

# energy manager

Newspaper for energy suppliers

## Topics

Secure Energy Supply	1
Energy Trade Fairs 2013	2
Smart Grid and Infeed Management in the PSI Control System	4
Data Exchange between Market Participants	5
Renewal of the Network Control Technology at MITNETZ STROM	6
Network Billing at TenneT with PSI <sub>passage</sub>	7
Network Training Center GridLab	7
Control System Order from Denmark	8
Integrated Trading and Distribution System for the Süwag Energie AG	9
Intelligence for the Low-Voltage Grid	9
Intelligent Balancing	10
Leak Detection and Locating for the LUKOIL Pipeline Perm-Andreevka	11
Pipeline Monitoring	12
PSI Info Days for Energy Suppliers	12
PSI at the E-world 2013	13
PSI at the CIRED 2013	13
Windpark Administration at the ENEA	13
PSI Awarded by Frost & Sullivan	14
OOO PSI Moves into New Office in Moscow	14
Change in Management Board of the PSI AG and in Electrical Energy	15
PSI with Strong Growth	15



Source: ©Alexandr Mitiuc, fotolia

## Secure energy supply

### Process IT in the Age of Cyber Security

The importance of information technology in the process area of energy supply has increased dramatically in the last few years. Important developments in energy supply such as the separation of network operations and energy operations (unbundling) were only made possible by means of modern information and communication technology (ICT).

In particular, the energy transition is based on a massive use of ICT and cannot be implemented without it. The resulting increased dependency of their availability is reason enough to properly protect the controlling and telecommunication systems required to operate the energy supply networks. In Germany and other European countries, the

BDEW white paper currently serves as the primary guideline for security requirements for control systems. PSI control systems completely fulfill the requirements of the BDEW whitepaper. The functionalities bundled and provided for PSI<sub>control</sub> in an IT security basic package are integrated into the

► Page 3

## News ticker

+++ PSI with Record Volume of New Orders in First Quarter – Group revenues grow by 11% to 45.4 million Euros +++ PSI Presents Solutions for the Mobility of the Future at the UITP 2013 – software for transportation companies and railway electrical supply +++ PSIPENTA Awarded Contract by EURO-COMPOSITES Group – ERP/MES solution for optimisation of production planning and control +++ PSI Establishes Subsidiary in Brazil – Expansion of activities in Latin America with new branch office +++ PSI awarded contract for control system from Denmark – A common network control system for thirteen energy companies in Jutland +++ PSI Metals to Supply Production Management System to California Steel +++ PSI further expands market position in Rail Transportation in Switzerland – Aare Seeland mobil AG orders Automatic Vehicle Management System with integrated passenger information +++ PSI Awarded Contract by MITNETZ STROM for the Renewal of the Network Control Technology – new network control system for the management of electricity and gas distribution networks +++ PSI China wins important steel contract for JISCO TianFeng Stainless – New customer Jiuquan Steel and Iron Group decided in favour of PSImetals +++

## Publisher

### Publisher

PSI AG  
Dircksenstraße 42–44  
10178 Berlin (Mitte)  
Germany

Phone: +49 30 2801-0  
Fax: +49 30 2801-1000  
info@psi.de  
www.psi.de

### Editorial Staff

Bozana Matejcek

### Layout

Heike Krause

### Concept, Production

PSI AG

## Editorial



Dear readers,

Many of you are faced with the challenges of an extremely volatile supply situation as a result of the infeed of renewable energies and modified supplies.

The task of providing secure supply under the conditions of the energy transition, the requirements placed on critical infrastructures, cyber-security and the current market design can only be met with intelligent solutions. We are proud to be able to present you the widest variety of solu-

tions from the PSI Group's energy unit.

In the current edition we have dedicated one focus to the electrical energy supply and cross-component system with "smart" solutions. These solutions support you in meeting the requirements efficiently and effectively and making them controllable.

PSI offers solutions for the German energy market, which plays a central role for us. Your challenges are always a driving force and motivation for us to seek new solutions and develop innovative components together with you so that we can also be successful in the global market. Here, we are expanding in a good way and will continue to do so in a targeted manner.

This is also demonstrated by Jutland, which you will be able to read about in this issue. We are also especially proud that we have managed to gain access to the Polish market by means of the project with ENEA Operator.

I wish you enjoyable reading.

Best regards,

Wolfgang Fischer

Managing Director Electrical Energy

PSI AG

## Energy events 2013

04.06.–05.06.2013	11. ICG	Frankfurt, Germany
05.06.–06.06.2013	CONSULECTRA Symposium	Hamburg, Germany
10.06.–13.06.2013	CIREC 2013	Stockholm, Sweden
11.06.–13.06.2013	BDEW Congress 2013	Berlin, Germany
25.06.–28.06.2013	Mioge 2013	Moscow, Russia
10.09.–11.09.2013	8 <sup>th</sup> German Energy Congress	Munich, Germany
01.10.–02.10.2013	GAT 2013	Nuremberg, Germany
26.11.–27.11.2013	EMART energy 2013	Berlin, Germany
03.12.–06.12.2013	Elektroseti 2013	Moscow, Russia

◀Page 1

systems delivered in accordance with the customer requirements. Furthermore, PSI has designed and implemented the IT security expansion package *PSIsecure*.

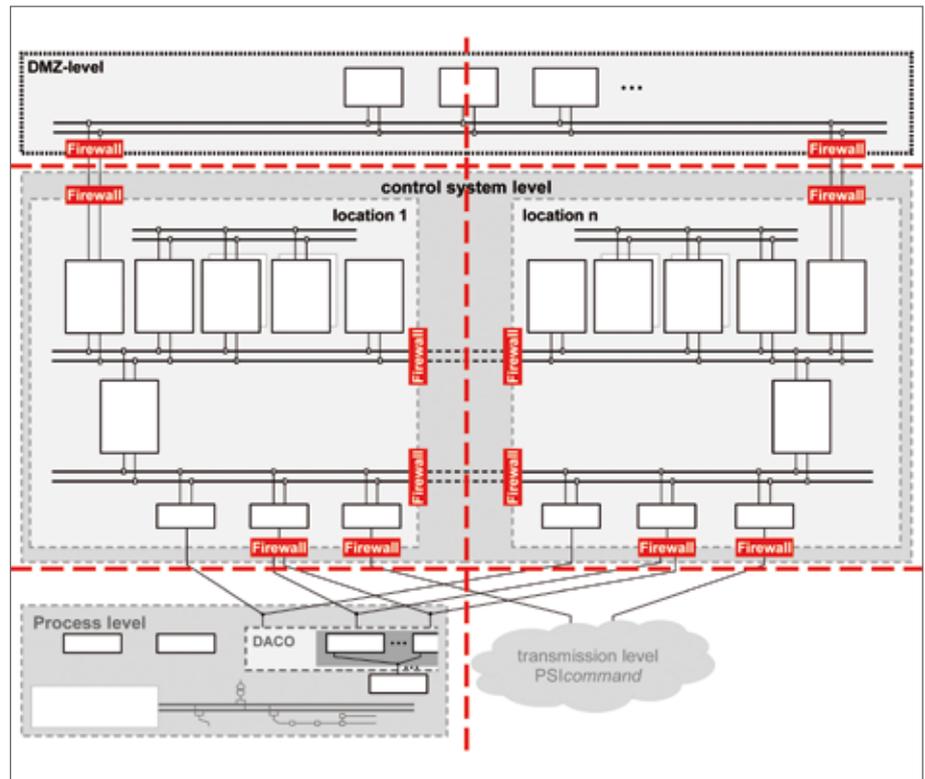
### IT security basis package

PSI control systems are delivered only as tempered systems. That means that specifically generated minimal basic systems provide precisely the services required by the application software systems installed on the computer. All the system components are patchable.

*PSIcontrol* has been consistently implemented as a so-called “minimal need to know” principle so that without a successful authentication, no system operation is possible with the exception of the login. The authentication is made using a password and card reader. It is assured that a login is also possible if the main domain name server is not accessible. Users can be issued precisely the rights that are required to fulfill their tasks.

To assure that potential intruders cannot move freely through a “compromised” network, *PSIcontrol* networks are divided into appropriately sized network islands (perimeters). The network segmentation is achieved by the use of firewalls. All the network connections that extend beyond confines of the site (WAN connections) are produced as VPN tunnel connections with encrypted data transmission and TCP/IP protocol (IEC 60870-5-104).

In the age of cyber security, remote accesses are considered to be especially critical elements of system architectures due to the fact that as a rule they are connected with public networks and therefore accessible for attackers.



Horizontal and vertical network segmentation

*PSIcontrol* is equipped with a secure and time-tested remote access concept.

The installation, compile and patch (ICP) server is an essential component for the fulfillment of the BDEW white-paper requirements. All source and object codes as well as the system parameters are stored on this server.

With an ICP server any number of repeatable system generations can be performed. The completed, generated systems are stored in a version-administrated repository so that the possibility for a rollback to a previous system version is available. The entire configuration and supply management is handled through these repositories.

### Extension package for increased IT security

The solution *PSIsecure* provides a broad range of technologies for successfully resisting the attacks of the future that are

becoming increasingly more sophisticated. Because the current attack scenarios are very complex in their design, conventional virus scanners neither detect all the known malware such as viruses, worms or Trojan horses nor the unknown, so-called zero-day exploits. This risk can be completely excluded with the application whitelisting, because, in contrast to the virus scanner, a list with trustworthy code is defined in the whitelist. Prior to starting any program, the content origin and integrity are checked and compared with the whitelist. Only recognized programs can be loaded and executed.

### Centralized security events and next generation firewalls

The security information and event management (SIEM) is a central platform for the collection, detection, processing and reporting of security events. The SIEM integrated in *PSIsecure* consists of functions such as central data col-

▶Page 5

Supplying the electricity of the future

## Smart Grid and Infeed Management in the PSI Control System

Smart grid, smart market and smart meters as solutions for the intelligent electrical supply of the future were topics discussed on 27 November 2012 at the Day of the Berlin Energy Business. As a Berlin company, PSI AG was represented with a presentation about “Smart grids and infeed management in the PSI control system”.

The network operator is responsible for the secure operation of the electrical grids and for securing the supply. This is regulated by the applicable market role. Other players in the energy market have

generators. Should an action be required, the systems that have the greatest possible impact on the elimination of the bottleneck are regulated first. To do this, the actual infeed of the decentralized feeders

views, in particular long term for reasons of threats of compensation claims.

With the aid of forecast calculations it is possible to continually monitor not only the current network status, but also that of the near future. The expected network status is simulated for every point in time and a network analysis is performed. If bottlenecks are determined, they are shown to the operator. The specific points in time can be investigated in detail so as to be able to plan measures for the avoidance of bottlenecks in advance if necessary.

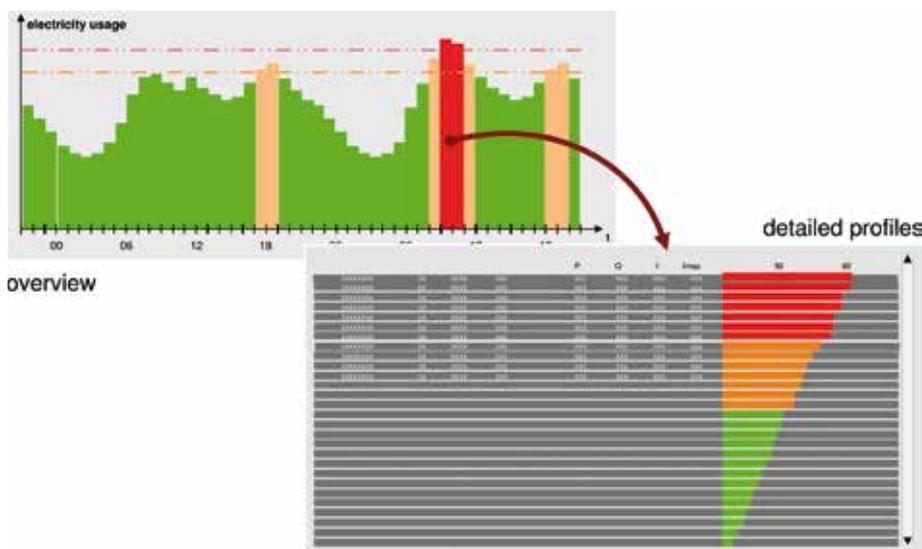
### Forecasting calculations

Along with the switching status in the network and power transfers to neighboring grids, the essential entry data for the expected loads and infeeds is absolutely necessary for the forecasting calculations and meaningful results. To develop prognoses, time-tested predictive procedures such as comparable day searches, regression processes or neuronal networks have established themselves. Along with historical data, calendar data and weather data, for future load prognoses as well as the impact of the expected rate signals are to be taken into consideration.

### Virtual power plant and multi utility optimization

A jointly observed and controlled group of feeders as well as consumers with varying generating and loading characteristics may, depending on qualifications, take part in the balancing energy market.

The control of a virtual power plant does not belong to the (regular) tasks of a network operator. Nevertheless, they may provide such services for other players in the market, especially due to the fact that they have an optimally suited infra-



Forecasting calculations

other optimization goals and may cause grid instabilities as a consequence of the interactions. If the secure operation is endangered, the network operator must take action. To assure that this occurs as infrequently and highly effectively as possible, the *PSIcontrol* network control system contains a number of “smart” functions.

### Infeed management

The goal of infeed management is to take up the largest possible volume of electricity from renewable energies and co-

is measured or calculated by means of suitable algorithms. The dependency on external parameters such as wind speed or global radiation is taken into consideration.

Should the limiting values of transformers or lines be reached, reduction commands are issued to the appropriate feeders in accordance with an optimized procedure (sensitivity matrix). This is recalculated with every relevant change in the topology, the loads or the infeeds. The commands are documented in corresponding lists, protocols and over-

◀ Page 3

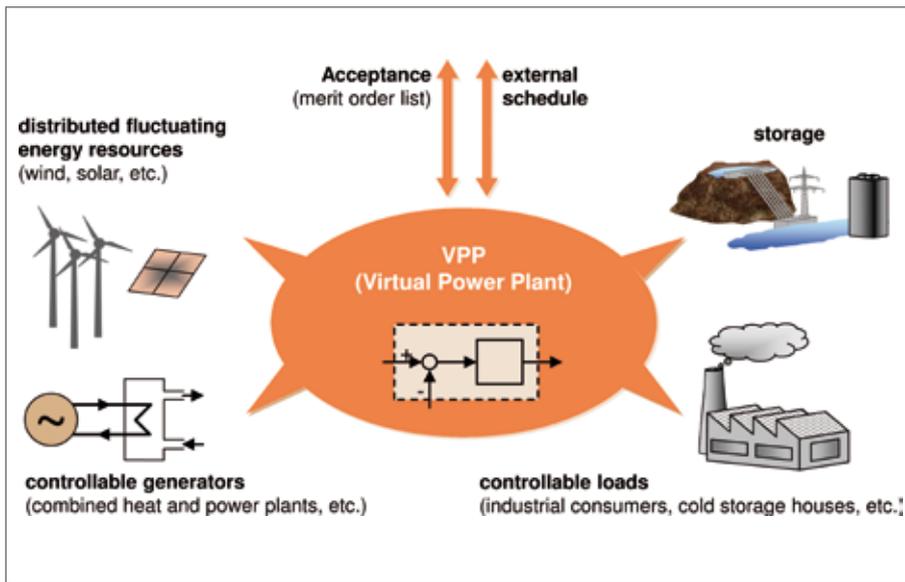
lection, correlation and alarming, reporting, archiving and compliance testing.

Firewalls regulate data traffic. This simple regulatory mechanism has been significantly extended by means of a next generation firewall in PSISecure. Next generation firewalls completely analyze the data traffic. As a result, for instance, rules are possible at the application level and even at the user level. With IPS/IDS functions data content is checked against signatures as well as against known viruses, Trojan horses and worms. ☉

### Information

Wolfgang Dreger  
Phone +49 6021 366-885  
E-mail: wdreger@psi.de

Gregor Domhan  
Phone +49 721 94249-30  
E-mail: gdomhan@psi.de



structure with a control center with the corresponding staff available around the clock. The necessary tools for control and monitoring of a virtual power plant are available with the software module of PSIconrol. ☉

Virtual power plant

### Information

Guido Remmers  
Phone: +49 6021 366-337  
E-mail: gremmers@psi.de

## ENTSO-E formats made readable

### Data Exchange between Market Participants

Within the framework of the market business processes there is a significant and growing electronic need for data exchange between the various market participants. The communication on the level of the transmission networks for this is handled with XML (eXtensible Markup Language) based formats, which are binding and prescribed by the ENTSO-E (European Network of Transmission System Operators for Electricity).

Affected business processes are, for instance, the matching between the transmission system operators and the data exchange processes with balancing group in the framework of the schedule management and auction houses with regard to the capacity management.

XML is especially suited for exchanging data between IT systems. For every XML format there is a DTD or scheme file in which the structure (content and set-up)

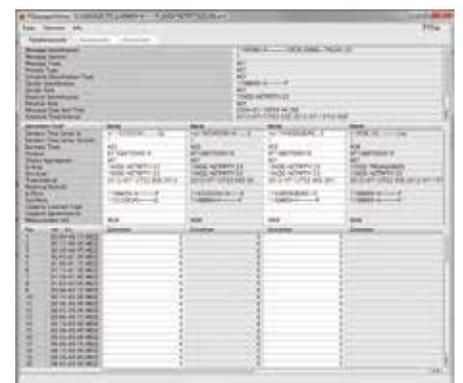
of a corresponding XML file is strictly regulated. The IT systems set up the file on the basis of these rules and can then interpret them. In normal cases, the machines communicate using these formats without requiring actions by the users.

But what happens if a structural error occurs? Formally these cases are caught by the corresponding process descriptions. Often enough, however, because a quick solution is required, bilateral clari-

fication between the market participants involved is desired. This requires a need for action on the part of the users of the IT systems involved. The files have to be read and tested manually. The possibility of a uniform interpreta-

▶ Page 6

Data exchange between market participants



◀Page 5

tion and handling of the file for the users of the two business partners would therefore be desirable.

To that end, PSI has developed *PSIpassage/Viewer* which is available free-of-charge for downloading for all market participants at [www.psienergy.de/de/loesungen/netznutzung/](http://www.psienergy.de/de/loesungen/netznutzung/). The files have been provided in a clear tabular view. All codes are shown directly in plain text

with Tooltips/Quickinfo. Export functions, e.g. in accordance with MS-Excel, were implemented.

The Viewer represents various formats of ENTSO-E processes (ESS, ECAN, ERRP, RGCE etc.) in release 1.0. Amongst other things, special formats in the environment of regularly awarded services and auction processes are also shown.

In stages, the *PSIpassage/Viewer* will be expanded with new formats and versions. The product lines of *PSIpassage* support transportation and distribution network operators in the field of energy data management. ☉

### Information

Christian Klein  
Phone: +49 6021 366-327  
E-mail: [cklein@psi.de](mailto:cklein@psi.de)

## Electricity and gas in a cross-component system

# Renewal of the Network Control Technology at MITNETZ STROM

The MITNETZ STROM, a leading eastern German energy service provider and subsidiary of the *enviaM* Group, of which the RWE Group is the majority shareholder, awarded the PSI Electrical Energy business at the end of 2012 with the delivery of a new network control system.

The MITNETZ electricity and gas distribution networks will be managed by *PSIcontrol* in the future. The new control system will merge the previously separate solutions of the gas and electricity divisions in a cross-component system on the basis of the current *PSIcontrol* version.

Along with the merger of the previously separate supply units, the upgrade to the current *PSIcontrol* software version, the renewal of the hardware in accordance with a virtualization concept and the fulfillment of the increased security requirements of the RWE Group are the primary reasons for the procurement.

The new *PSIcontrol* version offers, along with many other higher analysis and network calculation functions, extensive integrated functions for the support of the management of the feeding in of renewable energies. It also takes into con-

sideration the security requirements of the BDEW Security whitepaper.

After the contract from the Rhein-Ruhr Verteilnetz GmbH (now: Westnetz) awarded in June 2012, with MITNETZ

STROM another major network operator from the RWE Group has decided for the migration to the current *PSIcontrol* technology. This new version offers expanded possibilities for updating and upgrading in the future. ☉

### Information

Gerhard Buchweitz,  
Phone: +49 6021 366-359  
E-mail: [gbuchweitz@psi.de](mailto:gbuchweitz@psi.de)

*Electricity and gas in a cross-component system*

Source: MITZNETZ STROM



## Transmission system operators – unintentional deviations between control areas

### Grid accounting at TenneT with PSI*passage*

In the context of the management of the European grid, the transmission system operators (TSO) are responsible for maintaining the balance of electricity fed in and drawn off within their control areas at all times. To accomplish this, balancing energy is applied. For regulating technical reasons, deviations occur between the actual and desired value of the exchange between neighboring control areas.

In the grid accounting, this so-called unintentional exchange of electrical energy between the TSOs is determined and then balanced out by means of compensation schedules (in kind). The rules of the ENTSO-E (European Network of Transmission System Operators for Electricity) have established that the volume determined in the recording period, generally one week, are valued according to ENTSO-E rate times and must be balanced out in the following week during the compensation periods as corresponding band delivery with the corresponding UCTE rate times.

Here, the TSOs form the 15-minute difference between the measurement data and the actual value intrusions (actual exchange) and the desired exchange. The latter result from cross-control-area energy transactions that were registered in advance with schedules by the corresponding market partners. To that end, the TSOs run schedule management systems, which besides the acceptance of these schedules and the matching amongst the partners, also achieve a joint understanding of the desired exchange.

The processes for the determination, approval and accounting of the actual exchange were strictly established after a pilot phase in 2011. In accordance with these determinations, the TSOs have to

first of all automatically communicate amongst one another before the unintentional exchange established can be communicated to the overriding Control Block und Coordination Center.

The TenneT TSO GmbH decided in favor of PSI*passage* for the implementation of the corresponding communication and accounting processes. TenneT has already been using PSI*passage*-T for 10 years for the schedule management described above as well as outsourced energy management business processes.

Now PSI*passage*-ACC will be used for the grid accounting. The system, specialized in energy accounting and invoicing processes, has thus far been used by Am-

prior GmbH for the handling of the market rules for balancing group invoicing of electricity processes. After a short specifications phase in 2011, the necessary customizations were immediately implemented so that in 2012 a successful, scheduled productive phase began, initially in Germany and on the border to the Netherlands. In January 2013 the missing borders to Austria and the Czech Republic were completed. As a result of the system's flexible structure, the majority of the requirements could be implemented simply with the configuration. Software modifications were necessary only to the slightest extent.

Currently the specifications for the next expansion phase are being developed, the complete automation of the processes is the focus of this phase. 

#### Information

Volker Kniehase  
Phone: +49 6021 366-533  
E-mail: vkniehase@psi.de

## System security for electrical grids

### Network Training Center GridLab

The GridLab GmbH, a subsidiary of the Eurogrid International CVBA, aims to be the leading European training and research center for the system security of electrical grids. A major contribution to achieving that goal is to be provided by the new PSI Training and Schooling System (T&S).

The Training and Schooling system, based on the PSI*control* network control system, was ordered at the end of 2012 and should primarily fulfill the tasks of training and further training of staff, in particular for the interaction of the

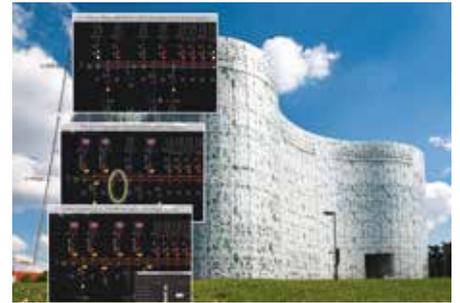
transmission system operators and power plants. Furthermore, the system allows the detection and control of hazards to the security and reliability of the electrical supply and therefore supports the

◀ Page 7

sensitivity of the network management staff for the system-critical conditions including restoration of the grid. The controlling of the impacts of fluctuating fed-ins, controlling the load-flows and calculating the reactive effects on the power plant behavior as well as the implementation of various power frequency regulators round out the fields of action. The T&S works with real network data and reproduces a dynamic model of the networks, power plants and control centers. This then makes it possible to flexibly simulate close-to-real situations such as critical network situations, network conditions and network restoration. One important task consists of making the

schooling system so that the participants hardly notice a difference between the training system and their actual control system. To that end, amongst other things, the design of the menus, the presentation of the grid, the topological network color schemes and the object presentations in the system can be easily adapted for every customer.

With the Training and Schooling System, GridLab can quickly and independently compile new grid data and therefore flexibly offer other network operators training on their networks. Along with these inter-TSO and inter-DSO trainings, GridLab also offers a technical assessment center (TAC) it



GridLab network training center

developed itself for the network system operators. ☉

### Information

Thomas Böhmer  
Phone: +49 6021 366-331  
E-mail: tboehmer@psi.de

## Contract for control system from Denmark

# A common network control system for thirteen energy companies in Jutland

**PSI has been contracted to deliver a common network control system for thirteen Danish energy companies in Jutland. The new system based on PSIcontrol will replace the thirteen former ABB individual systems.**

The thirteen energy companies supply energy for a total of almost 1.2 million customers and operate with 40,000 local network stations using medium voltage. The system architecture of the new control system comprises two redundant server locations and thirteen control rooms, each with a different number of workplaces. The special feature is the ability to monitor and control the grid

area of all thirteen companies within their exclusive responsibility with one single distributed control system, even though the total amount of data is stored in a central database. Centralized administration of data management results in an enormous potential of savings for each company.

The network control system includes classical SCADA (supervisory control

and data acquisition) functionality as well as complex network calculations and applications for smart grid requirements. In the field of Smart Grid, Denmark holds a leading role in Europe. Besides this, the safety requirements of the BDEW whitepaper Security will be implemented in the project, which are widely spread in German-speaking countries.

Once again, PSI was able to prevail against strong international competition and to win the contract. This underlines PSI's leadership in security issues within the energy market and intelligent network management functions. ☉

Official contract signing in Aschaffenburg in April 2013



### Information

Peter Schedlbauer  
Phone: +49 6021 366-9723  
E-mail: pschedlbauer@psi.de

## Reproduction of a uniform process of all products

# Integrated Trading and Distribution System for the Süwag Energie AG

The Süwag Energie AG and its subsidiaries, as a strong, multi-regional energy services provider, offer their customers much more than just the reliable supply of electricity, heat and natural gas.

The field of energy trading, with a total staff of 13, is located in the subsidiary Süwag Vertrieb AG & Co. KG. For financial year 2011, electricity sales were 7,934 GWh and gas sales were 3,901 GWh. In the framework of the "Calculation tool PSImarket" project, a uniform basis for the calculation of offers for electricity and gas are to be established in an integrated system. In a second step, procurement and portfolio management were integrated. The goal was the reproduction of a uniform process for all the relevant products such as electricity, gas, oil hedges and certificates, from the calculation of the offer to the procurement in an integrated system.

In 2009, PSI was awarded the contract for introducing an integrated distribution system for Süwag Distribution on the basis of PSImarket in a distribution system including the modules. The productive implementation of the distribution system was completed in 2010 with about 80 users. A second phase then followed in which customer-specific extensions and interfaces were implemented. The introduction of the trading and portfolio management system began at the end of 2011 and went live in 2012. Currently Süwag Distribution is evaluating the use of the PSImarket risk management module.

The functional scope in PSImarket for distribution and trading systems contains

the commodities electricity, gas and certificates.

Today, more than 100 users work with PSImarket in Süwag Distribution.

Ca. 87,000 contracts are managed, with an annual growth of about 5,000 contracts. 



Integrated trading and distribution system for Süwag Source: Süwag

### Information

Elke Domeyer  
Phone: +49 511 610189-60  
E-mail: edomeyer@psi.de

## Intelligence for the low-voltage network

# Smart Telecontrol Unit in the RWE "Smart Operator" Pilot Project

With the increase of the decentralized energy production, network management today is being confronted with new challenges. Due to the feeding-in of renewable energies and new consumers such as electrical vehicles, the network stability also depends heavily on fluctuating factors. Instead of investing in the cost-intensive expansion of the power grid, the "Smart Operator" project focuses on intelligent network components for the control and optimization of the electrical supply in the low-voltage range.

Together with partners from industry and research under the leadership of RWE, PSI AG is significantly involved in the "Smart Operator" project. RWE is responsible for the infrastructure and database system and PSI covers the areas smart operator (SO), SO manager and

load flow calculations. The RWTH Aachen is taking over the optimization procedures and analysis tasks.

The smart operator is based on the Smart Telecontrol Unit and is the core of the project. With its flexible interfaces and extensive protocol support, it allows the

connection of intelligent network components. Databases and analysis systems can be connected directly and can provide information to the smart operator or query measured values.

In addition, the powerful Smart Telecontrol Unit offers the possibility for data pre-processing of complex network calculations. Therefore, function libraries for the load flow calculation for the low-voltage range were adapted and implemented in the smart operator. The SO manager provides information about each smart operator in the various local

► Page 10

◀ Page 9

network stations and displays static and dynamic data in form of event logs, overviews and grid images.

### Autonomous control of low-voltage networks

The smart operator is installed in the low-voltage grid. Local network components and smart meters are connected to it. They deliver the data to the smart operator which uses this data to detect overload situations and voltage range violations with the aid of optimization procedures and load flow calculations. This results in optimized schedules and switching states that are sent to the local network components.

The smart operator is currently being tested in various areas. These areas, with a high number of small energy pro-

ducers, have been equipped with intelligent network components and are connected to a fiber-optic, power-line or DSL network. They therefore offer the prerequisites for collecting and evaluating data and provide the actuators for avoiding overloads.

### Hierarchical management

Today, the Smart Telecontrol Unit is already successfully being used as local network component. Through add-on applications, it is suitable for the implementation of complex requirements that can be specifically adapted to the needs of the energy supply companies. Together with the PSIconrol system, in the future it is possible to implement hierarchical network management concepts in power grids. ☉



Intelligence for the low-voltage grid

### Information

Andreas Stolte  
Phone: +49 6021 366-640  
E-mail: astolte@psi.de

Klaus Becker  
Phone: +49 721 9424920  
E-mail: kbecker@psi.de

## Intelligent balancing

# Transportation and distribution of crude oil and its products

The PSIBalance software solution carries out the balance technical tracking of technological processes in crude oil processing including the valuation of material imbalances in real-time operations.

This concept includes two primary tasks: the compilation of plausible operative information about the production, distribution and transportation of crude oil and its derivative products. This also includes transit resources and crude oil in the framework of crude oil extraction and processing. Furthermore, PSIBalance offers the development of an entire resource balance for production, distribution and consumption of crude oil, taking into consideration individual by-products, production and consumption areas, production, storage and handling objects as well as the means of transportation used for reforwarding.

PSIBalance is based on an integrated online modeling of the flow status of oil and oil products in all pipelines as well as the entirety of the telemetric data compiled in the system. The results of the model calculations and the evaluation of all the measurement data provide a balance for both the entire operation as well as for the individual structural units.

The use of PSIBalance allows a loss of reduction by applying the actual loss data in the invoicing instead of statistical means and increases the transparency of the transportation routes. The reduced

number of staff also increases the effectiveness in the administration.

The core of the system is formed by the model calculation and complex evaluation. These consist of the balancing of the operations taking into consideration the imbalances for crude oil and ballast components in real-time. Mean values for the individual imbalances are formed online, e.g. for daily and monthly values. An online calculation is made for the residual value for oil and ballast components in every technological unit, every tank and in every pipeline as well as for the estimation of mineral deposits and the water collected in the magistral pipelines. The working condition of the water purification devices such as hydrocyclones or water filters, etc. is evaluated

because of the amounts of oil accumulated in the water after passing through these parts of the system. In addition, *PSIbalance* allows for a monitoring of all the oil handling processes by means of an imbalance evaluation and the updating of the monthly operating reports on the crude oil producing wells in online modus.

The PSI system provides the long-term storage of all historical balancing data and the automatic writing and storing of

report documents as well as sending them according to a schedule and recipient list. *PSIbalance* allows for any graphic visualization of any of the parameters contained in the system and permits the generation of station and overview images of all the technological processes occurring. If needed, a system can be developed for the exchange of laboratory measurements between the individual laboratories and *PSIbalance*, taking into consideration the specifics of the individual operation. 



Intelligent balancing with *PSIbalance*

### Information

Prof. Dr.-Ing. habil. Berndt Böhme  
Phone: +49 30 2801-1507  
E-mail: [bboehme@psi.de](mailto:bboehme@psi.de)

## PSIpipeline

# Leak Detection and Location for the LUKOIL Perm-Andreevka Pipeline

LUKOIL was founded on 25 November 1991 as a result of a merger between numerous small crude oil producing and processing companies. Today, LUKOIL is the world's largest vertically integrated crude oil and natural gas company. The group ranks sixth worldwide amongst the privately held crude oil producing companies. In 2012, 16.6% of the crude oil production and 17.7% of the oil processing in Russia was accounted for by LUKOIL.

Starting at the refinery in Perm on the edge of the Urals, diesel fuel and gasoline is transported through a 335 kilometer long pipeline to the tank farms in Kambarka and Andreevka. There the connection to the state and private oil transportation infrastructure is made. The pipeline with a diameter of 16" (DN 400) has a nominal pressure of 64 bar

Refinery in Perm

Source: LUKOIL



and a capacity of 400 t/h. It crosses three rivers (Tulva, Buj and Belaja) as well as areas which are very important for the water supply of the Kama-Volga region. In case of a leak, large nature reserves could be affected.

The *PSIpipeline*/LEO leak detection and location system installed in 2004/2005 was to be modernized and expanded with new functionality. The focus of the modernization included the installation of new *PSIpipeline* servers, workstations and a video wall in the control center. In addition, the system was improved with the modernization the measuring instruments.

Furthermore, the system has to generate a smaller number of false alarms as per

API 1130, but detect leaks reliably and quickly. LUKOIL places especially high demands on the detection of small leaks in terms of sensitivity, accuracy and reliability due to the more ingenious ways oil is being stolen.

As with the predecessor system, two continuously working procedures had to be employed which could determine leaks both in stationary and transient operations as well as during breaks in pumping.

The primary procedure is model compensated mass balance which is used in many pipelines and leads to robust and reliable leak detection. Pressure wave analysis is the second procedure. This provides accurate tracking results even for small leaks. The pipeline content is tracked to an accuracy of 0.2 m<sup>3</sup> and fluctuations in pressure are detected as low as 0.07 bar.

The *PSIpipeline* servers work in hot-standby mode and handle tasks such as

► Page 12

◀ Page 11

the acquisition of process data from the Honeywell control system (via OPC), online simulation of the hydraulic processes in the pipeline, leak detection and

location, load exchange collectivation, alarming and logging as well as visualization at the workstations and on the video wall in the control center. ☉

### Information

Aleksej Lisunkin  
Phone: +49 30 2801-1575  
E-mail: [alisunkin@psi.de](mailto:alisunkin@psi.de)

## Pipeline monitoring

# TÜV Certification in Accordance with SIL 1 for Leak Detection System

In 2011 PSI AG was awarded a contract by Dow Olefinverbund GmbH, a wholly owned subsidiary of Dow Chemical, to upgrade the existing PSI leak detection system that was delivered in 1997 for all the company's pipelines to the current version of the PSI *pipelines* monitoring system. The official experts at TÜV Süd, TÜV Nord and TÜV Rheinland certified PSI *pipelines* after thorough testing and issued the required permit for the commencement of permanent operation in June 2012.

a total length of more than 1200 km. In accordance with the requirements of TRFL, two continuously operating and independent methods must be employed for these pipelines to detect leaks.

The new system had to meet the necessary requirements in accordance with the Technical Guideline on Pipelines (Technische Regel für Rohrfernleitungen – TRFL) as well as the requirements for Safety Integrity Level 1 (SIL 1) as per IEC EN 61508.

materials and products to and from their production plants in the Leuna/Schkopau/Böhlen chemical triangle.

Dow currently operates a network of ten pipelines for the transport of raw mate-

Raw materials such as naphtha, condensate and liquid gas as well as products such as styrene, ethylene, propylene or butadiene are transported in the network. The pipelines have a diameter between 6" and 16" (150–400 mm) and

The hazardous classification of the transported fluids requires that the leak detection and location system correspond to the Level 1 safety requirements of IEC EN 61508. ☉

### Information

Klaus Luber  
Phone: +49 30 2801-1510  
E-mail: [kluber@psi.de](mailto:kluber@psi.de)

## First PSI Info Days for energy suppliers

# Expert Exchange on Trend Subjects of Control Technology and Energy Supply

The PSI Electrical Energy (EE) business organized the first PSI EE Info Days in the Stadthalle in Aschaffenburg for its customers from the energy business from 22 to 23 November.



Successful first PSI Info Days for energy suppliers in Aschaffenburg

Top quality international speakers, primarily from customer companies, presented on important topics of control technology and energy supply. The lectures, simultaneously translated into three languages, were supplemented by workshops on current developments.

Here, the focus was in particular on dealing with the future requirements in the framework of the energy transition by applying intelligent software solutions. In addition, the PSI EE user group, which has existed since 2003, presented its members with goals as well as topics and activities.

PSI customers and partners also took the opportunity to inform themselves in

workshops on specific topics and about the latest software developments and trends as well as to exchange experiences in a circle of international experts.

The EE Info Days were attended by all the participants with great interest and

### PSI presents at the E-world 2013

## Solutions for the Energy Sector

The PSI Group presented its comprehensive portfolio of solutions for the energy sector for the first time at its new, double so large, stand No. 326 in Hall 3 at the E-world in Essen from 5 to 7 February 2013.

The focus was, along with software solutions for trade, distribution and optimization, on systems for gas and electricity logistics and a web-based data management. In addition, new results from the Smart Watts research project were presented.

The response to the new stand was very positive and the interest of the trade fair visitors in PSI solutions extraordinarily great. ☉

the response was very positive so that a regular event is planned. ☉

#### Information

Wolfgang Dreger  
Phone: +49 6021 366-885  
E-mail: wdreger@psi.de



Successful trade fair presence with the new stand at the E-world 2013

#### Information

Elke Domeyer  
Phone: +49 511 610189-60  
E-mail: edomeyer@psi.de

### Distribution network operator

## PSI at the CIRED 2013

Following the great success in 2011 in Frankfurt, PSI Electrical Energy will be participating in the CIRED in Stockholm, Sweden from 10 to 13 June 2013.

The focus this year is on subjects dealing with the integration of renewable energies in control systems for distribution network operators and municipal utilities. Using the example of the Trafikverket control systems, the integration of facility management functions in a control system for monitoring rail electricity supply is being presented.

Functions for the calculation of three-phase grids (network calculations, open conductor fault), cross-component systems and the PSI workforce management system PSIcommand form additional highlights of the trade fair. ☉

#### Information

Wolfgang Dreger  
Phone: +49 6021 366-885  
E-mail: wdreger@psi.de

### Wind Farm Management System

## Test System for Wind Farm Management to ENEA Operator

In March 2013, PSI Poland signed an agreement with ENEA Operator Sp. z o.o. for the implementation of the test version of the Wind Farm Management System (WFMS) based on PSIcontrol.

The focus is on the testing of the WFMS by ENEA Operator with the goal of both increasing the safety of the network operations as well as guaranteeing the optimal utilisation of renewable energies. The test system is intended to optimally

support the dispatcher in overload situations that can occur from wind feeds in the wire transmission of the Reclaw station in the direction of Trzebiatów. Furthermore, on the basis of power flow calculations, bottlenecks should be detected

early on and corrective proposals determined.

ENEA Operator has lines with a total distance of more than 129,000 km and more than 35,000 network stations. ☉

#### Information

Thomas Böhmer  
Phone: +49 6021 366-331  
E-mail: tboehmer@psi.de

Energy Management Solutions

PSI awarded Prize by Frost & Sullivan

On 14 May 2013, the PSI AG was awarded the 2012 European Customer Value Enhancement Award for special services in the market for smart energy solutions by the globally-active research company, Frost & Sullivan.

The decision by the Frost & Sullivan analysts was primarily based on the numerous innovative functions of the PSI software for the intelligent management of feeding renewable energies into grids, a signifi-

cant added value for customers. Along with that, the strong market position in the German and international markets that PSI currently holds over tough international competition, was emphasized. ☉



European Customer Value Enhancement Award

Information

Bozana Matejcek  
Phone: +49 30 2801-2762  
E-mail: bmatejcek@psi.de

OOO PSI moved to new office

Solutions for Russian Energy Providers and Industrial Companies

The PSI Group has been represented with its own branch office in Russia since 2006. PSI employs a total of 50 persons at sites in Moscow and Yekaterinburg.

The operational focus in the field of energy is on software systems for the control of electrical grids and gas and oil pipelines. In addition, PSI is represented on the market in Russia with solutions for the planning and control of steel production and logistics solutions.

The gas and oil business counts Gazprom and Lukoil amongst its customers. The process control systems for the controlling of numerous pipelines are used by Gazprom. Lukoil and other Russian oil companies use the PSI leak detection system.

The PSI Electrical Energy business has supplied a total of 18 control systems for the distribution of electricity in the medium-voltage range for MRSK Holding. Beyond that, the Federal Grid Company of Unified Energy System (FGC UES/Russian: FSK EES) uses two PSI control systems for the high-voltage

network in the regions Northwest and Primorje.

In the field of logistics the warehouse management system optimizes the warehouse administration for Itella Logistics at fifteen Russian sites. In addition, the warehouse management solution is used by companies such as Auto 49, Campina, ECCO-ROS und Mistral Trading.

Amongst the well-known Russian customers in the field of production management solutions for metal production, there are Chelpipe with factories in Chelyabinsk and Pervouralsk, Stary Oskol Electrometallurgical Plant (OEMK), Severstal Cherepovets and VIZ-Stal in Yekaterinburg (NLMK Group).

In 2012 PSI was awarded other contracts from Gazprom and from the Russian electrical industry as well as from NLMK Kaluga, another subsidiary of the leading

Russian steel producer NLMK. With these orders PSI has continued to expand its market position in the important Russian market. ☉

At the end of May 2013 OOO PSI moved to its new office:

OOO PSI  
Bolschoi Savvinski Pereulok 12  
Strojenie 16 (sixt floor)  
119435 Moscow

Information

Bozana Matejcek  
Phone: +49 30 2801-2762  
E-mail: bmatejcek@psi.de

New office of OOO PSI in Moscow



## Harald Fuchs joins Group's Management Board

### Change in Management Board at PSI AG and organizational change in Electrical Energy

Effective 1 July 2013, Harald Fuchs has been named to the Management Board of the PSI AG. He will follow Armin Stein, who is resigning from the company with the end of his contract on 30 June 2013. At the same time, Dr. Harald Schimpf has extended his contract for another five years until 30 June 2018 and has been named the Chairman of the Management Board.

Harald Fuchs, as the Head of Finances and Controlling, has been active in the business unit Electrical Energy of PSI AG since 2011. Prior to that he held a number of senior commercial positions in the RWE, Continental and Alpine Energy Group within Germany, the USA and Austria. Harald Fuchs studied business

management in Germany, the United Kingdom and the USA.

Dr. Michael Wolf changed as of 1 January 2013 from the management of PSI Energy Markets GmbH into the management board of Electrical Energy and as of 1 July 2013 assumes the tasks of Harald

Fuchs. As of September 2012, Wolfgang Fischer was appointed to the business unit Director of PSI Electrical Energy at PSI AG. He



Harald Fuchs

took over the position of Frank Wortmann who took over the additional managing director at PSI Nentec GmbH. ☉

#### Information

Bozana Matejcek  
Phone: +49 30 2801-2762  
E-mail: [bmatejcek@psi.de](mailto:bmatejcek@psi.de)

## Group sales increased

### PSI 2012 with Strong Growth

The PSI Group had sales of 180.9 million Euros in financial year 2012, an increase of 7%. The EBIT increased by 21% to 12.9 million Euros. The group net result increased by 27% to 9.4 million Euros, the earnings per share increased to 0.60 euro. The new orders were, at 188 million Euros, 8% above the previous year, the order book volume at the end of the year increased to 118 million Euros.

Energy Management was primarily carried by the gas and oil business in 2012, while in the field of electrical energy the demand backlog continues as a result of the German energy transition. Due to the fact that this cannot be completely compensated by the export business, the sales in this segment decreased by just about 10% to 62.3 million Euros. The electrical energy business invested in the improvement of the product character of its solutions and developed many new unique selling points for the management of the fluctuation of renewable energies. Encumbered by these expenses,

the EBIT dropped to 3.2 million Euros. In Production Management, PSI increased sales in 2012 by 14% to 89.4 million Euros. The EBIT increased by 20% to 6.6 million Euros. The largest contribution to the EBIT came from the metals and raw materials extraction business, followed by production planning, logistics and optimization. Following upon the successful entry into the Chinese market in the previous year, the raw materials extraction business won a strategically important major contract from one of the largest Chinese coal mining companies.

With 29.2 million Euros, Infrastructure Management obtained a 32% increase in sales in 2012). The EBIT increased by 39% to 4.3 million Euros. All of the segment's business units improved their result; the strongest growth in new orders was shown by PSI Poland.

In 2012, PSI had expenditures totalling 17.9 million Euros for research and development. The new group-wide development platform increasingly allows the strengths of all the business units to be combined and at the same time to reduce costs. In the future the new platform will also be employed more so than to date in the Energy and Infrastructure business. ☉

#### Information

Karsten Pierschke  
Phone: +49 30 2801-2727  
E-mail: [kpierschke@psi.de](mailto:kpierschke@psi.de)

**PSI Aktiengesellschaft für  
Produkte und Systeme der  
Informationstechnologie**

Dircksenstraße 42–44  
10178 Berlin (Mitte)  
Germany  
Phone: +49 30 2801-0  
Fax: +49 30 2801-1000  
[info@psi.de](mailto:info@psi.de)  
[www.psi.de](http://www.psi.de)