ercot

Request for Proposal for
Reactive Power Coordination Tool

Date of Release: August 1, 2019

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1. General Information

1.1. Request for Proposal (RFP) Objective

The objective of ERCOT in this procurement is to identify and contract with a qualified vendor to develop a production-grade tool for reactive power coordination to be integrated with the Energy Management System (EMS) used in the ERCOT control room. This application will be used for both real-time operations and off-line planning.

1.2. ERCOT Background

1.2.1. Overview of Electric Reliability Council of Texas, Inc.

The Electric Reliability Council of Texas (ERCOT) manages the flow of electric power to 25 million Texas customers, representing about 90 percent of the state's electric load. As the independent system operator for the region, ERCOT schedules power on an electric grid that connects more than 46,500 miles of transmission lines and 650+ generation units. ERCOT also performs financial settlement for the competitive wholesale bulk-power market and administers retail switching for 8 million premises in competitive choice areas. ERCOT is a membership-based 501(c)(4) nonprofit corporation, governed by a board of directors and subject to oversight by the Public Utility Commission of Texas and the Texas Legislature. Additional information about ERCOT can be found at http://www.ercot.com/.

1.3. Strategic Elements

1.3.1. Contract Term

ERCOT intends to award a contract resulting from this solicitation for an initial term from date of award through the time necessary to fulfill the goals of this Request for Proposal (RFP).

Any contract issued as a result of this solicitation is subject to cancellation, without penalty, either in whole or in part, for breach of contract. Such a contract may also be canceled by ERCOT for convenience upon a thirty- (30) day written notice.

1.3.2. Contract Elements

The term "contract" means the contract was awarded as a result of this RFP and all exhibits attached hereto. At a minimum, the following documents will be incorporated into the contract: this RFP and all attachments and exhibits; any modifications, addendum, or amendments issued in conjunction with this RFP; and the successful Respondent's proposal. The Respondent, if selected, must execute ERCOT's Master Agreement. The actual work to be performed and the compensation for such work will be documented in a Statement of Work. If the Respondent currently has an active Master Agreement with ERCOT, only a new Statement of Work will be required.

1.4. Basic Philosophy: Contracting for Results

ERCOT'S fundamental commitment is to contract for value and successful results. A successful result is denoted as the generation of defined, measurable, and beneficial outcomes that support ERCOT's missions, objectives, and goals, and satisfies all defined contract requirements.

1.5. Legal and Regulatory Constraints

1.5.1. Conflicts of Interest

ERCOT seeks to ensure a level playing field in the award of the contract. ERCOT has implemented an aggressive policy concerning actual or potential conflicts of interest to ensure fair and open competition, and has included language concerning actual and potential conflicts of interest in Section 8 of the Master Agreement. Respondents must carefully review and understand this language when developing proposals.

1.5.2. Former Employees of ERCOT

The Respondent must disclose any past employment of its employees and agents, or its Subcontractors' employees and agents, by ERCOT, including the individual's name and the date such individual's employment at ERCOT ended.

1.5.3. Interpretive Conventions

Whenever the terms "shall," "must," "or "is required" are used in this RFP in conjunction with a specification or performance requirement, the specification or requirement is mandatory for the potential vendor. ERCOT may, at its sole discretion, reject any proposal that fails to address or meet any mandatory requirement set forth herein.

Whenever the terms "can," "may," or "should" are used in this RFP in conjunction with a specification or performance requirement, the specification or performance requirement is a desirable, but not mandatory, requirement.

1.6. ERCOT Point of Contact

The sole point of contact for inquiries concerning this RFP is:

Lisa Sanchez
2705 West Lake Drive
Taylor, Texas 76574
(512) 248-6544
Lisa.Sanchez@ercot.com

All communications relating to this RFP must be directed to the specified ERCOT contact person. All other communications between a Respondent and ERCOT staff concerning this RFP are prohibited. Failure to comply with this section may result in ERCOT's disqualification of the proposal.

1.7. Procurement Timeline

Procurement Timeline	
RFP Release Date	Thursday, 8/1/2019
Optional Notice of Intent to Propose Due	Monday, 8/12/2019
Vendor Questions Due	Tuesday, 8/13/2019
Response to Vendor Questions Sent	Monday, 8/19/2019
Vendor Proposals Due	Friday, 9/6/19
Vendor Presentations (if needed)	September/October 2019
Anticipated Contract Award	TBD
Anticipated Contract Start Date	TBD

1.8. Communications Regarding This Procurement

ERCOT reserves the right to amend this RFP at any time prior to the proposal submission deadline. Any changes, amendments, or clarifications will be made in the form of responses to vendor questions, amendments, or addendum issued by ERCOT and sent to the point of contact listed on the Notice of Intent to Propose. Vendors not submitting the Notice of Intent to Propose will not receive changes, amendments, or answers to questions regarding this RFP.

1.9. RFP Cancellation/Non-Award

ERCOT reserves the right to cancel this RFP or to make no award of a contract pursuant to this RFP.

1.10. Right to Reject Proposals

ERCOT may, in its discretion, reject any and all proposals submitted in response to this RFP.

1.11. No Reimbursement for Costs of Proposals

ERCOT will not reimburse any Respondent for costs of developing a proposal in response to this RFP.

2.   Scope and Requirements

2.1. Project Scope Overview

ERCOT is seeking a tool that can analyze all base case and contingency voltage violations and suggest actions by reactive control devices to resolve the violations based on a power flow case derived from a real-time snapshot of the ERCOT grid. This tool must analyze multi-hour scenarios up to 48 hours and provide an optimized solution, taking a number of constraints into consideration (details below).

2.1.1.   Use cases for this new tool include:

2.1.1.1 **Hourly 12 hour look ahead Real-Time Periodic Studies Initiated from Real-Time Production EMS –** These look-ahead studies develop a dispatch plan of switching and set-points for reactive power control elements for up to the next 12 hours on a real-time recurring periodic basis. The real-time production version of the tool will be executed hourly, immediately after hourly unit commitment studies and in sequence with the most recent State Estimator and Contingency Analysis executions of the online EMS system and also must support integration with stability limit analysis. These studies will utilize a node breaker model and operations contingencies.

2.1.1.2 **Daily 32 hour look ahead Real-Time Periodic Studies Initiated from Real-Time Production EMS –** These look-ahead studies develops an advisory plan of switching and set-points for reactive power control elements for up to the next 32 hours on a real-time recurring periodic basis. The real-time production version of the tool will be executed daily, immediately after daily unit commitment studies and in sequence with the most recent State Estimator and Contingency Analysis executions of the online EMS system and also must support integration with stability limit analysis. These studies will utilize a node breaker model and operations contingencies.

2.1.1.3 **Ad-Hoc Studies Initiated from Study EMS –** The ERCOT user selects a defined study time period, up to 48 hours (likely limited to 24 hours for most use cases), to run a study from Study EMS server and develops cases to simulate expected system conditions (incorporating outages, generation profiles, emergency conditions, etc.). The tool identifies voltage violations for the study hours and develops an optimized reactive control plan for the period. These studies will utilize a node breaker model and contingencies.

2.1.1.4 **Offline Study from Planning Group –** The ERCOT planning group user selects a defined time period, up to 24 hours, to run the offline study by providing required cases and input files to the RPC tool. The offline study solution must be able to utilize an ERCOT Steady State Working Group (SSWG) bus-branch case and associated contingencies as well as the node breaker model and contingencies. The tool identifies voltage violations for the study hours and develops an optimized reactive control plan for the period.

2.2. Solution Requirements

ERCOT intends to procure a tool that operates as a component of a larger control process by recommending an optimized control dispatch for reactive devices for up to 48 hours. The tool will take the historical, current and future system conditions into consideration to suggest an optimized hourly reactive control dispatch for the entire study period. This dispatch schedule will ultimately be shared with and used by transmission

operators throughout ERCOT to maintain system voltages, reactive reserves, and to facilitate coordination among different entities responsible for voltage control.

The following requirements must be met by the solution:

2.2.1. Objective function

2.2.1.1   Minimize "pseudo-cost" of control actions – "Pseudo-cost" is the weighted aggregate of control action costs influenced by user-defined weighting factors which, when summed, account for the impact of the change of a control from its current state. ERCOT requires the tool to auto generate the cost curves based on configurable input settings.

2.2.2. Constraints

2.2.2.1   Temporal constraints – There are two types of temporal constraints:
1) Maximum number of control actions (modeled value) within a 12-hour period per reactive control device. The maximum number of control actions constraint should be respected regardless of the overall timespan of the study, thus the maximum allowed for a 48-hour study is not simply the 12-hour value multiplied by 4, but the tool should ensure that no 12-hour period within the study timespan contains more than the maximum number of operations allowed in a 12-hour period.
2) Lead time for control action per device (which should generate a notice or message for the user that the device to be used requires advance notice).

2.2.2.2   Physical constraints – typical AC power flow limits (facility ratings) and system voltage limits, reactive capability curves of units, Interface limits

2.2.2.3   Maintain pre and post-contingency bus voltages within limits

2.2.2.4   Maintain sufficient dynamic reactive reserves defined at station (or unit) and region level. ERCOT will coordinate with the Vendor to determine the appropriate levels. Reactive reserves should be monitored and there should be an alterable limit for each region that can be enforced in the optimization parameters.

2.2.2.5   Maintain pre-contingency bus voltages within voltage schedules (configurable) as a soft constraint which can be relaxed in the event that operating outside the schedules resolves a limit violation.

2.2.3. Controls

The following reactive controls must be configurable in the tool, meaning they can be enabled/disabled, weighted by type, prioritized by type for each study initiated. The control grouping should further group between generator owned and transmission owned controls. This will allow for example capacitor/reactor switching of generator owned shunts to be enabled/disabled and or be more "expensive" than transmission owned shunts.

2.2.3.1   Capacitor / Reactor switching
a) Must be able to handle special configurations where multiple cap or reactor banks are switched in a special order where there is a "master" or 1st cap/reactor that is always first, then others due to breaker/switch configuration.
b) Must be able to distinguish generator owned capacitors and reactors so that they as a control group, then can be enabled/disabled.

2.2.3.2   Change in SVCs/STATCOMs/Synchronous Condenser set point

a) Must be able to distinguish generator owned SVCs/STATCOMs/Synchronous Condensers so that they as a control group, then can be enabled/disabled.

2.2.3.3   Change in online Generating Unit voltage set points
a)   Reasonability limits need to be configurable, default values should be 0.98 to 1.04 pu at the high side of the GSU
b)   Allow for enable/disable of individual unit controls (e.g. nuclear units, units lacking or having reduced reactive capability)

2.2.3.4   Change in transformer tap setting or voltage set point (which of these is used should be configurable per device or per station)
a) Must be able to distinguish generator owned transformer tap settings so that they as a control group, then can be enabled/disabled.

2.2.3.5   Should respect the AVR flags supplied by ERCOT in the input model files for local control movements during PF and CA

2.2.3.6   Transformers with number of tap positions less than a configurable number should not be used as a control in optimization (effectively disabling use of no-load tap changers and fixed tap transformers)

2.2.3.7   OPTIONAL: Other potential control actions could be considered in Operations if the above actions are not sufficient. Since these actions would only be used infrequently, ERCOT is not proposing to include their consideration in this tool, unless the responder believes they can be included at a low incremental cost. These optional controls are:
a)   Distribution load reactive control (load power factor adjustment)

2.2.4. Inputs

2.2.4.1   SE / Contingency analysis base case from EMS. The following inputs will come from ERCOT's Energy Management System embedded in an exported, solved power flow case in node-breaker format for each hour of the study period (PSS/E v34 cases, a Siemens proprietary RAW file format).
a)   Real-time (initial case) and future (future cases) system topology with modeled equipment data
b)   In/out status for Shunts
c)   Tap settings for Transformers
d)   Voltage set points for SVCs, STATCOMs, Units, and Synchronous Condensers
e)   AVR statuses
f)   Device statuses
g)   System voltages
h)   Other Voltage set points
i)   Tap range information to match instructions with modeled taps
j)   Generic Transmission Limits (GTLs)/Interface Limit
k)   Operator
l)   Owner

2.2.4.2   Contingency Data
a)   Contingency definitions (breaker-to-breaker and outaged element definitions, exported in PSS/E Siemens proprietary format)
b)   Remedial Action Scheme (RAS) definitions

2.2.4.3   Future Data
a)   Load Forecasts (embedded in power flow case)

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b)   Wind/Solar Forecasts (embedded in power flow case)
c)   RUC/COP data (embedded in power flow case)
d)   Outages (separate file)
e)   DC Tie Schedules (embedded in power flow case)

2.2.4.4   Supplemental Model Data
a)   Voltage Limits for both normal and N-1 operation.
b)   Temporal Constraint data - Acceptable maximum number of control actions per 12-hour period and lead times for each control element. These will be provided in a supplemental file but may eventually be incorporated into the power flow cases.
c)   Reactive capability – generator capability curves, etc.
d)   Reactive reserve station (unit) /region definitions
e)   Voltage Schedules (target voltage and tolerance band)
f)   Load Distribution Factors (adapted MWs and PFs), if needed
g)   Tap range information to match with modeled taps

2.2.4.5   Application settings
a)   Control Priorities (weights and penalties), plus device-level enable/disable
b)   Constraint Penalties at kV level as well as the device level.
c)   Sensitivity Cutoffs
d)   Enterable multiplier for voltage limits by kV level. This will act as a multiplier on the limits for all buses at a particular kV level.
e)   Violation Priorities (345/230/138/115/ 69 KV) for voltage limits.
f)   Violation Priorities for reactive reserves configurable at various reserve levels
g)   Power flow and CA settings to correctly model local control (AVR) actions per equipment type
h)   Power flow and CA settings to tune the overall solution to match with EMS solution (flat start, convergence criteria, and enable/disable local control movements for shunts, taps, and other devices).

2.2.5. Displays

ERCOT intends to build detailed internal displays to convey the real-time results of the tool to the operators through the EMS and other visualization tools. These will enable improved voltage control and situational awareness in the control room. ERCOT requires a user interface for the RPC tool in order to tune, test, and troubleshoot issues with the study scenarios offline as the need arises. At a minimum, the user interface should allow the user to visualize the below results deemed essential by ERCOT. Any display suggestions based on the Vendor's experience in other control areas will be considered.   The displays should be web based displays accessible by Google Chrome.

2.2.5.1   Violations – The tool will detail base case (exceeding normal limit) and post contingency (exceeding emergency limit) violations for each hour of the study period prior to any suggested control actions and also detail the violations which remain or precipitate after the suggested control actions are implemented. The displays should separate violations into two separate views, base case and post-contingency violations, also making a clear distinction between old unresolved violations and highlighting new violations caused by the control actions. The identified violations shall utilize contingency and violated element naming and terminology identified by ERCOT, generally using ERCOT bus names and contingency IDs and avoiding use of EMS or PTI bus numbers.

2.2.5.2   Significant sensitivities – All reactive devices with sensitivities higher than the defined cutoffs for each violation. Moreover, the below information for each of the reactive devices should be available.
a)   Switching History

b)   Lead times
c)   Acceptable maximum number of control actions
d)   Highlight suggested control actions
e)   Gray-out devices that are on outage
f)   Gray-out devices that are already in desired state
g)   Identify controls which cannot be used due to temporal constraints

2.2.5.3   Suggested Control Actions – A list of the minimal optimized control actions suggested by the tool for each hour of the study period. The tool will have the capability to track control actions for each iteration if multiple iterations are used to get to the final solution. This will aid in testing and troubleshooting the application.
a)   Identify controls at the device level using EMS equipment names, also giving details about switching devices (breakers or switches) used for shunts
b)   Reason for suggestion – User will have the ability to trace back each suggested control action to violations which found that control to have a significant sensitivity

2.2.5.4   Remaining violations - Highlight violations that are unresolved after exhausting all control actions available (subject to the Violation Priorities). The tool should identify which of these remaining violations are new violations that are created as a result of suggested control actions, making a clear distinction between old unresolved violations and highlighting any new violations caused by the control actions.

2.2.5.5   Reactive reserves – For each hour of the study, calculate reactive reserves (static and dynamic) for each of the zones and margin between actual and input limit.

2.2.5.6   Sort and filtering capability based on field type (e.g. time based, number based, text based.

2.2.5.7   System Losses - For each hour of the study, calculate and display total system losses before and after optimization.

2.2.5.8   Optimized pre-contingency bus KV per KV level, separated by reactive zones overlaid with the normal voltage limit range to validate that bus kVs are realistic.

2.2.5.9   Ability to manipulate the settings for controls/control groups and constraints/constraint groups including but not limited to; enabling/disabling, modifying curves, modifying ranges, modifying priorities, etc.

2.2.5.10   Log in page for username and password.

2.2.5.11   Coloring, organization of pages, font and other general UI design will be subject to ERCOT's approval to ensure clarity and usefulness.

2.2.5.12   Displays should be sortable and filterable where possible, allowing the user to easily observe specific items and areas of concern.

2.2.5.13   There should be distinct views for the pre-control violations, optimization's control movements, and post-control remaining violations.

2.2.5.14   Real time Hourly tracking log and statistics of implementation of previous hour's reactive dispatch schedule by Transmission Operator and by equipment type for each hourly study.

2.2.5.15   Unsolved contingencies that showed up in any iteration.

2.2.5.16   General statistics from the optimization engine (e.g. start time, stop time, solution time, # of processed contingencies, # of control movements, , # of high voltage violations resolved (pre and post contingency), # of low voltage violations resolved (pre and post contingency, # of caps switched in, # of caps switched out, # of reactors switched in, # of reactors switched out, # of voltage set point movements, etc.).

2.2.6. Outputs

To enable ERCOT to build the required displays (possibly including internal versions of the ones discussed above and more), the tool should provide all the following required fields to EMS in an easy to use format. Additionally, there are other items detailed here which are required for displaying results and outputs.

2.2.6.1   Pre-optimization Voltage Violations (Station name, Bus number, Bus name, Operator, Base KV, Actual KV, Deviation, Violation Type, for post-contingency show the pre-post values and the limit, etc.).

2.2.6.2   Reactive device optimized schedules (Station name, Bus number, Bus name, Device name, Operator, Reactive capabilities, AVR status, Outage status, On/Off status, Tap setting, Set point, Switching history, Lead times, Acceptable maximum number of switching, reactive area, etc.).

2.2.6.3   Post-optimization Voltage Violations (Station name, Bus number, Bus name, Operator, Base KV, Actual KV, Deviation, Violation Type, for post-contingency show the pre-post values and the limit, etc.).

2.2.6.4   Sensitivities – Sensitivity of all reactive control devices for each of the violations using the EMS bus naming convention (not bus numbers).

2.2.6.5   Actual bus KV values data to EMS (in CSV file).

2.2.6.6   Reactive reserves (Static and Dynamic) for each region for each hour before and after implementing the control actions

2.2.6.7   Power flow cases containing suggested solution for each hour of the study period

2.2.6.8   Output must detail any relaxed and or violated constraints.

2.2.6.9   Output solution start time, end time, and duration.

2.2.6.10   Output solution should provide a base case KV plot, per KV level, separated by reactive zones overlaid with the normal voltage limit range.

2.2.6.11   Logs and log files detailing power flow and CA solution iterations for pre and post control solutions. These should detail the local control actions that would result from automatic operation of reactive devices.

2.2.6.12   The log messages should be in a standard character-delimited format (e.g. timestamp, hour of study, severity [info, warning, or error], and message text).

2.2.6.13   System Losses - For each hour of the study, calculate and display total system losses before and after optimization.

2.2.6.14   Real time Hourly tracking log and statistics of implementation of previous hour's reactive dispatch schedule by Transmission Operator and by equipment type for each hourly study.

2.2.6.15   Unsolved Contingencies that showed up in any iteration.

2.2.6.16   General statistics from the optimization engine (e.g. start time, stop time, solution time, # of processed contingencies, # of control movements, , # of high voltage violations resolved (pre and post contingency), # of low voltage violations resolved (pre   and post contingency, # of caps switched in, # of caps switched out, # of reactors switched in, # of reactors switched out, # of voltage set point movements, etc.).

2.2.7. Functionality

The tool must:

2.2.7.1   Have the capability to run independently of EMS but have the capability to allow integration of the inputs and outputs with EMS. An online instance of the tool will be integrated with the ERCOT EMS to run once an hour.

2.2.7.2   Have the capability to run hourly and provide suggested optimized control dispatch for up to next 48 hours.

2.2.7.3   Have the ability to easily manipulate input data and configuration parameters at a device level, kV level and global level.

2.2.7.4   Have the ability to give switching out shunts a higher priority than switching in shunts when both options are available to resolve a violation.

2.2.7.5   Have the ability to account for capacitor bank master-follow configurations when switching shunts in/out of service.

2.2.7.6   Have the ability to run study automatically every hour (Real-Time Periodic run from Real-Time EMS) with the ability to trigger manual run as needed.

2.2.7.7   Retain control actions of relevant devices from actual operations (not previous runs of tool), in order to retain history. This will require historical capture of real-time base case statuses and/or SCADA history tracking.

2.2.7.8   Provide and use defaults (expert suggestions) if user inputs for parameters are left empty.

2.2.7.9   Provide power flow case export capability "on-demand" (containing suggested solution) for each hour.

2.2.7.10   Real-Time Periodic study run (from Real-Time EMS), which executes hourly after HRUC completes and will analyze a study timeframe up to 48 hours, should complete within 60 minutes.

2.2.7.11   The solution must take the latest SE/RTCA solution and should consider previous hourly solution results while analyzing future hours and attempt to limit the number of changes from previously provided schedule. Thus, there should be a penalty assigned to deviating from controls recommended in previous solutions for a given hour.

2.2.7.12   The tool must provide the solution as an iterative process between power flow and optimization and show thorough detail of which actions are taken as a result of the power flow parameters and which actions are suggested by the optimization engine.

2.2.7.13   The tool must include a scheme for detecting and handling infeasibility. Errors must be generated which indicate clearly the issue causing the infeasibility and guiding the user to areas of concern.

2.2.7.14   Real-Time Hourly Periodic study run (triggered from Real-Time EMS) must converge 95% of the time.

2.2.7.15   Ad-Hoc Study runs (triggered by Study EMS) must converge 90% of the time and Offline Study run (from planning group) must converge 90% of the time.

2.2.7.16   In the event that a non-linear solution engine diverges, there should be an option to revert to a simpler linear solution optimization based purely on sensitivities.

2.2.7.17   The solution must be able to utilize a full node-breaker model and node-breaker contingencies while accounting for each shunt device discretely by equipment name.

2.2.7.18   The offline study solution must be able to utilize an ERCOT Steady State Working Group (SSWG) bus-branch case and associated contingencies.

2.2.7.19   The solution must be able to utilize interface/GTL constraints to ensure the solution does not violate the limits.

2.2.7.20   The solution must validate that new thermal violations are not introduced or existing thermal violations are not worsened as part of the optimization.

2.2.7.21   Solution Stopping Criteria
a)   No Voltage Violations or the voltage violation Magnitude change is less than a configured % threshold in consecutive iterations
b)   Maximum number of iterations reached.
c)   The solver has the capability for the user to designate how long the too should run (timeout).
d)   If any of the base case power flow solutions for an hour fail to solve, then the tool should exit with a clear indication of solution failure.
e)   An abort function shall be available to the user.

2.2.7.22   The solution and violation results for power flow and CA should match with the ERCOT EMS solution for the same case/hour.

2.2.7.23   Have the ability to modify any input data (include/exclude a control, manually move a control) and run analysis to see the effect.

2.2.7.24   Have clear debug messages for every iteration of the power flow and contingency analysis.

2.2.7.25   Have an exported list of unresolved violations, suggested control actions, and solution status which can be output to the ERCOT EMS for real-time display (simple CSV format).

2.2.7.26   Any modifications in the solution needed to arrive at converged power flow solutions needs to be conveyed clearly by the tool so that the results can be verified in ERCOT EMS.

2.2.7.27   The solution must demonstrate the ability to recalculate new limits based on the optimized reactive dispatch to verify system conditions remain within limits. This could be a stability limit calculation internal to the tool or an integration with the existing ERCOT stability analysis tool, per ERCOT's preference. An internal stability limit calculation tool should be provided as an OPTIONAL line item if not included in original pricing.

2.2.7.28   Have the ability to distinguish generator owned reactive controls equipment so that they as a control group(s), then can be enabled/disabled.

2.3.   OPTIONAL Functional Requirement: Linear MW Re-dispatch Engine

ERCOT requests pricing for an optional tool feature that allows the input case to be security constrained and economically dispatched on a MW basis. This is to be achieved using Generator Cost and Energy Offer Curves, and Power Balance Penalty Curves to first initially dispatch on available units in the case, and then run Contingency Analysis and re-dispatch MW economically such that any base case and post contingency thermal violations are addressed.

2.3.1.   Objective function

Minimize "cost" of control actions – "Cost" is the user defined weighting factor on impact of the change of a control from its current state. ERCOT wants to utilize cost curves provided by ERCOT to represent the generation cost. This can be handled through a linear sensitivity approach.

2.3.2.   Constraints

2.3.2.1   Physical constraints – typical AC power flow limits (facility ratings), real power capability of units, Interface limits.

2.3.2.2   Maintain pre and post-contingency thermal and interface MW flows within limits.

2.3.2.3   Intermittent Renewable Resources should not be allowed to dispatch up by the tool, only curtailment should be allowed.

2.3.2.4   PUN loads should be locked down during optimization.

2.4. Non-Functional Requirements

The following are the non-functional requirements of this project:

2.4.1.   Integration

2.4.1.1   The architecture of the Vendor system must allow running multiple instances of the tool concurrently in the application server to allow multiple studies from different users from the EMS system. ERCOT is planning to run 6 instances of this tool in the application server simultaneously. Two instances of the tool running in the server should be dedicated for periodic study runs from Real-Time EMS system, and the rest of the instances should have the capability to run the studies as requests come in from Study EMS systems. Any study request that the tool receives while all non-dedicated instances are busy should be queued. Queued requests should be processed when non-dedicated instances are available in the order the requests are received. The offline studies will likely be hosted on a separate server than the Online and Real time study instances.

Please note that system server hardware, storage and software configurations will be built to support multiple instances of the tool running simultaneously in the application server based on the Vendor's recommendation. Server hardware, storage and software requirements are specified in the later part of this requirement section. Data exchange and messaging, queuing methods between Vendor

system and EMS system, job scheduling, and external databases can be discussed during the planning phase of the project.

The system administrator must have the ability to configure each instance of the tool as dedicated or non-dedicated in the application server and should have the option to associate dedicated instances to a particular study initiated from the EMS.

2.4.1.2   The Vendor system and its interfaces should be capable of receiving the following study requests from the EMS system.

a) Real-Time Periodic Studies from Real-Time EMS system – (Short Term reactive scheduling) runs every hour with a study period of up to the next 12 hours. It requires a dedicated instance of the tool running in the server. All the input files, and commands to run the study will come from the Real-Time EMS system.

b) Real-Time Periodic Studies from Real-Time EMS system – (48 hour look ahead studies) runs every hour (or every other hour) with the study period of up to the next 48 hours. It requires a dedicated instance of the tool running in the server. All the input files, commands to run study will come from Real-Time EMS system.

c) Periodic Study from Study EMS system – (Next Day reactive scheduling) runs once every day for the remainder of the hours in the current day and all 24 hours of the next day, up to a total of 32 hours. It requires a dedicated instance of the tool running in the server. All the input files, control parameters, and execution commands to run the study will come from the Study EMS system.

d) Online Studies from Study EMS system – User request for the study with up to a 24 hour study period. At least 3 instances will be used for these types of studies. All the input files, control parameters, and execution commands to run the study will come from the Study EMS system.

e) Offline studies from the planning group - User request for study with up to a 24 hour study period. One instance should be dedicated for this type of study. All the input files, control parameters, and execution commands to run the study will come from a file structure in the server. This User may be more dependent on the user interface. The offline studies will likely be hosted on a separate server than the Online and Real time study instances.

2.4.1.3   The Vendor system and applications should have the capability to run studies in integration with EMS and independently of EMS (standalone mode based on input files placed in a folder). The ERCOT EMS system will provide model data in PSS/E v34 format (node breaker model) and all other required input data (as specified in functional requirements) in csv file format to the tool. Offline studies must also accept PSS/E v34 bus branch model and contingencies.

2.4.1.4   The Vendor system shall accept commands from the EMS system to start/stop/pause/interrupt the tool instance running a particular study. The Vendor's system shall also have the capability to accept commands to rerun the tool (that is running a particular study) or run the tool manually from the EMS system.

2.4.1.5   The Vendor system shall have the capability to time-out the particular study instance if its execution is taking longer than a predefined time-out period. Tool shall accept the time-out parameters as well from the EMS system for a particular study.

2.4.1.6   The Vendor system shall also accept specific control parameters (including Power Flow and Scheduling engine) from the EMS system. This feature enables the users to change parameters from the EMS system display.

2.4.1.7   The Vendor system shall provide the required commands or messages to the EMS system to notify the study is complete and ready to retrieve results from the tool before making actual output results available to the EMS system.

2.4.1.8   The Vendor system shall utilize JMS/TIBCO EMS messaging service to receive messages, commands from EMS and send messages to EMS.

2.4.1.9   The Vendor system shall provide the client UI display to show each study instance end-to-end work flow with all modules execution status and start/end execution times.

2.4.1.10   The Vendor system shall provide the client UI display to show in progress, completed, pending queued study requests with all relevant information (received time from EMS, etc.) from the EMS for each study instance including instances/services status. System shall also provide the study status (from each module of the tool) as well as work flow status (example: in progress, completed, pending queue) back to the EMS system.

2.4.1.11   The Vendor must provide APIs that would allow integration with ERCOT systems.

2.4.1.12   The Vendor system shall have Oracle database as back end database. The tool shall have the capability to import any required input data from Oracle database and shall have the capability to export data (provided to EMS through output files) into Oracle database.

2.4.2.   Application Performance

2.4.2.1   The Vendor system applications should meet the following execution completion times for each study. Please note that tool execution times are measured from the time input data is available for the study until output results are made available to EMS system.

a) Real-Time Periodic Studies up to rolling 12 hours should complete in 15 minutes.
b) Real-Time Periodic Studies up to rolling 32 hours should complete in 30 minutes.
c) Real-Time Periodic Studies up to rolling 48 hours should complete in 1 hour.
d) Online Studies up to rolling 12 hours should complete in 15 minutes.
e) Online Studies up to rolling 32 hours should complete in 30 minutes.
f) Online Studies up to rolling 48 hours should complete in 1 hour.
g) Offline Studies from planning group up to 24 hours should complete in 30 minutes.

2.4.2.2   The Vendor system application must support multi-threading techniques to improve the application performance.

2.4.2.3   The Vendor system shall archive (and display) overall and individual modules execution times for all the studies performed in last 7 days in a file (and make it available to the EMS) and in a database. Vendor also must provide display in the client UI to see this archive data. EMS system will provide the required study information such as study name, user name, and console name to the tool to archive this data.

2.4.2.4   The Vendor system applications must support running multiple instances of the tool simultaneously in the same server without causing any stability, performance or availability issues. ERCOT is planning to run 6 instances of this tool in the server simultaneously.

2.4.2.5   The Vendor system applications must be available, up and running 24x7 excluding system and application maintenance periods.

2.4.2.6   The Vendor system client UI must support multiple users (15-20) simultaneously without causing any stability, performance or availability issues.

2.4.3.   Hardware and Software Configuration

2.4.3.1   The Vendor system and applications must have the capability to run in virtual machine and physical machine environments.

2.4.3.2   The Vendor system must have the capability to run in a Linux environment or Windows environment with the latest operating system versions. Vendor System must support latest and supported versions of all third party software used in the systems.

2.4.3.3   The Vendor system must support server client (thin client or web based client) architecture. Client UI should have the capability to run from a remote machine and issue commands to a server where the scheduling engine is running and display input, parameters and output data.

2.4.3.4   The Vendor shall provide the required hardware specifications (memory, CPU, disk space, etc.), storage requirements and network bandwidth requirements for a server to build the system based on the assumption that multiple instances of the tool would run simultaneously.

2.4.3.5   The Vendor shall provide the supported third party software specifications and configurations required to build and run the system and applications.

2.4.3.6   The Vendor shall provide the required hardware specifications (memory, CPU, disk space, etc.), storage requirements and network bandwidth requirements for the system client UI to run on a remote machine/workstation.

2.4.3.7   The Vendor system client UI should have the capability to run from a Citrix Environment and the Vendor should provide the required hardware specifications (memory, CPU, disk space, etc.), storage requirements and network bandwidth requirements for the system client UI to run in a Citrix Environment.

2.4.3.8   The Vendor must support ERCOT supported Oracle database versions and the Vendor must provide the database software, storage requirements and database server hardware and storage requirements.

2.4.3.9   The Vendor must provide a system architecture document that contains:

a) Server-side hardware and software requirements, configurations
b) Client-side hardware and software requirements, configurations
c) Interaction of each component of the system
d) Input and output data flows including folders/directory structure
e) Server-client communication
f) Service accounts and access points

2.4.4.   Security and NERC Standards Compliance

2.4.4.1   The Vendor system must have application and user login authentication against Active Directory (AD). Application shall provide the ability to integrate User access provisioning and revoking process with Oracle Identity Management (OIM) tool.

2.4.4.2   The Vendor system must support service accounts (used for this tool installation in the servers and the client UI and running the tool) defined in Active Directory (AD) specific to each environment (Dev, FAT, ITEST, OTS and Production, etc.). This capability is required to allow different users and different service accounts access across different environments.

2.4.4.3   The Vendor system that runs in Linux environment must have the capability to authenticate user accounts with Active Directory through a Kerberos authentication process integrated with LDAP.

2.4.4.4   The Vendor system must have the capability to define user access levels (authorization) with specific roles like Read-Only, Write, Execute permissions etc. The system should provide the ability to provide the client UI displays access based on the defined access roles. Client UI should have the capability to distinguish administrative, configuration and each application displays. Client UI display accesses to users are provided based on user roles.

2.4.4.5   The Vendor system should provide the capability to extract user accounts and service accounts defined in the system for quarterly access review to meet compliance/CIP requirements.

2.4.4.6   The Vendor must have a defined process to assess security vulnerabilities of the system and its application periodically and provide the security patches to resolve the security risks to meet ERCOT compliance and CIP requirements.

2.1.4.7   The Vendor must perform third-party software security monitoring and provide patches to meet ERCOT compliance and CIP requirements.

2.4.4.8   The Vendor shall validate its system and application against latest ERCOT infrastructure changes (hardware, firmware, operating system, security patches etc.) on a periodic basis and provide the patches to make the system compatible with infrastructure changes.

2.4.4.9   The Vendor system should have the capability to handle server port scans from ERCOT security tools in the event server ports are being used by Vendor system at the same time as ERCOT security tools. This event should not trigger Vendor system application crashes or failures.

2.4.4.10   The Vendor system must support encrypted passwords for any accounts used at the system level and at the client side.

2.4.4.11   The Vendor system and client should not display passwords in the log messages, log displays, or in any displays, including any files in the server.

2.4.4.12   The Vendor System must have audit capabilities. All the user actions (including user logins and logouts) from the client UI shall be captured and logged in the log files (and shall be displayed in the display). The system should have the capability to retain the log files, input and output data files for all the studies performed in the last 7 days.

2.4.4.13   The Vendor must provide Secure Development Practices – documentation of secure product development life cycle and protection of the source code.

2.4.4.14   The Vendor must work with ERCOT to be compliant with the requirements of the NERC CIP 013 standards.

2.4.4.15   The Vendor system may be subjected to Cyber Security penetration tests. The Vendor must resolve any CRITICAL and MAJOR priority security vulnerabilities identified from the

test immediately and any LOW priority vulnerabilities shall be addressed over a period of time based on the timelines determined by ERCOT and the Vendor.

2.4.5. System High Availability and Failovers

2.4.5.1   The Vendor system must support high availability within the site and disaster recovery at the passive site using VM Infrastructure.

2.4.5.2   The Vendor system must support automatic local failovers within the same site and automatic site failovers in the event of hardware failures, server failures, or critical application failures (e.g. application is not responding, application is unavailable).

2.4.5.3   The Vendor system shall provide input, output and log files synchronization mechanism between active server to standby server of active site and passive site servers.

2.4.5.4   The Vendor system shall provide a mechanism to continue the execution in the event of system failover to other standby system during execution of any studies.

2.4.5.5   The Vendor system shall provide the capability to display system health conditions such as application resource utilization and communication (heartbeat, ping, messages, etc.) with a redundant system on the same site and disaster recovery/passive site.

2.4.6. Monitoring, Logs and Data Archiving

2.4.6.1   The Vendor system must provide monitoring and logs with error messages for troubleshooting and debugging purposes. This requirement is applicable for applications running in the server as well as the client application.

2.4.6.2   The Vendor system must provide all the application log messages (that includes INFO, WARNING, ERROR messages) with debug levels. This requirement enables ERCOT to increase the debug level to get more log messages when troubleshooting specific issues.

2.4.6.3   The Vendor system should create new log files for each day for each study (with date/time on the file name) and the system shall also have the capability to create new log files based on the file size as well. System should provide the ability to set the configuration of the log files and log file size threshold through a configuration display or configuration file.

2.4.6.4   The Vendor System must provide the capability to archive input and output data of each study and rerun the studies based upon archived input data.

2.4.6.5   The Vendor system must be able to create save cases and restore save cases for each study run and must be able to rerun the studies based on the restored save cases.

2.4.6.6   The Vendor system client UI shall show all the log messages of each study run.

2.4.6.7   The Vendor system application shall create the save case or required input files separately when a given study fails. This requirement enables the user to take the save case or input files and rerun the study with configuration parameter changes to troubleshoot the issue further.

2.4.6.8   The Vendor system shall archive (and display) online (real-time) scheduling study and offline studies' overall and individual modules' execution times in a file (and make it available to the EMS) and in a database for the last 7 days. The system must provide a display in the client UI to see this archive data.

2.4.6.9   The Vendor system application must log and archive each iteration of power flow/contingency analysis and scheduling engine modules and each stage's detailed log messages. Vendor system client UI must show each iteration's log messages on UI displays.

2.4.7. Support and Maintenance

2.4.7.1   The Vendor system and applications must be validated, highly available, and robust. The system must be fully supported and maintained in operational condition on a 24x7 basis.

2.4.7.2   Vendor Support Availability

a) Support must be available during ERCOT's local business hours (8:00am-5:00pm, Central Time) Mon-Fri (excluding holidays).
b) Support for critical issues (Severity 1) must be available 7x24x365.
c) Critical service request can be submitted via telephone or email.
d) Toll free customer support number (1-800-XXX-XXXX) must be provided.
e) The Vendor Helpdesk must provide immediate response for critical issues reported by ERCOT with acknowledgement of the issue and indicating the Technical SMEs who will resolve the issue.
f) Technical SME response time for critical issues must be less than one hour (from the time ERCOT reported the issue to Vendor helpdesk) with resolution or at least workaround to resolve the critical issue.

2.4.7.3   Severity level will be assigned to each defect (by ERCOT) and may be modified after initial assignment if, for example, a workaround is found and implemented.

2.4.7.4   Defect Resolution Timing - Vendor shall comply with the following defect resolution times based on the defect severity levels.

Severity Level	Description	Acknowledge Notice	Resolution
CRITICAL	Software is inoperative or unusable. Critical or material impact on normal business operations.	Immediate	< 1 hour or continuous effort until resolution. Resolution may include but is not limited to, a workaround patch.
HIGH	Software is partially inoperative, and there are no work-arounds available. Less critical but severely restrictive impact on normal business operations.	2 hours	1 business day.

MEDIUM	Software is usable with limited functions. Work-around exists to prevent impact on business operations.	1 business day	7 business days
LOW	Software is usable, but problem has been identified and correction is required.	7 business days	14 business days
SIR	Software is usable and is functioning properly. A change or enhancement has been identified, and is requested.	10 business days	Time lines will be developed based on discussions with Vendor and ERCOT

2.4.7.5   The Vendor must support periodic meetings with ERCOT to discuss technical system and application, interface and configuration issues, prioritize the work, Defect review and plan for software releases.

2.4.7.6   Training and Knowledge Transfer to ERCOT Staff – The Vendor must facilitate complete technology transfer to ERCOT to enable a rapid response to production issues, including user and support personnel training and required documentation.

2.4.7.7   The Vendor must provide documentation describing the software deployment and testing methodology for each software release cycle.

2.4.7.8   The Vendor system software release package should include actual software deliverables, a detailed installation document, a detailed list of changes including defects, test procedures with steps related to change/requirement and a Vendor unit test results document.

2.4.7.9   The Vendor development servers will be built and available physically at the ERCOT site based on Vendor hardware and software specifications. The Vendor shall utilize the development servers built at the ERCOT site for developing and testing the software.

2.4.7.10   Defect Management Tools

Available to manage defects via a Vendor-supplied portal.
Vendor shall provide ERCOT personnel access to enter, modify, close defects and generate defect reports.

2.4.7.11   The Vendor must provide a document describing the problem reporting and resolution process.

2.4.7.12   The Vendor must provide a document describing their maintenance and support process.

2.4.7.13   License Agreement – Vendor must:
   a) Provide source code for licensed Applications.
   b) Allow ERCOT to make modifications to source code and build executables.
   c) Source code into escrow.
   d) Provide a product road map.

2.4.7.14   Documentation – the Vendor shall provide the following documentation that is specific to ERCOT:
- a) Detailed Design Specifications
- b) Installation - Runbook for ERCOT Environment
- c) Configuration - Runbook for ERCOT Environment
  NOTE: Installation and configuration can be in one document
- d) Administration - In addition to training
- e) Business Continuity - FAIL-OVER
- f) Developer Guide
- g) User Guide (in addition to training)

2.4.8. Operator Training Simulation (OTS)

2.4.8.1   The Vendor system must have the capability to run in simulation mode in the Operator Training Simulator environment.

2.4.8.2   ERCOT Operator Training Simulator (OTS) system provides the simulation time to the Vendor system and it is expected to run the studies based on the simulation time instead of the current time. Simulation time can be in past or in future.

2.4.8.3   Vendor system must have capability to read the simulation time from OTS system through either flat file mechanism or Oracle database interface or third party API call and run the application in simulation time based on the run commands and study period received from OTS system. RPC Application must have the capability to display the results on RPC user interface and send the results back to OTS EMS through either flat files or oracle database or Third party API call using simulation time.

2.4.8.4   Vendor system must have the capability to recognize OTS simulation start/stop commands messages through flat file mechanism or third party API calls and perform appropriate action. If start message is received from OTS after receiving the input data, application work flow shall be brought up, ready to run study and send acknowledge message back to OTS system. If stop message is received, application shall have capability to stop the execution and send acknowledge message back to OTS. When a new Save Case is restored in OTS during a given simulation, OTS system will send Case Restoration message to RPC application, it must bring down application work flow, delete all input & output files, data sets, truncate any input & output data from database tables and send the acknowledgement back to OTS system after respective actions are completed. Vendor system user interface shall have the capability to enable/disable these capabilities.

2.4.8.5   Vendor system as well as its user interface must show all the data, log messages with simulated time and intervals instead of in current system time.

2.4.8.6   RPC Application study time selection (if there are any) must be based on simulation time instead of current system time.

2.4.8.6   RPC Application must create the save cases (or input/output files) with simulation time and must have the capability to rerun the save case in study mode with same simulation time.

2.4.9. Day Light Savings Time (DST)

2.4.9.1   The Vendor systems and applications shall support Long and Short Day Daylight Savings (DST) times (Hour 25 during Long DST and 23 hours during Short DST). Real-time periodic,

online studies and offline studies can go up to rolling 48 hours in future. Long DST additional hour and Short DST missing hour must be respected in scheduling engine and input/output displays and output data file to EMS must identify DST hours clearly.

2.5. General Requirements

2.5.1. In their responses to this RFP, Respondents must describe in detail the methodology and approach to meeting the requirements of this RFP.

2.5.2. As part of the RFP response, Respondents must fill out the "Requirements Response Template." This is a separate Excel document posted in addition to this RFP document. This spreadsheet requires Respondents to confirm their ability to meet functional, non-functional requirements.

2.5.3. Respondent to provide and describe previous experiences in delivering a similar system.

2.5.4. Gantt chart or project schedule for completing each set of deliverables, key milestones, or scope requirements described herein

2.5.5. The awarded supplier must provide a project manager or lead who has decision-making authority and who will assume responsibility for coordination, control, and performance of this effort.

2.5.6. Any changes to key personnel associated with the subsequent contract must be submitted in writing and approved in writing by ERCOT.

2.5.7. The awarded supplier must provide an organizational chart and list of the supplier's corporate chain-of-command, as well as any established procedures for contacting individuals within that chain-of-command.

2.6. Qualifications

The awarded respondent must show evidence of successful completion of similar applications on other large power systems.

2.7. Deliverables

The awarded respondent must provide the following deliverables in order to complete the requirements of the RFP.

2.7.1. Provide a list of all features (existing and new) that the new tool will deliver.

2.7.2. Provide a list of all features (existing and new) that the new tool cannot deliver.

2.7.3. Provide documentation on how the system handles bad or missing data.

2.7.4. Provide detailed documentation for all features of the product

2.7.5. Provide specifications for all hardware and software, network bandwidth, and client requirements

2.7.6. Provide costing for a functioning tool per the requirements listed in Section 2.2- 2.4

2.7.7. Provide end-to-end assistance in the installation of the hardware and/or software tools both during the trial period and during commissioning of the product at ERCOT.

2.7.8. Provide Consultant and/or Implementation services if "optional" requirement is requested by ERCOT. This should include hourly rate(s) to be used for additional services. Confirm this rate(s) will be locked for up to a three year period.

2.7.9. Provide Maintenance and Support Services Option(s) and costs per the requirements listed in Section 2.4.7

2.7.10. Provide cost and options for onsite training course(s), all the features of the product and systems administration training, user training, and supporting documentation

2.7.11. Identify any additional third party software that may be required, specifically including any optimization software. Confirm this cost is included in your proposal.

3.   General Instructions and Requirements

3.1. Notice of Intent to Propose

A prospective vendor may submit a Notice of Intent to Propose to the ERCOT Point of Contact identified in **Section 1.6** no later than 5:00PM Central Time on **the date listed in the Section 1.7 Procurement Timeline.** The Notice of Intent should consist of an email stating that the prospective vendor intends to submit a proposal for this procurement. **Only vendors who submit a Notice of Intent to Propose will receive the answers to questions from all vendors, and/or any clarifications, amendments, and addenda to the RFP.** Vendors who provide a Notice of Intent are not obligated to submit proposals after submitting the Notice of Intent, but must submit a response to be considered for an award.

3.2. Vendor Questions and Comments

All questions and comments regarding this RFP must be submitted electronically to the email address contained in **Section 1.6**. All questions must reference the appropriate RFP page and section number. In order to receive a response, vendor questions and comments must be received no later than the deadline set forth in **Section 1.7**. Inquiries received after the due date may be reviewed by ERCOT but will not receive a response. Answers to vendor questions will be emailed to the point of contact listed on the Notice of Intent to Propose. A Respondent must inquire in writing as to any ambiguity, conflict, discrepancy, exclusionary specification, omission, or other error in this RFP prior to submitting a proposal. If a Respondent fails to notify ERCOT of any error, ambiguity, conflict, discrepancy, exclusionary specification, or omission, the Respondent shall submit a proposal at its own risk and, if awarded the contract, shall have waived any claim that the RFP and Master Agreement were ambiguous and shall not contest ERCOT's interpretation. If no error or ambiguity is reported by the deadline for submitting written questions, the Respondent shall not be entitled to additional compensation, relief, or time by reason of the error or its later correction.

ERCOT reserves the right to amend answers prior to the proposal submission deadline.

3.3. Modification or Withdrawal of Proposal

Proposals may be withdrawn from consideration at any time prior to the award of contract. A written request for withdrawal must be made to the ERCOT Point of Contact (**Section 1.6**).

A Respondent has the right to amend its proposal at any time and to any degree by written amendment delivered to the ERCOT Point of Contact prior to the proposal submission deadline. ERCOT reserves the right to request an amendment to any part of the proposal during negotiations.

3.4. News Releases

A Respondent may not issue press releases or provide any information for public consumption regarding its participation in this procurement without specific prior written approval of ERCOT.

3.5. Incomplete Proposals

ERCOT may reject without further consideration any proposal that is not completely responsive to this RFP.

3.6. ERCOT Use of Vendor Ideas

ERCOT reserves the right to use any and all ideas presented in any proposal that are not the Respondent's proprietary information and so designated in the proposal. The Respondent's proprietary materials do not include information that:

- is already published or available to the public, or subsequently becomes available;
- is received from a third party who, to ERCOT's knowledge, is not in breach of any obligation of confidentiality; or
- is independently developed by personnel or agents of ERCOT without reliance on the Respondent's proprietary materials.

3.7. Additional Information

By submitting a proposal, the Respondent grants ERCOT the right to obtain information from any lawful source regarding: (i) the past business history, practices, conduct, and ability of a Respondent to supply goods, services, and deliverables; and (ii) the past business history, practices, conduct, and ability of the Respondent's directors, officers, and employees. ERCOT may take such information into consideration in evaluating proposals.

3.8. Instructions for Submitting Proposals

3.8.1. Submission

Submit all copies of the proposal to the ERCOT Point of Contact no later than **2:00 p.m. Central Time on the submission deadline** (see **Sections 1.6 and 1.7**). The proposal must be signed by an authorized representative of the Respondent and submitted electronically via email—the file must not exceed 20MB. If this size restriction cannot be met, multiple emails may be sent, but the Respondent must indicate how many emails ERCOT should anticipate (i.e., "email 1 of 3"). ERCOT reserves the right to disqualify late proposals.

3.8.2. Additional Requirements

All proposals must be:
- clearly legible;
- sequentially page-numbered;
- organized in the sequence outlined in **Sections 3.9 and 3.9.1**;
- limited to 50 pages (excluding ERCOT required forms);
- responsive to the requirements of this RFP; and
- proposals should include the Respondent's name at the top of each page, and should not include unrequested materials or pamphlets.

3.9. Format and Content

The proposal must consist of two separate parts and must be sent in two separate attachments:
Part 1 – Business Proposal
Part 2 – Cost Proposal
Part 3 – Requirements Response Template (Excel File)

3.9.1. Part 1 – Business Proposal

The Business Proposal must include the following sections:
- *Section 1 – Transmittal Letter*
- *Section 2 – Executive Summary*
- *Section 3 – Corporate Background and Experience*
- *Section 4 – Methodology and Services Approach*
- *Section 5 – Assumptions*
- *Section 6 – Appendices*
- *Section 7 – Vendor Information and Other Required Forms*

Section 1 – Transmittal Letter

Respondents must include a transmittal letter printed on official company letterhead. The letter must be signed by an individual authorized to legally bind the Respondent.

The transmittal letter must include:
1. Disclosure of all pending, resolved, or completed litigation, mediation, arbitration, or other alternate dispute resolution procedures involving the Respondent (including Subcontractors) and its client(s) within the past 24 months.
2. Disclosure of all affiliations with, or ownership relationships with, any ERCOT Market Participant or its affiliates. A list of Market Participants can be found here: http://www.ercot.com/mktparticipants/
3. A description of any personal or business interest that may present an actual, potential, or apparent conflict of interest with the performance of the contract and an explanation of how the Respondent can assure ERCOT that these relationships will not create an actual conflict of interest.
4. A list of key personnel previously employed by ERCOT in accordance with the requirements of Section 1.5.2.
5. A complete list of all exceptions, reservations, and limitations to the terms and conditions of the RFP.
6. Signed copies of the Professional Services Agreement, NDA, IRS W-9, and Vendor Information Form, located here: http://www.ercot.com/about/procurement/index.html.
7. Additionally, if the nature of this RFP solicitation involves an Information Technology purchase, please review and acknowledge the "Cyber Security Requirements" document, also located here: http://www.ercot.com/about/procurement/index.html.
8. If proposing a SaaS solution, the Respondent must include a copy of a SOC 2 (type 2) audit report, or equivalent (ISO 27001 certification proof).
9. Please also address the following Records and Information Management (RIM) RFP questions:
    1. Does the solution include an application that will generate electronic information to be saved or stored within such application, whether hosted off-site or within ERCOT's current IT infrastructure?
        - If YES, proceed to question 2.
        - If NO, no further questions are required as this does not pose any RIM Program concerns.
    2. Does the solution utilize proprietary electronic document formats?
        - If YES, provide additional detail for RIM evaluation (format(s) and access requirements).
        - If NO, provide additional detail for RIM evaluation (format(s)).

3. Can the product meet ERCOT's RIM program requirements[1] for records and information generated or stored by the system including destruction at the end of their lifecycle?
   - If YES, provide additional detail for RIM evaluation.
   - If NO, initiate additional discussion.

Section 2 – Executive Summary
In this section, the Respondent should condense and highlight the content of the Business Proposal to provide ERCOT with a broad understanding of the Respondent's approach to meeting ERCOT's objectives for this procurement.

Section 3 – Corporate Background and Experience

Respondent's Background and Experience
This section details the Respondent's corporate background and experience. If the Respondent proposes to use Subcontractor(s), it must describe any existing ongoing relationships with such Subcontractor(s), including project descriptions. The section should include the following information:
- respondent's full organization, company, or corporate name
- headquarters address
- type of ownership (e.g., partnership, corporation)
- if the Respondent is a subsidiary or affiliate and the name of the parent organization
- state where the Respondent is incorporated or otherwise organized to do business
- federal taxpayer identification
- name and title of person who will sign the contract
- name and title of person responsible for responding to questions regarding the proposal, with telephone number, facsimile number, and email address

Describe the Respondent's corporate background as it relates to projects similar in scope and complexity to the project described in this RFP.

If the proposal includes the use of Subcontractors, include a similar description of the Subcontractor's corporate background.

Include at least three (3) references for projects performed within the last five (5) years that demonstrate the Respondent's ability to perform the required RFP services. Include a brief description of work performed, contract dates and contact parties, with address, telephone number, and email, if available. If the work was performed as a Subcontractor, the Respondent must describe the scope of subcontracting activities.

Key Personnel
Identify and describe the Respondent's proposed labor skill set and provide resumes of all proposed key personnel (as defined by the Respondent). Resumes must demonstrate experience germane to the position proposed. Resumes must list any relevant professional designations for key personnel identified by Respondent. Resumes should include work on projects cited under the Respondent's corporate experience, and the specific functions performed on such projects.

Section 4 – Methodology and Services Approach
Describe the Respondent's methodology for providing the deliverables identified in Section 2. Include a proposed project schedule, illustrating start and finish dates of the terminal and summary elements identified in Section 2 or proposed by the vendor.

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[1] RIM program requirements include purging records and non-record information based on current business requirements and the retention requirements found in ERCOT's Records Retention Schedule.

Section 5 – Assumptions
State any business, economic, legal, or practical assumptions that underlie the Respondent's Business Proposal.

Section 6 –Appendices
Include any appendices to the Respondent's Business Proposal.

Section 7 – Vendor Information and Other Required Forms
- Except for current ERCOT suppliers who have an active Master Agreement with ERCOT, all Respondents must complete the following documents located at
www.ercot.com/about/procurement
  - Nondisclosure Statement
  - IRS W9
  - Vendor Information Form
- If the anticipated contract value with ERCOT is equal to or >$250,000.00, the Respondent must include the two (2) most recent two (2) years' audited financial statements (include unaudited statements if supplier is unaudited). Publically-held companies must include or provide a link to the most recent Forms 10-K and 10-Q filings.

3.9.2. Part 2 – Cost Proposal

The Cost Proposal must be based on the Scope of Work described in Section 2. This section should include any business, economic, legal, or practical assumptions that underlie the Cost Proposal. Respondents may separately identify cost-saving and cost-avoidance methods and measures and the effect of such methods and measures on the Cost Proposal and Scope of Work.

Respondents must utilize the Cost Proposal table format listed below for submitting a Cost Proposal. However, Respondents may propose optional cost proposals if such proposals are more cost effective (i.e., time and materials cost structure, etc.) for ERCOT.

Cost Proposal		
Cost not included in Respondent's pricing proposal to ERCOT are the sole responsibility of the Respondent. Project Deliverables and Costs	Estimated Number of Hours to Complete	Total Cost
Deliverable 1 – Software Solution with description of Licensing Structure. Provide complete list of detailed features included in solution, and indicate if feature is part of base product, or ERCOT customized. (as required in Section 2.7.1-2.7.6)	XX	$0.00
Deliverable 2 – Installation Support Services (as required in Section 2.7.7 – 2.7.8)	XX	$0.00
Deliverable 3 – Maintenance Support Services Option(s) (as required in Section 2.7.9)	NA	$0.00
Deliverable 4 – ERCOT Onsite Training: Course(s) (as required in Section 2.7.10)	N/A	$0.00
	TOTAL FIXED COST:	$0.00

3.9.3. Part 3 – Requirements Response Template (Excel File)

As noted in section 2.5.2, Respondents must fill out the "Requirements Response Template." This is a separate Excel document posted in addition to this RFP document. This spreadsheet requires Respondents to confirm their ability to meet functional and non-functional requirements.

3.9.4. Multiple Responses

A Respondent may submit more than one proposal, including a joint proposal with one or more Respondents.

3.10. Joint Proposals

Two or more companies may join together and submit a joint proposal in response to this RFP. A joint proposal must completely define the responsibilities each company proposes to undertake. Also, the joint proposal must designate a primary Respondent who will be responsible for the delivery of all goods, services, and requirements as specified in the RFP, and a single authorized official from the primary Respondent to serve as the sole point of contact between ERCOT and the joint proposers. Any contract resulting from a joint proposal must be signed by an authorized agent or officer of each company. Each company included in the submission of a joint proposal will be jointly and severally liable during the term of the contract.

4. Evaluation

4.1. Evaluation of Proposals

ERCOT will select the successful vendor through an internal evaluation process. ERCOT will consider capabilities or advantages that are clearly described in the proposal, which may be confirmed by oral presentations, site visits, or demonstrations, if required, and verified by information from reference sources contacted by ERCOT. ERCOT reserves the right to contact individuals, entities, and organizations that have had dealings with the Respondent, or staff proposed for this effort, whether or not identified in the proposal.

4.2. Evaluation Criteria

The primary criteria for evaluating the proposals as they relate to this RFP are:

1. the vendor's responsiveness to ERCOT's RFP
2. the vendor's experience and qualifications
3. the vendor's ability to meet the scope and requirements set forth in Section 2
4. the vendor's fees, cost structure, and best value to ERCOT

4.3. Oral Presentations and Site Visits

ERCOT may, at its sole discretion, request oral presentations, site visits, and/or demonstrations from one or more Respondents. ERCOT will notify selected Respondents of the time and location for these activities, and may supply agendas or topics for discussion. ERCOT reserves the right to ask additional questions during oral presentations, site visits, and/or demonstrations to clarify the scope and content of the written proposal, oral presentation, site visit, or demonstration.

4.4. Discussions with Respondents

ERCOT may, but is not required to, conduct discussions and negotiations with all, some, or none of the Respondents for the purpose of obtaining the best value for ERCOT.