# APPENDIX A - DETAILED PROJECT DESCRIPTION AND SCOPE

**Introduction**

Peninsula Clean Energy (“PCE”) is seeking services across five tasks in this RFP to serve PCE’s load and resource scheduling, battery storage optimization, short-term load and price forecasting, and CRR management.

## Task 1: Scheduling Coordinator (“SC”) Services

1. Load SC Services

B. Resource SC Services

C. Settlement & Reporting Services

D. Advisory Services

## Task 2: Battery Energy Storage Systems - Bidding Optimization & Performance Measurements

Task 3: Load Forecasting Services – Day-ahead and short-term (1-14-day horizon)

Task 4: Price Forecasting Services – Day-ahead and short-term (1-14-day horizon)

## Task 5: Congestion Revenue Rights Portfolio Management Services

##

Detailed descriptions can be found in the Task Descriptions section below.

Respondents offering scheduling coordination services are encouraged to bid on both Task 1 and Task 2 together. Tasks 2 - 5 can be bid in addition to Task 1 or independently. Respondents are required to price each service independently if bidding for multiple services but may, if desired, propose additional pricings to combine two or more of the proposed services.

## Task Descriptions

## Task 1: Scheduling Coordinator Services

Act as SC agent on PCE’s behalf in the CAISO market and provide the following services while performing in accordance with the obligations of SC, as defined by CAISO in the Tariff and Business Practice Manuals:

1. **Load SC Services**:
2. Load Scheduling:
	1. Provide 7-day, 24-hour day-ahead pre-scheduling, and any real-time services as needed for scheduling load in CAISO’s Day-Ahead and Real-Time markets.
	2. Receive and incorporate the load forecasts resulting from Task 3 into the schedule.
	3. Create and Submit demand bids to CAISO Day Ahead Market to meet PCE’s forecasted load requirements, including convergence bidding.
	4. All load scheduling practices/strategies must be coordinated and approved by PCE staff before implementation.
	5. Monitor demand bids for accuracy by using commercially reasonable measures to validate submitted bids against their schedules.
	6. Perform the scheduling and bidding services in accordance with the CAISO Tariff, protocols, and Business Practice Manuals.
	7. File with the CAISO all schedules and meter data reports required of the SC on behalf of PCE.
3. Compliance Submissions:
	1. Facilitate and assist PCE in all load related filings due to CAISO, such as historical load submissions required of load serving entities.
	2. Coordinate and submit PCE requests for remaining import capability through the CAISO annual multi-step process.
	3. Prepare and submit Customer Inquiry Dispute and Information (CIDI) and related helpdesk tickets to CAISO on PCE’s behalf to initiate necessary inquiries.
	4. File invoice disputes with CAISO on behalf of PCE and organize any further actions necessary to resolve the disputes.
4. Documentation:
	1. Develop and formalize an operational protocol document to adhere to in collaboration with PCE and its consultants.
	2. Store and record all SQMD quality data and make data available to PCE and its consultants, in a form mutually agreed upon.
5. System/Data Requirements:
	1. Manage and maintain computer systems required to transmit or receive information from CAISO in accordance with Prudent Industry Practice.
	2. Provide automated data access to PCE (API or other) and its consultants.

## B. Resource SC Services

Act as SC agent on behalf of PCE in the CAISO market for its generating resources and battery energy storage facilities and provide the following services while performing in accordance with the obligations of SC, as defined by CAISO Tariff and Business Practice Manuals:

1. Scheduling:
	1. Meet scheduling requirements of CAISO and WECC:
		1. 7-day, 24-hour real-time services, including weekends and holidays (with backup facilities available)
		2. 7-day per week, day-ahead pre-scheduling services
	2. Develop, submit, validate, and adjust schedules and bids into the CAISO Day-Ahead Market (DAM) and Real-Time Market (RTM).
	3. Receive renewable resource forecasts from forecasting services chosen by PCE or use CAISO forecast as directed by PCE.
	4. Update schedules received from Project Operator and transmit schedules to CAISO or the applicable Control Area Operator and act on any further instructions received.
	5. Schedule applicable resources under the CAISO prevailing protocols for interconnected variable energy resources (VERs).
	6. Create, submit and validate bids for storage resources into the CAISO market to provide Energy, Resource Adequacy, Ancillary Services, Residual Unit Commitment (RUC), and related CAISO market products, while adhering to the Tariff, Business Practice Manuals, and CPUC regulations for bidding energy storage resources, based on instructions from PCE or its battery storage optimization consultant.
	7. Perform scheduling steps necessary to schedule pseudo-tie and dynamically scheduled resources in PCE’s portfolio.
	8. Submit Inter-SC Trades (IST), import schedules, and prepare any e-tags as necessary to satisfy any of PCE’s agreements with energy suppliers.
2. Asset Management:
	1. Act as interface between the plant operator and the CAISO or applicable Control Area Operator; communicating all Dispatch Operating Targets (DOT), outages, and curtailment notices.
	2. Set up operational protocols with each resource to facilitate communication among PCE, Project Owner, Project Operator, and CAISO.
	3. Track Project Telemetry outages, and remind Project Owner to take necessary actions.
	4. Participate in CAISO’s New Resource Implementation process, if applicable, including the following:
		1. Meet the SC requirements listed on the New Resource Implementation Checklist provided by CAISO and assist PCE in completing the required documentation for CAISO;
		2. Work closely with the Interconnect Customer (IC) and Operation Control Center for Participating Generators in following CAISO’s “Bucket” system requirements prior to achieving Commercial Operation; and
		3. Coordinate pre-COD testing with PCE, Project Operator, any of PCE’s PPA contract counterparties, and CAISO, including the set up for trial operation for Initial Synchronization as required to be approved for Commercial Operation.
3. Resource/Load Optimization:
	1. Coordinate with PCE staff or its consultant(s) to develop scheduling and optimization of a portfolio of energy resources, battery energy storage, and PCE’s load to meet PCE goals and strategies.
	2. If the chosen SC is different from the Task 2 performer, the SC shall be receiving the suggested scheduling strategy from the Task 2 performer, and incorporate it into the final Optimization plan of this Task 1.B.
	3. Actively monitor the resources’ performance, and track the various measurements associated with each resource, including battery storage operation.
	4. Actively monitor the portfolio performance, and measure against PCE goals to recommend necessary changes of the existing bidding strategies.
4. Compliance Submissions:
	1. Submit annual and monthly Resource Adequacy and Supply Plans (prepared by PCE staff) to the CAISO through CIRA. Provide PCE with cross validation reports from CIRA after filings are submitted.
	2. Work with PCE staff through CAISO’s annual MIC allocation process and facilitate bilateral import allocation right transactions on behalf of PCE in CIRA.
	3. File invoice disputes with CAISO on behalf of PCE and organize any further actions necessary to resolve the disputes.
5. Documentation:
6. Develop and formalize an operational protocol document to adhere to in collaboration with PCE.
7. Document communications with CAISO, transmission operators and the plant operators, including but not limited to information requests, outage and curtailment notifications, validation errors, and general notices.
8. Phone calls made to generator or storage resources should be documented in a reporting log, copies of which will be provided to PCE at regular intervals.
9. System/Data Requirements:
	1. Manage and maintain computer systems required to transmit or receive information from CAISO in accordance with Prudent Industry Practice.
	2. Provide automated data access to PCE (API or other) and its consultants.
10. Outage Management Services:
	1. Coordinate unit outages with generation operators and CAISO in accordance with the Tariff. Manage, record, and coordinate planned and unplanned outages effectively in the Outage Management System (OMS) in accordance with the CAISO Tariff.
	2. Monitor Planned Outage Substitution Obligation (POSO) notifications from CAISO and perform substitution requests in CIRA when necessary.

**C. Settlement & Reporting Services**

1. CAISO Settlement Services:
2. Obtain, document, and audit settlement quality meter data in accordance with the CAISO Tariff.
3. Review charges/revenues on settlement statements for accuracy, identify CAISO data error, and work with PCE staff and CAISO to resolve any discrepancies.
4. Download invoice pdfs and email to PCE Finance staff for processing.
5. Perform shadow settlements and CAISO data validation
6. Load Reporting:
	1. Deliver validation reports:
		1. Provide a weekly CAISO invoice report, in a form mutually agreed upon, to summarize all CAISO load charges and credits by charge code and resource / load ID for each billing period in that invoice. The weekly invoice report should list any variance between shadow and billed settlements and the reason for the variance.
		2. Provide a monthly CAISO invoice report, in a form mutually agreed upon, to summarize all CAISO load charges by charge code and resource/load ID for the prior month billing period. Revised monthly invoice reports should be issued on T+70 data. The monthly invoice report should list the status of any billing disputes.
	2. Provide daily, weekly, and monthly reports related to load scheduling costs, accuracies, and imbalances.
		1. EAL forecast, updated daily
		2. Load performance (backward looking), updated daily
	3. All reports should be automatically generated by software systems and thoroughly QA/QC’d by qualified human staff. Any errors or data discrepancies should be resolved prior to sending to PCE. Daily reports should be delivered to PCE on T+1. Weekly reports should be delivered on T+3 and monthly reports on T+10 or other mutually acceptable schedule. Chronically inaccurate or late reports will be grounds for contract termination.
7. Resource Reporting:

a. Collect and report the following resource data in hourly and five-minute intervals, when applicable:

* + 1. CAISO shadow settlements with description of the charge types and how they are applied to the scheduled and metered volumes;
		2. VER forecasts for Participating Generators;
		3. Bids and Self-Schedules submitted to SIBR;
		4. Day-ahead and Real-time Market Awards shown in CMRI;
		5. CAISO Meter Data in MWh’s;
		6. Imbalance MWh’s between Actual and Scheduled; and
		7. Day-Ahead and Real-Time LMP’s broken down by the three price components; LMP price, congestion, and losses.
		8. Provide the following routine reports, in addition to other ad-hoc reports in hourly and 5-minute intervals, when applicable.
			- 1. Daily reports, including curtailment, EAL forecast, portfolio net open position, price summaries, revenue summaries, generation summaries, and outages
				2. Weekly reports, including a summary of the weekly invoice by charge code, resource ID, and billing period, variance between actual billing and shadow settlements.
				3. Monthly performance report, including monthly review of resource performance, revenue, outages / availability, and calculated contractual quantities (such as curtailment, deemed delivered energy, storage performance criteria, etc). T+70 data should be summarized in a revised monthly report.
	1. Work with PCE’s PPA counterparties to obtain projects’ operational data according to the relevant provisions of the PPAs.
	2. All reports should be automatically generated by software systems and thoroughly QA/QC’d by qualified human staff. Any errors or data discrepancies should be resolved prior to sending to PCE. Daily reports should be delivered to PCE on T+1. Weekly reports should be delivered on T+3 and monthly reports on T+10 or other mutually acceptable schedule. Chronically inaccurate or late reports will be grounds for contract termination.
1. Data Requirements:
	1. Manage and maintain computer systems required to transmit or receive information from CAISO in accordance with Prudent Industry Practice and CAISO Tariff.
	2. Manage and maintain software systems that can automatically generate reports. Validate CAISO data and resolve data discrepancies prior to sending reports to PCE. See Section 2 and 3 above.

**D. Advisory Services**

* 1. Proactively monitor load performance, at least weekly, and provide recommendations to improve and/or resolve load scheduling or load performance issues.
	2. Proactively monitor resource awards and performance at least daily, if not hourly. Immediately notify PCE staff of poor resource performance, curtailment, or forced outage. Suggest mitigation for curtailment or resource performance issues.
	3. Provide regular, or as needed, advisory services to PCE to implement load and resource scheduling strategies that are consistent with PCE’s goals, e.g. achieving 100% renewable on time-coincident basis (matching load with supply).
	4. Coordinate with PCE staff to strategize to optimize its load/resource portfolio including:
		1. matching PCE’s load to meet the 24/7 100% renewable goal, or
		2. maximizing CAISO revenue and/or minimize exposure; e.g., optimizing portfolio of resources in the Day-Ahead Market (DAM) and Real-Time Market (RTM); reducing curtailment risk and exposure to negative pricing; perform risk assessment of deploying new bidding strategies.
	5. Review PCE PPAs with Participating Generators and related project documentation to strategize appropriate scheduling and bidding practices.
	6. Advise PCE of any relevant CAISO requirements/notices and Tariff changes that will impact PCE’s load and resource scheduling practices.
	7. Promptly notify PCE of any system emergencies declared by the CAISO and any associated advisories and instructions.

**Task 2. Battery Energy Storage Systems - Bidding Optimization and Performance Measurement**

1. Develop and provide daily resource optimization strategies to PCE for CAISO’s Day-ahead and Real-time Market.

a. Daily bidding strategies should include optimizing the energy storage resource for the following products.

* + 1. Energy
		2. Spin/Non-Spin
		3. Regulation Up and Down
		4. Residual Unit Commitment
		5. Additional market products developed by CAISO
	1. Define the objective function that is used to develop the bids for each of those products.
	2. Define the risk metric used to help build the bids created.
	3. Ability to implement new strategies to accommodate new products as the CAISO market evolves.
	4. Support for changes to current or future market products as needed.
	5. Track contractual operational limits as they factor into the opportunity cost of optimizing these resources.
		1. Minimum/Maximum State of Charge
		2. Throughput Limits
		3. Cycle Limits
		4. Depth of charge Limits
		5. Others according to PCE’s PPAs
1. Technical Capability
	1. Structure bids in requirements to meet Must Offer Obligations for resources as they are placed in RA/Supply Plans.
	2. Structure bids in requirements to meet CAISO SIBR interface for an energy storage resource.
2. Performance Measurement and Reporting
	1. Standard reports along with ability to create ad-hoc custom reports.
	2. Monitor and measure performances of PCE’s fleet of storage resources, and report on resource-specific performance metrics, including but not limited to
		1. Minimum/Maximum/Average State of Charge
		2. Number of Throughput/Cycles
		3. Project availability
		4. Round-Trip Efficiency
		5. Deviation from CAISO dispatch (imbalances), and
		6. Other characteristics and performance necessary to administer the storage contracts.

## Task 3: Load Forecasting Services - Day-ahead and short-term (1-14-day horizon)

1. Develop short-term load forecasts to serve as PCE’s final demand forecasts
	1. Forecast should take into account at a minimum historical load, recent customer usage, current customer types and counts, and weather forecasts.
2. Transmit accurate real-time, hour-ahead, day-ahead, week-ahead, and two week-ahead load forecasts to PCE and to PCE’s SC agent daily on an appropriate time frame for submission to CAISO.
	1. Aggregate total load forecast data for PCE service territory and disaggregate by rate class and city.
3. Deliver monthly forecast reconciliation reports to compare forecast against actual electricity usage.
	1. Update forecasting algorithms and models to reduce forecasting errors.
	2. Including reporting on accuracy of forecast.

## Task 4: Price Forecasting Services – Day-ahead and short-term (1-14-day horizon)

1. Develop short-term price forecast and sensitivity scenarios to inform PCE’s scheduling of generation and storage resources and participation in convergence bidding processes. The price points are:
	1. PG&E DLAP
	2. NP-15
	3. SP-15
	4. 25 PNodes within CAISO associated with delivery points in PCE’s PPAs,
	5. Additional PNodes provided by PCE.
2. Frequency of updates: Day-ahead market forecasts should update at least once daily and real-time market forecast should update at least hourly using the most recent published market data, weather forecasts, and other data chosen by the contractor. If these update frequencies are not feasible, discuss how often prices would be updated. Forecasts should be developed for the following markets:
	1. DAM,
	2. RTPD (15-min)
	3. RTM (5-min)
3. Communication: Transmit forecasts to PCE, PCE’s scheduling coordinator, and PCE’s BESS optimization consultant as necessary, on the timeframes necessary to complete all optimization and scheduling activities.
4. Advise PCE on price trends and forecasts on an ad-hoc basis.

## Task 5. Congestion Revenue Rights Portfolio Management Services

1. Review PCE’s Risk Management Policy, specifically related to CRRs, and coordinate with PCE to implement a CRR portfolio management strategy that is consistent with our Risk Management Policy.
2. Assist PCE in obtaining CRRs through the CAISO annual and monthly nomination and allocation process.
3. Consult with PCE on CRRs to nominate and purchase, which will remain under PCE’s sole discretion, and provide the following:
	1. Market analysis to support CRR nominations and purchases, including strategies for mitigating congestion costs.
	2. A report of the results from the market analysis, in a form accepted by PCE, including a description of the deployed strategy, identified constraints, outages, and any other necessary information.
4. Provide a CRR revenue forecast for the relevant calendar year after PCE receives annual allocations.
5. Provide a monthly report, in a form accepted by PCE, to summarize the prior months CRR portfolio performance and compare against the CRR revenue forecast.
6. Review all CRR settlement statements for accuracy and highlight any discrepancies.
7. Assist PCE with any CRR holder registration and ongoing administrative requirements throughout the Term.
8. Update annually a one-year forward calendar to include the pertinent dates when CRR nominations and auctions occur as well as any other dates that are relevant for the CRR process.
9. Minimum Participant Requirement (FERC Order 741)
	1. PCE will bear the responsibility of funding the CRR Candidate Holder Minimum Participant Requirement, if necessary, with CAISO.