



Memorandum

To: ISO Operations Committee
From: Dan Yee, Acting Chief Information Officer & Vice President Information Services
CC: ISO Board of Governors, ISO Officers
Date: September 2, 2005
Re: *Technology Status Report (Report covers period 06/09/05 through 09/02/05)*

This is a status report only. No Board action is required at this time.

EXECUTIVE SUMMARY

This memorandum provides an overview of and status report on certain key technology and capital projects. The projects are grouped by the following focus areas:

- Ensure Reliability of the Grid
- Technologies and Activities Supporting Market Redesign and **Technology Upgrade** Program (MRTU)
- Improve Operational Efficiencies
- Enhance Business Effectiveness
- Strengthen and be Responsive to External Relationships

Management has grouped the projects by focus area so that the Board and stakeholders can appreciate and understand how these projects relate to both the ISO's corporate goals as well as issues raised by stakeholders.

In addition to the progress of recent activities outlined below, Information Services highlights the following:

- **Alerts, Warnings, and Emergency (AWE) System Regional Notice Enhancement:** The current Alerts, Warnings, and Emergency Notification System provides automated creation and display of system notices based on Emergency Operations Procedures E-508 "Electrical System Emergency" and E-509 "Restricted Maintenance Operations". The system automates all actions required when an emergency notice is issued. It sends out emails, pages, posts the notices to the ISO Internet site (www.caiso.com), posts selected notices on the California Office of Emergency Services (OES) Emergency Digital Information Service (EDIS), and updates several internal databases. Currently, all notices are issued statewide. With the possibility of regional deficiencies this summer, the application was enhanced to issue and track notices at the regional level. The regions are currently Northern California and Southern California, and are split approximately at path 26. In addition to this notice enhancement, the project includes development of a "Conserve-O-Meter" to be posted on the CAISO Internet site, which will advise California entities of increased needs for conservation based on existing or forecasted conditions.

Status: Project Complete. Project was placed into production on May 31, 2005.

- **IS Divisional Benchmark – IT Overview Analysis (ITOA) of 2005:** This annual effort includes data collection and analysis for benchmarking Information Technology (IT) activities such as Enterprise Computing (UNIX & NT), Wide Area Network (WAN), Local Area Network (LAN), Voice Premise Technology, Internet, Client and Peripherals, Applications Support and Development for Corporate Enterprise Applications, Operations Systems Support, and Energy Management System (EMS). This study provides comparisons to peer costs, ISO costs from study-to-study, analysis, and recommendations on improvement to IS Operations.

Status: Project Complete. Final management report was received on August 25, 2005. Project delays in the report phase were a result of minor report changes within three areas (Voice Premise Technology, Internet, and Corporate Enterprise Applications) as well as Gartner consultant availability. Further delays may be experienced related to the management report presentation due to Gartner scheduling conflicts. Presently, the management report presentation is scheduled for September 13th. An annotated copy of the report will be sent to IS Managers and Directors immediately following the formal presentation. Target date: August 1, 2005

Ensure Reliability of the Grid

- **Energy Management System (EMS) 2004 Upgrade Project:** The Energy Management System (EMS) is a group of systems/subsystems and hardware that monitors, evaluates, and controls the power system lines, loads, and generators in the ISO Control Area. The EMS is the fundamental system that the ISO utilizes to operate the grid safely and reliably in real-time. In an effort to ensure that the EMS will meet future requirements and functionality, Management undertook a review of the existing EMS and identified the need for implementing the ISO's existing vendor's technology upgrade - ABB's EMS Network Manager 2004 release. Key functionalities associated with the upgrade include:
 - Performance improvements: There is a 10 second update for real-time EMS screens in the EMS User Interface. The Network Manager 2004 update would provide a minimum 2 second update.
 - SAS 70: The current EMS does not accommodate for the level of auditing and access controls currently being mandated. Security requirements would be addressed within the new release inclusive of auditing, authorization controls, and access controls.
 - Security requirements: This upgrade would provide single user sign on, audit records of user's actions, and administration of security update patches.
 - Alarm enhancements: In response to August 14, 2003 Eastern Blackout, NERC and WECC requirements include the usability of alarm systems, navigation, and usability of EMS systems. The business requirement is to have a system that would allow operators the ability to view what is pertinent and not overload them with lower priority views. This update would address the enhancements necessary to accommodate mandates.
 - Workstation expansion: The update would allow for an easy expansion of additional workstations. Moreover, the update would remove the necessity for an intermediate display server resulting in a simpler architecture.
 - New web interface: All on-line diagrams of the EMS system would be available for Operations Engineers via a new web interface. This would expand the Grid Operations views of our system to a much wider engineering user community.

Status: Project on target (deadline extended). Funding approval for the EMS 2004 Upgrade project was received at the September 15, 2004 ISO Board of Governors meeting. The project team continues to work on the conversion and validation of all the displays used in the EMS; Operator Displays, Network Application Displays, Grid Operations Training Simulator (GOTS) Displays, EMS Application Displays, etc. Real-time Applications staff are beginning the various levels of acceptance testing and cutover testing. To date, we have cutover the Grid Operations Training Simulator (GOTS System) and part of our Quality Assurance EMS System (QAS) to the upgraded EMS format. Several critical project milestones were delayed in the display and conversion areas that may impact our actual implementation date. There have been issues with our new data engineering tool. Additional concerns are our converted code testing with critical functionalities. We will not be able to fully test until the first full week in September when we can completely change our QAS environment over to the upgrade. Depending on the results, we will be able to better ascertain impacts to the project schedule. Original target date: May 15, 2005. Revised target date: October 31, 2005.

- **Transmission Register Redesign:** The ISO's current Transmission Register (TR) application provides information on transmission equipment, specifically, the ratings of equipment. It is frequently used by Grid Operations and Planning to determine the most limiting element(s) on a transmission line. The initial TR application met these business requirements but has quickly become deficient in being able to meet the evolving business requirements of external PTO administration and more robust reporting. Due to performance and usability issues, many users are no longer accessing this application. The administration of transmission equipment is problematic for PTO administrators due to limited functionality. Some PTO administrators have resorted to updating their organization's equipment details in a process that, at times, bypasses the front end of the TR application. This process, along with other "workarounds" to prevent security violations, costs the ISO in both Operations Engineering and Information Systems employee resources. The deficiencies that negatively affect the business today will become even more exasperated with the deployment of the Market Redesign & Technology Upgrade program in which the TR becomes even more critical to day-to-day operations. In 2004, the ISO performed a business analysis, gathering information from the primary PTOs such as SDGE, SCE, and PG&E. The result of that effort was presented to the participating PTOs and they were very pleased.

The primary benefits to be achieved include:

- A satisfied user community. Performance issues will no longer prevent PTOs from accessing the system.
- A system that provides accurate transmission equipment information to those who need it at the time they need it. Users will no longer have to rely on potentially outdated printed reports to determine ratings. Providing the most up to date and accurate transmission data will reduce the potential for grid reliability events.
- An open system that conforms to ISO application standards. This will lower maintenance costs and make it easier to expand its functionality, as business needs change. The TR can easily and openly share information with other ISO applications with minimal integration efforts.
- A more flexible system that allows the TR administrators to support business changes without requiring new development.
- A secure system.

Status: Project on target. The ISO Project Steering Committee approved funding for this project during their April 21, 2005 meeting. Business requirements completed. The team is currently working on the application design. Target date: June 30, 2006.

Technologies and Activities Supporting Market Redesign and *Technology Upgrade Program (MRTU)*

- **Vitria 4.3 Upgrade:** Vitria is the vendor that provides the ISO's Enterprise Application Integration (EAI) software solution that connects the Energy Management System (EMS) with the Market Operations systems, as well as other market related systems. Completing the upgrade will not only provide increased system reliability and availability, it will also support the new system integration requirements necessary for the MRTU program. The production upgrade of the existing software will be performed; fully complying with Vitria's maintenance agreement and obsolesces of their 3.X platform.

Status: Project on hold. The project team completed integration and high availability testing efforts on the staging environment. The ultra-high available production environment has been setup and configured. However, due to the risk associated with deploying Vitira prior to summer operations, as well as the organization realignment impact, it has been decided to postpone the upgrade project until a complete project evaluation and prioritization can be conducted. A new implementation plan will be developed, providing for a possible Fall 2005 release schedule.

- **Enterprise Test Environment Management Project:** The management and support of the current ISO testing environments is decentralized with each of the different support and development groups maintaining their own processes, system configurations, and sets of documentation. While this approach has worked in a maintenance mode, it adds additional overhead, makes consistency difficult, and audit assessments more expensive. At the same time, specific tools and practices that improve, automate, and simplify the required processes cannot be leveraged easily across the environments. As the ISO continues to develop and implement the Market Redesign & Technology Upgrade program, it has become apparent that the existing processes and procedures for managing the introduction of system changes into the environment will not scale adequately to support the major changes that are required for the MRTU program to succeed. The Test Environment Management Project will provide a standardized set of strategies, guidelines, and tactical artifacts that improve the processes and procedures for managing the ISO testing environments. The project will move the management and support of the MRTU test environments to a centrally managed and supported Enterprise testing environment.

Status: Project schedule revised to complete in Q4 2005. Due to delays in the Enterprise System Testing improvement effort, the Enterprise Test Environment Management Project will complete based on the original end of year timelines rather than an accelerated schedule. The two projects schedules will continue to be aligned based on the end of year completion. The schedule supports specific MRTU timelines for integration testing. These two efforts will provide the ISO with a comprehensive solution that will support current testing operations as well as MRTU testing efforts.

The project team continues to build out testing environments and apply specific consolidated designs that provide flexibility and maintainability for ongoing operations support. Many of the

processes that are being utilized to build out these testing environments are being formally documented over the next few months to ensure knowledge transfer. Current activities include setup and documentation of MRTU testing environments for System Acceptance Testing, build out of shared Legacy test environments, and finalizing network configuration for testing infrastructure. IS Infrastructure Services teams (Engineering, Security, and Application Support) have completed conceptual and specific detailed designs for testing hardware, administration tools, network infrastructure, and server raised floor environments required to support current and MRTU testing infrastructure delivery. The team has:

- Installed and is working to configure testing hardware to fill specific gaps for MRTU Stage 1 release.
 - Purchased and received hardware for specific environmental gaps for MRTU Release 1 Integration and End-to-End testing.
 - Continued to migrate current projects and applications into the centralized release repository for configuration control for development code and testing and production environment releases.
 - Continued to refine processes for overall environment management and configuration management activities.
 - Continued to leverage the MRTU Test Management Methodology and efforts to support the ISO Enterprise System Testing project through collaborative planning sessions with Market Operations, Settlements, and Information Services. Currently working with these teams to align ongoing efforts with MRTU Test Management plans. Original target date: December 15, 2005. Revised target date: Q4 2005.
- **Legacy System Project:** Fundamental market changes proposed under MRTU (e.g.: integrated forward market, nodal prices, etc.) impact a number of the current systems operating at the ISO. There are many MRTU impacted information systems that are not included within the scope of the four major MRTU projects or within the IS support projects. Impacts of the MRTU program, the market rule changes and the organizational architectural changes to existing ISO systems that are not addressed by the major MRTU project or IS support projects, will be managed within the scope of the Legacy System Project.

Status: Project on target. Legacy team developers and testers have completed the implementation of web services being deployed under Stage 1. Unit Integration Test is in progress, scheduled for completion September 6, 2005. Application Integration Test and Functional Integration Test for Stage 1 are scheduled through September. The Legacy team continues to work on further definition of the functional impacts to Legacy systems that are required by new MRTU market rules and systems. The team is meeting with all application IT support managers and application business unit owners to review the functional impacts to Legacy applications caused by MRTU. The team developed a functional impact dashboard, included with this status report, which shows the state of each of the Legacy systems. Target date: MRTU program milestone(s) and project schedule(s) will ultimately dictate completion.

- **Computer Infrastructure (System) Provisioning:** The current process for the installation, configuration, and maintenance of computer systems, databases, and applications is mostly a manual and decentralized effort as well as a labor and time intensive process due to the lack of automated provisioning tools. Until recently, the few tools available in the market were point solutions for a few computer infrastructure components and for specific technologies. However, mature enterprise-wide provisioning tools are now available in the market, which address previous shortcomings. The primary objective of this project is to deploy an

automated provision tool to accomplish the following: a) reduce labor and time required for the deployment and upkeep of computer systems; b) ensure consistent computer infrastructure deployments across all technologies; c) track computer systems' configuration from a central location as well as automate detection of non-compliant configurations; d) centralize the auditing of computer systems through the automated recording of all configuration changes applied on any managed system; and e) increase the leveraging of ISO's computer assets for multiple projects through rapid redeployment of those assets. Initially, this tool will manage all new systems being introduced by the MRTU program as well as other existing critical systems impacted by MRTU.

Status: Project on hold. The ISO Project Steering Committee authorized the initiation of the planning phase for this project. Due to critical summer readiness projects and the organizational restructuring, this project was placed on hold. Provisioning capabilities have been included within the outsourcing contract currently under negotiation. Target date: December 31, 2005.

Improve Operational Efficiencies

- **Enterprise Lightweight Directory "Access" Protocol (LDAP) Infrastructure Upgrade:** The ISO's current LDAP infrastructure was initially created to support the existing public-key infrastructure required to secure access for many of our external-facing market systems. Today, there is a need for several new systems to also utilize LDAP, including the Vitria upgrade; the Portal; and the new Identify, Policy, and Access Management (IPAM) Project. Analysis has shown that the current LDAP infrastructure cannot support the additional availability and load requirements of these new systems. The purpose of this project is to create a single new enterprise infrastructure for application and system security that will accommodate all current and foreseeable future business requirements. This eliminates the need for current and future systems to provide separate servers to host individual LDAPs, centralizing access control and decreasing the maintenance required to manage multiple infrastructures.

Status: Project pending. The ISO Project Steering Committee approved funding for this project during their August 5, 2004 meeting. All hardware and software has been installed and configured in production. The LDAP infrastructure is currently in place and ready for production use. Existing web applications cannot make use of the new LDAP infrastructure until they are decommissioned from the existing ISO Internet network infrastructure and migrated to the Internet segment of the Next Generation Network (reference Internet Application Tree Network Project). The project team is currently testing migrations of existing web applications. Original target date: January 2005. Revised target date: October 31, 2005.

- **Database Server Replacement Project:** The database server infrastructure that currently supports several ISO mission critical applications (ADS, SLIC, BITS, SRS, and GRMMA) must be upgraded to support upcoming applications such as SIBR, Vitria, Portal, and others. The Information Services department has, over the last two years, redefined its systems availability architecture and server consolidation strategy. This architecture seeks to group like-applications with identical availability requirements onto a common set of infrastructure that can be leveraged for all projects in a cost-effective and reliable manner. The current database server infrastructure is not compliant with ISO's system availability architecture. To bring the database server infrastructure into compliance requires an additional database server in

Alhambra. In addition, Information Services has defined a testing infrastructure architecture comprised of staging, testing, development, and sandbox environments to allow deployment teams to capture and address application and integration issues before they impact production. In order to reduce the risk of impacting production databases, it is imperative to test new updates in a staging environment where functional and performance testing can be performed before being deployed into a live production environment. The primary objective of this project is to replace the three older production database servers with four new production servers and two new staging servers to accomplish the following: a) replace five year old servers with new servers to reduce infrastructure costs for both current and future projects; b) add one additional server in Alhambra to support failover support to increase the availability of mission critical applications; c) expand the database server infrastructure to support new applications such as SIBR, Vitria, Portal, and others as identified; and d) add two new servers to support a staging environment for testing.

Status: Project delayed until after Summer 2005. The ISO Project Steering Committee approved funding for the Ultra-High Availability Database (UHDB) project on September 2, 2004. A change request to extend the project through June 2005 to utilize Oracle's latest database solutions, which will provide a savings of \$263,400.00 or approximately 30% of the approved budget, was approved in December 2004. The savings were used to upgrade the ultra-high availability database servers to support future databases such as SIBR, Vitria, Portal, and MasterFile – providing additional room for future growth. The ultra-high available production environment has been setup and configured. However, due to the risk associated with replacing the existing SLIC, ADS, BITS, and SRS database servers prior to summer operations, a decision was made to postpone the upgrade project until after the summer. The project has approximately two months of activity remaining, as defined within the original project plan. An updated plan will be developed. Original target date: December 31, 2004. Revised target date: Fall 2005.

Enhance Business Effectiveness

- **Internet Application Tree (IAT) Network Project:** The Internet Application Tree (IAT) Network supports all ISO Internet web and application services such as Open Access Same-Time Information System (OASIS), Automated Dispatch System (ADS), Secondary Registration System (SRS), Scheduling and Logging for ISO in California (SLIC), and others. The IAT network is currently separated from the Next Generation Network (NGN) through security and network infrastructure. This separation results in increased operational complexity, increased hardware and software costs, and does not support future MRTU Portal requirements. The IAT decommission project presents an opportunity to: a) increase system reliability by reducing operational complexity; b) reduce hardware and software costs through better utilization of computer assets; and c) enables integration of existing Internet applications into the ISO Portal solution.

Status: Project behind schedule. The ISO Project Steering Committee approved funding for this project on June 15, 2004. A collaborative design effort between Network Services and Information Security was completed on July 15, 2004. Procurement of the security equipment was completed on August 31, 2004. Infrastructure installation, configuration, and testing were completed on October 29, 2004. Application migrations began on February 1, 2005 and will continue through the duration of the project. Eighty percent of IAT application migrations have completed. Resource constraints experienced during the organizational realignment slowed

progress. However, the team is back on track with migration planning and execution for the remainder of the project. Original target date: May 31, 2005. Revised target date: October 15, 2005.

Strengthen and be Responsive to External Relationships

- **Website Redesign Project:** The ISO Internet Website is the organization's principle tool for communicating and disseminating information externally to market participants, stakeholders, regulatory and governmental entities, the media, and consumers. Website users have voiced substantial concerns about the volume of stale data on our website and the difficulty they encounter retrieving current and relevant information, including difficulties navigating the site and determining where to look for information. In 2004, several incremental improvements were made to the current site, and more specific information was gathered regarding the concerns identified above. In 2005, the ISO will concentrate on a redesign and deployment of a new website that addresses the most important stakeholder needs and the ISO's business requirements.

Status: Project on target. The scope of requirements that will be implemented in the first iteration of the project is complete. New branding is complete and has been approved by executive staff. Drafts of the new governance management plans, as well as requirements for agreed upon enhancements have been created. The team has begun development on the internal web publishing application. Target date: October 1, 2005.