



# VATTENFALL EUROPE DISTRIBUTION

VATTENFALL IMPROVES EFFICIENCY AND SECURITY OF SUPPLY WITH TETRA DIGITAL RADIO SYSTEMS FROM MOTOROLA



## THE COMPANY: VATTENFALL EUROPE DISTRIBUTION

The Swedish Vattenfall group is a leading European energy supplier and operates in the area of power and heat generation as well as energy supply for millions of customers. Customers include large enterprises as well as private households, municipal utilities and regional energy suppliers. The German and Polish activities of the Vattenfall group are bundled in the Vattenfall Europe AG. The headquarters of Vattenfall Europe are based in Berlin, further key facilities are in Hamburg and Cottbus. As a distribution network operator, Vattenfall Europe Distribution ensures a reliable and efficient power distribution for all customers in Berlin and Hamburg.

### COMPANY PROFILE

#### Company

- Vattenfall Europe Distribution
- Germany

#### Sector

- Energy sector

#### Motorola products

- TETRA digital two-way radio system consisting of 23 base stations each with two base radios. A further 100 mobile radio devices, 550 handsets and 30 explosion-protected handsets are also in operation.

#### Benefits

- Secure and reliable communication for the employees
- Monitoring and control of the medium voltage network by telemetry
- Reduction of repair times and duration of power outages



of distribution networks. Firstly, Vattenfall looked for a way to use its own field staff even more efficiently so they could react as quickly as possible in the case of a disruption to a power network.

For this, Vattenfall required a communication system with a secure fallback level, which would prevent the failure of the entire system. Previously the company used public mobile phone networks for its mobile communication in the field – none of which are fail-safe systems, especially in case of an interruption in the public energy grids. The company also wanted its new communication platform to operate independently of public networks and ensure that technicians could be contacted at any time and any place in the case of an emergency. Moreover, the new system was to offer both voice and data transmission capability so that field workers could also access the required information from any location.

Secondly, Vattenfall is determined to improve its processes in the medium voltage grid in order to resolve technical problems more rapidly. So far, Vattenfall employees needed to travel to the affected medium voltage station to locate the problem on site and then to repair the damage. This process was very costly in terms of both time and resources. Vattenfall was therefore seeking a solution to automate urban medium voltage stations so that disruptions could be detected centrally from the network control center and repaired at the touch of a button.

### THE CHALLENGE

#### High reliability communication for field workers and automation of the medium voltage network

On the day it began operating in the German energy market, Vattenfall announced their goal to set new standards for safety and customer focus as an energy supplier. This was a difficult challenge as even power networks with the most modern infrastructure can be disrupted by external factors such as construction work or extreme weather conditions. According to the statistics, German consumers have to cope with interruptions to the electricity supply for approx. 17 minutes annually. In Berlin, Vattenfall has already dropped below this mark with an average yearly interruption of 14 minutes. Vattenfall is anxious to further reduce outages and offer both private households and commercial customers the maximum security of supply.

In order to achieve these goals, the company decided to tackle two key aspects of its operations in the area



Motorola MTP850



## THE SOLUTION

### TETRA digital radio for combined voice and data transmission

At the end of 2005, Vattenfall commissioned Motorola to set up two TETRA digital radio networks in its Berlin and Hamburg locations within the framework of an EU-wide invitation to tender. The networks are based on the Motorola Dimetra IP platform and provide secure and reliable transmission of voice and data in an independent network. In the initial phase from late-2005 to late-2006, Vattenfall used the TETRA digital radio system purely for the purpose of communication with and between employees. At this point it comprised 10 base stations in Hamburg and Berlin respectively. Since 2006, Vattenfall has also been using the TETRA digital radio network for the transmission of process data. To this end, Motorola increased the density of the infrastructure and the number of base stations to 20 in Berlin and 16 in Hamburg. At the same time Vattenfall integrated diagnostic equipment and telecontrol systems into the network stations, which provide power distribution to individual households. This allows all the systems and equipment to be monitored and controlled from the control centre.

**“It is our aim to set new standards for safety and customer focus as an energy supplier in the German market. We therefore put our trust in communication solutions, which allow us to respond quickly to developments and also introduce future oriented services for our customers.”**

The duplex telephony feature allows field workers to communicate absolutely transparently (comparable to internal cordless phones) in Vattenfall's telephone network. There is no need to learn or train additional operations or calling number plans.

The need for point-to-multipoint communication, which had been supported by analogue radio systems, is now completely covered by the TETRA digital two-way radio

system. For this reason, Vattenfall was able to replace the costly and technically outdated analogue radio systems.

## THE BENEFITS

### Constant and independent availability of critical functions, innovation security and increased efficiency

TETRA digital radio systems from Motorola guarantee that Vattenfall can communicate reliably with its field employees at all times. Even if public mobile or cable-based telephone networks should fail during serious disasters, Vattenfall technicians can still be contacted at all times due to the redundant infrastructure of TETRA digital radio solutions. Furthermore, an authentication function prevents unauthorised users from accessing the TETRA systems. Only handsets programmed with a terminal-specific software key are capable of logging into the TETRA digital radio network and using it for voice and data transmission.

As well as securing communication with and between employees, the TETRA digital radio system also meets Vattenfall's second requirement – it provides a reliable communication channel for the remote monitoring and control of the medium voltage network in real-time. In contrast the public telecommunication network could not be used for technical reasons whilst the construction of a cable based communication network would not have been acceptable from an economic point of view. Because the system reports disruptions in the distribution network immediately, Vattenfall technicians in the control centre can immediately restore the energy supply by localizing a faulty power line and diverting it to a replacement line. This allows the energy supplier to reduce repair times and therefore also the duration of power outages by up to 50 percent. After the power supply has been successfully diverted, field technicians have enough time to investigate and eliminate the cause of the disruption. For Vattenfall, however, the decisive factor for selecting TETRA digital radio technology was primarily that the new solution satisfies its economic criteria. The TETRA digital radio network is characterised by low operational costs and durable individual components. Moreover, the solution can be scaled up or down flexibly to meet Vattenfall's requirements. Finally, as well as being cost-effective, the TETRA standard, which also serves as the basis for national public safety networks, ensures a high level of investment security.





Matthias Wittig,  
Head of Project Management  
& Strategy TETRA Networks  
Vattenfall Distribution

## **OUTLOOK**

### **Transformation of existing medium voltage networks into „smart grids“**

In the next ten years, Vattenfall will invest in network maintenance and further modernisation of the distribution networks in order to improve security and quality of supply in Berlin and Hamburg still further.

In addition, TETRA digital radio technology will be a vital component for advancing the distribution networks into so called „Smart Grids“ – intelligent electricity networks. Currently, large plants generating electricity centrally are the dominant element of power grids. However, the trend is towards decentralised generation plants which feed electricity directly into the lower voltage levels such as the low or medium voltage networks. This creates a significantly more complex structure – especially in the area of load control and maintenance of grid stability. As a result, one focus for medium and low voltage networks in future will be preventing the grids from overloading and distributing excess load to times when the load is lower. Intelligent power networks smooth out this load using automated control and by controlling the equipment that consumes or generates electricity. They are therefore in a position to access and process status information and power flow data from the various elements of the network in real-time. Vattenfall aims to increase the number of TETRA base stations in Berlin and Hamburg to over 30 so as to further improve the coverage of the radio network in the service areas of its distribution networks and to adapt the network capacity to the growing demand.

Matthias Wittig, Head of Project Management & Strategy TETRA Networks Vattenfall Distribution, on the company's experiences with TETRA digital radio and the future modernisation of distribution networks

### **Vattenfall employees have been using TETRA digital radio to communicate since the end of 2005 and to transmit process data since 2006. What is your assessment of the past five years? Are you satisfied with the decision to invest in TETRA digital radio?**

On balance, our company has benefited enormously from the TETRA digital radio system. The networks have always proven to be a reliable communication platform and provide a solid foundation for the automation of the medium voltage grid. Since commissioning the TETRA digital radio system, we have been able to reduce the duration of power outages by 50 percent – a figure that speaks for itself.

### **Did the switchover from analog to digital radio cause any problems?**

No, the transfer went very smoothly. The partnership between our technicians and the Motorola service staff was outstanding. The solution oriented approach adopted by both teams was, above all, responsible for the fact that we were able to put the new TETRA networks into operation in just a few weeks – on-time and within the planned budget. The networks have undergone successive expansions since they were first installed but there have been no notable difficulties.

### **Did your employees have difficulties coming to terms with the new TETRA digital radio system?**

Not at all. On the contrary, we have received a great deal of positive feedback from our staff. The new digital handsets are easy and intuitive to operate. They are also much smaller and lighter than the old analog handsets and therefore much more comfortable to carry. Moreover, the handsets offer a wide range of practical functions that simplify our employees' daily work. The freely programmable quick dial buttons, joint telephone book and group calling function are particularly popular features, which were not available with analog radio. In addition, the voice transmission quality has improved significantly as the new technology also filters out background noise. This allows our employees to communicate even in a loud environment.

**Can you think of an everyday situation, in which you would not like to be without the advantages offered by the TETRA system?**

Above all, we profit from the opportunities the system gives us for remote monitoring and remote control of the medium voltage grid. The TETRA network reports faults to us in real-time so our technicians in the control centre can respond immediately. They can either restore the electricity supply centrally by remote control or localise the faulty line and re-route to an alternative connection. This means we can keep power outages to a minimum for our customers. In future, we will even be able to manage the power input from the control centre.

**Can you explain that in more detail?**

The trend in the sector is towards decentralised electricity generation. In future, smaller and larger quantities of electricity will be fed directly into the low and medium voltage grids from a variety of different sources. Using the TETRA digital radio system, we will be able to manage these processes so that the electricity grids do not fail due to overloading while hardly being used at other times. Intelligent power networks – commonly known as “smart grids” – can make predictions about the supply and consumption

of electricity, manage the storage of excess energy and adapt electricity distribution to the demand. We are using this technology as we continue to optimise the security and quality of supply for our customers in Hamburg and Berlin.

**What effect has the switchover to digital radio had on your business?**

TETRA is an investment in a highly future-proof technology. Firstly, the individual components of the digital radio system are very durable and robust. Secondly, the network is flexibly scalable so we can expand it to meet our requirements. Finally, we have significantly cut our costs in the areas of maintenance and servicing as the technologically outdated analog radio system was very expensive to operate.



**CASE STUDY**  
VATTENFALL EUROPE  
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