

Hefcom Smart Meter – Smart Grid Implementation Lessons Learnt

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1 Introduction

Hefcom, as a Utility Services Management company has since 2004 developed a Smart Meter/Smart Grid Services management solution to support management of multiple services in the utilities industry.

The management of utility services are challenged with the high cost of service delivery and the overwhelming quantity of service points to be addressed on a daily bases which are growing at a staggering pace. This calls for automated and efficient systems to be able to keep up with the requirements for growth to accurately manage, bill and maintain these services.

The private and public sector demand from utilities first world measures to address the maintenance and management of utility services in order to support them to become competitive and a first class player in a global economy.

Although this responsibility resides with the utilities, consumer participation and buy in to Smart Meters and Smart Grid by consumers are

essential. Implementation of Smart Meters and a Smart Grid bombards utilities and their consumers with an array of new technologies which they were never exposed to in the past.

2 Define a roadmap with your motivation to change.

The main driver for any change in an organisation is due to the inability to perform. The inability to perform is mainly because of the growth in consumer quantities and the age of the measurement and management systems. Mostly all industries have automated their management systems and equipment to deal with these issues and now is the time for utilities to move in the same direction.

The problem is; who do you call? The main concern in the past was to grow utility infrastructure at the lowest cost. The traditional meter infrastructure supplier were so tied up in the race for the lowest cost meter that they did not take up the responsibility to support the utilities in their demise of managing the huge quantity of consumers whom is growing annually at a rapid pace. Furthermore, the suppliers did not manage to automate the supporting management tools to deal with the growing volume of data that needs to be managed and to keep track of your assets, maintenance and the billing of services rendered.

The utilities motivation for change is born out of the current metering and management infrastructure which was not upgraded but merely face-lifted over the past 40 to 50 years. This infrastructure needs to be replaced with current metering and management technology to enable utilities to cope with the current demand of service delivery.

The roadmap to deal with this infrastructure replacement is deemed quite simple and this causes many of these projects to fail and technology gets blamed for the demise created.

3 Acquire a good understanding of the technology

Hefcom found that many of the utilities are venturing into the deployment of Smart Metering and Smart Grids without a good understanding of the technology available and the physical and technical constraints of the technology in relation to their deployment environment.

Typical questions you need to ask yourself are:

- 3.1 How suitable is your current electricity network infrastructure to deal with wired communication?
- 3.2 How suitable is your current meter cubicles for wireless communication?
- 3.3 Are we able to replace the old analogue meters with the new electronic meters where they are exposed to rain, direct sunlight and dust?
- 3.4 Is the communication employed in a manner which is affordable when hundreds of thousands of meters are deployed?
- 3.5 Is the new solution compliant to international standards?
- 3.6 Are you able to update the complete infrastructure remotely to stay compliant to standards as they get updated as new managing methods gets accepted internationally without replacing the Smart Meter and the related infrastructure?
- 3.7 Is the management infrastructure stackable or does it needs to be replaced when growing the number of metering points?
- 3.8 Are you able to manage and maintain your metering assets on-line and in real-time with little human intervention?
- 3.9 Is the management system able to present management with enough information to assess the availability and quality of services rendered?

- 3.10 Is the system able to assist quick response times during outages?
- 3.11 Is the system able to report on electricity by-passes?
- 3.12 What is the system response time of reporting electricity tampering?
- 3.13 Does the management system cater for call centre support?
- 3.14 Does the management system allow for multiple levels of management to access the system in relation to profile access?
- 3.15 Does the management system cater for pre-pay and conventional metering?
- 3.16 Does the solution provide for single tariffs, Step-Tariffs and Time of Use?
- 3.17 Is the management system capable of supporting other utility services other than electricity? This will enable other utilities to utilise your Smart Grid infrastructure to manage their services and the cost of acquiring and maintaining the system could be shared.
- 3.18 Are you able to reconcile electricity consumption in the Smart Grid with Smart Meters installed at distribution points?

4 Public awareness of the utilities challenges.

The changes you are about to make could be seen as intrusive to the private lives of consumers. This is a common phenomenon in many parts of the world where Smart Meters and Smart Grids are deployed.

The information captured on consumption is at 15 minute intervals which give the utility much detailed information on the living patterns of consumers including their social behaviour in terms of spending time at home or away from home.

This information is regarded as confidential and consumers need to be briefed about this to assure them that the information is not available in the public domain and dealt with in a secure way. You would find that your non-payers would use any

means to discourage consumers to accept the new Smart Metering solution in order to keep with their old meter and stick with the bad habits of non-payment due to poor management capabilities to the detriment of the utility.

The deployment of Smart Meters is never understood by consumers due to the fact that their current meter is working 100% and they get billed every month. Why do you want to spend money on something which is working 100%. This needs to be explained many times and in the simplest manner to consumers. They are not all engineers or accountants and will only see this venture as a way to bill them at a higher rate and they even have to fork out the money to pay for the new meters directly or indirectly.

Be aware, consumers will never see this venture as something to their benefit. This is why Hefcom implemented a view tools on the customer interface unit (CI100) specifically for consumers to help them to monitor/manage their own consumption in relation to their tariff and the consumption of their appliances.

5 Choose your first participants/consumers well.

The kick-off and the first six months of implementing Smart Meters and Smart Grid is the most crucial period of your project. Within this period consumers will be very aware of the project and will watch your every move.

You will find that some consumers will be positive, some will be neutral and some will be negative towards your project. During the first phase of the project, concentrate on the supporters of the project and implement the first Smart Meters and related equipment with these consumers. This will give you enough time to fine tune the settings and train your installers properly within the environment they need to work. This does not mean that training to install and commission was not done before moving into the field.

This process will give your staff and installer's confidence and knowledge to deal with the difficult questions they will encounter from the consumers negative to the Smart meters.

You will also find consumer will complain the system too be complicated and not user-friendly at all. Remember, this is the first time in their life interacting with the supply of electricity and many of the terminology will be new to them. They will feel threatened by this and the

resistance to change on these projects is very real. The more experienced your installers and maintenance crew get, the easier it becomes to deal with these issues.

6 Plan your successes and failures.

Utilities in general are on top of their game, they understand their business very well and they deal with their consumers and their supporting systems every day.

With this in mind, remember, you will have successes in Smart Meter and Smart Grid deployments, but you will have set-backs as well. Both of these need to be communicated to your consumers.

If you do not communicate your set-backs, this will be communicated to you consumers by your critics and regarded as being untruthful to them. They will never believe what you are reporting to them in the future and regard feedback as spinning to conceal the truth.

Report set-backs only when you have a way to fix the problem. Never allow a situation where consumers are left without knowing how your problem will be fixed. The consumer is not the solution provider and will turn negative if it seems that you are not in control of the situation.

Never forget to report your successes. This will ensure that your positive consumers stay positive and your neutral consumers stay neutral or become positive. This will also give your positive consumers some facts to support their positive behaviour towards the project even though they are not specialists in the field of Smart Metering.

7 Keep your participating consumers informed.

The deployment of Smart Meters and a Smart Grid is very demanding. This creates a situation where you easily forget to inform your participants in the progress of the project.

The project has many levels which need to be implemented at the same time. This includes meters, communication boosters, concentrators, central management servers, migration of data, configuration of contracts, etc. We do not say that all of these facets need to be conveyed to your consumer, but this will distract you from keeping them informed about the progress on the project. The success of the project weighs heavily on their on-going participation.

The personal interaction with your participating consumers is always under-estimated. The consumers could see your absence as abusing their willingness in

participating willingly in your venture, using them only to the benefit your own goals.

8 Plan and manage your project till completion.

Project managing implementation of Smart Meters does get boring after a month or two. It is the same old same old every day and you might feel that this is not challenging enough to your liking.

Be aware, this will be the situation with your whole team. This attitude will cost you a potentially successful venture. This is the time to formalise your procedures on stock movement, installation processes, data maintenance, training of utility personnel, repair processes and daily, weekly and monthly management reports.

The environment in which meters are replaced is different at every installation. It is easier to install meters at a new project where most of the physical installation architecture is similar. Replacing old metering infrastructure is challenging in the sense that the physical infrastructure is different with each installation. The meter cubicles are mostly degraded or non-existent, the wiring on site is many times not according to the current standard. These conditions make it difficult to budget the cost per installation related to the time spent per installation and the material required. Most of these projects are sub-contracted and these unknown factors lead to the over claiming of hours and material spent per installation. It is of utmost importance to ensure that you are always aware of the installation environment and in control of you teams not to overspend on the project without having any proof of money and time spent.

Your installation team normally gets paid per successful installation. Due to this they will find ways to install seemingly successful with a proper signoff sheet from the consumer of the installation. The Hefcom management solution manages the installation process on-line and will not accept an installation if not in a proper working condition. Furthermore we do not make payment to any installer unless the installation proves to be operating properly for at least 7 consecutive days. The management system will allow for sign-off only on properly operational Smart Meters.

This seems to be a simple mistake to make, but it is real and escalating at an unforgiving pace if not properly managed.

It does not matter which technology you choose, all of them make use of data concentrators to deliver metering information to the central management system and manage updates on functionality to the meters. These data concentrators are costly and planning your

communications network is essential in terms of cost and the efficiency of these data concentrators in terms of operations. Your central management system should be able to report on the effectiveness of each concentrator in order for you to plan the communications network and the placement of these data concentrators in the areas of distribution.

The topography of your communications network varies from area to area. This makes it difficult to plan the distribution placement of data concentrators. In some areas the data concentrators will be placed fairly far apart and in some other areas they will be closer to each other.

The use of data transmission boosters will also come into play in difficult communication areas. None of these situations will cause the Smart Meter deployment to fail if your management system is able to supply you with the necessary information to plan and maintain your communications network properly.

The project to deploy Smart Meters and Smart Grid does not end after the successful installation of a meter or a concentrator. The communications environment between the meter and the data concentrator changes every day and your chosen solution needs to be able to cater for these changes in a process of self-healing without human intervention. This will ensure the maintainability and the reliability of your system.

These projects run for months and sometimes for years. It needs total commitment and dedication till the end.

9 Report progress to management.

Metering and billing of electricity consumption is the main stream of revenue to most utilities. In order to keep your project funded and successful till completion, you need to report to management the progress of the project.

The factors which will influence the project positively are:

- 9.1 The benefits this project has on the bottom line of the company.
- 9.2 Consumer acceptance of the Smart Meter.
- 9.3 Consumer satisfaction relating to accurate and prompt billing of consumption.
- 9.4 A decrease in call centre calls relating to poor service delivery.

9.5 A decrease in by-passes and electricity theft.

10 In Conclusion

The deployment of Smart Meters and Smart Grids is a combination of old school management, high tech meters, the latest means of communication and endurance. The black art of managing communications networks will be experienced at first hand, but so the incredulous availability of metering information in real time.

Most of the utilities are very old and so is their staff compliment. This creates a challenge for many of the employees to embrace new technology after years of managing services the old fashion way. Utility employees may become concerned that the Smart Meters and Smart Grids may replace some of them. This is similar to believing that the digital age will replace the use of paper. As a matter of fact, more revenue will be created, fewer technical losses will occur and the resources are created to fund more projects to relieve the current backlog of service delivery.

Our experience is that once a utility experienced Smart Metering and Smart Grids, they cannot believe that they managed without it.

None of the utilities will escape the process of change and still survive.



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