Acquisition of MDUS/ODS Software

Background

London Hydro procured an advanced new unified system or to rebuild the current system to enable us to consolidate all energy meter data management and interval billing and wholesale settlements activities into one common and supported system. The new system would assist in managing current and future regulatory and customer requirements at the lowest cost possible. The search for a new system was completed and it was decided to purchase a full suite of SAP ISU (CIS, ECC6), EDM and customer care solutions and to enter into an integration contract with Wipro. It was London Hydro's desire that through the procurement of the SAP system with built-in EDM and on-line customer care functionalities that our goal of consolidating most all energy data management activities would be accommodated. To date a high level set of data management and processing requirements have been defined and configured into the new system. London Hydro *"go live"* date was June 11, 2009.

Figure No. 1 below illustrates the current high level London Hydro IT architecture.

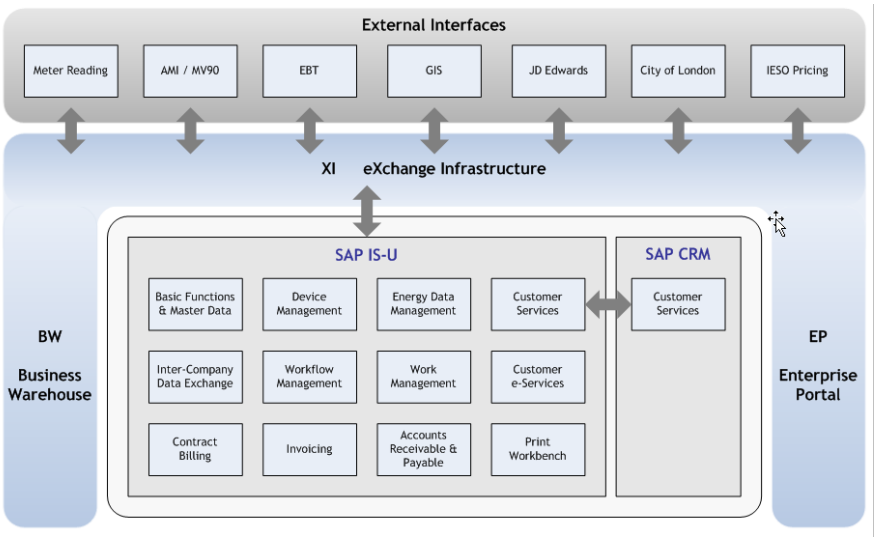

Figure No. 1

At the time we procured SAP the role and functionality of the MDM/R and the AMI was in its infancy. In addition, requirements have further changed due to the recent Green Energy and Green Economy Act (GEGEA). Our current understanding leads us to believe that London Hydro will require an Energy Data Management (EDM) hybrid business process to manage both interval and time-of-use (TOU) smart meters, as well as the capabilities to pre and post validate the smart meter reading. Moreover, the smart meter/AMI system will be providing a tremendous amount of data, which needs to be warehoused for analytical purposes. The MDM/R will act as an extension of our current energy data management systems, as London Hydro will be responsible for the VEE of data through either a front end web interface to the external system or internally within our own system.

One of the proposals was to make a copy of SAP standalone as our data warehouse application. However as the rules related to the MDM/R and smart metering began to evolve, staff became concerned about the standalone SAP option and its ability to perform once we go to TOU billing and synchronization with the MDM/R. After speaking to other large volume SAP customers that are members of the Lighthouse Council[1] SAP users group, it was determined that we needed to re-evaluate our initial proposal. The Lighthouse Council was formed by a consortium of large volume SAP users and SAP to review and develop an IT infrastructure for the smart metering AMI landscape and smart grid initiatives in the mass market. Through discussion with Council members and an SAP consultant concerns were raised as to whether our standalone SAP/EDM would or would not perform.

We identified the following key business functions that needed to be considered in any assessment of the system.

- Data warehousing; operational, communication and energy data
- Data validation and reporting tools
- Coincidental batch processes
- Meter exchanges, system synchronization,
- System integration and master file management
- Retailer and SSS hourly spot settlements
- Retailer Rate Ready; TOU Options
- EBT processing; send interval usage requirements
- Data Presentment
- CODAC volumes
- MDM/R TOU Data Management
- Data Archiving

London Hydro had determined that it was time to revisit our IT infrastructure and determine how to best integrate various newly required systems into a common infrastructure. Staff created a statement of work document entitled *"SOW for*

[1] The Lighthouse is a consortium of large utilities and SAP as a Global Advisory Council (AMI/Smart Grid working group)

Consultation on London Hydro Architecture" – March 2009. the SOW focused on the initial report primary (Required) and secondary (Preferred) smart meter business requirements and challenges and sought to have these reviewed by a consultant. SAP as our system vendor was given the first right of refusal. We negotiated the terms of the SOW with SAP and procured their services. Basically the engagement sought advice and recommendations on how to efficiently utilize the infrastructure currently in place and to determine if we required any additional software changes. Through this process London Hydro also sought to define the appropriate IT architecture for managing smart metering, smart grid and other various current and future business requirements.

SAP Evaluation

SAP conducted a one week review of our IT infrastructure and smart meter and smart grid business requirements at London Hydro and gave consideration to four main options as follows:

1. Adoption of the recommended SAP (Lighthouse Council derived) Meter Data Unification and Synchronization (MDUS) Standard[2]
2. Customization of London Hydro's SAP Energy Data Management (EDM) system to function as a full Operational Data Store system
3. Starting out with a customized EDM solution and then transitioning to the MDUS standard at a later date
4. Fronting the EDM solution with another copy of the solution to act as a volume buffer

The following are key excerpts from the SAP consultants report recommendations:

> *"SAP recommends that London Hydro adopt SAP's roadmap for smart meter and AMI enablement.*
> ...
> *In order to fully exploit the business benefits of AMI and Smart Grid-related business processes, SAP advocates the adoption of our MDUS (Meter Data Unification and Synchronization) standard for AMI back office integration and the acquisition and deployment of an MDUS-compliant ODS application.*
> *(Currently, SAP has signed development agreements with the following ODS vendors to allow them to enhance their products using the MDUS standard: eMeter, Itron, OSI Soft, and Landis and Gyr.*
> ...
> *SAP does not recommend that a utility enhance EDM (even if only temporarily) to function as an enterprise ODS (supporting*

[2] MDUS Defined: *"The standard is called MDUS and stands for Meter Data Unification and Synchronization. Any upstream application that subscribes to the standard in integrating with SAP is referred to as an MDUS System"* – SAP Consultants Report

meter polling, billing, and grid operations) because we believe the requisite effort to be substantial. Additionally, the end result would be a heavily-customized solution which is not supported by SAP. London Hydro would be forced to maintain this application on its own.

...

SAP does not guarantee that our AMI roadmap will meet every one of London Hydro's requirements on schedule and out of the box, but we do believe that continued alignment with our MDUS standard and AMI roadmap is the right decision both from a risk mitigation and a TCO perspective..."

– AMI Strategy Report Prepared for London Hydro – September 1, 2009"

SAP has developed an AMI architecture which they believe is flexible and scalable for any size utility. The architecture calls for SAP to integrate with MDUS or operational data storage applications, leveraging the smart meter AMI system with certified interfaces being basically *"plug and play"*.

The recommended roadmap includes implementation of a series of SAP enhancement packs (EhP) starting out with EhP4 which is currently available. To utilize the smart meter functionality in the enhancement packs London Hydro will have to upgrade our business process license costs (TBD). EhP4 leverages a service-oriented architecture (SOA) and facilitates the MDUS. Enterprise services in the SOA will drastically reduce implementation time and efforts for integrating the AMI.

SAP also states in their report that the MDUS architecture maximizes operational efficiency and total cost of ownership over the long term, as they limit unnecessary data exchanges between SAP and the ODS system. London Hydro will have to also move towards an enterprise messaging BUS architecture not addressed in this report, which is an upgrade to our current Netweaver Xi data exchange BUS.

On future (Annual rollouts) EhP releases, SAP will be delivering[3] functionality for the following, directly from the SAP application:

- ECC6 EhP 4.0: Master file synchronization for smart meter deployment,
- ECC6 EhP 4.0: Remote "on demand" meter reading
- ECC6 EhP 4.0: Remote data collection
- ECC6 EhP 4.0: Billing data collected from the smart meters
- ECC6 EhP 5.0: Off loading interval data storage and processing burdens to ODS,
- ECC6 EhP 5.0: Remote disconnect/reconnects,

[3] SAP Consultants Report - *"AMI Strategy Report Prepared for London Hydro – September 1, 2009"* – Author Chris Bui, Project Manager & Principal (IS-U/CCS) Consultant

- ECC6 EhP 5.0: Event management,
- ECC6 EhP 5.0: Demand response,
- ECC6 EhP 6.0: Higher-level AMI applications
- ECC6 EhP 6.0: Outage management
- ECC6 EhP 6.0: prepay metering
- ECC6 EhP 6.0: Smart grid

The following figure No. 2 illustrates the SAP recommended MDUS/ODS and Service Oriented Architecture (SOA) for smart meter and smart grid:

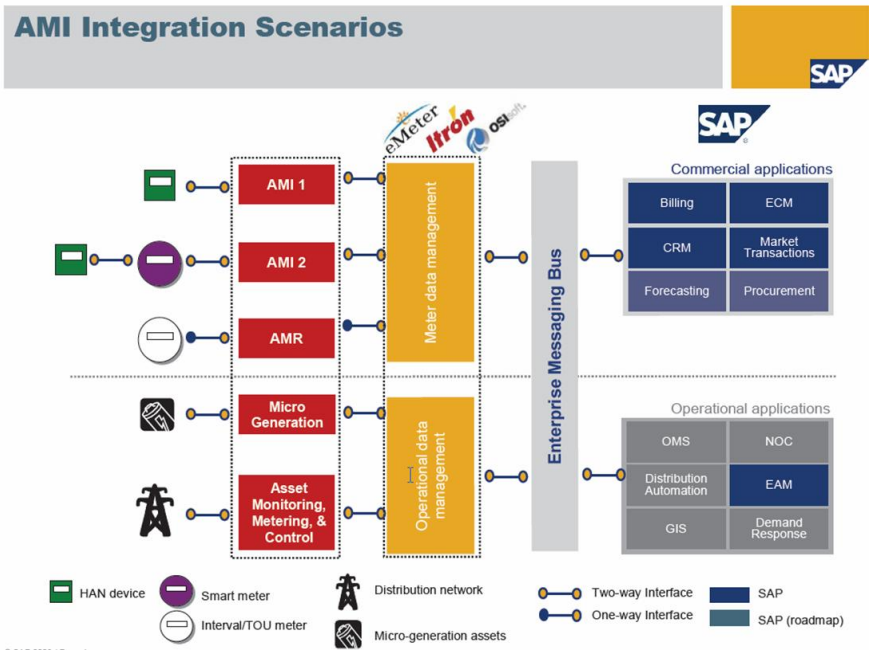

Figure No. 2

London Hydro has also consulted with a number of System Integrators with regard to SAP IS-U CIS Application Management and Support (AMS) and System Integration (SI) for Smart Metering infrastructure. Vendors included Deloitte, HP-EDS, InfoSys, Util-assist and HCL Axon. All vendors presented basically the same system framework to manage smart meter requirements as SAP. This has afforded us comfort in SAP findings, as being logical and valid. Also, Toronto Hydro, Hydro Ottawa and other major utilities have implemented a similar standalone MDUS type software.

Our Proposal

After evaluating the report London Hydro staff recommends that we implement the MDUS/ODS and Enterprise Messaging Bus standard and follow the SAP EhP roadmap as recommended by SAP as soon as possible. We estimate the cost to implement would be in the range of $1 million to $2 million dollars. The vendor

for the MDUS/ODS system would have to be in currently working towards standardization certification through a development agreement with SAP (e.g. Itron, eMeter, OSI Soft, Landis & Gyr).

It is felt that, as we are currently planning and implementing the final configurations for smart meter TOU billing and MDM/R synchronization it would be better to integrate changes now rather than do costly rebuilds into the future when resources will be limited.

Next Steps

London Hydro has recently been asked informally by the MOEI to commit to TOU billing and MDM/R synchronization by June 2010 for all or some of our accounts (E.g. 50% - 100%). We have responded that we do our best to complete MDM/R enrollment and have 50K meters on TOU rates within their timeline. This commitment would mean that London Hydro would be smart meter ready at least one year before the expected mandatory *"go live"* date and six months before our internal milestone date. Therefore, what ever we elect to do to procure a system (RFP or other) would have to be in a very timely manner with only 8 months to go.

There are only two MDUS/ODS vendors that have development agreements with SAP, that London Hydro is familiar with; Itron and eMeter. London Hydro currently operates an Itron interval AMI/MDM (MV90, MV COMM and MV-Web) system for managing our large volume accounts metering data and an Itron MVRS system for capturing the low volume meter reads. The relationship with Itron has been excellent and software and system support has consistently either met or exceeded our expectations. We are aware of eMeter only through their relationship with Toronto Hydro which utilizes their system for ODS functionalities and the MDM/R which uses the system for MDM functionalities. The other two development agreement vendors OSI Soft and Landis & Gyr systems are unknown to London Hydro and to our knowledge not utilized in Ontario. It has come to our knowledge that the Light House Council members and SAP utilize Consumer Energy (Near Detroit and Light House member) SAP *"sandbox"* for testing the vendors systems through to certification.

London Hydro staff feels that as there are only four vendors that we solicit competitive proposals from these few select vendors only, in order to meet the June 2010 timeline. The following are proposed fast track steps for evaluating and implementing a new system in light of the June 2010 timeline:

- Review through presentation and or demonstration the two London Hydro known system Vendors Itron and eMeter MDUS/ODS systems

- Review through presentation and or demonstration the two known system Vendors Itron and eMeter MDUS/ODS hardware architecture requirements,

which are generally acquired separately through London Hydro procurement

- London Hydro to define a certification process to ensure as much of the known business requirements are delivered and that the Vendor is on a roadmap to certification to the SAP MDUS standard

- London Hydro staff to request the Vendor to define the terms and conditions, costs or user implications related to the sale of MDUS/ODS services to others (e.g. CODAC); integrating other distributors onto the system

- London Hydro to solicit a turnkey solution price quotation for software license and maintenance from the Vendors for up to 200k meters as well as a separate quotation for complete implementation services; provided by the Vendor or their partner

- London Hydro staff to determine the business process license costs for enterprise bus upgrades and to enable smart meter functionality in SAP device management

- London Hydro staff to review all Vendor hardware specifications and determine all hardware costs to support the SAP MDUS/ODS infrastructure

- London Hydro to request a site visit to the Light House *"sand box"* site at Consumer Energy to evaluate the progress of both MDUS/ODS vendors and SAP to the desired standards and references

- London Hydro staff to evaluate the Vendor proposed timelines, system functionality, costs (System, hardware and integration costs) and certification responses to determine whether an RFP is required, stop process or to proceed with one Vendor

- Once the above is completed London Hydro staff will make a recommendation to the Board by October 22, 2009 on how to proceed if a move forward option is selected

- Subject to the Board's approval, we will then finalize an agreement for the product and or services and then implement the system by June 2010.

The above road map would provide for a quick turn around of procuring systems and licenses to implement the proposed SAP architecture at the earliest possible time. At all milestones the project will be evaluated for its practical and financial viability to determine whether or not we proceed to the next milestone. As a project of this magnitude success will be measured on its ability to deliver in a short time frame when current staff is also dedicated to other readiness activities it is also recommended that a qualified project manager be hired to facilitate over the extent of the project. Vendors will be asked for a letter of reference from SAP outlining their

status and commitment to developing the SAP AMI within their certified products. If we find that OSIsoft or Landis & Gyr have a product and or service that warrants greater evaluation we will invite them in for a demonstration, however in light of the time and other staff commitments we are proposing only to focus on Itron and eMeter at this time.

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Director, Utility Support Services & Energy Management

Submitted by: _____
Vinay Sharma
CEO

Attachments:

- SAP Consultants Report - *"AMI Strategy Report Prepared for London Hydro – September 1, 2009"* – Author Chris Bui, Project Manager & Principal (IS-U/CCS) Consultant
- Consultants Profile - Chris Bui, Project Manager & Principal (IS-U/CCS) Consultant
- Consultant Report Appendix's