



PEAKRELIABILITY
assuring the wide area view

Peak Reliability Coordination Services in the West
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Peak's fundamental mission is to enhance and promote the reliability of the Bulk Electric System (BES). Today Peak meets its mission primarily through its mature and sophisticated reliability coordination services, system modelling capability, and innovative reliability services such as Hosted Advanced Applications (HAA). While the quality of Peak's services and capability are without equal among new or existing reliability coordinators, the fact is that the emergence of markets in the West has driven funding entities to demand choice and quality reliability services at a competitive cost.

Well-run organized electric markets promote reliability and include key functions, like reliability coordination. Further, the structure of organized markets allows for services like reliability coordination to be provided for little cost. In contrast, Peak as a stand-alone organization funded through bilateral contracts is dependent on its funders for support and has little ability to compete on a cost basis with an organized market provider. It is highly probable that our current funders will obtain reliability coordination services (as a standalone or bundled product) from a provider who offers both reliability coordination and market services in the future. The planning assumptions of Peak's member entities and other prospective reliability coordination providers suggests that future could be already upon us or certainly coming soon, depending on a number of variables including the certification of reliability coordinators and the speed at which emerging markets mature. Peak, as a steward of reliability and a prudently managed operation, has an obligation to respond and plan for this transition.

The purpose of this document is to set forth Peak's plan to address these changes. First, Peak is fully funded through Dec. 31, 2019 and intends to hold its budget flat while looking for opportunities to reduce costs. Second, starting in 2020 Peak will offer reliability coordination service options at an extremely competitive price point that is further described in this document.

In evaluating its RC services, Peak first considered an RC scenario that was in the \$16 million to \$18 million range. Ultimately Peak's management and board concluded that this scenario is not consistent with our mission to promote or enhance the reliability of the Western Interconnection. Consequently, this option is not addressed in this paper nor will it be pursued further.

Next Peak evaluated a scenario where it could reliably perform RC functions for \$23.5 million ("Transition RC"). Peak believes the Transition RC scenario is both NERC certifiable and operationally sustainable beyond 2020. It is important to note, however, that cost and sustainability of the Transition RC is highly dependent on the scope of services selected from the components described below and the financial commitment of the membership. Peak believes it is in the interest of reliability for Peak's funders, membership and industry stakeholders to fully support Peak and the funding of the Transition RC as it allows prospective market operators and reliability coordinators to mature their offers without compromising reliability. Peak will seek to enter into a non-binding letter of intent with entities to further explore the Transition RC.

Peak has divided all of its services into three categories, more fully described below, to allow for more clarity and transparency with regards to core RC costs versus innovations and other services that enhance the reliability and efficiency of the Western Interconnection. These include:



1. **Core Reliability Coordination Services** – services that are critical for maintaining the reliability of the BES and ensure compliance with NERC Reliability Standards applicable to the RC function.
2. **Optional Reliability Services** – services that are optional and may be selected “a la cart” by BAs and/or TOPs. This includes services such as Hosted Advanced Applications (HAA).
3. **Interconnection Shared Services** – services that provide value and enhance reliability for the entire Western Interconnection. These services will need to be agreed upon and funded by Peak and the other RCs in the Western Interconnection so that there are no “free riders” extracting the value of the services without paying their share. Examples of these services include the WECC Interchange Tool (WIT) and the Reliability Messaging Tool (RMT).

In addition to a detailed review of Peak’s services, this plan for the Transition RC includes discussions about RC governance and committees, and a service cost evaluation that provides transparency for the costs associated with each of the services.

RC Governance and Committees

Peak will continue to leverage an independent board, but will seek to reduce the number of board seats to three and reduce the number of board meetings. Similarly, Peak contemplates engaging with the Member Advisory Committee (MAC) to explore restructuring as is appropriate to reflect the scope of services and operational focus of a transitional Peak. These steps will contribute to the reduction of overall Peak services cost.

Peak will continue to leverage the RC User Group to address operational and technical issues, for sharing operational practices, and as a forum for hearing issues faced by BAs and TOPs in the West. Work groups would also be created from the RC User Group to tackle specific issues important to the RC service recipients.

Core RC Services

Peak’s Core RC Services are those services that are required by NERC standards to ensure that the reliability of the Bulk Electric System (BES) is maintained. Key components of Peak’s Core RC Services include the Wide-area View, System Operating Limits (SOL) and Interconnection Reliability Operating Limits (IROL) identification and monitoring, coordination and emergency operations.

Wide-area View

Peak will continue its situational awareness platform based on Peak’s existing West-wide System Model (WSM), maintaining a complete view of the Western Interconnection. In the Western Interconnection, it is important to have a complete model of the entire system to capture the many interactions that occur from one entity’s system to another. Detailed system topology, phase shifter modelling and Remedial Action Scheme (RAS) modelling are all important to ensure accuracy of real-time contingency analysis results, as well as for transferring current system state to external real-time applications such as real-time markets and the Enhanced Curtailment Calculator (ECC). Peak’s RC System Operators (RCSO) will leverage Peak’s existing visualization, analytics and alarming technology to ensure a high level of situational awareness.

SOL and IROL Identification and Monitoring

Peak will continue to maintain an SOL methodology for Peak’s RC Area and will use existing advanced applications such as State Estimation, Real-time Contingency



Analysis and Real-time Voltage Stability to identify and monitor SOLs and IROLs within Peak's RC footprint. Utilizing these existing tools and models will help ensure the system is able to operate both reliably and efficiently. Peak will leverage existing Energy Management System (EMS) and voltage stability tools for this effort, both of which have been used extensively in operations and have demonstrated the capability to handle challenging operating conditions including real-time RAS status changes, unexpected forced outages and other unique conditions.

Coordination & Communication

Coordination among TOPs and BAs in the Peak RC Area is a major responsibility for Peak, including outage coordination, operations planning and real-time event coordination. Peak will continue to provide a high degree of coordination and communication with all entities in the West to ensure our reliability objectives can be met. For the Peak RC Area, coordination activities include, but are not limited to:

- Outage Coordination – Outage Coordination is required per NERC Standard IRO-017-1 and enhances reliability through improved planned outage information and associated studies.
- Operations Planning – Also required by NERC standards, operations planning includes all coordination of operating plans and procedures that are impactful beyond individual TOPs or BAs. Peak will continue to facilitate sharing of operations plans via a secure website where all entities within the Peak RC Area will submit and coordinate their operational planning activities. Today this is accommodated through the study dashboard hosted on Peak's secure .org site.
- Real-time Coordination through the Reliability Messaging Tool (RMT) – RMT is a critical real-time communication and coordination tool used by RCs, BAs and TOPs. RMT will continue to be supported by Peak for entities within the Peak RC Area. Because RMT is an important tool for the entire Western Interconnection, Peak will make RMT available for a fee for entities not participating in Peak's RC Area.

Emergency Operations

Peak will support numerous emergency operations conditions as required by reliability standards. Emergency operations conditions include capacity or energy emergencies, frequency excursions, stability limit or IROL exceedances, and natural emergencies that impact the BES such as fires or storms. In addition to supporting real-time emergency conditions, Peak will provide emergency operations simulation training such as restoration training and IROL training leveraging Peak's Dispatcher Training Simulator (DTS).

Uses of the DTS to support Interconnection-wide operational issues, such as system restoration or IROL training, will continue; those entities outside the Peak RC Area will pay a fee to participate in these drills.

Optional Reliability Services

Today, Peak offers other services for a fee that are not directly tied to Peak's core RC function. Peak will continue to offer these reliability services for a fee outside of Peak's Core RC Service offering. These services are offered because they provide a high degree of reliability and economic value to recipients, and Peak believes that a continued emphasis on tools and services focusing on the reliability of the entire Western Interconnection ultimately is a benefit to everyone. Peak's offerings associated with Optional Reliability Services include, but are not limited to:



- Hosted Advanced Applications (HAA) – HAA is a technology platform available to TOPs and BAs that contains near real-time data required for their situational awareness and their performance of Operational Planning Assessments and Real-time Assessments. The key applications available in HAA are SCADA (data, station diagrams and overview diagrams), state estimator, real-time contingency analysis, network sensitivity calculator (for identifying effective mitigation options), study power flow and study contingency analysis. HAA also provides numerous situational awareness tools to support alarming, monitoring of key facilities/contingencies outside of a TOP footprint, offline study case management, and other features to enhance the use of the tools for HAA users. Peak will continue to offer HAA services to any TOP or BA in the Western Interconnection, even if not part of the Peak RC Area.
- WECC Interchange Tool (WIT) – WIT is the primary tool in the West used for managing confirmed interchange, performing net interchange verifications and tracking inadvertent interchange among the BAs. Peak has the support structure in place and has established a WIT user group to address issues and make improvements to the tool. Peak will continue to offer WIT to all required users in the West.
- Miscellaneous tools – Peak has supported reliability initiatives in the West for many years, even if those are not directly associated with Reliability Coordination. For example, Peak currently supports entities like the Northwest Power Pool Reliability Tools Advisory Group (RTAG) in developing technology that supports the reliable and efficient operation of the BES within their respective region. Peak will continue to support this type of effort.

Interconnection Shared Services

The West is unique insofar as an issue on one side of the system can impact the opposite side of the system. Peak will continue to offer services that support reliability for all entities in the West given the new paradigm with multiple RCs. In addition to those services listed above, Peak encourages entities in the West to consider model, data, visualization and other advanced analytics that could be coordinated and provided by Peak in order to reduce the duplication of activities by multiple RCs, thereby improving model and data consistency while reducing cost for everyone in the West. Interconnection Shared Services will be funded by all RCs in the West, each one paying an amount based on their load ratio share.

Peak's offerings associated with Interconnection Shared Services include:

- Synchrophasor tools – The development of synchrophasor technology holds much promise and has resulted in more than \$150 million of investment in the Western Interconnection since 2011. Peak will facilitate continued synchrophasor development that benefits the entire Western Interconnection. Tools such as oscillation detection, linear state estimator and phase angle monitoring are best suited to wide area (across RC boundaries) analysis and monitoring. Peak would like to continue supporting the development and operational use of these tools for the entire Interconnection.
- Enhanced Curtailment Calculator (ECC) – The ECC is currently used primarily for managing unscheduled flow on Qualified Paths in the Western Interconnection per the Western Interconnection Unscheduled Flow Mitigation Plan. It is being enhanced to support seams management and SOL monitoring on other transmission facilities beyond Qualified Paths. The ECC is able to identify which BAs are contributing to flows on the system and allocate the BA with an obligation to provide relief. The ECC can be an extremely valuable tool for supporting reliable and efficient operations in the Western Interconnection if all RCs use the tool; the ECC will not be effective if only parts of the Interconnection participate in its use. The ECC will continue to be supported primarily by



Peak with appropriate collaboration, coordination and influence by the other RCs within the Interconnection.

- Reliability Messaging Tool (RMT) – RMT is a critical operations communication tool, used today to communicate important real-time information between Peak, TOPs and BAs. Peak will continue to use RMT for its own RC area, including all BAs and TOPs within Peak’s RC Area. Peak is offering RMT for the use of the entire Interconnection including RCs, TOPs and BAs outside of Peak’s RC Area. The use of RMT outside of Peak’s footprint will be on a fee basis.
- Other services – There are many other services that benefit all reliability entities in the Western Interconnection. Some of those include the real-time data sharing Extra High Voltage (EHV) Inter-Control Center Communications Protocol (ICCP) system, Interconnection-wide simulation drills utilizing Peak’s DTS, and wide-area geo-spatial visualization which could be used by any RC, TOP or BA in the West. Peak would like to continue to use its knowledge and skill to innovate and develop services for the betterment of reliability throughout the Western Interconnection.

Peak and the other RCs in the Western Interconnection are embarking on a major coordination effort to ensure that important Interconnection-wide tools and services currently provided by Peak can continue to be supported in the future multi-RC Western Interconnection. As those discussions progress, it will be determined which of the Interconnection Shared Services will be supported long term. Peak believes that while the West is moving to a multiple RC/market operator environment, tools and services that benefit the entire West should continue to be developed and encouraged so that they can add value and improve the overall reliability of the Western Interconnection.

Service Cost Evaluation

Peak has reviewed a significantly reduced RC Core Service that Peak believes could operate reliably and which will cost around \$23.5 million. This cost reduction reflects two main things. First, it is exclusively core RC services; additional services such as optional services (see “Optional Reliability Services” above) are not included. Second, reliability services which are shared, Interconnection-wide services (see “Interconnection Shared Services” above), would need financial support from all RCs to be maintained. If that support doesn’t occur, those costs may need to be added back to the core Peak RC cost if there is a desire to maintain those services going forward. Tables 1 and 2 provide a breakdown of the services to be offered by Peak. Table 3 provides pricing for Peak’s HAA service. These costs reflect Peak’s best estimate at this time and include overhead and administrative assumptions; final costs may vary based on the number of services selected.



Table 1. Description and Entity Cost for Peak Services

Service Name	Peak Reliability Total Cost (per year) ¹	Description
Core Reliability Coordination Services		
Core RC	\$23.5 million	This is the total “base” RC cost that all Peak RC service takers must pay. Cost allocation based on net energy for load of participants.
Reliability Messaging Tool (RMT)	Included in Core RC	RMT supports RC, TOP and BA real-time communication and coordination.
Coordinated Outage Scheduling Tool (COS)	Included in Core RC	COS is the primary tool for coordinating scheduled transmission and generation outages in the Western Interconnection.
Voltage and Transient Stability	Included in Core RC	Additional services such as TTC calculation engine, frequency response monitoring and system model validation.
Dispatcher Training Simulator – Interconnection Simulation	Included in Core RC	Restoration drills, IROL drills and other simulation-based training for the Interconnection.
SharePoint Coordination Services	Included in Core RC	Use of Peakrc.org for coordinating data, such as studies, TOP/BA data requests, models, etc.
Optional Reliability Services²		
WIT	\$575,000	WECC Interchange Tool supports all BAs in managing scheduled interchange.
EHV/ICCP Management	\$60,000	Real-time operational data sharing system used by TOPs, BAs and RCs.
ECC	\$925,000	Enhanced Curtailment Calculator manages Qualified Paths and is being expanded to incorporate other facilities in the Western Interconnection.
Synchrophasor Technology	\$520,000	Synchrophasor technology supports wide-area situational awareness across the entire Western Interconnection.
Peak Visualization Platform (PVP)	\$250,000	Geo-spacial visualization tool. PVP allows weather, fire and other non-electrical information to be monitored on power system situational awareness displays.

¹ Assumes that Peak’s footprint consists of the Western Interconnection minus AESO, CAISO, PSCO and WACM. Assumes participation in Interconnection Shared Services by all Western Interconnection RCs (Peak has 63%, rest of RCs have 37%).

² Entity cost allocation determined by number of participants.



Table 2. Other RC Provider Cost for Peak Interconnection Shared and Optional Reliability Services

Service Name	Other RC Provider Cost Share (Fully loaded)	Description
Shared and Optional Services for RC Providers³		
Reliability Messaging Tool (RMT)	\$200,000	RMT supports RC, TOP and BA real-time communication and coordination.
Coordinated Outage Scheduling Tool (COS)	\$325,000	COS is the primary tool for coordinating scheduled transmission and generation outages in the Western Interconnection.
Voltage and Transient Stability	\$260,000	Additional services such as TTC calculation engine, frequency response monitoring and system model validation.
Dispatcher Training Simulator – Interconnection Simulation	\$375,000	Restoration drills, IROL drills and other simulation-based training for the Interconnection.
SharePoint Coordination Services	\$190,000	Use of Peakrc.org for coordinating data, such as studies, TOP/BA data requests, models, etc.
WIT	\$375,000	WECC Interchange Tool supports all BAs in managing scheduled interchange.
EHV/ICCP Management	\$40,000	Real-time operational data sharing system used by TOPs, BAs and RCs.
ECC	\$600,000	Enhanced Curtailment Calculator manages Qualified Paths and is being expanded to incorporate other facilities in the Western Interconnection.
Synchrophasor Technology	\$340,000	Synchrophasor technology supports wide-area situational awareness across the entire Western Interconnection.
Peak Visualization Platform (PVP)	\$170,000	Geo-spacial visualization tool. PVP allows weather, fire and other non-electrical information to be monitored on power system situational awareness displays.

³ Cost allocation determined by number of RC participants.



Table 3. Peak's HAA Service Cost

Service Name	TOP/BA Cost	Description
Hosted Advanced Applications (HAA)	\$90,000 base + license/maintenance cost for study tools (GE contract) One time initiation fee of \$30,000 for new users	HAA provides situational awareness, real-time assessment and operational planning assessment capabilities to TOPs and BAs.