

# > Suunta

Tekla Infra &amp; Energy's customer publication

## The future is smart

Energy distribution is approaching a very important turning point. Until recently, the energy distribution business was the same for one hundred years or so: there was one spot where energy was produced, and it was delivered to consumers in a controlled manner. There was one party who owned and managed the entire chain. Everything was more straightforward. In the 2000s, new laws governing energy markets were enacted: the production and distribution of energy were separated. In Europe, this is a common trend.

With smart grids on their way, the situation is far from simple. In short, the idea behind smart grids is to minimize energy consumption and to optimize network design. Smart grids are about building, expanding, operating and maintaining future electricity networks in a way that will also help meet the European Union's 20/20/20 climate change objectives. These targets for the year 2020 include 20% reduction in greenhouse gas emissions, 20% share of renewables in overall EU energy consumption and 20% savings in consumption by improving energy efficiency.

If even a fraction of the smart grids visions came true, it will be the biggest change in energy distribution and energy distribution business ever.

What smart grids bring to the old way of energy distribution is, on the one hand, the basics, i.e. distributed production. In addition, smart grids mean measures for saving energy, using renewable energy resources and new ways of using energy, e.g. electric cars. Smart networks controlling the entire network will be built alongside traditional electricity networks. There will be more and more telecommunication – with or without wires – and smart components at the customer, at distribution substations and in the network itself.

There will be a flood of information that can be received from the network. This is a big challenge not only for the energy utility but for Tekla as well. All the information must be controlled and utilized in the best possible way in the network information system. One of the technical challenges of smart grids is that when more IT is involved, the network will become more vulnerable to

attacks. Information security will play a big role in the development of smart grids.

On the financial side, smart grid goals require great investments. These investments, however, enable the establishment of new business models for energy utilities. For example, the energy utility might not own the actual network components at all. Instead, there will be service providers which will provide the utilities with information from the network. In this way, it is easier to assess the relationship between the investment and the benefits. Reaching smart grid visions and building the path to 20/20/20 must be reasonable and cost-effective to all parties.

With all the new technologies, business models, vendors and regulations, there is a risk of complexity. Because of the great investments, smart grid solutions must be well planned to be future proof. Otherwise repairs will have to be made along the way. This has already happened in some cases with the rapid shift to automatic meter reading (AMR).

Despite megatrends such as smart grids, we must not forget the basics: asset management, which forms the basis of any network utility's operations. Infrastructures are ageing, and renovation gives opportunities to new technologies. Controlling network assets from planning, documentation and operation to maintenance and reporting is crucial. So are the benefits for the utility and for the customer.

Tekla Xpower Days 2010 (TXD10), the 8th international biennial seminar for the members of the Tekla Xpower community will be organized on Wednesday 13 and Thursday 14 October 2010 in Latvia in cooperation with Latvenergo. I warmly welcome all the leaders of Smart NIS to TXD10. See you in Riga! ■



**PEKKA HÄMÄLÄINEN**  
Segment director, Tekla Infra & Energy,  
Energy distribution



## TXD10 brings together top professionals in energy distribution

Tekla Xpower Days 2010 (TXD10) is an international seminar for the leaders and experts of the Tekla Xpower community. This year, the biennial event will be organized on Wednesday 13 and Thursday 14 October 2010 in Riga, Latvia. A more detailed program will be announced during the summer.

The theme of the seminar is "Smart NIS", smart network information system.

The presentations and discussions will focus on how Smart Grids enhance traditional network asset management. The lecturers will present case studies of successful development projects and the benefits of utilizing Tekla Xpower applications in smart electricity networks.

The presentations will also cover traditional energy network asset management themes as well as the challenges of a changing distribution network environment. ■



 Latvenergo

## Tekla receives the Internationalization Award



The President of the Republic of Finland, Tarja Halonen, has presented the 2009 Internationalization Award to Tekla Corporation. The objective of the award is to encourage businesses in an international environment and to boost their ability to develop and apply new operational models. Finpro, the organization that promotes the growth and competitiveness of Finnish companies, selected the nominees for the award. The grounds of the Internationalization Award emphasize international growth, ability to network and development of new kinds of products and services. These awards have been presented annually since 1967.

- We are very happy to receive the Internationalization Award as a recognition of our work. Our success in the international software product market is based on Finnish expertise, industry know-how and close cooperation with the customers, as well as our long-term perspective, comments Ari Kohonen, Tekla's President and CEO. ■

Tekla was founded in 1966. The company's first export deals were made in 1972. The first foreign subsidiary was established in Sweden in 1995, with foreign trade accounting for 15% of net sales at the time. International operations were expanded strongly around the turn of the millennium, with subsidiaries or local offices established in the US, the UK, Germany, France, Malaysia, Japan, the UAE and China among others. In 1999, the share of foreign operations of net sales increased above 50%.

Today, more than 80% of Tekla's annual net sales of some EUR 50 million is generated outside Finland. The company has its own offices in 15 countries and additionally a comprehensive global partner network. Tekes, the Finnish Funding Agency for Technology and Innovation, has significantly promoted the development of Tekla's business. Tekla also collaborates with many universities and research institutes. The company employs over 460 persons, of whom 40 percent work outside Finland. ■

## Tekla 2009 in a nutshell: a good year in challenging circumstances

- Tekla's turnover declined somewhat in 2009, comments CEO Ari Kohonen on the 2009 results. - Even so, we consider the year as a good one, given the challenging circumstances. Tekla's profitability is at least satisfactory and our financial position excellent. This is a very good basis to continue our long-term approach of customer service. Unlike many competitors, we increased our headcount somewhat in 2009. The investment in product development was as much as almost 30%. We do not consider product development an expense but creating added value to our customers.

The net sales of I&E amounted to 13.80 million euros for January-December 2009, increasing by 6.6% during the year. I&E's operating result was 2.08 million euros. The business area succeeded in increasing its net sales and operating result on an annual level, with which we are very pleased. I&E's operating result percentage was 15.1%, which is considered good in the prevailing business environment. International operations accounted for 42% of net sales.

In the energy industry, information system acquisitions are strategic investments for the companies. The economic recession has not had much effect on these investments. Tekla's market po-

sition as a supplier of network information systems is strong in the Nordic and Baltic countries.

At the end of the year, Vattenfall Central Europe decided to expand the use of Tekla Xpower in Berlin and Hamburg. Vattenfall's goal is to enter full production use of the system in Berlin gradually during 2010. System coverage will also be expanded in Hamburg, where Tekla Xpower has been in use for approximately ten years.

Tekla is participating in the Smart Grids and Energy Markets research program started in fall 2009. The program aims to develop technologies and operating models for building an electricity distribution network that meets future needs. The five-year program has three themes: management of the smart electricity network, active resources and the infrastructure of the future of energy distribution.

Latvenergo expanded the use of Tekla Xpower, and the distribution management system covers the management of the entire Latvian distribution network. The system integration for Eesti Energia Jaotusvõrk OÜ as well as the support for the European network calculation standard (IEC standard) were completed. ■

## Tekla's offering expands to international markets in civil engineering sector

Tekla publishes an international version of Tekla Xstreet, an information system developed for civil engineering design, management and construction support. The English version of Tekla Xstreet is directed at international markets. With this version, Tekla will be able to serve infra customers also outside the Nordic Countries.

- Tekla Xstreet has long and widely been used in demanding infra design projects in Finland. Now we have completed an international version of the system. Our goal is to introduce a new and efficient, model-based system for civil engineering design and construction support to the international markets. One of the things we have worked very hard for is the ability to better support horizontal integration between construction industry branches, says Erkki Mäkinen, Director for the Civil engineering and water segment at Tekla.

Globally, Tekla is primarily known for its BIM (Building Information Modeling) software Tekla Structures.

- Tekla's goal is to serve the international market with all its products. Tekla Structures is the leading software for building information modeling that is used worldwide. Now we can offer a model-based system to be used globally by the civil engineering sector as well.

Tekla Xstreet provides various tools for planning and designing all kinds of routes from streets to highways and railways, water and sewer networks, street areas and all related equipment. Tekla Xstreet also supports machine control-based construction process and the quality assurance of the construction. ■

[www.tekla.com](http://www.tekla.com)

## > Sustainable network performance

*Vattenfall and Tekla are forerunners in smart electricity networks.*

### Vattenfall Verkkö and Tekla

Vattenfall Verkkö develops intelligent electrical networks that make use of modern technology. The company has 390,000 customers and 60,000 kilometers of electrical networks. In 2002, Vattenfall Verkkö Oy selected Tekla Xpower as its electrical network information system.

### Efficient processes

Versatile use of a modern network information system enhances work and facilitates process management.

- Our goal is to provide electrical network services to our customers in a reliable and efficient way and to serve them with information. Automated data transfer in the various work processes of the network utility and in the provision of information on, for example, storm damage requires that the network information system and the information that can be obtained from it be absolutely reliable, states Jarmo Karjalainen, the director responsible for Vattenfall Verkkö Oy's information technology and technical development.

### Partnership principle

In collaboration with other partners, Tekla and Vattenfall Verkkö, have completed several system development projects in constructive partnership.

- We have developed standards for the whole industry. The industry is changing constantly, and developers must work in a customer-oriented way. Tekla has responded well to this need, Karjalainen says.

- Together, we have integrated Tekla Xpower with our processes and other information systems, such as the customer service system and the multi-channel communication system.

### Up-to-date customer information

- Data maintained in Tekla Xpower can be used, for example, in communications with customers. If a power outage occurs, information on the objects can be immediately found on the Web or obtained via a telephone message. Furthermore, customers who have signed an agreement with us will receive notification of the matter by text message or e-mail - automatically, says Karjalainen.

### AMR provides information on network and consumption

Vattenfall Verkkö was the first company in Finland to adopt intelligent electricity meters that can be read remotely. The meters installed on the customers' premises are read automatically with Tekla Xpower via an interface to the AMR system. This way, Vattenfall Verkkö is also able to monitor the low voltage network automatically and in real time.

- The integration of Tekla Xpower and AMR more than tripled the length of our automatically controlled network. We obtain data from each household in our area of operation.

### High-quality service and measured decisions

Data gained from the integration of Tekla Xpower and AMR can be used in many ways in the company's operations.

- We are able to locate and repair the fault in less time than before. We obtain real-time data on power consumption and our customers get bills that are based on actual consumption.

- We obtain reliable data on network status, power quality, power consumption, and changes in the consumption. The data can be used as a basis for strategic decision-making, investments, and risk management.

> Information systems for electrical networks must be reliable and integration-ready. That is why Vattenfall Verkkö selected Tekla Xpower as its network information system.



Read more: [www.tekla.com/vattenfall](http://www.tekla.com/vattenfall)

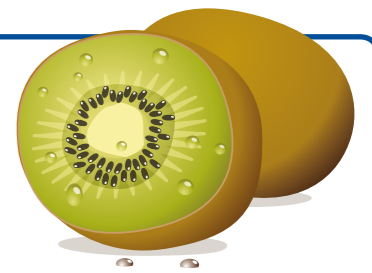
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## Pointing towards a wider view – comments by a wondering Kiwi



The sceptic might be forgiven for believing that reliability in today's consumer-based society means making sure that a device can be relied on to fail just after the guarantee has expired. This is a sorry state of affairs, but is in line with the unsustainable paradigm where economic growth is based on people buying consumer products they don't need, which is to say that a healthy economy equates to unhealthy (neurotic) human behaviour...

Most readers of this article are fortunate in being able to work in infrastructure areas, for example, energy distribution, that genuinely aid the long-term development and well-being of society. This carries a significant challenge, because our view must be long-term and as comprehensive as possible. We need to predict the future, in terms of interest rates, load growth, fault frequencies, regulation models and future technology trends, while being aware of the limitations of our predictions. We also need to consider the past, by making the best use of the aging existing infrastructure and experiential knowledge we have inherited.

In the last century, developed societies have become increasingly dependent on infrastructure and in recent years reliability has become a major cost driver in network planning. It is well known, however, that increasing reliability increases investment and operation costs. By incorporating Customer Interruption Costs (CIC - in Finnish, KAH), something close to the optimum balance between investment, losses, maintenance and interruption can be found in network planning.

This leads to a dilemma. Generally speaking, it would seem good practice to head towards globally cost-optimum networks, but global cost-optimum, from a reliability point of view, may not be equally fair to all customers.

For example, providing a backup connection to a customer on the geographical periphery of a particular electricity distribution network might be disproportionately expensive. A globally optimum network solution might leave such a customer without a backup connection, meaning the customer, or cluster of customers, would have to wait for repair time before restoration of power after a fault in the line feeding them. If these customers are paying the same tariff as customers with backup connections, they could justifiably say that, over the long term, they are not receiving fair treatment.

Considering network planning a bit further, we have found that the CIC values

assigned to the various customer groups have a large effect on the topology of a distribution network. If they are overvalued, there will tend to be overinvestment due to a greater number of feeders and backup connections, and more investment in switching. Interestingly, making a distribution network more reliable for customers means having more network, which means more faults - but shorter interruptions.

It is difficult, perhaps impossible, to put monetary values on everything, but quantifying the cost of interruption has brought reliability firmly into network planning. The same could be said for including costs that represent environmental impact in the cost functions in planning algorithms, and even more so, in the full life-cycle costing of all consumer products... ■



**Robert John Millar** is a D.Sc. (Tech.) and researcher at the Aalto University School of Science and Technology. His research interests include network planning and cable rating. How John got to Finland from his native country of New Zealand is a long story, involving music, love and the sense of space. He has been here, most of the time, since 1992. John likes the sauna and skiing aspect of life in Finland, and can still be heard in various bands playing the clarinet and other more exotic wind instruments.

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Layout: Tekla Corporation, Mainostoimisto Polttopiste, Press: Erweko Painotuote Oy

**Tekla Suunta** is Tekla Corporation's customer publication for energy utilities, municipalities, water and wastewater utilities & infrastructure designers and constructors. "Suunta" is Finnish for 'Direction' or 'Course'.