



WHAT FLOWCHIEF DOES FOR YOU

# ***e-Gem*** web based Energy Management



ENERGY MAGAGEMENT



## What ***e-Gem*** does for you

### **Transparency for your energy usage!**

Integrated and consistent energy management is an environmental and economical factor for businesses. Efficient energy management concerns many employees within a company; therefore, consumption data and key figures must always be available location- and device-independent. e-Gem will support you with this – using 100% pure web technology, it will integrate itself into existing infrastructures and is characterized by an easy and intuitive operation.



- ***Flexible, open and manufacturer-independent – perfect integration into your system infrastructure***
- ***Powerful – highest performance in web browser***
- ***User-friendly – simple configuration and operation***
- ***Certified according to ISO 50001***
- ***Highly scalable – on-prem, virtual or via cloud***



# Scope

## INDUSTRY

Energy data management in industry and business is usually based on a heterogeneous metering infrastructure. Universal measuring devices, PLCs or data loggers serve as data sources. Often, data sources need to be connected across locations. Not only consumption data but also physical measurements such as temperatures, pressures and across data or production data from ERP, MES and control systems need to be collected. e-Gem serves as a central platform for all processes of industrial energy data management: All consumption data are archived, without gaps, and checked for plausibility. Measuring data, key figures, reports and dashboards are available to all parties involved in the energy management system throughout the company in a meaningful and clear form.

- *Simple and flexible recording of all relevant data*
- *Company-wide easy availability of data*
- *Historical mapping of structures (meters, cost centres)*
- *Supports you with the introduction and maintenance of ISO 50001*

## SMALL MEDIUM ENTERPRISES (SME)

SMEs are characterised by great know-how and a high degree of specialisation. Competitive pressure is enormous when operating globally. For this reason, the government grants financial relief for the introduction of a resource-friendly operation. Usually SMEs don't have large employee resources for an energy management and therefore a system, which is simple in configuration and operation, is required. e-Gem matches these requirements exactly and offers an automated and also a flexible manual data capture for consumption data. Investing in an energy management system is worthwhile for SMEs, since high cost savings can be achieved with small effort. The investment will recoup quickly through cost reduction.

- *Easy configuration and operation of the system*
- *Flexible analyse functionality in the form of dashboards, charts or reports*
- *Extensive solutions for manual recording of consumption data*
- *Support for business audit according to EN 16247-1*



## SERVICE PROVIDERS

Energy saving Contracting (ESC) is a business case, which can be offered together with other services to improve a long-term customer relationship. e-Gem ensures that consumption data is reliably logged and available to the customer, anytime. As a cloud-based system, e-Gem offers a cost-effective way to manage many customers on a single system.

- *Cloud-service, on-prem installation or hybrid solution*
- *Designed for multi-client capability*
- *Scheduled and shift controlled alerting system*
- *Integrated maintenance management*

## ENERGY SUPPLIERS

Energy suppliers are characterised by their extensive competence in the energy sector. In a highly competitive market, it is of great importance for energy suppliers to offer solutions for energy management. This improves customer retention and offers a contrast to competitors. In most businesses, energy management stands at an early stage. Expertise support at planning, integration and certification is gladly accepted. Suppliers, using e-Gem, can offer this service via cloud or as on-prem solution.

- *Portal solution (cloud) or on-premises installation*
- *Data import via MSCONS, LPEX or CSV*
- *Provisioning meaningful reports and dashboards*
- *Whitelabeling – user interface in corporate design of your business*

## WATER SECTOR

Sewage treatment plants and water suppliers are real energy guzzlers in the municipal sector. Energy intense procedures such as biological wastewater cleansing offer a high potential for energy saving. On the way to energy optimization a continuous recording of the entire consumption data is inevitable. e-Gem analyses and monitors all energy values and converts them to conclusive key figures. This is how the energy consumption of a water pump can be set in relation to the extracted water amount.

- *Energy management functionality integrated in the control technology*
- *Calculation of efficiency key figures (e.g. kWh/m<sup>3</sup>TW)*
- *Peak load monitoring for sewage treatment plants*
- *Accounting reports for water suppliers*

## TECHNOLOGY

# Where **e-Gem** goes ahead

100 % pure  
web technology

e-Gem stands for web-native technology, always and without compromises – this is what the user feels. Operational energy management affects a large number of roles and workstations in a company. Whether energy managers, technical departments, machine operators or controlling - web technology is the only way to supply information to various users. Gone are the days of complicated terminal server installations, client updates or incompatibilities between server and client workstations.

e-Gem is entirely designed in pure web technology and, from the very beginning, developed to be applied in the web browser. No matter if control desk, office workstation, notebook, tablet or smartphone, you connect securely and without further installation with your application on the intranet, via a private cloud or via the internet. Your e-Gem system is accessible from anywhere in the world and is not limited to pure visualization. To us, 100% web means full functionality in visualization, charts, reporting, alerting or maintenance management.



### **Platform and device independent**

*Web browsers are available everywhere*

### **Location-independent**

*On-site or via world wide web*

### **Secure and simple integration**

*into the system infrastructure (firewalls, DMZ, proxies etc.)*

### **Free choice of browser**

*Work in your familiar environment – your preferred browser. Firefox, Google, Safari, Opera or Edge.*

### **Powerful**

*High performance due to web-based technology*

### **Future-proof investment**

*Profit from the fast-developing web technologies*

### **No client installation**

*Plug-ins and browser extensions are no longer needed*





## HISTORICIZATION

The structure of a business is represented in the energy management system, exactly how it is operated. Depending on the dynamics of the business, the structures can vary in the course of time. e-Gem can illustrate these changes, by using the integrated historicization functionality including the master data. Each parameter modification receives a unique timestamp when archived. Other structure elements such as tariffs, meter points, cost centres, key figures and their mapping among each other will be archived correctly. The user will have accurate data in all time-based front ends for the appropriate validity.

- ***Historicization of all relevant structure elements and their master data***

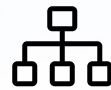
- ***Complete illustration of the life cycle for all historicized parameters***

- ***Easy modification via web interface***

- ***Synchronisation mechanisms for matching with third-party-systems***

## Connectivity

e-Gem is an open and manufacturer neutral energy management platform, which captures all relevant data, consistently. Multiple data types are collected: consumption data from the measurement infrastructure, digital states or further information such as climate data, produced amounts or number of employees. e-Gem can be adapted to your requirements and implemented for small applications with just a few metering points or high available cluster solutions with more than 10.000 metering points.



### MASTER DATA AND PARAMETERS

Corporate structures, cost centres or tariffs are displayed in e-Gem, indicating the associated master data. All parameters can be customized via the user web-front-end, if granted by user rights management. The configuration will be historicized within the system. If the structure is dynamic or the project has a wide range, it is recommended to implement synchronization mechanisms between systems such as ERP, CAFM or business databases. e-Gem provides various possibilities: From semi-automatic synchronisation of master data via Excel to matchings via OPC UA, ODBC or the connection to existing APIs of third party-systems – a large amount of solutions has been implemented already.



### AUTOMATIC DATA ACQUISITION

e-Gem disposes of a numerous amount of interfaces. PLCs, meters, SCADA systems, building control systems or data loggers serve as data sources. If the data from these sources is delivered pre-processed, e-Gem can integrate them directly. If not, the incoming raw data will be checked for plausability and pre-processed by the integrated delta-event logic. This is how fast updating data streams can be processed efficiently.



### MANUAL DATA ENTRY

The user can easily insert or extract data such as amounts, meter values, business data or measurement values. An integrated plausibility check prevents errors. Data that is rarely entered, can automatically be averaged on a random time frame. To insert meter readings while on-the-go and without a server connection, use the FlowChief scadaApp (available in Google Play and App Store). The app will synchronise all inserted values automatically as soon a connection to the server is established.







DB

ERP

EVU

electricity market

control technology

## DATA EXCHANGE WITH THIRD PARTY

### 1. Interfaces and drivers

- *OPC UA (including historical access)*
- *OPC*
- *Webservice (SOAP)*
- *ODBC*

### 2. Text based structures (e.g. CSV)

### 3. EVU Protocols

### 4. Formats

- *CSV*
- *XML*
- *HTML*
- *MSCONS*

### 5. Excel Add In



## *e-Gem* Energy management

## LINKING VARIANTS FOR DATA ACQUISITION

### 1. Interfaces

- *OPC*
- *OPC UA (incl. Historical Access)*
- *Text based structures (CSV, XML, regular terms etc.)*
- *Import methods (HTTP(S), FTPs, POP3 Mailclient (including S-MIME), Webservices (SOAP, REST etc.), locale file system)*
- *MQTT*

### 2. Various power inverters

### 3. Physical meters (MID, temperature meters etc.)

### 4. Supported Hardware

- *Universal measuring devices (Janitza, SIE-MENS PAC, Panasonic, Schneider, Jean Müller, Socomec etc.)*
- *PLC (all manufacturers)*
- *Divers Dataloggers (Lertes etc.)*

### 5. Protocols

- *M-Bus*
- *RFC 1006*
- *ODBC*
- *Modbus*
- *ECL*

### 6. Energy provider formats

- *MSCONS*
- *LPEX*



DB

CAFM

GLT

SPS

EVU

Measuring devices

Datalogger

## CONTACT US!

This is not a complete list of interfaces – your interface is missing? **Contact us!**

E-Mail: [productmanagement@flowchief.de](mailto:productmanagement@flowchief.de)

## MAPPING OF STRUCTURES

When selecting a suitable energy management software, the question is “Is the software able to map the individual structures of my business?” e-Gem provides this flexibility and can be implemented for SMEs or even large enterprises with various sites. Decide individually, if e-Gem should display consumption data from a technical view (energy flow) or for accounting (company structure and cost centres).

- **Multi-dimensional illustration of structures (company, energy distribution, location)**
- **Dynamic switching of views**
- **Display of structure elements and their master data (contacts, addresses, coordinates)**
- **Extensive filter and analyse functionalities for attributes such as company divisions, installation site, meter types, media and their master data**
- **Manual configuration of all structure elements via web interface**
- **Half or full automated synchronisation of structure elements with third-party-systems (ERP, database, CAFM)**
- **Graphical editor for creating overview illustrations (top-down-navigation), based on standardized vector graphics or map services such as Google Maps**



## STRUCTURE ELEMENTS



ORGANISATION  
NODES



METER POINTS



METERS



MEDIA



TARIFFS



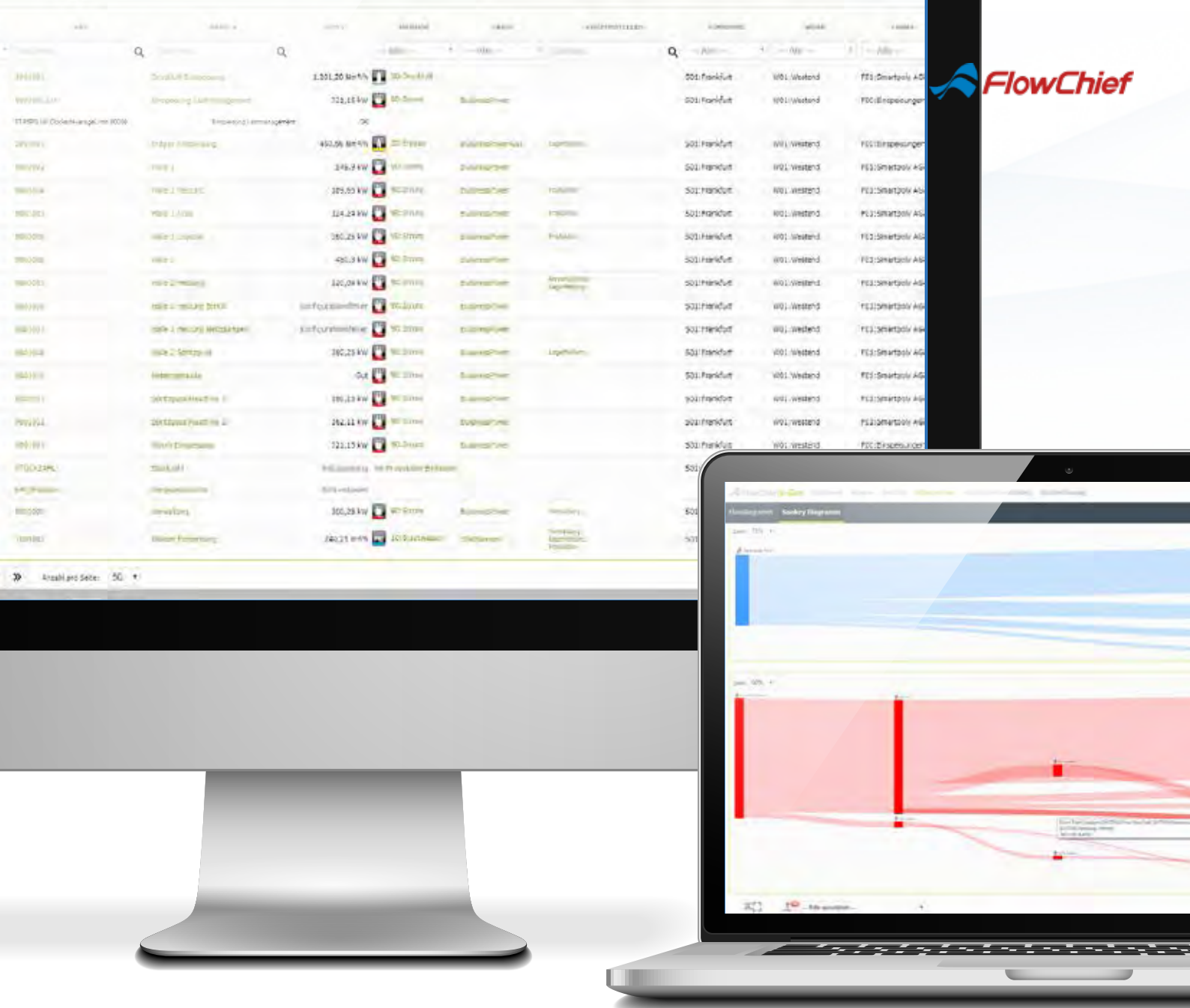
MEASUREMENTS



ENPI



COST CENTRES



## ACCOUNTING & HIERARCHIZATION

The further you dive into production processes the more complicated the power grid gets. e-Gem uses parent-child-relations to illustrate these structures. Remaining quantities for accounting points or superordinate amounts can be created from differentiating the relations and therefore build virtual meter points.

**Organisation-independent parent-child relations between numerous meter points**

**Balancing group formation and automatic profit and loss corrections**

**Gradual reduction of residual quantities of balance points**

**Flowcharts and Sankey diagrams**

**Current online status (counter state and performances value) or archive data (counter state, quantities and performances value) for an individual period**

**Accounting reports**

**Historicized illustrations of parent-child relations**



# More Highlights



## SECURITY AND LOGIN

- Web access via TLS encryption
- Active directory integration, single-sign-on and authentication via OAuth
- Password policy and 2-factor-authentication



## PERFORMANCE MONITORING AND ALERTING

- Database-supported alerting functionality – alerts via e-mail, phone, text message or push-notification (scadaApp)
- Peak load monitoring
- Message archive for detailed analysis of all events
- Monitoring and visualization



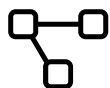
## USER INTERFACE

- Whitelabeling
- scadaApp for inserting meter values on mobile devices (even offline)



## USER MANAGEMENT

- Multi-client capability for rights- and role-management on system functionalities, organisation units, cost centres and/or media



## VIRTUAL METERING POINTS

- Calculation of all data for a time period based on calculation requirements



## SCALABILITY

- Installation on-prem, virtual or in a (private) cloud



## ENGINEERING

- No programming skills needed – simple and clear configuration



## HIGH AVAILABILITY

- Support of Windows Clusters and SQL High-Availability
- Redundancy optional available



## TRACEABILITY

- Audit functionality for configuration, login and other system events



## MAINTENANCE MANAGEMENT

- Optional integrated solution for maintenance and operational management



## PROCESS CONTROL

- Set points and commands are supported

## GRAPHICAL ANALYSIS

e-Gem has an integrated graph analysis which can be applied flexibly and is the central application of the system, helping to detect hidden savings. Intuitive handling through flexible steering elements such as mouse pointer, envelope curves, limit values or min./max. values. Various formatting features such as colour, time range, resolution, diagram types (line, bars, area etc.) are easily applicable. Once options and compilations have been made, they can not only be saved for private use but can also be shared flexibly between different users.

*Online-, archive- and time comparison mode*

*XY-scatter diagram and regression analysis*

*Consumption data, measured values or digital states*

*Simultaneous illustration of up to 100 variables*

*Creation of plotter combinations including sharing functionality*

*Auto scaling*

*CSV export*

*Virtual calculation functionality*





## REPORTING

Instantly create reports from existing master data, e.g. for a cost centre or manually via an integrated designer. Enabling the creation of classical spreadsheets and diagrams such as pie-, heatmap- or Sankey-diagram. Reports can be displayed as web reports in HTML-style, which makes them platform neutral and are visible in any web browser or device. For more complex business solutions, a Microsoft Excel base reporting is available. Energy management reports can easily be sent to responsible employees via reporting service.



- *Ad hoc standard reports (load transition analysis, cost reports, distribution etc.)*

- *Automatic dispatch of reports via e-mail, FTP-push or file storage*

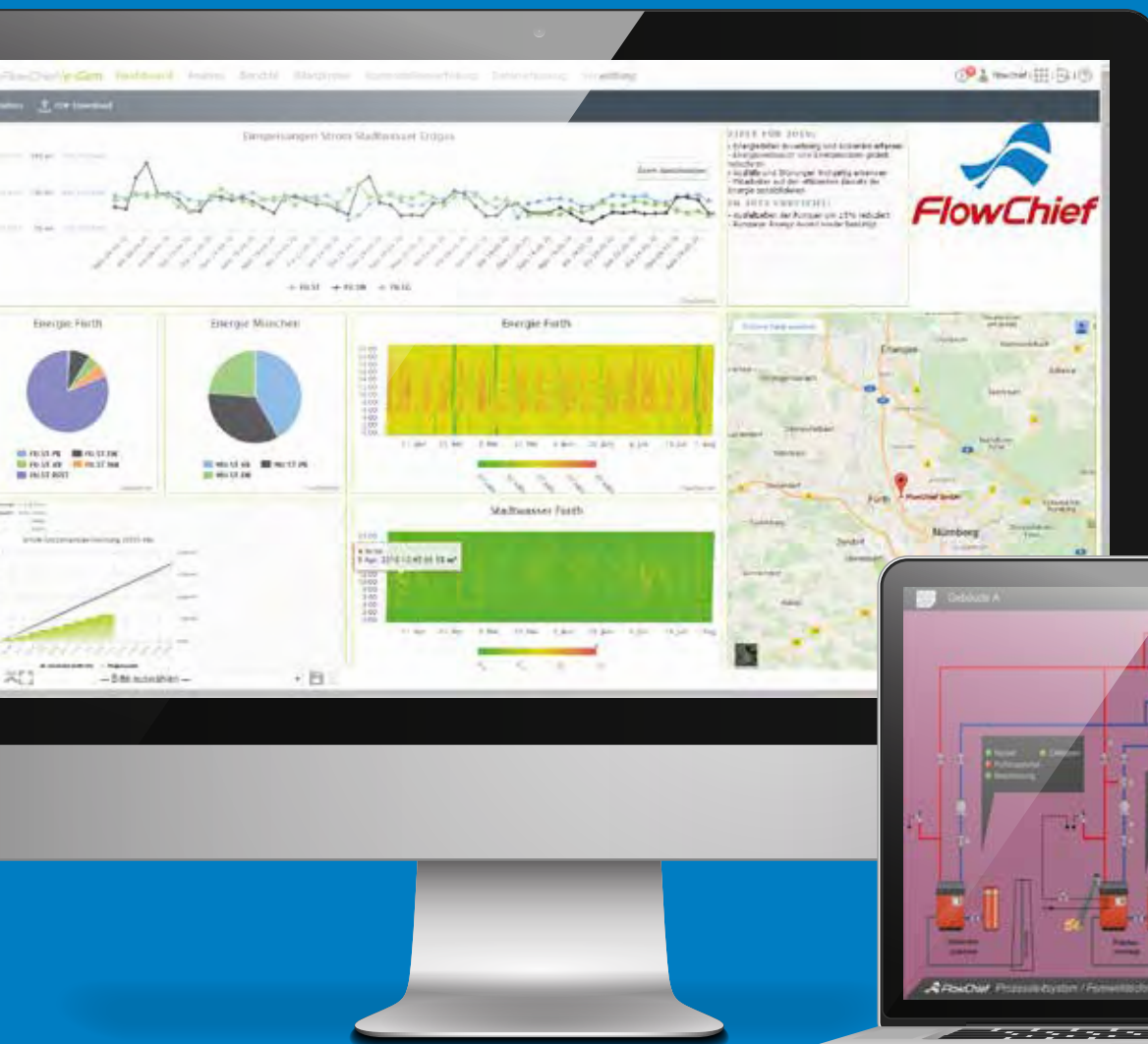
- *Spreadsheets, charts or diagrams available*

- *Excel add-in for integration into existing Excel-solutions*

- *Flexible export possibility (Excel, PDF)*

- *Powerful and flexible report-engine*

- *Free time range (daily, weekly, monthly, quarterly, yearly, individual period)*



## DASHBOARD

The dashboard will always provide you with the most important data of your business – compact, simple and organised. Easy compilation of widget elements such as performance monitoring, HTML, visualisation components or diagrams. Thanks to responsive web design the dashboard can be viewed on any kind of display – PC-monitor, tablet, smartphone. Easily create new dashboards, duplicate existing ones or simply share with colleagues.

*Intuitive and flexible dashboard designer*

*Scrollable – no limit on page size*

*Integration of charts (pie, bars, XY etc.)*

*Integration of online information (visualisation, monitoring)*

*Integration of external web resources (Webpage, video, PDF)*

*Responsive – applicable for any screen size*

*Individual and user group dashboard*

## TOOLS

e-Gem offers a great range of tools for the evaluation of archived data. Energy and media streams can be analysed online or historically via Sankey-diagram or flow charts. Heatmaps display usage patterns over a large timespan. Highchart, a powerful chart engine, enables a simple and intuitive illustration of extensive data. Also, digital events such as operating messages or limit violations can be analysed either chronologically or statistically in the message archive.

*Sankey diagram*

*Flowchart*

*Heatmap or Carpet-Plot*

*Load profile*

*Highcharts charting engine*

*Message archive*



## VISUALISATION & MONITORING

Interfaces such as OPC UA offer the possibility to capture data in real time. Current outputs, temperatures or states of aggregation make it possible to identify correlations for efficient plant operation. This data is available online for monitoring purposes. The integrated visualization illustrates the entire plant with its current operational status.

*Real-time display of data (performance, meter reading, measured values, operational status)*

*Standard templates for online display*

*Spreadsheet-based monitoring with filters based on master data*

*Performance monitoring including forecast and alerting*

*Intuitive imager software for the creation of visualisations*



# References

## WALDWASSER – EFFICIENT TREATMENT AND DISTRIBUTION

The Water supply special purpose association “Bayerischer Wald” covers an area of seven administrative districts and 8000 km<sup>2</sup>. The supply is based on two reservoirs: the fresh water reservoir Frauenau with the fresh water treatment plant Max Binder and the well field Moos, whose waterworks has been in operation since 2018. During the construction of the new building waldwasser has decided to actively incorporate the topic of energy efficiency into the mission statement of the association and has already established a certified energy management system according to DIN EN ISO 50001 in 2017.



*„Several years ago, we worked out the actual energy situation in our fresh water treatment plant Max Binder as part of an energy concept and are successively implementing measures to reduce energy consumption. In the construction of the new waterworks in Moos, the execution of an energy-efficient plant and facility, was of great importance from the very beginning. An area-wide measuring infrastructure ensures that all consumption data is collected seamlessly in our central energy management platform e-Gem. We also record water quantities and can thus monitor and historically analyse the current energy performance for each sub-process such as the extraction, purification or distribution of our water.“*

**Dipl.-Ing. Herman Gruber**  
Government architect and Plant Manager  
Water supply Bayerischer Wald



## INFRASERV HÖCHST „ENERGYXPERT“

As a site operator, Infraser serv Höchst offers its customers comprehensive energy services. The company’s own EnergyXpert® portal solution based on e-Gem is an elementary component of the portfolio.

**Current configuration:** 5,400 real meters, 7,000 virtual meters, 37,000 quality variables, approx. 80 different media and products, 70 companies, 800 different users.



*„As a site service provider, we collect large amounts of data, which we make available to a great number of customers in various services. Until 2011, we used software that required an entire terminal server farm. The regular client updates alone caused an enormous amount of work and were no longer up to date. So we were looking for a pure web solution. Another important requirement was a software platform that could easily be extended to meet our requirements. With FlowChief we found a partner with suitable software and the necessary flexibility for our complex and demanding requirements.“*

**Dirk Scheid**  
Business Partner Networks and Energy Management  
Infraser serv GmbH & Co. Höchst KG



## CROSS-SITE ENERGY DATA MANAGEMENT WITH e-Gem

SCHOTT, the technology group specialized in glass production, has been using FlowChief's ISO 50001-certified energy data management system e-Gem since 2011. e-Gem acts as the company's data hub. Energy planning, peak load optimization, billing and technical services continuously access the data and use it for their individual tasks.



*„Approximately 50 employees in the company work with the system and access the application via browser without installing any additional software. This was one of the main reasons for the decision to FlowChief process control technology. The effort became too great. Only a few employees had access to the system and were increasingly busy transmitting their consumption data to third parties. The prerequisite for a new system was therefore the non-discriminatory, continuous access via web browser. FlowChief offers all this.“*

**Dipl.-Ing Lothar Kretschmer**  
Head of Energy Management  
Schott AG



## SÜWAG ENERGIE

Süwag customers benefit from many years of experience in energy management. The services include analysis of the existing measurement technology, measurement concepts, energy audits, integration of monitoring systems and support in terms of certification according to ISO EN 50001.

Depending on the requirements and needs of its customers, Süwag offers an e-Gem-based cloud service or an on-site installation at the customer's site.

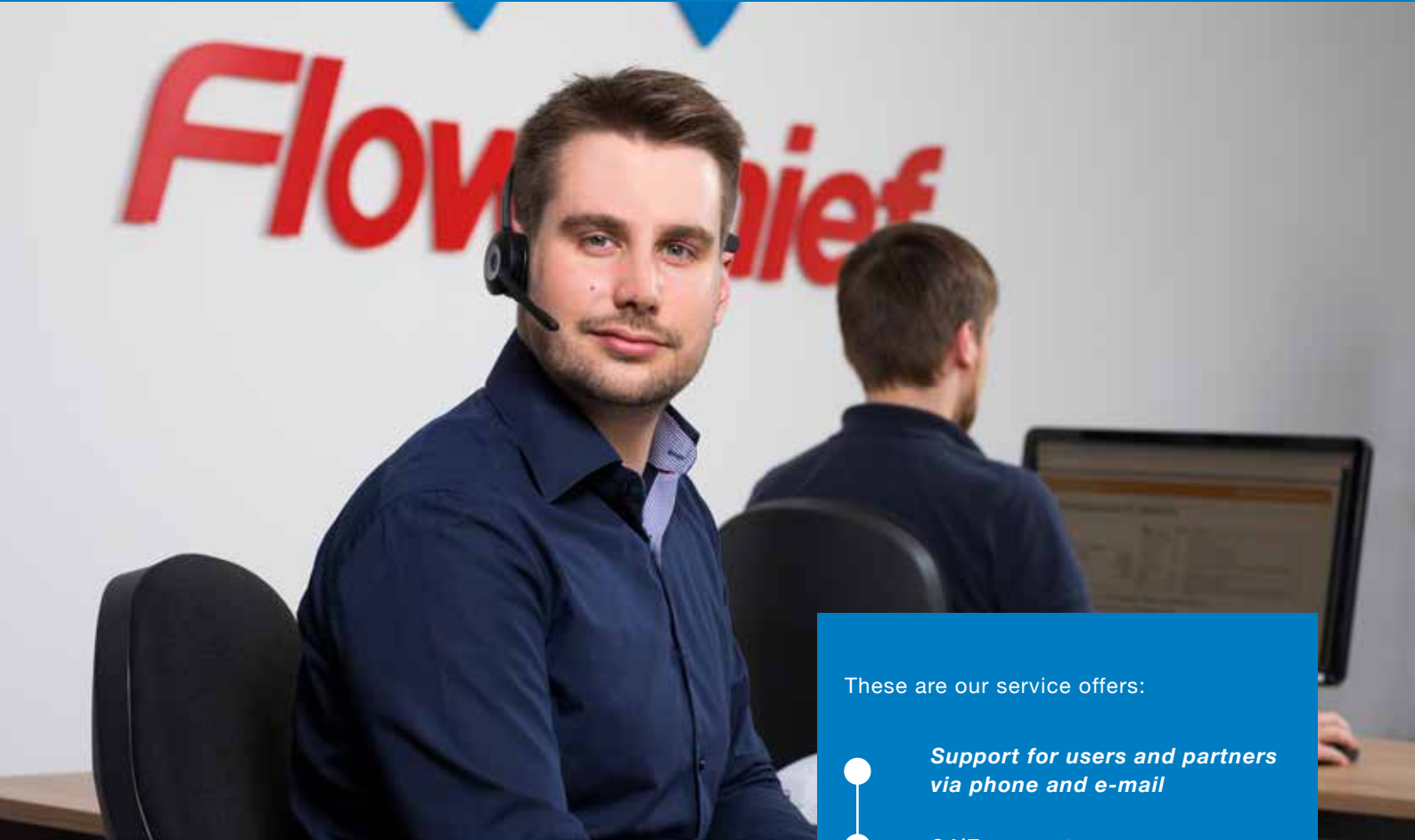


*„We have many years of experience in the field of industrial data acquisition and energy management. This enables us to offer our customers a wide range of services. We create data acquisition concepts specially tailored to the customer and his measurement technology and integrate solutions for software-supported energy management on request. With e-Gem, we use an open and manufacturer-neutral solution that can be optimally integrated into existing measurement technology. In addition, all employees involved can easily gain access to the system via web technology. We also support our customers in operation and certification according to ISO 50001.“*

**Lars Jenner**  
Solution Management B2B Energy+  
Süwag Vertrieb AG & Co. KG



## Service & Support



As a customer, you and your project are unique to us. That's what we and our system integrators experienced in over 2.000 projects.

These are our service offers:

- ***Support for users and partners via phone and e-mail***
- ***24/7 support***
- ***Coordinated training program***
- ***Assistance for engineering and consulting offices***
- ***Detailed multilingual documentation***
- ***Project consultation – from concept to review***
- ***Software update service***
- ***Software purchase or leasing***