REMOTE READING PROJECT
PHASE I

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Glossary

MOC	Measurement Operations Center
CII	Commercial, Institutional and Industrial
HAN	Home Area Network
AMI	Advanced Measurement Infrastructure
RR	Remote Reading
MDMS	Measurement Data Management System
MMC	Main Microcomputer
NAN	Local Wireless Network
IT	Information Technology
WAN	Wide Area Network

1. INTRODUCTION

1.1. Remote Reading Project

The remote reading project (the LAD project) aims to replace 3.75 million meters with new generation meters and implement information technology (IT) to create an Advanced Measurement Infrastructure (AMI). The LAD project affects all the Distributor's clients, except for high-power clients (rate L). The new generation meters which constitute the replacement plan for the LAD project, will be deployed in three stages (regions) over a total period of five years. The LAD project, including preparatory work which began in 2010, is summarized in Table 1.

Table 1: Principal Steps of the LAD Project

2010-2012	Installation of AMI IT
2012-2013	Meter replacement: Region 1 (1.7 million)
2014-2015	Meter replacement: Region 2 (1.7 million)
2016-2017	Meter replacement: Region 3 (0.4 million)

LAD project Goals and Justification

There are three levels of LAD project goals:

- Durability of the embedded meters
- Improving efficiency through automated reading of consumption and remote cut-off and restoration of service
- Possibility of technological development that will allow us to offer new services to clients in the future, and implementing grid management measures

The LAD project will make it possible to ensure the durability of the installed base of meters. More than 45% of the meters, the majority of which are of the electromechanical type, have reached or exceeded their expected lifespan. Because there is a base of meters which must be renewed, the Distributor has chosen to implement new technology instead of continuing to use the type already installed on its grid. This platform of evolvable technology will make it possible to introduce new functions or services when they are developed such as failure detection and demand management.

The LAD project will make it possible to substantially improve the efficiency of meter reading activities and include the ability to cut off and restore service for the collection process. The Distributor will no longer need access to its clients' properties to read, cut off and restore service. This will remedy the problem of reading meters located inside buildings. Furthermore, client billing will be based on actual consumption, not estimated consumption, as is sometimes the case currently.

Costs Associated with the LAD Project

The total cost of the LAD project is $997 million for the 2012-2017 period[1], with $82 million allotted for the implementation of the AMI IT and $915 million for acquiring, installing and operating the new generation meters. The LAD Project will generate savings of nearly $300 million discounted (2011) over a 20 year period. From 2018, the recurring annual savings will be $81 million.

Because of the accumulated savings, the fixed infrastructure costs will be paid back after implementation of the first region of the meter replacement plan. In fact, over the 20 year analysis period, a savings of $73.70 will be generated for each meter installed. This savings will make it possible to pay back the AMI IT implementation costs after 1.2 million meters are installed.

[1] Including $42 million of preparatory work starting in 2010.

Consequences and Impacts

The LAD project will lead to the creation of a center of excellence by Landis + Gyr in the greater Montréal region which will employ up to 75 people. The number of staff could reach up to 200 people depending on other contracts which may be obtained in Canada. Additionally, meter installation will be done by a Québec company.

The LAD project will, over time, make 726 positions redundant (primarily meter readers). The permanent employees affected by this who have not yet taken their retirement will be relocated to another position under the terms of various labour contracts.

Regulatory Approach

The Distributor has chosen to perform the LAD project in three phases. A specific request for authorization under Article 73 of the *Loi sur la Régie de l'énergie* (the Law) will be made for each of the phases. The decision to use phases is justified by the scope and length of the LAD project. The authorization of distinct phases by the Régie also allows the Distributor to take into account any cost refinements and re-evaluate in case any contingencies occur over the course of the LAD project using the experience they have acquired and any potential evolution of the technology. This regulatory approach by phase is centered on risk management and respects the recommended deployment approach.

Table 2: Regulatory Approach

R-3770-2011 Phase I	LAD project preparatory work
	Implementation of the AMI IT
	Meter replacement: Region 1
R-3770-2011 Phase II	Meter replacement: Region 2
R-3770-2011 Phase III	Meter replacement: Region 3

1.2. Authorization Request: Phase 1 of the LAD Project

The Distributor requests the Régie's authorization to perform the AMI IT implementation work and replace the meters in the first target region. The first phase of work will begin with preparatory programs in February 2010 and continue until December 2013. The LAD project preparatory work, which will take 24 months, is given in this authorization request[2].

Work

As a part of the preparatory work for the LAD project, the Distributor has acquired the goods and services required for the broad-scale replacement of counters, executed pilot projects in order to test the elements of AMI and has validated the benefits and costs. The first pilot project began in June 2010 and is scheduled to continue until May 2012 in St-Jean-sur-Richelieu, Val d'Or, Sept-Îles and Trois-Rivìeres. Others will start between June 2011 and May 2012 in Boucherville, Montréal and in the RCM of Memphrémagog. In order to perform these pilot projects, the Distributor acquired and integrated a data acquisition front-end and measurement data management system (MDMS) with the Hydro-Québec systems.

The AMI IT implementation phase, which will enable remote reading of new generation meters, provides for the finalization of the IT integration, Including in particular:

- Development of communication links with the service provider and charge for installing the computers
- Development of the remote service cut off and restoration function
- Implementation of the Measurement Operations Center (MOC)

[2] Section 36 of the decision D-2010-078 of June 15, 2010 on case R-3723-2010, Request Concerning Creation of a Reported Expense Account Relating to Remote Reading

The region 1 meter replacement plan covers:

- The purchase of new generation meters and telecommunications equipment (collectors and routers)
- The replacement of 1.7 million meters between June 2012 and December 2013 with new generation meters, and the installation of the collectors and routers associated with these meters
- The operation of an AMI and operation of the new meter reading process

Costs Associated with Phase 1

The costs of the preparatory work, implementation of the AMI IT and replacement of meters for the first region come to a total of $440 million.

2. CONTEXT

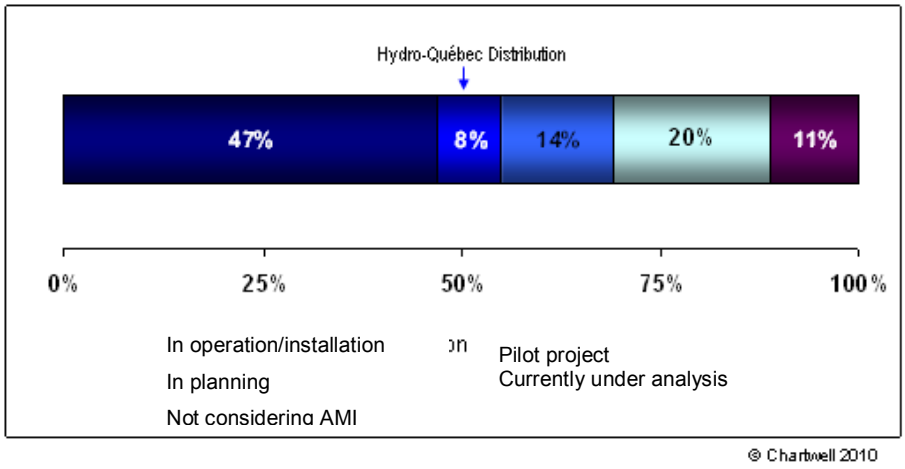
The conjunction of several factors, the general context of the North American market for public service companies and those specific to the Distributor, make it such that establishing an AMI over the coming years offers the Distributor an exceptional opportunity.

2.1. Market Context

AMI technology, although recent, corresponds to a major trend in the North American market according to a survey conducted by Chartwell of 128 public service companies. Nearly half of these companies have already begun installing an AMI network and an additional 20% are either at the planning stage or are currently conducting pilot projects. Figure 1 shows the progression of AMI projects in North America in 2010.

Figure 1: Progression of AMI Projects in North America – 2010

Benchmarking Done Using 128 Public Service Companies

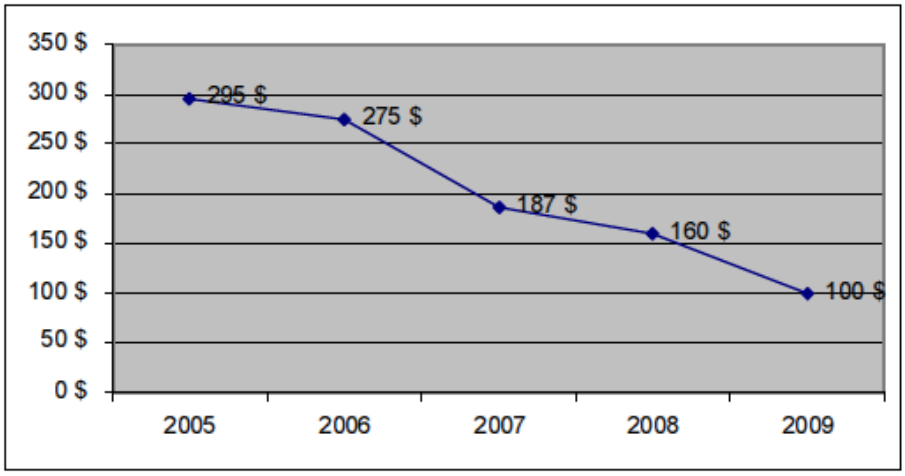


The recent establishment of a large number of AMI projects has lowered the cost of the new generation meters themselves and has increased the number of their basic functions or reduced the price of these functions. For example, since 2008 the cost of the function

that makes it possible to remotely cut off and restore service has gone down significantly. Now the new generation of meters includes this function.

Figure 2 shows the progression of the prices for new generation meters between 2005 2009.

Figure 2: Progression of New Generation Meter Prices, 2005-2009



These meter prices are the amount paid by various electricity distribution companies surveyed by Accenture (2009) for the new generation meter and the various functions they chose.

It is now economically attractive for the Distributor to implement an AMI solution.

2.2. Distributor's Context

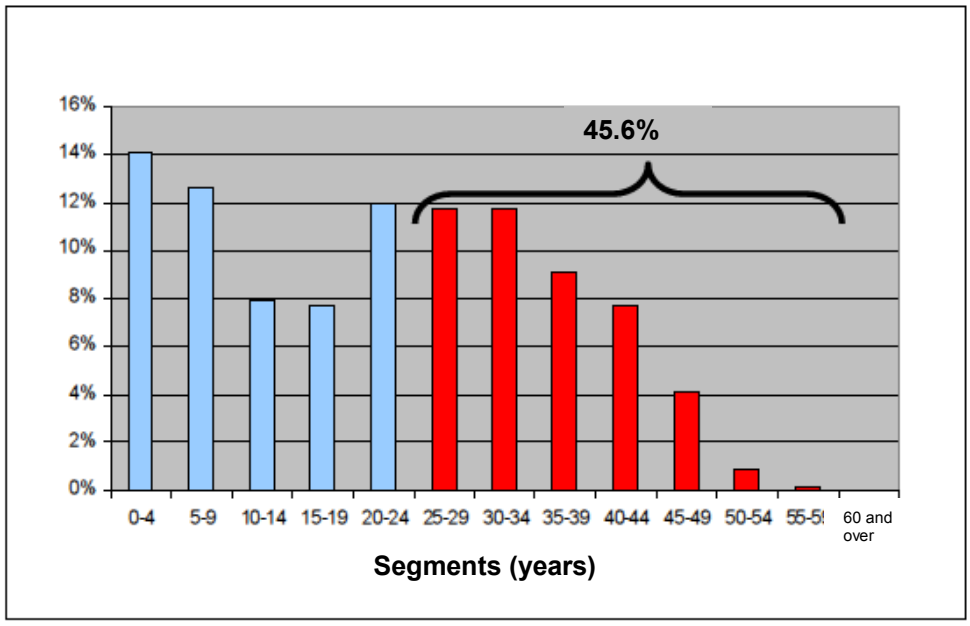
2.2.1 Durability of the Fleet of Meters

The fleet of meters for the residential, commercial, institutional and industrial (CII) client-base is made up of about 3.75 million devices which are mostly electromechanical.

Figure 3 shows the age distribution of the current fleet of meters. According to this table, more than 45% of the meters used for residential clients have exceeded their lifespan (25 years for electromechanical meters and 15 years for electronic meters). In 2001, there were 1.7 million meters which had exceeded their lifespan across all the regions of Québec. In 2016, another 12%, nearly another half million meters, will have exceeded their lifespan. In 2011, the average age of the fleet of meters was 22 years.

In 2009, the Distributor had slowed the pace of replacing these meters following the decision to undertake preparatory work in order to deploy an AMI. Although the Distributor's rigorous reliability programs continue to ensure that the meters are dependable, the fleet is nevertheless aging, and the Distributor must take this into account.

Figure 3: Age Distribution of the Meters (2011)



The Distributor must therefore renew its fleet of meters. The replacement cost for the fleet over a period of 20 years and using technology currently deployed in its grid is estimated at $1.3 billion discounted to 2011. Faced with this observation, the Distributor is opting for a new technology that will allow it to generate significant recurring savings from efficiency. The cost for the replacement of the fleet ($1.0 billion actualized) will be lower overall.

2.2.2 Distributor's Efficiency

Reading Process

The readings used for billing purposes are mostly obtained by readers (visually or using radiofrequency). Consumption data for some for some clients is read remotely using Nertec technology (client telephone line) or the MV-90 acquisition system (dedicated telephone line).

Only the meters for clients with a consumption level over 50 kW are read monthly by meter readers or the MV-90 system. Residential clients, or those whose power is below 50 kW, are visited every two months for reasons of efficiency related to the billing system.

The fleet of meters to be read is broken-down into reading rounds. The meter reader performs their round by following a predetermined sequence during the meter reading planning. The reading is done visually and entered manually using a handheld microcomputer ("MOM"). It is consulted and various pieces of information about the client's meter, placement (accessibility) or device (anomalies or in the case of possible theft) are recorded. When the meter reading data is rejected by the billing system, a team must confirm it before proceeding with client billing.

The consumption is calculated based on one or more of the following means:

- meter readings entered by reading on foot (74%[3] of the cases)
- meter readings entered by automation (17% of the cases)
- meter readings transmitted by the client using the Internet or interactive voice response (1% of cases)
- estimated consumption in the case where no reading could be obtained (8% of cases)

Nearly 85% of the cases of unread meters are related to a difficulty accessing the meter, due, in some cases, to the absence of the client when the meter reader went by. In fact 35% of the meters are installed inside buildings (69% in Montréal). In some cases, reading outside meters requires the client's presence as a locked barrier impedes their access.

Since 1998, the Distributor has attempted to improve the efficiency meter reading through continuous improvement of the process and the implementation of radiofrequency meters which can be read by meter-readers equipped with a MOM. Despite these efforts, the Distributor was ranked in the third quartile among benchmarked public service companies for per client costs of the meter reading process in 2009. One of the means for the Distributor to improve its efficiency is the automation of meter reading.

[3] 2010 data for each reading.

Collection Process: Cut off and Restoration of Service

Cutting off and restoring service to clients in collection is currently done by collection agents who must go to cut off or restore service at the client's location. The cost of cut off and restoration of service activities are mostly related to the cost of the employees and travel. In 2010, the Distributor cut off service just under 40,000 times and restored service an equivalent number.

The addition of this function to the LAD project in no way changes the collection process; the only expected benefits come from ending the travel of the collection agents.

2.2.3 Human Resources

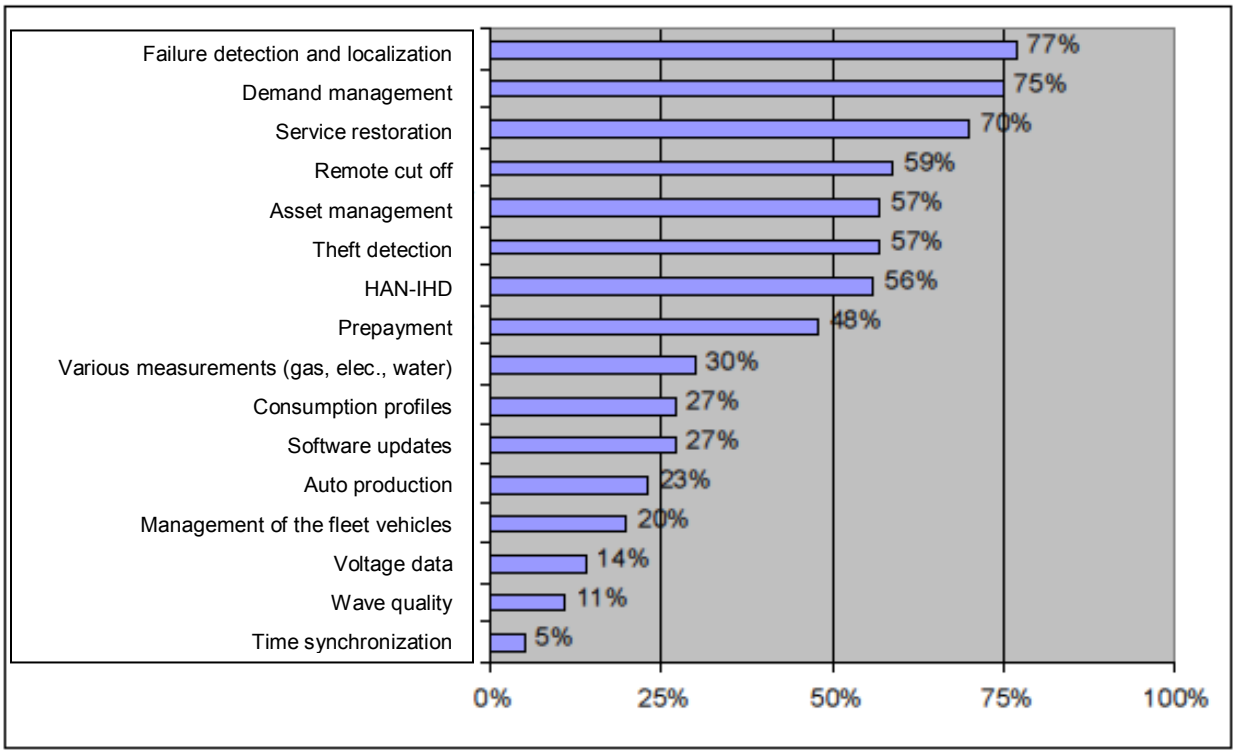
From a human resources management perspective, the period from 2012 to 2017 offers an excellent window of opportunity to begin the implementation of an AMI. The Distributor estimates that of the 726 positions affected by the LAD project, the combined effect of the number of employees eligible for retirement during this period (32%) and the historic annual turnover rate in these operations (21%) will contribute to a reduction of about 445 positions. Thus, fewer than 300 employees will need to be relocated within the distribution division or elsewhere in the company.

2.2.4 Grid Management and Business Opportunities

To begin with, the Distributor will just implement the AMI IT to automate the meter reading process and the cut off and restoration service. However, the Distributor may eventually wish to turn towards an intelligent "Smart Grid" type of network. Consequently, the Distributor required that the technology used by the suppliers of the new generation meters allows for the implantation of new functions.

Figure 4 shows the main functions of the AMI network, other than remote meter reading, used by electricity distribution companies.

Figure 4: Main Functions Available in Addition to Remote Meter Reading



Source: Accenture 2009

Every new function that addresses an actual need by the Distributor or its clients will be the subject of a specific examination. This examination will focus on determining the benefits of the function and an analysis of implementation cost will also be performed. When required, a distinct authorization request will be presented to the Régie. Other than remote cut off, the savings presented in connection with this authorization request do not incorporate additional savings which could be generated because of the implementation of these new functions.

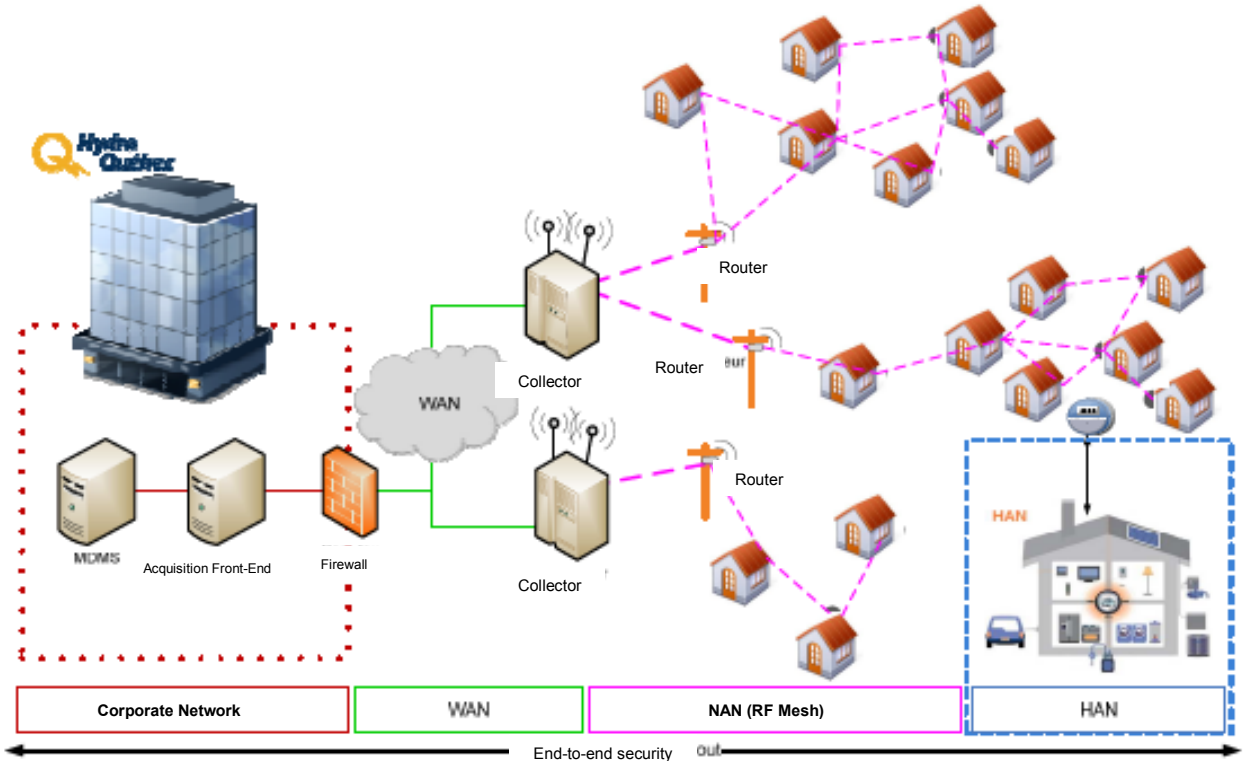
3. TECHNOLOGY BEHIND THE LAD PROJECT

3.1. AMI Components

Technologically, AMI is a system which includes meters, collectors, routers, one or more data acquisition front ends (just one for the LAD Project), and an MDMS (Meter Data Management System). This infrastructure acts as the bank were the measurement data used for billing by the business' systems (SAP) are stored.

Figure 5 shows the main elements necessary for setting up an AMI network.

Figure 5: Advanced Measurement Infrastructure (AMI)



New Generation Meters

With the new generation meters it will be possible to:

- communicate in both directions between and with the installed routers and collectors
- record a consumption profile
- cut off service remotely

In total, 14 electronic meter models are necessary to address the various needs of the residential and CII clients (e.g.: standard or dual energy, monophase or polyphase, with or without transformation, 200 A or 400 A electric service). However, one of these models alone will satisfy over 90% of the needs.

The meters are interconnected by a local wireless network (Neighbourhood Area Network – NAN), based on radiofrequency mesh technology ("mesh network"). They are equipped with a 900 MHz radio frequency communication module. In order to guarantee the installation of a single telecommunication network for all of the distributor's needs, they will all have the same type of card. Additionally they will have a ZigBee type card that provides communication between the Distributor's network and an eventual household network (Home Area Network – HAN). ZigBee technology, 2.4 GHz at 100 mW, is the most commonly used of the compatible cards. They are frequently installed (or will soon be), in many new household appliances.

Although they will not all be used in the first years, the functions offered by the meters selected by the Distributor include:

- real-time alarms in case of meter related events (for example, failure or reverse rotation)
- addition of an HAN

Collectors and Routers

Collectors – often placed on Hydro-Québec installations (distribution stations) or existing communication towers – are distributed in the various regions of the territory served by the Distributor. The function of each collector is to aggregate the consumption data from a set of meters located nearby for forwarding on a Wide Area Network (WAN).

The function of the routers installed on the Distributor's poles is to assure coverage on the NAN network's territory on the periphery of the collectors.

Collectors subsequently transmit the acquired data to the acquisition front-end.

Telecommunications Network (WAN)

In addition to the radiofrequency mesh network connecting the meters, routers and collectors, the AMI requires the use of a WAN. The purpose of the WAN is to interconnect the data acquisition front-end (located in the Distributor's IT centers) to the collectors.

Data Acquisition Front End and Measurement Data System

The MDMS and the data acquisition front end are systems located in the Distributor's IT centers.

The enterprise systems are not designed for collecting data coming from an outside network. Implementing AMI technology therefore requires implementing an acquisition front-end for consumption data transmitted by a WAN. The acquisition of data by an acquisition front-end makes it possible to create a buffer zone between the meters and the enterprise systems thereby guaranteeing a higher level of security. The data are then transferred to the MDMS.

The enterprise systems cannot serve as a base for warehousing and validating a large volume of client consumption data. The Distributor has therefore acquired the system developed by the Energy ICT company. This MDMS was integrated in the enterprise

systems with the collaboration of Ericsson. The MDMS sends the data into the enterprise systems allowing their use for billing purposes.

Once the software is acquired, the data acquisition front-end and MDMS address the Distributor's requirements which are to:

- guarantee the security in matters of availability, integrity and confidentiality
- provide a complete, evolvable and simple functional solution
- provide an open solution
- manage the growth of data processing, transport and storage
- provide ease of integration and interoperability with enterprise systems such as SAP
- set up a type of infrastructure that does not limit growth

Measurement Operations Center

Establishing an AMI involves moving some meter reading data acquisition and management function activities to an MOC. The purpose of this center is to acquire, ensure reliability, produce and transmit consumption data. It also has an AMI monitoring role: tracking installations, putting assets into action, monitoring and managing alerts and events, and administering and managing the AMI. The management of the security and performance of all service cut off and restoration actions with clients in collection is done from the MOC.

3.2. Technical Standards

The main technical standards applicable to the LAD project are given in Attachment A.

4. DESCRIPTION OF THE LAD PROJECT

4.1. Scope of the LAD Project

The Distributor chose to limit the project to implementing the AMI IT, replacing old model meters with new generation meters and the automation of meter reading, and remote cut off and restoration of service for clients in collection.

This careful approach is dictated by the experience learned from some distribution companies who set-up a new generation meter deployment project where the scope was too large. In some cases, the breadth of the scope made the project more difficult for the client base to accept - they were slow to accept new meters, rates and displays in their homes. In other cases, the magnitude of the project resulted in a deployment which was delayed relative to the initially planned schedules.

4.2. Preparatory Work

In its request for the creation of a reported expense account for the execution of preparatory work (case R-3723-2010), the Distributor indicated their intention to:

- experiment with and confirm the level of connectivity, interoperability and security of the AMI components by conducting pilot projects in both urban and rural zones
- acquire an MDMS and data acquisition front-end and confirm their integration in the Hydro-Québec technology infrastructure
- update the business plans on the basis of actual negotiated costs coming from requests for proposals conducted during the period of the preparatory work
- determine the deployment strategy and configuration, the schedules and progress

- define and establish the various necessary operational processes (temporary and permanent) and the information systems required in order to deploy the AMI
- define the human resources management plan

In conjunction with the preparatory work, the Distributor also established a division responsible for managing the LAD project. This division performs all of the planning for the operations, integration with Distributor's other operations, cost and savings tracking, also all the deployment logistics and the communication plan.

4.2.1 Pilot Projects

As a part of the preparatory work, the Distributor went ahead with various pilot projects in order to test the feasibility of the selected AMI solution.

The first pilot project has been ongoing since June 2010 and will continue until May 2012. It aims to test the integration of the consumption data in the Hydro-Québec systems and the accuracy of the bills obtained with the new technology. This pilot project is taking place in St-Jean-Richelieu, Val-d'Or, Sept-Îles and Trois-Rivières with 2600 meters from the Heure Juste [Right Time] rate project. Added to these meters are 800 additional meters for residential clients installed in order to allow a sufficient and representative density of new generation meters for an AMI network, and 17,500 meters already in remote measurement for the CII clients.

This pilot project collected more than 22.4 million consumption profiles for residential clients alone. At the IT security level, the management of user access rights to client data according to the information confidentiality level was confirmed. Additionally, the installation procedures could be confirmed for the 800 additional meters installed. On the communication strategy side, this test validated the tools such as personalized letters for the clients and/or tags left after installation.

The Distributor was also able to confirm the integrity of the consumption data coming from the MDMS for billing purposes. The data coming from the AMI are identical to those obtained by the current meter reading processes.

The second pilot project started in June 2011 and will continue to September 2011. It addressed the installation of meters in Boucherville and the Regional County Municipality of Memphrémagog. It aimed to test the solution end-to-end, including the meters, telecommunication equipment (collectors and routers), data acquisition front-end and MDMS both in a rural environment and a typical suburban environment including an industrial zone. The items tested were both for the robustness of the solution when the distances between the various communication network components are large (rural zone) and the reliability of the solution (such as meters located inside commercial or industrial facilities). The ratio between the number of meters, routers and collectors will also be confirmed. Intrusion tests are being performed in order to assure the solution's security. Furthermore, transmission of consumption data to the data acquisition front-end is being tested. Finally, the integrity and availability of the data will be confirmed by comparing them with a manual meter reading of the consumption data.

At the time the case was filed with the Régie, 100% of the meters installed for the pilot project were detected at the acquisition front-end and passed in advanced security mode. 100% of them were read daily by the acquisition front-end compared to the threshold which was set at 99.4%. The integrity of the data at the acquisition front-end is demonstrated by comparing the meters' display on a sample of about 10% of the devices. The progression of the installation planned for the bulk deployment corresponds to the one followed in the installation of the first meters for this pilot project.

A third pilot project will extend from August 2011 to May 2012 and will concern the installation of meters by an outside service provider. It will include the installation of 19,000 meters in the Villeray neighbourhood of Montréal. Its purpose is to demonstrate the overall performance of the AMI in an urban zone and confirm the implementation and

management strategies for the proposed installations. In particular, it will be able to test the meter installation progress in winter and when meters are installed inside buildings.

4.2.2 Contractual Understandings or Commitments

As planned, the Distributor went ahead with the necessary requests for proposals to implement the pilot projects and implement the LAD Project. Contractual commitments made by the Distributor for the pilot projects related to the acquisition and integration of both the MDMS and the data acquisition front-end, the Accenture partner firm and the solid commitments made for the equipment and services required for installing and performing tests of the meters and telecommunication equipment. The contractual commitments made by the Distributor for the meter replacement plan are conditional on authorization by the Régie of the various phases of the LAD project.

4.2.2.1. Goods and Services Acquisition Strategy

The Distributor decided to proceed with the acquisition of goods and services on the basis of distinct requests for proposals in order to ensure the best possible quality and price for each of the project's elements. Concerning the meters, the Distributor settled on a strategy where two suppliers share the replacement of the embedded base. This strategy enabled the Distributor to minimize its supply chain risk.

4.2.2.2. Request for Proposals

The first request for proposals concerns the MDMS and an integrator for the implementation, configuration and participation in the integration of this system into the corporate systems. This request for proposals led the Distributor to select the services of Ericsson and the MDMS from Energy ICT. The Distributor also selected services from a consulting firm, Accenture, which will accompany it throughout the preparatory works and guide it during the implementation activities of the LAD project. In particular, Accenture provided the Distributor with its experience in the implementation of an AMI network and the best deployment strategies.

A second call for proposals led the Distributor to select the services of two meter suppliers. The first supplier will provide up to 80% of the new generation meter needs, a telecommunication card, a data acquisition front-end and telecommunications equipment (collectors and routers). The second supplier will supply a minimum of 20% of the meters and use the communication card selected by first supplier. The firms Landis+Gyr and Elster were selected as the first and second suppliers in this request for proposals.

A third request for proposals was made for the purpose of finding a Québec firm for the installation of the computers. This request for proposals, which was first launched in autumn 2010, was restarted in May 2011. The significant disparities between the proposals received prevented the Distributor from determining which bidder had tendered the best offer. The Distributor plans to select an installer in August 2011.

At the end of this request for proposals, the Hydro-Québec Technology group selected telecommunication services provided by Rogers Communications Inc. The proposed solution is based on the use of a digital cellular service in the areas where cellular coverage is available and satellite service where cellular service is not available.

4.2.3 Conclusions from the Preparatory Work

The preparatory work conducted until now has allowed the Distributor to confirm the LAD project's assumptions and reduce its risk:

- The technology has been tested and it meets the needs and concerns involving reliability, security and robustness in particular
- The cost and sizing of most of the components has been confirmed by solid contractual agreements (MDMS, data acquisition front ends, meters, equipment and telecommunication services)

- The integrity of the consumption data coming from MDMS for billing purposes has been verified; the data coming from AMI are identical to those obtained by current meter reading processes
- The proofs of concept and testbeds have been conducted
- The communication plan established for bulk deployment should make it possible to address client concerns

The preparatory work, which will be done from now until the bulk deployment of the LAD project is started, will enable the distributor to continue the AMI performance and reliability testing, confirm the installation of meters with a service provider, complete the implementation of new processes and finalize the authorization of the AMI components. Thus, the Distributor will be able to properly manage the risks involved in bulk deployment of the LAD project.

4.3. Bulk Deployment of the LAD Project

The bulk deployment of the LAD project includes the following items:

- Finalization of the IT implementation for an AMI, including interface development with the service provider and the remote cut off and restoration function services; after 2012, a substantial portion of the IT work will follow the deployment volume
- Execution of the meter replacement plan (regions 1, 2 and 3) including the acquisition and installation of new generation meters and the telecommunications equipment and services required for each of the regions

A project office will be required to provide management for the LAD project, AMI IT implementation and to conduct the meter replacement plan.

4.3.1 Implementing the IT for an AMI

The AMI IT integration work is a precursor to the deployment of the new generation meters for the reading and billing clients. The Distributor's IT development work has integrated the data acquisition front-end and the MDMS with the corporate systems.

In order to develop links with the service provider responsible for installation of the new generation meters, the Distributor will establish an information exchange channel between the service provider's IT systems and its own systems.

The IT development work started with the preparatory work phase in order to confirm the interoperability of the components and provide for deployment of meters in June 2012.

The MOC work includes establishing the organization of the MOC's work, the implementation of data acquisition related processes, their management, and the management of the AMI network.

4.3.2 Meter Replacement Plan

The bulk replacement of meters will be done by geographic region and in an accelerated manner over five years. To be able to take advantage of the AMI network, a critical mass of meters and telecommunication equipment (routers and collectors) must be set up in order for a linking of the various system components to occur. The replacement of all the meters per region makes it possible to end manual meter reading and enable remote service cut off and restoration for clients in collection. It also makes it possible to immediately benefit from the efficiency savings offered by acting on the durability of the embedded base.

The three regions which are the subject of the new generation meter deployment plan are described in Table 3.

Table 3: Deployment by Region of Meters for the LAD Project

Region	Period	Number of Meters	Municipalities
Region 1	2012-2013	1.7 million	• Montréal • Laval • Municipalities of the northern shore • Municipalities of the southern shore (57% of the meters)
Region 2	2014-2015	1.7 million	• Municipalities of the southern shore (remaining 43% of the meters) • National capital • Chaudière-Appalaches • Montérégie • A portion of the following regions: — Outaouais — Mauricie/Québec Centre — Estrie — Saguenay – Lac-Saint-Jean — Abitibi-Témiscamingue — Bas-Saint-Laurent
Region 3	2016-2017	0.4 million	• Other municipalities and regions of Quebec

In order to sustain a high installation rate while not putting its current operations at risk, the Distributor will be able to call on the services of an outside installer whose role will be to install a significant portion of the new generation meters (principally those which need to be installed for residential clients). Therefore, more than 90% of the residential client meters for Regions 1 and 2 will be installed by the employees from this outside firm. The others will be installed by the Distributor's installers.

The Distributor required the service provider to have qualifications and a level of security that comply with its rules. Additionally, the service provider's employees must wear an identification badge at all times and use vehicles identified using material provided by the Distributor.

The installation of collectors and routers is the responsibility of the Hydro-Québec Technology group.

5. LAD PROJECT IMPACTS

5.1. Impact on Human Resources

The LAD project has a human resources impact which will result in the elimination of 726 positions between now and 2018. This will break down as follows:

- 603 positions related to meter reading activities
- 102 positions related to service cut off and restoration activities associated with the collection process
- 21 customer service representative positions due to fewer billing related calls arising from meter reading automation process and billing based on actual consumption data

The distributor estimates that, of the 726 positions affected by the LAD project, the combined effect of the number of employees eligible for retirement during this period (32%) and the historic annual turnover rate in these activities (21%) will contribute to the reduction of about 445 positions. Thus, less than 300 employees will need to be relocated within the Hydro-Québec Distribution division or elsewhere in the Corporation. Considering the number of employees eligible for retirement in the Corporation during 2012-2017, the Distributor is confident that they will be able to relocate these employees. In fact, the total number of positions which will be available within the Hydro-Québec Distribution division is estimated at 800 and a further 1,350 in other Hydro-Québec divisions will be more than sufficient for this purpose.

Notwithstanding this employee relocation opportunity, the Distributor has used conservative assumptions for estimating the relocation costs. The reassignment cost of $31 million considers the degree of difficulty for replacements related to the pool of available positions and the work location. The Distributor based this on the assumption that the average period for relocating an employee in an urban area would be at most six months, and that this period would be at most 12 months for an employee in a semi-urban region and at most 24 months for an employee in a rural region.

5.2. Impacts for Clients

The improvement related to real consumption data corresponds to an expectation which clients think is a priority. In fact, the client satisfaction survey conducted by the Distributor for 2010 gave a score of 8.87 out of 10 on the expectation “Send exact bills based on real consumption” for the residential clientele. For the business clientele, the expectation “assure that the billing is accurate (bill and meter reading)” received a score of 9.37 out of 10 and was one of their primary expectations. With AMI technology, the Distributor will be able to systematically obtain real consumption data from the meter for billing and for establishing a client’s consumption even during a move between two meter reading periods.

As a part of the LAD project, the remote cut off and restoration function mostly targets clients in collection. However, the Distributor is also considering using this function in the case of supplying service when moving out and moving in and also for secondary residences not occupied during the winter.

Additionally, unlike measurement samples which are currently available to the Distributor, the AMI offers the advantage of a census rather than a survey (e.g. absolute accuracy of results and obtaining very detailed information). This will provide a better understanding of the consumption profiles and will provide an opportunity to develop solutions which better reflect its clients’ reality.

Additionally, once completed, the evolvable platform will make it possible to improve the service’s quality, in matters of outage management and service provided to the client, especially by reducing response times and a more reactive management of the grid.

The Distributor will no longer need to access client properties for meter reading thereby reducing the inconvenience to them. The reduction of the fleet of vehicles associated with meter reading and collection activity will contribute to the reduction of road traffic and efforts to reduce greenhouse effect gases. For the meter reading process alone, the Distributor estimates there will be a reduction of 2,018 tons of CO_2.

5.3. Health Impacts

Radiofrequency emissions from new generation meters comply with Health Canada standards that limit exposure to radio frequencies to a power density of 6 W/m^2 in uncontrolled environments for a frequency of 900 MHz at 20 cm from the meter. Daily readings will take place six times per day as recommended by the main manufacturer of the meters. The Distributor plans to evaluate the possibility of reducing the number of communications once it has experience with the technology. The total length of daily communication varies between 1 and 5 seconds, because of an 800 ms maximum transmission time per reading. The Distributor will mostly perform the data acquisition from the meters at night. When the meter is not in communication, the radiofrequency is inactive. In most cases, radiofrequency emissions from the meters are 20,000 to 300,000 times below Health Canada standards. For the less than 1% of the meters located very near a collector (where the radio frequencies will be much higher) the emissions will still be 3,600 times below the Health Canada standards.

6. Costs and Benefits of the LAD Project

The total cost of the LAD project including the preparatory work is given in Table 4.

Table 4: LAD Project Costs (2010-2017)

k$ (current)

	Preparatory Work	2012	2013	2014	2015	2016	2017	TOTAL
Investments	36,736	86,574	247,128	205,054	145,985	69,704	48,783	839,964
Information Technology (IT) infrastructure	17,372	18,787	10,132	6,170	11,417	8,265	-	72,143
Project Consultant	7,100	3,083	-	-				10,183
Sub-total	**12,264**	**64,704**	**236,996**	**198,884**	**134,568**	**61,439**	**48,783**	**757 638**
Purchase and installation of meters	6,364	46,604	192,300	155,456	97,731	43,104	42,330	583,889
Telecommunications equipment	1,900	10,920	33,414	33,277	28,112	11,970	-	119,593
Project Consultant		3,083	5,238	5,343	5,299	5,405	5,356	29,724
Capitalized borrowing costs		1,388	920	599	172	190	344	3,613
Other	4,000	2,709	5,124	4,209	3,254	770	753	20,819
Operating Costs	**5,234**	**13,156**	**25,789**	**31,929**	**36,850**	**24,216**	**20,264**	**157,438**
Relocation of resources		-	7,062	8,642	11,248	3,399	585	30,936
Information Technology	4,628	6,919	7,808	9,857	11,221	11,233	11,370	63,036
Telecommunications		1,084	1,834	2,906	3,952	4,590	4,727	19,093
Various charges	606	5,153	9,085	10,524	10,429	4,994	3,582	44 373
TOTAL	**41,970**	**99,730**	**272,917**	**236,983**	**182,835**	**93,920**	**69,047**	**997,402**

1. Preparatory work (R-3723-2010) of 42 M$ over the period 2010 to 2012

The cost of the LAD project totals $997 million, including $82 million attributable to setting up the AMI IT. It should be noted that when the integration of the AMI IT is finalized in June 2012, the IT costs required for following up on deployment will also track the volume of new generation meters deployed. The other $915 million expenses are related to the replacement plan for the meters over a five year period. The preparatory work of $42 million, performed between 2010 to 2012, is composed of $37 million of investments and $5 million of operating costs.

Investments

The AMI IT costs of $72 million include acquiring and setting up the data acquisition front end, MDMS and MOC.

The initial project consultant costs of $10 million are included in the implementation of the AMI IT for 2010 to 2012. For subsequent years, the consulting firm costs of $30 million, attributed to the investments, are included in the meter replacement plan.

The progression of purchasing and installation of $584 million of new generation meters will follows the same progression as the planned deployment. The purchase price for the meters comes from the second request for proposals. The cost of installation performed by the external installer was only an estimate by the Distributor and will be based on the results of the third request for proposals which will only be known in August 2011. The cost of installation performed by the Distributor's personnel follows the service costs.

The purchase and installation of telecommunication equipment (collectors and routers) for $120 million comes from the results of the second request for proposals and estimated installation costs. The consulting firm will make the acquisition according to the progression of the planned deployment. Installation of collectors and routers will be done under the responsibility of the Hydro-Québec Technology group and then billed to the Distributor.

Capitalized borrowing costs of $4 million are calculated with the recovery rate on the Distributor's rate base, as authorized by the Régie in the D-2004-47 decision. In decision D-2011-028, the Régie authorized a 7.264% recovery rate.

The other investments of $21 million are principally made up of training design, quality assurance costs and work performed by master electricians.

Operating Costs

The operating costs include costs for the reassignment of employees currently assigned to the meter reading and collection processes (cut off and restoration of service), in the amount of $31 million as detailed in Section 5.1.

The IT $63 million costs include licenses, maintenance and operation. For telecommunications, a recurring cost of $19 million is given for maintaining and operating the routers and collectors.

The various charges of $44 million are principally made up of costs related to training, communications, information campaigns, client activity (during the meter installation period) and contingencies.

Contingency

Since the price of the meters comes from a request for proposals and firm prices, no contingency has been provided for in this respect. However, the Distributor has integrated contingency into the LAD project cost components which could vary. Thus, a $21 million contingency has been provided for as investments on the basis of a 15% rate applied to IT and telecommunications investments, and 12% on the installation costs of meters installed internally and on other investments. Similarly, an $8 million contingency on operating costs, calculated on the basis of the 12% rate applied to the operating expenses, is planned.

Depreciation of In-Service Devices

The accounting value of the in-service devices is estimated at $160 million on December 31, 2011. Over the 2012 to 2017 period, the natural depreciation of the in-service devices according to their lifespan would be $109 million (without the LAD project). With the LAD project, the replacement of the devices with new generation meters leads to a revision of the lifespan which causes an accelerated depreciation and write-off charges in the order of $51 million[4] over the length of the LAD project.

Table 5: Depreciation and Write-Off of In-Service Devices

M$	2012	2013	2014	2015	2016	2017	TOTAL
Depreciation and Write-Off of In-Service Devices	36.8	61.2	41.0	16.2	3.8	1.1	**160.1**

[4] Including $17.3 million in 2012 broken down into $7.4 million additional depreciation and $9.9 million in write-off charges for in-service devices.

However, this scenario does not consider predicted reuse by the Distributor of the meters whose value will be slightly depreciated. In fact, in order to meet the demand for meters to absorb the natural growth of its fleet in areas where the AMI network is not yet installed, the Distributor plans to reuse electronic meters retired during the replacement with new generation meters. The write-off of these assets will be a priority for the Distributor in 2012 and it will report on the proposed attenuation measures in its 2013-2014 rate case.

Savings Associated with the LAD Project

During 2012-2017, the LAD project will enable the Distributor to replace on foot meter reading with automated reading of the meters and perform remote service cut off and restoration for clients in collection, generating savings of $207 million and, starting in 2018, a recurring savings of $81 million per year.

The reduction of the salary base will eventually make it possible to realize cost reductions of $62 million and other savings of $19 million associated principally with the reduction of operating costs for telephone lines, internal billing and other costs arising from operations including gasoline and vehicle registrations.

Table 6: Savings Associated with the LAD Project

k$ (current)	2012	2013	2014	2015	2016	2017	2018
Salary base	(103)	(8,234)	(19,933)	(36,214)	(42,057)	(47,682)	(62,493)
Other savings	(571)	(3,478)	(6,571)	(11,913)	(14,461)	(15,839)	(18,807)
Total	**(674)**	**(11,712)**	**(26,504)**	**(48,127)**	**(56,518)**	**(63,521)**	**(81,300)**

7. ECONOMIC AND FINANCIAL ANALYSIS OF THE LAD PROJECT

In order to measure the economic value of the LAD project, the Distributor compared the LAD project (AMI scenario) with the reference scenario.

Reference Scenario

Over the next 20 years, the Distributor will continue its base activities (replacement and installation). Therefore, the entire fleet of meters will have to be replaced with standard electronic meters. The meter reading will still be done manually by about 600 employees using the MOM and remote measurement for CII clients. The progression of the meter replacement will increase over the first few years to take into account the aging fleet and that the meters were not replaced during the LAD project evaluation:

- Replacement at an average rate of 346,000 counters per year from 2012 to 2016 inclusive
- Replacement at a rate of some 138,000 counters per year from 2017 to 2031 inclusive

AMI Scenario

The fleet of 3.8 million meters[5] will be replaced in five years with new generation meters. As the meters are installed, meter reading will progress to remote reading mode. Then, at the end of each phase, it is possible to perform remote service cut off and restoration for clients in collection.

[5] Sizing of the base estimated at the time of deployment in June 2012.

The investments for the implementation of the AMI IT are concentrated in the period from 2011 to 2012. From 2013 to 2017, the investments will focus on purchasing and installing meters, setting up telecommunications equipment and the evolution of the IT infrastructure. Specifically, reinvestment has been planned for 2018 and in 2025 because of the lifespan of the IT assets. All other assets which have reached their useful lifespan during the analysis will also be replaced. Other costs for preparatory work (pilot projects, consulting firms and other) are included in the scenario.

Details of the inputs to the AMI scenario are given in Attachment B.

7.1. Results of the Economic Analysis

The economic analysis of the two scenarios was done over a 20 year period beginning in 2011 and includes the preparatory work. The economic analysis given in Table 7 excludes investments required for setting up the AMI IT which will support the deployment of new generation meters. The economic analysis parameters appear in Attachment B.

Table 7: Results of the LAD Project Economic Analysis (in M$ Actualized to 2011)

M$ (actualized to 2011) analysis period: 2011-2031	AMI Scenario	Reference Scenario	Difference
Investments	720.1	500.4	**219.7**
Operating charges	365.3	871.8	**(506.5)**
Tax on public services	1.5	-	**1.5**
Residual values	(85.6)	(81.2)	**(4.4)**
Total	**1,001.3**	**1,291.0**	

* excluding IT infrastructure

Proceeding with the replacement of the base of meters and switching to remote meter reading is less costly for the Distributor than maintaining the current manner of doing things. Over

a period of 20 years, this cost reduction is nearly $300 million actualized (2011). This reduction economically justifies proceeding with the deployment of the LAD project. An initial actualized investment of $88 million will however be required for setting up the AMI IT which will support the deployment of new generation meters. The savings generated by the deployment of the new generation meters will therefore be distinctly higher than the initial costs required for setting up the AMI.

Relative to the reference scenario, this overall positive effect is broken down as follows:

- Investments in the LAD project are over about $220 million actualized. This is explained by two factors: the higher purchase and installation cost of the new generation meters and the increased rate of replacement for the fleet of meters as compared to the reference scenario
- The LAD project entails a significant reduction of the operating charges in the order of $507 million actualized; mostly generated by the reduction of positions

Thus, the reduction of operating charges amply compensates for the additional investment costs and opens a working margin of nearly $300 million actualized.

7.2. Evaluation of the Savings per Deployed New Generation Meter

A good representation of the economic value of the LAD project is expressed in the working margin allocated for this project in dollars per meter. This unit savings of $73.70 (annuity increasing at the inflation rate) compensates for the cost of setting up the AMI IT when 1.2 million meters are installed. According to the planned deployment scenario, this volume will be reached in the third quarter of 2013 of phase one of the LAD project

7.3. Sensitivity Analysis of the Results

In order to test the robustness of its results, the Distributor performed two exercises.

Increase to the Reassignment Costs

A sensitivity analysis was performed by choosing as an assumption that the relocation for all the employees would be more difficult than planned and would cost, for everyone, the equivalent of two years' salary. Because the savings from the LAD project are principally attributable to the reduction of positions, this simulation makes it possible to test the robustness of the project regarding any difficulties which may arise in the reassignment of employees. From this analysis, it follows that the reassignment costs are increased by $25 million (actualized), still leaving a significant working margin, justifying the Distributor's commitment to this project.

Increase in Investment Costs

This analysis seeks to evaluate the variation of investment costs which could cancel out the cost reduction calculated between the reference and AMI scenarios. It is expressed as a percentage over the portion of the investments which could vary. The IT cost and the cost of purchasing new generation meters is contractually committed, are therefore they not included in this analysis. The results of this sensitivity analysis indicate that an increase of 54% of the residual investments would make the working margin void for the Distributor. This demonstrates the robustness of the LAD project

7.4. Financial Analysis

Table 8 shows the impact of the project on the Distributor's required revenues.

Table 8: Financial Analysis and Impacts of the LAD Project on the Required Revenues (k$ current)

	k$ (current)									
	AMI Scenario	2012	2013	2014	2015	2016	2017	2021	2025	2031
	Charges	73,895	77,137	70,176	55,213	35,975	26,855	10,002	10,586	11,905
	Depreciation	4,626	20,456	35,564	47,459	55,184	57,183	52,613	52,491	22,477
	Tax on public services	0	16	77	136	182	196	175	154	123
	Financing costs	2,473	13,820	25,967	34,241	37,827	38,045	27,097	14,881	13,876
A	Required revenue (excluding write-off charges)	**80,994**	**111,429**	**131,784**	**137,049**	**129,168**	**122,279**	**89,887**	**78,112**	**48,381**
B	Required revenue – Reference scenario	**65,974**	**76,797**	**87,145**	**95,856**	**104,455**	**111,485**	**127,292**	**143,307**	**149,238**
C=A-B	Required revenue (difference of scenarios)	**15,020**	**34,632**	**44,639**	**41,193**	**24,713**	**10,794**	**-37,405**	**-65,195**	**-100,857**
D	Depreciation and Write-Off of In-Service Devices	**36,800**	**61,179**	**41,039**	**16,232**	**3,785**	**1,093**	**0**	**0**	**0**
E=C+D	Required Revenue (differential)	**51,820**	**95,811**	**85,678**	**57,425**	**28,498**	**11,887**	**-37,405**	**-65,195**	**-100,857**

The differential impact on the LAD project's required revenue constitutes the gap between the required revenue in the reference scenario and those from the LAD project.

During the period from 2012 to 2017, the LAD project will exert pressure on the rates. The maximum impact of the LAD project on the required revenue occurs in 2013, which is at the end of the first phase of deployment. In 2013, the LAD project will increase the Distributor's required revenue needs by $96 million. However, by that date, the LAD project will have already recovered the cost for setting up the AMI IT.

Starting in 2018, which is after the end of the deployment, the LAD project will contribute to reducing the required revenue levels needed, thereby reducing the pressure on the clients' rates.

8. RISK ANALYSIS AND MITIGATION MEASURES

The risks given in table 9 have been identified and have been analyzed

Table 9: Risk Analysis and Mitigation Measures

Risks	Mitigation Measures
Cost Overruns	The purchase and installation costs of the new generation meters are under firm contract with a performance guarantee
Client acceptance of meter replacement	External communication plan Limited scope of the LAD project Meeting the billing and reading schedule for existing meters so as to not have to modify the billing process Maximizing the economic impact in the affected communities, notably by creating installer positions
IT failure	Importance of continuing pilot projects (25,000 new generation meters) until bulk deployment Including a 15% cost contingency
IT and telecommunications security	Respecting proper standards in the field of operations, including encrypting data, access control, command audit trail, event logging, network monitoring, redundancy, etc.
Human resources	Handling of human resources issues by company's administration Relocation plan established before deployment that meets collective agreements
LAD project governance	Executing the LAD project in three distinct phases where each phase is subject to an authorization application with the Régie Confirming the main assumptions in conjunction with the preparatory work

9. AUTHORIZATIONS REQUIRED UNDER OTHER LAWS

No authorization is required under other laws.

10. REQUEST FOR AUTHORIZATION: PHASE 1 OF THE LAD PROJECT

10.1. Phase 1 Work

Other than the preparatory work (see Section 4.2 and setting up the AMI IT (see section 4.3.1), the goal of phase 1 of the LAD project is the replacement of meters in Montréal and its suburbs (Laval, northern crown and 57% of the meters in the southern crown). Table 10 presents the number of meters replaced in the first region in more detail.

Table 10: Number of Meters Replaced in Region 1

Year	Number per quarter		Number per year
2012	Q3	16,126	330,391
	Q4	262,265	
2013	Q1	334,180	1,339,932
	Q2	337,078	
	Q3	333,739	
	Q4	334,935	

10.2. Phase 1 Costs

The costs for LAD project phase 1 total $440 million, including $42 million for the cost of the preparatory work. The portion of the investments is $396 million and is broken down into $82 million for the work to set up the AMI IT and $314 million for the replacement of the meters for region 1. $44 million in Operating charges for the project are added to that. For this phase, the Distributor has planned for a contingency of $6.6 million on the investments and $0.6 million on the operating charges.

Table 11: Phase 1 Cost – Preparatory Work, Set up AMI IT and Plan for Replacement of Region 1 Meters

k$ (current)	Preparatory Work	2012	2013	2014 and +	TOTAL
Investments	36,736	86,574	247,128	25,852	396,290
Information Technology (IT) infrastructure	17,372	18,787	10,132	25,852	72,143
Project Consultant	7,100	3,083	-	-	10,183
Sub-total	**12,264**	**64,704**	**236,996**	**-**	**313,964**
Purchase and installation of meters	6,364	46,604	192,300		245,268
Telecommunications equipment	1,900	10,920	33,414		46,234
Project Consultant		3,083	5,238		8,321
Capitalized borrowing costs		1,388	920		2,308
Other	4,000	2,709	5,124		11,833
Operating Charges	**5,234**	**13,156**	**25,789**	**-**	**44,179**
Relocation of resources		-	7,062		7,062
Information Technology	4,628	6,919	7,808		19,355
Telecommunications		1,084	1,834		2,918
Various charges	606	5,153	9,085		14,844
TOTAL	**41,970**	**99,730**	**272,917**	**25,852**	**440,469**

1. Preparatory work (R-3723-2010) of 42 M$ over the period 2010 to 2012

10.3. Results tracking method

The Distributor has recommended tracking the results from LAD project phase 1 in its annual report filed with the Régie.

The following areas related to the project's performance will be tracked:

- The number of meters installed and the percentage of installations completed relative to the planned installations
- Project cost tracking according to Table 11
- Tracking of quantifiable savings generated by the project
- Project implementation due dates

10.4. Regulatory Treatment

10.4.1 Regulatory Treatment of Costs

In its 2012-2013 rate application, the Distributor requested a modification to the accounting process for the costs inherent to investment projects of $10 million or more. It integrated this proposal into the projected 2012 control year. The request consisted of including the costs assigned to a project known at the time of preparation into the requested revenues for the projected control year and will include the rate application for which the Distributor expected to receive a decision from the Régie before the decision concerning the file rate is made, which is typically arrives near the end of February or the beginning of March.

In order to be able to recover the significant charges arising from the LAD project, should the Régie refuse the rate case proposal, the Distributor requests that the Régie authorize the addition to the 2012 charges associated with phase 1 of the LAD project to the deferred expense account authorized by the Régie in its decision D-2010-078[6].

The costs which are the subject of this request come to $35 million and include $13.2 million in operating charges, $22.5 million in costs related to the implementation and withdrawal of assets and ($0.7 million) of savings associated with the project.

However, the Distributor needs to inform the Régie that if the case that the proposed rate is accepted in the rate case proposal, the deferred expense account will not be used.

10.4.2 Method for Making Available the Deferred Expense Account for the Preparatory Work

In its decision D-2010-078, the Régie authorized creation of an off base deferred expense account bearing interest at the rate authorized for the base rate, in order to accumulate all costs related to the LAD project preparatory work.

[6] Decision D-2010-078 in the case R-3723-2010, June 15, 2010, page 10.

In this same decision, the Régie referred any decision as to the disposition of the sums paid and to their prudently acquired and useful nature to the formation which would study the LAD project's request for authorization.

The present section details the components of the deferred expense account and discloses the proposed methods for disposition.

Components

The following elements are accrued in the deferred expense account:

- operating charges inherent to the preparatory work
- charges linked to the meters put into service during the preparatory work, which are: the depreciation of these new assets and the return on their net accounting value

The amounts recorded in the deferred expense account bear interest at the return rate of the set base rate authorized by the Régie until the time of the disposition of the deferred expense account.

Table 12 shows the detail of the charges accrued in 2010 and 2011. They come to $5.9 million, including interest.

Table 12: Preparatory Work – Charges 2010 and 2011 (in M $)

Outside Rate Setting Base	Operating charges	Other expenses	Interest	Total	Impact on required revenue
Operations in 2010					
Operating charges 2010	2.0			2.0	
Interest on deferred expenses 2010			0.1	0.1	
Balance December 31, 2010	**2.0**		**0.1**	**2.1**	
Operations in 2011					
Interest on deferred expenses 2010			0.1	0.1	
Operating charges 2011	3.2			3.2	
Depreciation in 2010				0.2	
Return on net accounting value of new assets				0.2	
Interest on deferred expenses 2011			0.1	0.1	
Balance December 31, 2011	**5.2**		**0.3**	**5.9**	
Operations in 2012					
Paid to required revenue	(5.2)	(0.4)	(0.3)	(5.9)	5.9
Balance December 31, 2012	**-**	**-**	**-**	**-**	**5.9**

Note: The totals are calculated from unrounded data.

Costs for investments not put in service are not accrued in the deferred costs account, since their impact on the required revenues (depreciation and return) only appears when they are subsequently put into service.

Disposition Methods

The Distributor proposes to have available the 2012-2013 rate setting application, the actual 2010 costs and the estimated costs for the 2011 base year, including interest, in the required revenue for the 2012 control year.

Additionally, as proposed in Section 10.4.1, should the Régie authorize the payment of the project's 2012 costs to the differed expenses account, the Distributor proposes making use of this in the 2013 required revenue for the 2013-2014 rate setting request.

These methods are compliant with those approved by the Régie in the D-2010-022[7] decision on deferred expense accounts authorized in projects authorized for $10 million and above.

[7] Decision D-2010-022 from case R-3708-2009, March 4, 2010 page 47.

ATTACHMENT A: LIST OF MAIN TECHNICAL STANDARDS APPLICABLE TO THE PROJECT

LIST OF MAIN STANDARDS APPLICABLE TO THE LAD PROJECT

MEASUREMENT CANADA:

- S-S-04: Sampling Plans for the Inspection of Isolated Lots and Short Series of Lots
- S-E-02: Specifications for the Verification and Re-verification of Electrical Meters
- S-E-06: Specification for the Approval of Type of Electricity Meters and Auxiliary Devices [Translator: source listed title as "Plans d'échantillonnage pour le contrôle de lots isolés de compteurs en service", but this doesn't match the number S-E-06.][8]
- LMB-EG-07: Specifications for Approval of Type of Electricity Meters, Instrument Transformers and Auxiliary Devices
- GS-ENG-07-03: Administrative Process for the Certification of Measuring Apparatuses[9]
- ICES-003 [French version: NMB-0003]: Digital apparatus

OTHER REGULATORY BODIES:

- PS-EG-02: Provisional Specifications for the Means and Methods of Sealing Verified Electricity and Gas Meters
- ANSI-C-12.1: Code for Electricity Metering
- ANSI-C-12.10: Physical Aspects of Watthour Meters
- ANSI-C-12.18: Protocol Specification for ANSI Type 2 Optical Port
- ANSI-C-12.19: Utility Industry End Device Data Tables
- ANSI-C-12.20: 0.2 and 0.5 accuracy classes
- ANSI-C-12.22: Protocol specification for interfacing to data communications networks
- ANSI-C-37.90: Standard for Relays and Relay Systems Associated with Electric Power Apparatus
- CEI 60068: Environmental testing
- IEC 60255: Electrical relays
- IEC 61000: Electromagnetic compatibility
- IEC 61968: Application integration at electric utilities – System interfaces for distribution management
- NISTIR 7628: Guidelines for Smart Grid Cyber Security
- NEMA SG-IMA 1-2009: Requirements for Smart Meter Upgradeability
- SRSP-504 [French version: PNRH-504]: Technical Considerations for the Licensing of Radio Paging Systems in the Band 929-932 MHz

[8] http://www.ic.gc.ca/eic/site/mc-mc.nsf/eng/lm00174.html

[9] http://www.ic.gc.ca/eic/site/mc-mc.nsf/vwapj/GS-ENG-07-03_e.pdf/$file/GS-ENG-07-03_e.pdf

OTHER REGULATORY BODIES:

- CAN/CSA-B72-M (C2003): Installation Code for Lightning Protection Systems
- GT-T-12.01.03.C: Grounding Standards for Hydro-Québec Telecommunications Installations
- S37-01 (R2006): Antennas, Towers, and Antenna-Supporting Structures
- Health Canada. Safety Code 6 (2009): Limits of human exposure to radiofrequency electromagnetic fields in the frequency range from 3 kHz to 300 GHz
- ISO 27002: Information technology – Security techniques – Code of practice for information security management

HYDRO-QUÉBEC STANDARDS:

- D-25-05: Hydro-Québec Distribution Safety Standards
- E-21-10: Low-Voltage Electric Service
- F.21-02: Standardized Technical Quote for Hydro-Québec Distribution Type Approval

ATTACHMENT B: PARAMETERS AND INPUTS TO THE ECONOMIC ANALYSIS

TABLE B-1: METER VOLUMES

	AMI Scenario	Reference Scenario
2012	330,391	370,540
2013	1,339,931	345,834
2014	1,097,369	345,390
2015	647,488	344,738
2016	207,233	342,500
2017	202,818	138,415
2018		138,415
2019		138,415
2020		138,415
2021		138,415
2022		138,415
2023		138,415
2024		138 415
2025		138 415
2026		138 415
2027		138 415
2028		138 415
2029		138 415
2030		138 415
2031		138 415
Total	**3,825,231**	**3,825,231**

Economic analyses were performed by incorporating economic parameters as approved by the Régie.

TABLE B-2: ECONOMIC PARAMETERS

Hydro-Québec Distribution	2011
Nominal actualization rate (D-2011-028)	6.099 %
Long-term inflation rate	2 %
Actual actualization rate	4.02 %

TABLE B-3: LIST OF INPUTS

INPUTS	INFORMATION SOURCE
Meter purchase price	results of second request for proposals
Cost of meter installation by outside provider	estimated by Distributor
Cost of meter installation by the Distributor	costs of internal services
MDMS costs	results of first request for proposals
Data acquisition front-end costs	results of second request for proposals
Cost of telecommunication equipment (collectors and routers)	results of second request for proposals
IT Infrastructure costs: - IT development work - installation of collectors and routers	prices obtained by Hydro-Québec IT group
Cost of telecommunication services	results of fourth request for proposals

The asset depreciation method is linear based on the lifespan given in Table B-4.

TABLE B-4: ASSET DEPRECIATION LIFESPAN

ASSETS	DEPRECIATION LIFESPAN
Meter	15 years
Poles	40 years
MDMS	5 years
Acquisition Front-End	5 years
Collectors	15 years
Routers	15 years