

# EXPERIENCE OF IMPLEMENTING AMM SOLUTIONS IN THE ENERGY DISTRIBUTION NETWORKS OF VKG ELEKTRIVÖRGUD, ESTONIA

By Arvo Karu

*Estonia is a small European state, situated on the south-eastern coast of the Baltic Sea. The territory covers 45,226 km<sup>2</sup> and the population comprises approximately 1.34 million people. In 1991 Estonia declared its independence and in May 2004 joined the European Union.*

VKG Elektrivõrgud OÜ is the second largest power distribution company in Estonia after Eesti Energia Jaotusvõrk (Distribution Network). The company supplies electricity to 10 percent of the country's population. In July 2006, Narva Elektrivõrk AS, which is well known for its long-established traditions, work experience and highly qualified experts, became a subsidiary of VKG.

VKG Elektrivõrgud OÜ mainly transmits and distributes electricity and provides operational management services for company power systems. In addition, the company provides the service of designing, building, repairing, using, checking and maintaining electrical installations. The customer base comprises 35,000 consumers in Narva, Narva-Jõesuu, Sillamäe, Vaivara district and, partially, in Kohtla-Järve. The mission of the company is to be the most effective power distribution company in Estonia. Client service, quality, and environmental friendliness are prioritised.

## SIGNIFICANT ACHIEVEMENTS

The most important achievement in the last three years was the finding of alternative power suppliers in addition to Eesti Energia, which has helped to provide electricity to clients at the lowest prices. The company has the best record in Estonia for avoiding power losses and network failures. Another significant accomplishment was the establishment of an ISO 9001 quality management system in 2004. In several national and international surveys, VKG Elektrivõrgud OÜ has been named as one of the best employers in the country. Hewitt Associates, in a document entitled: 'Best Employers – Best Results', summarising a survey carried out throughout Europe in 2004, named the company as the tenth best employer in Europe. In 2005 a competition was held in Estonia to find the most employee-friendly company and VKG Elektrivõrgud OÜ took third place in the category for family friendliness.

Starting in 2001, in preparation for joining the EU, Estonia initiated a process of energy market deregulation. By 2002

free consumers had already been given the opportunity to choose their electricity supplier.

This was one of the reasons that VKG Elektrivõrgud OÜ has become interested in automated meter reading (AMR) systems. Other requirements, including network events and a decrease of energy losses, also demanded higher functionality from the metering system. Moreover, the company had set goals, such as an improvement in its services, increase in its profitability and the fight against polluting the environment, which has required something more than inductive meters could offer. Thus, the management of the enterprise took the decision to implement an AMM system on its electricity networks.

## PILOT PROJECTS TRIALLED

Different offers from European solution suppliers were analysed and, starting in 2000, several pilot projects were trialled. In 2007, in line with European legal provisions, VKG Elektrivõrgud OÜ issued a tender for the supply of an AMM system. As a result of the trials and analysis of tender proposals, the ADDAX IMS system of the Moldovan producer ADD GRUP was selected. The selection criteria were simplicity in deploying and using the system, product functionality, and – also very important – the cost efficiency of implementation. Moreover, ADD GRUP was offering a novelty to the market – medium voltage power line communication, which promised a significant reduction in the utilisation costs.

The first trials of the system took place in the beginning of 2007 with implementation of ADDAX IMS to 300 customers in the city of Narva. The implementation process took four weeks and, due to the simplicity of installation, was carried out by VKG specialists. This allowed a reduction of the installation costs and as a result has enhanced the economic efficiency of the project. In the terms of this project the following equipment was installed: meters, user displays, routers and coupling units (the additional equipment needed to perform communication via MV power lines).

***“The displays connect to the meters via PLC, which has avoided investment in new infrastructure.”***

Further enrolment of the ADDAX IMS system took place with 2,000 metering points in the cities of Narva and Sillamäe. After the completion of the installation process the system was launched and all the meters were automatically registered in the network. During the first communication session three meters did not respond, leading to 99.9 percent coverage. After fixing a problem related to noise in the LV power lines, all of the installed meters could be registered.

Currently a team of three persons, including the operator of the system, is directly involved in the project.

The project is entirely based on LV and MV power line communications. The majority of the HV/MV transformer substations are connected to the VKG Elektrivõrgud office through its own infrastructure, so the communications are free of charge. There are also a few separate substations in the system, which are not connected to the Ethernet. In these cases GPRS is used for communication.

While using the AMM solution from ADD GRUP several advantages of the system were revealed, in comparison

with the old inductive meters. First multi-tariff metering has become more accessible, which has led to interaction from the consumers' side and an influence on the reduction of the load curve in peak hours. Second, some consumers were transferred to prepayment mode, which has increased the level of on-time bill payment. The use of in-home displays has allowed VKG's customers to monitor their consumption, even in the cases where meters were installed in inaccessible places, such as the basement. Moreover, the displays connect to the meters via PLC, which has avoided investment in new infrastructure.

#### **BENEFITS OF HOURLY-BASED CONSUMPTION DATA**

Receiving hourly-based consumption data has made it possible to carry out a more accurate analysis of the load curve and has helped to develop corrective measures. It became possible to monitor and influence technical and commercial losses and to eliminate attempts at electricity theft. The new equipment has also enabled the company to carry out monitoring of the energy distribution networks. As a result the human factor has been excluded as much as possible from the process of receipt of the consumption data, which has led to the elimination of mistakes and a reduction in running expenses.

To date the information is a very important component of each product or service. By offering information on consumption, balances and tariffs the utility helps the customer make more conscious decisions. This leads to the reduction of unreasonable energy

***“The use of in-home displays allows customers to monitor their consumption.”***

consumption and as a result reduces atmospheric emissions – a byproduct of power generation.

The project has been in operation for one year but already the benefits are apparent. In 2006 the losses of electrical energy were 8.5 percent. The implementation of the project has led to the reduction of losses by 1 percent. A more rapid response to emergencies on the network and troubleshooting has become possible. The load curve is normal compared to the same period of the previous year.

In future, it is planned to realise a step-by-step deployment of the ADDAX system, which eventually will cover the entire customer base of VKG Elektrivõrgud OÜ. **MI**



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**ABOUT THE COMPANY:** VKG Elektrivõrgud OÜ (former Narva Elektrivõrk AS) is a power distribution company in Estonia. Its main areas of activity are electricity transmission and distribution. In addition the company provides operational management services for company power systems and the services of designing, building and maintenance of electrical installations.

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