR bids shall not be considered as cost-verified bids for the purposes of calculating the bid ceiling for other resources. 	Core	• SIBR
RDRRBE1-BRQ-01120	Store Pre and Post Adjustment RDRR Bids System shall retain a record of what the pre-adjustment value and post-adjustment value of the RDRR bids as well as identifying that the post-adjustment value was generated by SIBR, not the one submitted by the SC.	Core	• SIBR

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6.2 Business Process: Manage Data Repository & FERC Reporting

- Manage Real Time Operations

6.2.1 Business Requirements

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
RDRRBE 1-BRQ- 02040	Publish to FERC System shall have the capability to automatically publish the following data to FERC: <ul style="list-style-type: none"> • SIBR-Adjusted RDRR RT Bid 	Core	<ul style="list-style-type: none"> • Internal ISO System

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6.3 Business Process: <Market/Business Simulation>

This section shall provide a basis for the development of the Market/Business Simulation Scenarios. These requirements will provide guidance on the market participant impacts, inputs into the Scenarios, endpoints to the Scenarios and reasons for potential Scenarios. The guidance on market participant impacts shall be gathered from the requirements that impact rules, interfaces, applications/reports, new system processes, new/modified data models and new user roles. The source and sink systems shall be determined through the development of the system context diagram and the web service requirements. The Reason for the Potential Scenario column will be to offer guidance regarding what potential Scenarios, and their context, may be needed for this project. This section applies to all policy development projects, market enhancements, technology enhancements, operation enhancements, Energy Imbalance Market (EIM) implementations and Reliability Coordination (RC) service implementations.

In the Reason for Potential Scenario column, the Business Analyst must select one or more of the following reasons:

1. **Rule Impacts:** Generalized changes in market rules, bidding rules, settlements rules, market design changes, or other business rules.
2. **Interface changes:** Changes that impact templates (e.g. the Resource Adequacy {RA} supply plan), user interface (UI), and application programming interface (API) (e.g. retrievals of new shadow settlement data).
3. **New application/report:** Changes that cause addition/modification of market software or reports, especially when market data input is required by the market participant.
4. **New system process:** Modification of data flow in systems, especially if the new process requires the market participant to demonstrate proficiency prior to production.
5. **New/Modified model data:** Addition or substantial modification of model data as a market solution provided by the ISO.
6. **New user role:** The addition or modification of access permissions for a user role applied to specific business units within an EIM entity or market participant organization (e.g. Load Serving Entity (LSE) as a Local Regulatory Authority (LRA) role). Scenarios are beneficial for market participants taking on a new function or process within their organization.

6.3.1 Business Requirements

ID#	Guidance on Market Participant Impacts	Source System	Sink System	Reason for Potential Scenario
RDRRBE1-MSIM-03020	Increasing RT RDRR Bid Ceiling and RDRR' SCs Resubmit their Bids <ul style="list-style-type: none"> • Setup a scenario where the RDRR bid ceiling changes from \$1,000 to \$2,000 and SC of RDRR take action to resubmit its bid. 	<ul style="list-style-type: none"> • SIBR 	<ul style="list-style-type: none"> • SIBR 	1. Rule Impact 5. New/Modified model data

ID#	Guidance on Market Participant Impacts	Source System	Sink System	Reason for Potential Scenario
	<ul style="list-style-type: none"> RDRRs' SC to verify their clean bid is processed correctly. 			
RDRRBE1-MSIM-03040	<p>Increasing RT RDRR Bid Ceiling and RDRR' SCs do NOT Resubmit their Bids</p> <ul style="list-style-type: none"> Setup a scenario where the RDRR bid ceiling changes from \$1,000 to \$2,000 and SC of RDRR does NOT resubmit its bid (in purpose). RDRRs' SC to verify their clean bid is processed correctly. 	<ul style="list-style-type: none"> SIBR 	<ul style="list-style-type: none"> SIBR 	1. Rule Impact 5. New/Modified model data
RDRRBE1-MSIM-03060	<p>Decreasing RT RDRR Bid Ceiling and RDRR' SCs Resubmit their Bids</p> <ul style="list-style-type: none"> Setup a scenario where the RDRR bid ceiling changes from \$2,000 to \$1,000 and SC of RDRR take action to resubmit its bid. RDRRs' SC to verify their clean bid is processed correctly. 	<ul style="list-style-type: none"> SIBR 	<ul style="list-style-type: none"> SIBR 	1. Rule Impact 5. New/Modified model data
RDRRBE1-MSIM-03080	<p>Decreasing RT RDRR Bid Ceiling and RDRR' SCs do NOT Resubmit their Bids</p> <ul style="list-style-type: none"> Setup a scenario where the RDRR bid ceiling changes from \$2,000 to \$1,000 and SC of RDRR does not resubmit its bid. RDRRs' SC to verify their clean bid is processed correctly. 	<ul style="list-style-type: none"> SIBR 	<ul style="list-style-type: none"> SIBR 	1. Rule Impact 5. New/Modified model data

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7 Appendices

7.1 Appendix-A – Acronym Definition

Acronym	Definition
A2A	Application-to-Application
ABC	Available Balancing Capacity
ACL	Access Control List
ADS	Automatic Dispatch System
AGC	Automatic Generation Control
AIM	Access and Identity Management
ALFS	Automated Load Forecast System
Anode	Aggregate Node
API	Application Program Interface
Apnode	Aggregate Pricing Node
AS	Ancillary Services
AUX	Auxiliary
B2B	Business-to-Business
BA	Business Analyst
BAA	Balancing Authority Area
BAAOP	Balancing Authority Area Operations Portal
BCR	Bid Cost Recovery
BPM	Business Process Manual
BRS	Business Requirement Specifications
BSAP	Base Schedule Aggregation Portal

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Acronym	Definition
BSC	Base Schedule Coordinator
BSSD	(WEIM) Base Schedule Submission Deadline
CAISO	California Independent System Operator
CB	Convergence Bidding
CC	Commitment Cost
CCDEBE	Commitment Costs and Default Energy Bid Enhancements
CDN	Conformed Dispatch Notice
CIM	Common Information Model
CIP	Critical Infrastructure Protection
CIRA	Customer Interface for Resource Adequacy
CISO	California Independent System Operator
CLAP	Custom Load Aggregation Point
CMRI	Customer Market Results Interface
Cnode	Connectivity Node
COG	Constrained-Output Generator
CPM	Capacity Procurement Mechanism
CRN	Contract Reference Number
CRR	Congestion Revenue Rights
CRRS	Congestion Revenue Rights Settlements (aka CRR Clawback system)
CSS	Critical Systems Support
DA	Day-Ahead

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Acronym	Definition
DACA	Day-Ahead Contingency Analysis
DAM	Day-Ahead Market
DART	Day-Ahead Reliability Tool
DCPA	Dynamic Competitive Path Assessment
DEB	Default Energy Bid
DER	Distributed Energy Resource
DCC	Default Commitment Cost
DGAP	Default Generation Aggregation Point
DMLC	Default Minimum Load Cost
DMM	Department of Market Monitoring
DOP	Dispatch Operating Point
DOT	Dispatch Operating Target
DR	Demand Response
DRP	Demand Response Program
DSA	Dynamic Stability Analysis
DSTC	Default State Transition Cost
DSUC	Default Start Up Cost
ECIC	Energy Costs and Index Calculator
ED	Exceptional Dispatch
EDAM	Extended Day-Ahead Market
EDR	Enterprise Data Repository

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Acronym	Definition
EE	Expected Energy
EEA	Expected Energy Allocation
EESC	Energy Imbalance Market Entity Scheduling Coordinator
EFC	Effective Flexible Capacity
EMM	Enterprise Model Management
EMMS	Enterprise Model Management System
EMNA	Energy Management Network Application
EMS	Energy Management System
EPI	Electricity Price Index
ESP	Electronic Security Perimeter
ETC	Existing Transmission Contract
ETSR	Energy Transfer System Resources
FERC	Federal Energy Regulatory Commission
FMCA	Fifteen-Minute Contingency Analysis
FMM	Fifteen-Minute Market
FMU	Frequently Mitigated Unit
FNM	Full Network Model
FODD	FERC Outgoing Data Depository
FRCT	Forbidden Region Crossing Time
FRD	Flexible Ramp Down
FRU	Flexible Ramp Up

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Acronym	Definition
GDF	Generation Distribution Factor
GHG	Green House Gas
GIP	Generator Interconnection Procedure
GMC	Grid Management Charge
GPI	Gas Price Index
GRDT	Generator Resource Data Template
GUI	Graphical User Interface
HASP	Hour-Ahead Scheduling Process
HAVGC	Heat Average Cost (for non-gas resources)
HR	Heat Rate
ICE	InterContinental Exchange
ICM	Infrastructure Contracts and Management
ID	Identifier
IFM	Integrated Forward Market
ISL	Intertie Scheduling Limit
ISO	California Independent System Operator
IOOC	Integrated Optimal Outage Coordination
IT	Information Technology
ITC	Inter-Tie Constraint
ITPD	Information Technology Product Development
ITS	Interchange Transaction Scheduler

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Acronym	Definition
ITSM	Information Technology Service Management
JOU	Joint Owned Unit
LACA	Look-Ahead Contingency Analysis
LAP	Load Aggregation Point
LDF	Load Distribution Factor
LEL	Lower Economic Limit
LFR	Lower Forbidden Region
LF	Load Forecast
LMP	Locational Marginal Price
LMPM	Locational Market Power Mitigation
LOL	Lower Operating Limit
LRA	<i>Local Regulatory Authority</i>
LRL	Lower Regulation Limit
LSE	Load Serving Entity
LTCA	Long-Term Contingency Analysis
MCI	Model and Contract Implementation
MD	Manual Dispatch
MDT	Minimum Down Time
MDS	Maximum Daily Startups
MF	Master File
MIBP	Maximum Import Bid Price

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Acronym	Definition
MLAC	Minimum Load Average Cost
MLC	Minimum Load Cost
MLHAVGC	Minimum Load Heat Average Cost (for non-gas resources)
MLHR	Minimum Load Heat Rate
MMA	Major Maintenance Adder
MMAMLC	Major Maintenance Adder for Minimum Load Cost
MMASUC	Major Maintenance Adder for Start Up Cost
MMASTC	Major Maintenance Adder for MSG State Transition Cost
MMG	Manage Markets & Grid
MMR	Manage Market & Reliability
MOS	Manage Operations Support & Settlements
MPM	market Power Mitigation
MQS	Market Quality System
MRID	Master Resource IDentifier
MRI-S	Market Results Interface – Settlements
MSSA	Metered Sub System Agreement
MSG	Multi-Stage Generator
MUT	Minimum Up Time
MV&A	Market Validation & Analysis
MVT	Market Validation Tool
N/A	Not Applicable

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Acronym	Definition
NA	Network Application
NDEB	Negotiated Default Energy Bid
NGR	Non-Generating Resource
NM	Network Model
NQC	Net Qualifying Capacity
OASIS	Open Access Same-time information System
OATI	Open Access Technology International
OC	Opportunity Cost
OCC	Opportunity Cost Calculator
ODCP	On Demand Capacity Procurement
OES	Operations Engineering Services
OMS	Outage Management System
OOM	Out Of Market
OTS	Operations Training Simulator
PAM	Program and Application Management
PBC	Power Balance Constraint
PC	Pre-Calculation
PCA	Price Correction Admin
PCT	Price Correction Tools
PDR	Proxy Demand Resource
PI	Plant Information

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Acronym	Definition
PL	Participating Load
Pmax	Maximum Generation Capacity
Pmin	Minimum Generation Capacity
PMO	Program Management Office
PNM	Public New Mexico
Pnode	Pricing Node
POC	Point Of Contact
PRSC	Participating Resource Scheduling Coordinator
PSH	Pump Storage Hydro
PSTD	Power Systems Technology Development
PSTO	Power Systems Technology Operations
PTO	Participating Transmission Owner
QRB	Quality Review Board
RA	Resource Adequacy
RC	Reliability Coordinator
RC-BSAP	Reliability Coordinator - Base Schedule Aggregation Portal
RCD	Reliability Capacity Down
RCSA	Reliability Coordinator Service Agreement
RCU	Reliability Capacity Up
RDOT	Ramping Dispatch Operating Target (a continuous piecewise linear curve connecting consecutive <i>DOTs</i> using their mid-interval points, from RTD, RTCD, or RTDD runs, as applicable)

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Acronym	Definition
RDRR	Reliability Demand Response Resource
RDT	Resource Data Template
RIG	Remote Intelligent Gateway
RIMS	Resource Interconnection Management System
RMR	Reliability Must Run
ROPR	Operating Reserve Ramp Rate
RR	Ramp Rate
RREG	Regulation Ramp Rate
RSE	Resource Sufficiency Evaluation
RSEE	Resource Sufficiency Evaluation Enhancements
RT	Real-Time
RTBS	Real-Time Base Scheduler
RTCA	Real-Time Contingency Analysis
RTCD	Real-Time Contingency Dispatch
RTD	Real-Time Dispatch
RTDD	Real-Time Disturbance Dispatch
RTPD	Real-Time Pre-Dispatch
RTM	Real-Time Market
RTUC	Real-Time Unit Commitment
RUC	Residual Unit Commitment
SADS	System And Design Specifications

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Acronym	Definition
SC	Scheduling Coordinator
SCME	Scheduling Coordinator Meter Entity
SE	State Estimator
SIBR	Scheduling Infrastructure and Business Rules
SME	Subject Matter Expert
SOA	Service-Oriented Architecture
SQMD	Settlements Quality Meter Data
SRS	System Requirement Specifications
STC	State Transition Cost
STF	Short-Term Forecast
STC	State Transition Cost
STT	State Transition Time
STUC	Short-Term Unit Commitment
SUC	Start Up Cost
SUE	Start Up Energy
SUF	Start Up Fuel
SURT	Start Up Ramp Time
SUT	Start Up Time
T	Trading Hour
TBD	To Be Determined
TEP	Tucson Electric Power

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Acronym	Definition
TG	Tie Generator
TNA	Transmission Network Application
TOP	Transmission Operator Provider
TOR	Transmission Ownership Contract
TEE	Total Expected Energy
TTEE	Total Target Expected Energy (based on RDOT)
UAT	User Acceptance Testing
UEL	Upper Economic Limit
UFR	Upper Forbidden Region
UI	User Interface
UIE	Uninstructed Energy Imbalance
UL	User Limited
UOL	Upper Operating Limit
URL	Upper Regulation Limit
VER	Variable Energy Resource
VOM	Variable Operations & Maintenance
VOMC	Variable Operations & Maintenance Cost
WebOMS	Web-based Outage Management System
WEIM	Western Energy Imbalance Market
XML	Extensible Markup Language
XSD	XML Schema Definition