California Energy Storage Roadmap

Companion Document

December 2014

CPUC

The CPUC is actively pursuing efforts to improve policies and streamline interconnection practices for energy storage and other distributed energy resources in several proceedings. Although CPUC staff participated actively in the roadmap development, staff cannot dictate future CPUC actions. Parties are encouraged to actively participate in CPUC proceedings to raise issues and work in collaboration with utilities and other stakeholder to affect desired policies. The best way for individuals and companies to follow these developments and track progress toward meeting goals is to become parties or to subscribe to relevant CPUC proceedings.

Major CPUC proceedings and initiatives listed below are directly related to energy storage procurement and/or interconnection, while others establish policies or incentives for installation of energy storage, either as a stand-alone resource or as an addition or enhancement to renewable generation. Although this Roadmap initiative cannot bind the CPUC to take up any of the action items listed in the body of this document, these proceedings may provide a forum for addressing some of the issues raised here.

Rulemaking on Energy Storage Procurement R.10-12-007

Directed investor-owned utilities to procure at least 1,325 MW of energy storage in four biennial solicitations through 2020. Other load-serving entities have targets based on 1% of peak load by 2020.

Provides a basis for cost/benefit analysis of storage in several use cases, illustrating how storage might provide services to the utility grid in transmission, distribution and customer applications. Allows IOUs to use storage procured through other solicitations and programs to count toward meeting targets.

Status: Final decision D. 13-10-040 issued in October 2013, directed IOUs to file storage procurement plans by March 1, 2014. Proceeding is closed.

For more information:
http://www.cpuc.ca.gov/PUC/energy/electric/storage.htm

Applications for Energy Storage Procurement Plans, A.14-02-006, et al.

In response to the Energy storage procurement rulemaking, the three IOUs filed plans for the initial solicitation issued December 2014. The plans include a Common Evaluation Protocol (CEP) to provide a public benchmark for evaluating projects selected by the IOUs in their solicitations.

Status: IOU plans were approved with minor modification in D. 14-10-045. Proceeding is closed.

For more information:
http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M127/K426/127426247.PDF

Rule 21 Interconnection, R. 11-09-011

The goal of the Rule 21 Interconnection Proceeding is to promote timely, non-discriminatory, cost-effective, transparent interconnection of new facilities to the grid, including energy storage.

The CPUC determined in R.10-12-007 that interconnection policies are among the major barriers toward the deployment of storage. In July 2014, Energy Division staff issued a document: Issues, Priorities and Recommendations for the Interconnection of Energy Storage.

Status: Several of these issues were addressed in workshops held in early December 2014, and may be subject of forthcoming rulings to implement changes to Rule 21 policies or tariffs.

For more information:
http://www.cpuc.ca.gov/PUC/energy/rule21.htm

Net Energy Metering , R. 14-07-002

On October 7, 2013, Governor Brown signed Assembly Bill (AB) 327 (Perea) directing the Commission to develop a standard tariff or contract for eligible customer-generators with a renewable electrical generation facility no later than December 31, 2015. Previous CPUC decisions determined that energy storage may be considered an enhancement or addition to renewable generation. In July 2014, the Commission launched a new proceeding to establish this NEM successor tariff.

Status: Work is ongoing to develop a NEM "public tool" to aid development of a NEM successor tariff.

For more information:
http://www.cpuc.ca.gov/PUC/energy/DistGen/NEMWorkShop04232014.htm

Distributed Energy Resource Planning Rulemaking R.14-08-013

Also in response to AB 327 (PUC section 769), the Commission launched a rulemaking to consider policies to enable distribution energy resource (DER) planning by the IOUs. The law specifies these DERs: distributed renewable generation, energy storage, electric vehicles, energy efficiency and demand response, and directs that Distribution Resource Plans (DRPs) must be filed by July 1, 2015.

Status: An Assigned Commissioner's Ruling issued November 17, 2014, seeks comment on Draft Guidance for the DRPs, including definitions of key terms and proposals for analysis of distribution grid capacity to accommodate deep penetration of DERs under various scenarios. A ruling on Final Guidance is expected in early 2015.

For more information:
http://www.cpuc.ca.gov/PUC/energy/Distribution_Resources_Plan.htm

Resource Adequacy R. 14-10-010

The Resource Adequacy program has two goals. First, it provides sufficient resources to the California Independent System Operator to ensure the safe and reliable operation of the grid in real time. Second, it is designed to provide appropriate incentives for the siting and construction of new resources needed for reliability in the future. Periodic Rulemakings address refinements of RA requirements necessary to meet expected system operational needs and establish capacity valuations for resources that can meet those needs.

Status: In October 2014, the CPUC launched a new Resource Adequacy rulemaking to consider policies affecting 2016 resource needs.

For more information:
http://www.cpuc.ca.gov/PUC/energy/Procurement/RA/ra_history.htm

Energy Commission

The Energy Commission has significant activities associated with the implementation of energy storage in California, primarily addressing energy storage research, development and deployment. The Energy Commission sponsored energy storage pilots, field demonstrations and deployments under the Public Interest Energy Research (PIER) electricity program. Additionally, on December 1, 2014, the Energy Commission hosted a workshop to explore the advancements of energy storage through PIER funded research since the American Recovery and Reinvestment Act. Information about these activities can be obtained from the Energy Commission's web site or by contacting the division staff. Moving forward under the new Electric Program Investment Charge (EPIC) program, the Energy Commission will process new competitive solicitations for applied research, demonstration and deployment activities that include energy storage technologies.

The second area of Energy Commission focus is the implementation of AB 2514 as it pertains to California's Publically Owned Utilities (POUs). The Energy Commission is responsible for including a summary of the reports submitted by the POUs in its Integrated Energy Policy Report (IEPR). The Energy Commission is also responsible for ensuring that the reports or plans submitted by the POUs are available on the Energy Commission's web site or on a POU web site that can be accessed from the Energy Commission's web site. The Energy Commission Energy Assessments Division has developed a web page to post the reports that it has received from the POUs.

As identified in this Energy Storage Roadmap in 2015, the Energy Commission staff will be working actively with stakeholders through hosting workshops and arranging technical working groups to address some of the identified actions in the Roadmap. All these activities will be held in an open and public process. Public announcements will be provided prior to these meetings that will inform interested parties on the topics to be discussed, date and times for the meetings, location of the meetings and the internet information for those who want to participate remotely.

Company Name	Project Title			
Primus Power Corporation	Wind Firming Energy Farm (ARRA)			
Purpose / Application	**PIER Funding**	**Total Funding**	**Status**	**Results Available**
Wind firming	$ 1,000,000	$ 46,700,000	Currently lab testing, installation in 2014	Late 2014
Type of Technology	**Rating (MW and MWh)**	**Projected Ramp Rate**	**Discharge Time**	
Zn / Halogen Flow Battery	28 MW / 84 MWh	Full power in 5 seconds	3 hrs	

Description:

Primus Power Corporation will work with the United States Department of Energy, Sandia National Laboratory, Pacific Gas and Electric Company, and Modesto Irrigation District to develop, field test, install, and evaluate a 28 MW / 84 MWh grid-connected Zinc-based flow battery energy storage system. The project will provide a low-cost energy storage system with a footprint consistent with or smaller than other competing technologies and will demonstrate primary and secondary applications including renewable firming, strategic local peak shaving, automated load shifting, and ancillary services.

Company Name	Project Title			
Pacific Gas and Electric Company	Pacific Gas & Electric Energy Storage Demonstration			
Purpose / Application	**PIER Funding**	**Total Funding**	**Status**	**Results Available**
Grid Support and PV Integration	$ 3,300,000	$ 11,300,000	Installation April 2013	Spring 2015
Type of Technology	**Rating (MW and MWh)**	**Projected Ramp Rate**	**Discharge Time**	
Na / S Battery	4 MW / 28 MWh	Full power in 10 seconds	7 hrs	

Description:

Pacific Gas and Electric (PG&E) will install two sodium sulfur battery energy storage systems to evaluate the system performance in supplying grid functions. A 2 MW / 14 MWh system installed at the PG&E Vaca-Dixon substation will be an energy storage test bed to evaluate various energy storage use scenarios and gain operational data on how future systems can be implemented within the grid. Scenarios to be tested include firming of the output from the nearby Vaca-Dixon solar generation facility, bidding in the California Independent System Operator's merchant market, voltage regulation, and others. The second 4 MW / 28 MWh installation at the Hitachi Global Storage Technologies facility in San Jose will mitigate fluctuations to enhance power reliability for customers on the distribution line. The large capacity of the battery will allow the Hitachi facility to be fully powered by the battery in the event of an outage. The battery will also supply ancillary services such as peak load shaving and voltage regulation, improving grid stability in the surrounding area.

Company Name	**Project Title**			
County of Alameda	CERTS Smart Grid Demonstration with Renewables and large-Scale Energy Storage Integrated at Santa Rita Jail, Alameda County, California			
Purpose / Application	**PIER Funding**	**Total Funding**	**Status**	**Results Available**
Peak Shaving and Renewables Integration	$ 1,983,555	$4,263,443	Operating and testing	Early 2015
Type of Technology	**Rating (MW and MWh)**	**Projected Ramp Rate**		**Discharge Time**
Li-Iron Phosphate Battery	2 MW / 4 MWh	Full power in <5 seconds		2 hr

Description:

County of Alameda will demonstrate the first commercial application of a Consortium for Electric Reliability Technology Solutions (CERTS) smart microgrid. This system will integrate wind, solar, thermal, fuel cell generation, efficiency measures, and advanced battery storage into a system able to island from the grid that saves energy costs, increases security at the jail, and reduces demand on the utility grid.

Company Name	**Project Title**			
Foresight Renewable Solutions, LLC.	Integrated Solar PV, Compressed Air Energy Storage, and Microgrid Demonstration Project			
Purpose / Application	**PIER Funding**	**Total Funding**	**Status**	**Results Available**
PV Integration, Peak Shaving, Load Shifting	$1,749,000	$2,992,570	Installation in early 2015	Early 2015
Type of Technology	**Rating (MW and MWh)**	**Projected Ramp Rate**		**Discharge Time**
Vanadium redox battery	100 kW / 400 KWh	Full power in 5 seconds		4 hrs

Description:

Foresight Renewable Solutions, LLC. will deploy an advanced energy storage system (CAES) and microgrid technology to support solar PV at a Naval Base facility in Ventura County. The project will demonstrate VRB storage technology suitable for community or distributed applications scaled to meet a community's needs. The key objectives of this project are to:

- Prove cost and performance breakthroughs promised by VRB when compared to other competing community-scale technologies.
- Demonstrate significant utility cost savings at the demonstration site by strategic use of load shifting and peak shaving capabilities of VRB.
- Maximize energy security and reliability, which will include providing firm, high-quality power to mission critical loads when operating independently from the grid.

Company Name	Project Title			
EnerVault Corporation	Flow Battery Solution to Smart Grid Renewable Energy Applications (ARRA)			
Purpose / Application	**PIER Funding**	**Total Funding**	**Status**	**Results Available**
Grid support and Renewable integration	$476,428	$9,528,567	Installation completed Spring 2014	Spring 2015
Type of Technology	**Rating (MW and MWh)**	**Projected Ramp Rate**	**Discharge Time**	
Iron-Chromium Redox Flow Battery	250 kW / 1 MWh	Full power in 5 seconds	4 hrs	

Description:

EnerVault Corporation (EnerVault) will demonstrate the commercial viability of EnerVault's novel iron-chromium redox flow Battery Energy Storage System (BESS). This demonstration comprises integrating EnerVault's Vault-20 BESS (250kW / 1MWh) with an intermittent renewable energy source – a dual-axis photovoltaic system. The 36 month project will culminate in the deployment of a Vault-20 Beta system in conjunction with a 150kW PV system at a site in California's Central Valley. Additionally, the operating results will be analyzed and compared to the baseline for final quantification of benefits and operating costs. The capital costs, operating costs, and benefits will be used to determine a Total Cost of Ownership.

Company Name	Project Title			
Transportation Power, Inc.	Grid-Saver Fast Energy Storage Demonstration			
Purpose / Application	**PIER Funding**	**Total Funding**	**Status**	**Results Available**
Grid support	$2,000,000	$2,520,004	Building and testing modules	Spring 2015
Type of Technology	**Rating (MW and MWh)**	**Projected Ramp Rate**	**Discharge Time**	
Li-ion Battery	150 kW / 300 kWh	Full power in < 5 seconds	2 hrs	

Description:

Transportation Power, Inc. will demonstrate a new, low-cost, fast energy storage Lithium-ion battery technology that can help facilitate acceptance of utility-scale renewable energy projects in California and nationwide. Supported by team members Evaira and General Atomics, Transportation Power will evaluate the feasibility of designing a low-cost fast energy storage system based on innovative design concepts. In addition, following analysis and validation of the concepts this project will proceed to prototype demonstration to provide further validation and establish a basis for widespread commercial adoption of such a system. The system approach, trademarked as Grid-Saver, is based on modular building blocks with advanced system integration and control methods. The Grid-Saver program aims to demonstrate the viability of the concept by building, testing, and deploying a 5 MW peak power for periods of up to 10-15 minutes. This fast energy system is comprised of interchangeable lithium battery modules and high-power inverter modules that can be produced at relatively low cost and integrated with advanced control technology. This also includes validating the performance and establishing a basis for widespread commercial adoption of such a system.

Company Name	Project Title			
Premium Power Corporation	Demonstration of Zinc-Flow Energy Storage System (ARRA)			
Purpose / Application	**PIER Funding**	**Total Funding**	**Status**	**Results Available**
Peak shaving	$394,082	$ 508,077	Lab testing	Spring 2015
Type of Technology	**Rating (MW and MWh)**	**Projected Ramp Rate**		**Discharge Time**
Zn / Br Flow Battery	100 kW / 150 kWh	Full power in 5 seconds		1.5 hrs

Description:

Premium Power Corporation will demonstrate the technical and economic performance of a 100 kW / 150 kWh zinc-bromide based energy storage system (ESS) that is connected on the customer side of the meter. The proposed host-site for the project is a local San Diego area Wal-Mart. The ESS will be a commercially available product and will be manufactured, distributed, and serviced by Premium Power. A successful demonstration of the flow battery energy storage technology at the site will provide critical data that will pave the way for applications at other Wal-Mart stores; industrial and commercial customer and utility sites in California where peak load reduction, load management, and demand response is needed; and areas where emissions and noise are a concern.

Company Name	Project Title			
Sacramento Municipal Utility District	SMUD's Smart Grid Pilot at Anatolia			
Purpose / Application	**PIER Funding**	**Total Funding**	**Status**	**Results Available**
PV Integration	$ 500,000	$ 4,800,971	Installation and testing complete.	Spring 2015
Type of Technology	**Rating (MW and MWh)**	**Projected Ramp Rate**		**Discharge Time**
Li-ion Battery (SAFT)	15 Units (5 kW / 7.7 kWh) and 3 Units (30 kW / 30 kWh)	Full power in < 5 seconds		1 hr

Description:

Sacramento Municipal Utility District (SMUD) will evaluate the benefits of adding distributed energy storage to a high photovoltaic penetration residential community (roughly 20% of peak feeder load) with advanced metering infrastructure. This project will provide recommendations on how to most effectively reduce peak demand with rooftop PV and distributed storage, the effects that may have on customer energy use, and the ability of storage to enable high penetrations of solar PV in similar communities throughout California. Distributed electricity storage systems will be demonstrated at the Anatolia III community located in Rancho Cordova, California, which contains more than 270 energy efficient SolarSmart homes with an average of 2 kW PV each.

Company Name	Project Title			
Seeo Inc.	Solid State Batteries for Grid-Scale Energy Storage (ARRA)			
Purpose / Application	**PIER Funding**	**Total Funding**	**Status**	**Results Available**
Peak shaving and PV integration	$ 600,000	$12,392,122	Testing Completed Spring 2014	Late 2014
Type of Technology	**Rating (MW and MWh)**	**Projected Ramp Rate**		**Discharge Time**
Li-ion Battery	5 kW / 10-15 kWh	Full power in < 5 seconds		2 - 3 hrs

Description:

Seeo Inc. (Seeo) will develop the first ever large-scale or grid-scale prototype of a new class of advanced lithium-ion rechargeable batteries with unprecedented safety, lifetime, energy density, and cost. The primary focus of this project will be the development and deployment of a 25 kWh prototype battery system based on Seeo's proprietary nanostructured polymer electrolytes. This will validate the transformational performance advantages of this technology for use in grid-tied energy storage applications. In particular, Seeo seeks to address the utility market needs for clean energy systems, which envision small (<100kW) distributed energy storage systems alongside pad-mounted and pole-mounted transformers as well as grid-connected electric vehicle systems.

Company Name	Project Title			
Harper Construction Company, Inc	Camp Pendelton Area 52 FractalGrid Demonstration Project			
Purpose/Application	**PIER Funding**	**Total Funding**	**Status**	**Results Available**
Support the innovative FractalGrid set of nested microgrids	$1,722,890	$2,895,318	-	-
Type of Technology	**Rating (MW and MWh)**	**Projected Ramp Rate**		**Discharge Time**
Advanced energy storage, incl. Li-ion battery	-	-		-

Description:

Camp Pendelton Area 52 FractalGrid Demonstration Project: Harper Construction Company, Inc. will work with Camp Pendleton to develop, field test, install, and evaluate a Lithium Ion battery energy storage system. The project will provide an energy storage system with a smaller footprint, a longer life, a lower initial cost, and lower total ownership costs (TOCs) compared to other competing technologies. It will support the innovative FractalGrid set of nested microgrids at Camp Pendleton to demonstrate automated demand-response.

Company Name Lawrence Berkeley National Laboratory	**Project Title** Los Angeles Air Force Base Vehicle-to-Grid Demonstration			
Purpose/Application Explore the V2G capability of a fleet by participating as fully as possible in the California ISO ancillary services markets.	**PIER Funding** $1,000,000	**Total Funding** $1,000,000	**Status** Installing, testing, and monitoring	**Results Available** Jun-16
Type of Technology V2G	**Rating (MW and MWh)** 40 vehicles demonstrated and anlyzed. 6 vehicles V2G ready	**Projected Ramp Rate** -		**Discharge Time** -
Description: Los Angeles Air Force Base Vehicle-to-Grid Demonstration: Lawrence Berkeley National Lab The effort will be focused on the integration of the medium and heavy duty electric vehicles. Some of funding is going to the lease/purchase of approximately 6 vehicles that will be made V2G-ready so they can be used to bid into the California ISO ancillary services market in addition to performing the normal daily vehicle activities. Additional data monitoring will be installed on the vehicles, charging stations and other appropriate areas to allow data to be collected on the battery charging profiles, availability for bidding into demand response and ancillary service markets, actual ancillary services provided, daily use profiles, and other detailed operational data. Research will be completed on the use of the entire 40 electric vehicle fleet being deployed at the LA AFB to determine daily charging profiles, availability of the battery energy stored on the vehicles for use as a grid asset and the actual performance of the vehicle batteries.				

Company Name KEMA, Inc.	**Project Title** Evaluation and Optimization of Concentrated Solar Power Coupled with Thermal Energy Storage			
Purpose/Application Analyze optimization and integration of different CSP configurations for dispatch	**PIER Funding** $447,642	**Total Funding** $621,631	**Status** Complete	**Results Available** 2015
Type of Technology Concentrated solar power	**Rating (MW and MWh)** -	**Projected Ramp Rate** -		**Discharge Time** -

Description:
KEMA, Inc. will perform transient thermodynamic modeling of nine different configurations of concentrated solar power-thermal energy storage and analyze optimization and integration of different models for dispatch. This also includes simulation of market outcomes in market simulation and economics models. Also, KEMA will bring the methodology and outcomes of the modeling to the market through dedicated technology transfer activities. The potential benefits include:

- Reduced ancillary services requirements and real time dispatch costs at a system level as a result of improved and managed CSP generation variability and ramping behavior, as well as reduced emissions from substituting for stand-by convention generation for these services.
- Improved system reliability as measured by system dynamic performance (area control error, frequency) and system ability to withstand events such as wind ramping, cloudiness and unit trips.
- Improved system reliability in terms of frequency response to disturbances that are improved as a result of CSP inertial and governor response. (As compared with the lack of same from PV and wind resources).
- Enhanced understanding of the economics - cost benefit comparison - of thermal storage and CSP reconfiguration to avoid gas co-firing and to allow the provision of ancillary services.

Company Name Lawrence Livermore National Laboratory	**Project Title** Using High Speed Computing to Estimate the Amount of Energy Storage and Automated Demand Response Needed to Support California's RPS			
Purpose/Application Estimate the amount of storage and ADR needed	**PIER Funding** $1,750,000	**Total Funding** $1,750,000	**Status** Completed	**Results Available** 2014
Type of Technology -	**Rating (MW and MWh)** -	**Projected Ramp Rate** -		**Discharge Time** -

Description:
Lawrence Livermore National Laboratory will estimate the amount of energy storage and automated demand response needed to support California's Renewable Portfolio Standard using high speed computing capability of super computer at Lawrence Livermore National Laboratory.

ISO

The ISO completed a number of initiatives that contained elements relevant to energy storage. These initiatives included development of the non-generator resource model, regulation energy management, and flexible resource adequacy capacity must offer obligations, in addition to others. Recent ISO initiatives include the energy storage interconnection initiative and flexible ramping product.

The ISO stakeholder initiatives listed below have a storage component. In addition, each year the ISO puts together a Stakeholder Initiatives Catalog that documents current and proposed policy changes and enhancements to the ISO market design and infrastructure planning processes. It provides a single, comprehensive directory of currently in progress and potential ISO stakeholder initiatives compiled from internal ISO staff input and stakeholder suggestions.

Non-generator resources in Ancillary Services

This stakeholder initiative is for compliance with FERC Order Nos. 719 and 890. FERC Order No. 719, Wholesale Competition in Regions with Organized Electric Markets, directs Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs) to allow demand response resources to participate in Ancillary Service (AS) Markets assuming the demand response resources are technically capable of providing the ancillary service within response times and other reasonable requirements adopted by the RTO or ISO. FERC Order No. 890, Preventing Undue Discrimination and Preference in Transmission Service, requires that non-generation resources such as demand response must be evaluated on a comparable basis to services provided by generation resources in meeting mandatory reliability standards, providing ancillary services and planning the expansion of the transmission grid.

Status: The Board of Governors approved the proposal in March 2010.

For more information:
http://www.caiso.com/informed/Pages/StakeholderProcesses/CompletedStakeholderProcesses/NonGeneratorResourcesAncillaryServicesMarket.aspx

Regulation Energy Management (new resource model)

As part of the Renewable integration market and product review phase 1 initiative, the ISO implemented non-generator resource and regulation energy management functionality as part of its fall 2012 market release. This functionality facilitates participation in the energy and ancillary services markets by batteries, fly-wheels and other resources that can operate as either generation or load.

Status: Completed

For more information:
http://www.caiso.com/27be/27beb7931d800.html

Lower Bid Floor

As part of the Renewable integration market and product review phase 1 initiative, the ISO proposed to lower the bid price floor to provide additional incentive to offer downward dispatch capacity. With negative price, suppliers are paid to reduce output. Similarly, over-producing suppliers are charged which provides a disincentive to over-supply.

Status: Completed. The bid price floor was lowered from the current soft bid floor of -$30/MWh to a hard bid floor of -$150/MWh.

For more information:
http://www.caiso.com/informed/Pages/StakeholderProcesses/RenewablesIntegrationMarketProductReviewPhase1.aspx

Flexible Ramping Constraint

Implementation of a new flexible ramping constraint in the market optimizations will help ensure sufficient ramping capability is available to meet conditions in the five-minute market interval when conditions have changed from the assumptions made during the prior procurement procedures. Enforcement of the constraint can produce opportunity costs for resources that resolve the constraint. Through this initiative the ISO and stakeholders will address how to appropriately compensate resources that resolve the constraint.

Status: The ISO implemented a new flexible ramping constraint in the five-minute market optimization as an interim measure until market bid-based products are developed through the Flexible Ramping Product initiative. Resources that resolve a constraint are compensated at the shadow price, which is the marginal unit's resource specific opportunity cost.

For more information:
http://www.caiso.com/informed/Pages/StakeholderProcesses/CompletedStakeholderProcesses/FlexibleRampingConstraint.aspx

Pay for Performance Regulation

FERC Order No. 755 required that the ISO modify the compensation mechanism for regulation to include a performance payment with an accuracy adjustment in addition to the existing capacity payment. The ISO has FERC approval of the proposed tariff modifications, and is conducting a one year evaluation of the methodology for calculating mileage accuracy and assessing whether the minimum performance standard and any additional items should be revised.

Status: Year one design changes in policy development: pending, Year one design changes in tariff development: pending

For more information:
http://www.caiso.com/informed/Pages/StakeholderProcesses/PayforPerformanceRegulation.aspx

15-Minute Scheduling & Settlement

Through the stakeholder initiative FERC Order No. 764 market changes, the ISO proposes a new 15-minute scheduling option in the real-time market to comply with FERC Order No. 764, which requires us to offer intra-hourly transmission scheduling. We will also explore implementing financially binding 15-minute schedule settlements, which will reduce barriers to integration of variable energy resources and address other identified market inefficiencies.

Status: On May 1, 2014 the ISO implemented a new 15-minute market with financially binding energy and ancillary services awards for internal generators, imports and exports and participating loads to comply with FERC Order No. 764, which required the ISO to offer intra-hour transmission scheduling. These market changes reduced barriers to integrating variable energy resources and addressed known market inefficiencies.

For more information:
http://www.caiso.com/informed/Pages/StakeholderProcesses/CompletedStakeholderProcesses/FERCOrderNo764MarketChanges.aspx

Reliability services

This initiative is to create an efficient and durable market mechanism for the procurement of backstop capacity, develop necessary conforming changes to various resource adequacy processes, and enhance rules specific to Resource Adequacy resources.

Status: Policy development: in progress

For more information:
http://www.caiso.com/informed/Pages/StakeholderProcesses/ReliabilityServices.aspx

Flexible Ramping Product

In August 2011, the California ISO Board of Governors approved the flexible ramping constraint interim compensation methodology. At that time the ISO committed to begin a stakeholder initiative to evaluate the creation of a flexible ramping product that will allow the ISO to procure sufficient ramping capability via economic bids. Through this initiative, the ISO will evaluate allocating costs to generation and load in accordance with cost causation principles.

Status: Tariff development: Pending, Policy development: Pending

For more information:
http://www.caiso.com/informed/Pages/StakeholderProcesses/FlexibleRampingProduct.aspx

Flexible resource adequacy criteria and must offer obligations

The ISO is working with the CPUC and local regulatory authorities to ensure flexible capacity resources are available to reliably operate the grid while fulfilling state energy mandates. The work includes developing the tariff changes necessary for the ISO to accommodate the resource adequacy flexible capacity requirements adopted by regulators. This includes establishing availability, must offer obligations and default provisions for entities that fail to procure their flexible capacity allocations.

Status: FERC approval: pending, Tariff amendment filing: August 1, 2014, Board of Governors approval: March 20, 2014

For more information:
http://www.caiso.com/informed/Pages/StakeholderProcesses/FlexibleResourceAdequacyCriteria-MustOfferObligations.aspx

Energy storage interconnection

This initiative developed an approach whereby existing tariff rules can accommodate the interconnection of storage to the ISO controlled grid without the need for tariff changes. This initiative was also used to discuss other storage issues such as: processes for modifying existing projects to add storage; resource adequacy and deliverability issues; and rate treatment issues, among others.

Status: Draft final proposal posted November 18, 2014.

For more information:
http://www.caiso.com/informed/Pages/StakeholderProcesses/EnergyStorageInterconnection.aspx

Potential initiatives for executing on specific roadmap actions is under review and evaluation.

For more information:
http://www.caiso.com/informed/Pages/StakeholderProcesses/StakeholderInitiativesCatalogProcess.aspx