HM Power AB

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Vår referens
Lars Hjort

Adress
ERGEG

Bruxelles

Telefon
+46 704 916751

Er referens
Mrs Fay Geitona

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Hereby we send our comments to your consultation. If you are interested to get more detail comments or if you want to consult us you are much welcome.

Best regards

HM Power AB

Lars Hjort

HM Power AB
Glödgargränd 14
721 30 VÄSTERÅS

Telefon:
+46 (0)21 40 34 90
Telefax:
+46 (0)21 470 21 57

Säte: Västerås

Hemsida: www.hmpower.se
E-mail: info@hmpower.se

Org.nr. 556588-6768
VAT no SE556588676801
Innehar F-skattesedel

Short summary

Sweden has experienced a roll out of 5,000,000 meters during the last 4 years. Legislation stated that from 1 of July 2009 shall all meters be read monthly. This requires AMR systems. Before the legislation we saw a lot of lobbying financed from big organizations who has the money and power to do it. They also normally dominate the industry organisations and it is obvious that that their agenda is not always what is best for the society, it is rather to create a huge market. This risks adding complexity and a lot of extra cost on the electricity consumers around Europe. This response tries to explain the hazards of listening too much to these lobbyists.

General

HM Power AB is one of the main suppliers of smart metering in Sweden and has covered about 15% of the meters in Sweden mainly in the hard to read areas on the country side. HM Power AB is the only smart metering provider using a unique PLC technology to communicate over long distances, hundreds of kilometers, on the power lines and through transformers without any auxiliary equipment. Before the legislation in 2006, stating monthly reads for all meters, there were still enough benefits for utilities to use the technology on their hard to read meters even with yearly readings. In some areas of Sweden no other technology can be justified and these are also areas where the most savings can be achieved. These are the areas where smart metering should be installed as a first step and are easy to justify based on economical and environmental calculations with less driving and less labor hours.

During the installation since 2006-2007 a lot of smart metering companies have popped up and disappeared. Most of them have been using common technologies for communication. The main problem is that these technologies work great in a laboratory environment but when installed in reality they lack of performance. Many providers have underestimated what it takes to have full coverage to reach all meters. Utilities investing in such systems have experienced that the cost for reaching all meters where far greater than initially offered from some providers.

It is important to gather experiences from utilities in Sweden who has done a full scale implementation of smart metering and not just listen to consultants, smart metering providers or big IT companies whose agenda can be questioned. We see consultants and metering operators lobbying for more interval data. They understand that utilities will not have the capability to collect readings themselves and see a great potential in collecting data for them. It is important that a smart metering installation don't make the electricity more expensive for the customers. The main goal should be to make the users more aware of the consumption and help them make decisions that save energy. This is beneficial for everyone and not just the big data houses.

Hazards with Standardization

HM Power´s technology differs from most others by using FDMA UNB (Frequency Division Multiple Access Ultra Narrow Bandwidth) technology over the Power Lines instead of TDMA (Time Domain Multiple Access). Using FDMA limits the amounts of bits that a single meter can send and does not allow for a standardized protocol for communication. Most standardized protocols are general and

use a lot of over head bits (headers etc.). The same information can be sent with the same security but the protocols used needs to be bit efficient which is not normally the case with most of the standardized protocols.

By using the FDMA PLC technology you can gain a lot of advantages that cannot be achieved by any other technology. The FDMA PLC technology uses ten thousands of channels in a frequency range. Any meter will have its own communication channel and the system is always on, always listening on all channels. If the signal strength on an individual channel or several channels decreases or increases you will know that there is something going on where that/those meters are installed. If it is a sudden drop of signal strength on channels in an area you know there is a power outage. This information will reach the central system within minutes no matter the amount of meters and utilities can dispatch personnel to the correct places instantly. Other changes in signal strength could be faulty equipment. By using the technology and trend analysis it is possible to understand when to invest in new equipment in certain areas. By getting this information utilities know where to invest to gain the most profit and prevent outages from occurring. This type of analysis is not possible with TDMA technology where the systems talks to only a few meters at a time. In other words, the system helps the utility to improve the performance to operate the grid.

Standardization which disqualifies an efficient technology would harm the innovation and the benefits for society. Of course some areas should be standardized like the interface between the meter and the endpoint/modem and maybe the interface between the central system and the collectors etc.

By standardizing the protocols being used to transfer meter information a technology like the FDMA PLC technology described above would be disqualified. By standardizing the transfer protocol there is a big risk to harm innovation and force all suppliers to use the same technologies i.e. GPRS, low voltage plc or short distance radio.

The FDMA PLC technology, which uses existing investments (the grid), makes it possible to communicate over long distances (well above 100 km) and through transformers without any auxiliary equipment. Experience from utilities in Sweden tells that the FDMA PLC technology has low installation, operational and maintenance costs that can be compared to no other. Once installed there are virtually no interference with other equipment since the frequencies used are much lower than what electricity equipment normally emit.

Comments to Recommendation 4

Monthly information to all market actors is a good target. It is however important to understand the efforts needed to collect information. In Sweden all users above 63A are hourly read and all users from 63A and below are monthly read by legislation. For the hourly read meters all hourly readings must be collected before 6:00 each day. If something is missing it shall be completed by 10.00. This takes a lot of effort every day for utilities in Sweden. The estimated cost per meter and year is between 90€ and 270€. It has been mandatory to collect hourly data from all customers above 63A since 1996 in Sweden and the utilities still see this cost to collect the data.

Using the same rules for the entire population of meters in Sweden would be impossible. The cost would be too great and it would take far too much labor. It is even so that some utilities in Sweden

are still struggling to get the monthly readings working, especially the bigger ones do not show performance figures even close to a 100% for the monthly readings.

According to an injunction from “Energimarknadsinspektionen” (regulatory for metering) in Sweden to one of the bigger utilities the performance of the 847,537 monthly read meters in October 2009 was only 93.5% of the readings within 5 days. The main issues were communication between the meter and the collection system and the transfer of readings between the AMR system and the billing system.

For hourly read meters another of the big utilities in Sweden managed to collect only 56.1% of the hourly readings from the 22,536 meters within 24 hours. After 5 days they had 98.02% of the hourly readings and within 10 days they reached 98.88%. Hourly reads for these meters have been legislated since 1996 and there is still not better performance. The figures come from a similar injunction from the regulatory.

One other thing to reflect over is how much extra value shorter interval readings give. One big consumer at a normal household is hot water. Let us say this household has a power limiter. In the morning all family members take a shower. It is cold outside and the heating for the house is using all the power it can because of the power limiter. Because of the power limiter, the water that was consumed during shower cannot be heated until later when there is power available to heat the water which could be hours away. If this customer looks at the usage for this day they will wonder what consumed the energy while they were at work. This shows what problems could occur when trying to change people’s behavior with interval data.

Since the electricity consumption is not time synchronous with the actual usage and the electric heating is depending on not controllable factors (e.g. outside temperature etc), the experience from clients having hourly data is often that it confuses more than clarifies. The net benefit of hourly reads for small users has not been possible to justify in Sweden, in spite of more than a decade of challenging the issue. A reward of 100 000 SEK has been launched over the course of many years, without anyone being able to demonstrate a calculation supporting the hourly reads. Still the reward is waiting to see a receiver.

By allowing estimation and interpolation of missed hourly reads the cost would significantly decrease for getting hourly data. The main goal to get a load profile for customers would still be fulfilled but to a very much lower cost. If a customer requires readings with 100% quality it should be offered by the company responsible for metering. But the extra cost for this should be paid by the specific customer that uses the service and not by everyone.

Our recommendation is daily readings with information sent monthly as a base and to allow for estimation and interpolation based on actual readings. This would allow for people to verify that investments in energy savings like insulation, installation of inverters etc. are justified. For customers wanting more information it should be offered to them from the metering company to the self cost. Experiences from Sweden tell that this is the most cost efficient way to do automatic metering. Collecting hourly data from millions of endpoints puts high demands on communication performance, servers and other equipment. It is one thing to show a certain performance in a lab environment and another thing to prove the same in the field. By setting the interval time to less

than an hour for all customers would disqualify technologies that are proven to be very reliable and have low maintenance costs and put great risks to the ROI calculations.

Most European countries have some kind of market strategy when it comes to fuse sizes or power limiters. If a customer have a 20A fuse he pays less than one having a 50A fuse. This is logical since the one having 50A fuse are using more of the distribution system than the one with the smaller fuse. It is recommended to have the same approach for metering. One that consumes very little energy and only wants monthly readings should pay less than one requiring hourly data.

Comments to Recommendation 6

It is important to understand that it is quite high currents flowing through the meter. A lot of meter manufacturers are using relays for disconnecting/connecting load. There are great hazards doing this especially for three phase meters. Usually the meter is equipped with one relay per phase. If one of the relays fails to operate there will still be power at the house even though the house owner/installer etc. thinks the power is off. This is very dangerous and could lead to great damage to both humans and property.

For a safety switch it is mandatory that the disconnection is secured for all three phases which generally is required from electricity safety authorities worldwide. Our recommendation is that it should be the same for a meter breaker. Doing otherwise will bring people into danger thinking that everything is disconnected by the meter.

It is also hazardous to reconnect power through the AMR system. Our recommendation is that the breaker can be activated through the power line but that the customer shall do the final connection. When the breaker is de-activated it is impossible to connect the power and when it is activated power can be connected. If remote connect is allowed and the customer has left the stove or something else on there is a risk of fire.

Finally the performance of a remote operable breaker has to be sufficiently good. Many existing solutions based on relays are not fulfilling basic requirements. The requirements necessary to comply to are:

Able to make onto short circuit with 6 kA current, without welded contacts

Able to break low power factor loads. It should be considered to break motor loads with pf 0,45 and also considering inrush current

It should comply with EN 6947-3

Most countries have safety standards and the main switch has to comply with basic standards, as EN 60947. This is also applicable for remote operated breaker. Many very expensive and hazardous mistakes have been made, since engineers within IT area are not familiar with high current aspects.

This is our comments to your proposal. As there are a lot of experiences from the 100% implementation of AMR in Sweden it is a lot more to tell. We are not completely sure you got true

and correct information through the normal information channels. If you are interested to know more we are available for closer discussions.