While efficiency options for smart cities cover every possible area, from public services, transport, utilities, health care to education, for Gyor energy management criteria we established.

For Gyor to achieve these goals, the process includes primarily rethinking production processes, connecting production units to a virtual power plant control system, organizing business and household consumers into smart networks and supplying them with smart meters.

For the complex energy management requirements, monitoring and projecting AVReporter Energy Management Software was deployed and integrated with measurement points for electricity, gas, heat and water through the communication network.

In 2013 the city of Gyor in Hungary, home of KONsys and E.ON, one of the world’s largest investor-owned power and gas companies, have entered a partnership to transform the city into a smart city with the commencement of the European Youth Olympic Festival in 2017.

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BEST-IN-CLASS ENERGY MONITORING AND MANAGEMENT FEATURES

Their aims of implementing an energy management system were to improve power supply safety, optimize demand power and consumption and determine costs.

The results of the energy management system include:
- Quality problems resolved from 1-2 monthly power failures to zero internally and 1-2 annually caused by external problems.
- Demand power has been optimised with 10% electricity saving
- The gas demand forecast optimised with 15% saving
- ROI period between 6 months and 2 years
- Utilizing the measurement for certain products, production efficiency increase by 20% and reduction of production scrap

While the production doubled over the years, due to the efficiently working energy management system, the increase of the gas and electric consumption is only one and a half times more.

www.konsys-international.com
What is the Energy Management?

Energy Management - Continuous Improvement of energy efficiency

- **Monitor and measure processes**: collection of measurement data
- **Analysis by the different departments concerned**: production, maintenance, accounting, site management, etc.
- **Take actions** to continually improve energy performance...etc.

1. **Identify energy flaws**
   - Discover your hidden energy potentials

2. **Evaluate saving potentials**
   - Consider life cycle costs of your investments

3. **Realize efficiency measures**
   - Improve your machines and processes

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**AVReporter**

Energy Management and Monitoring

- Energy management system
- Calculation & Analyzing tools
- Products and solutions
Why do Successful Companies use AVReporter?

... because they want to

- **cut down consumption**- „The energy consumption has dropped by a 30% on average. This was achieved by monitoring the energy consumption of the production process (per production line) and optimizing losses and factory management." (Audi)
- **save costs**- „The overall running costs decreased by 13% by the deployment of the energy management system and green technologies, this also allowed us to cut down on human resources.” (ABB, SKANSKA – Greenhouse)
- **save time**- „Because the energy accounts and reports are generated automatically the administration costs and time reduced significantly.” (EGIS Pharmaceutical)
- **be safe**- „AVReporter energy management was a powerful aid to increase our energy efficiency, but it also contributed towards the safety of the production process.” (Gallicoop-poultry producer)
- **take it easy**- „The AVReporter application helps staff to complete their energy accounts accurately and easily. This made the integration of the system into the already existing one flawless.” (VELUX)
- **get it quickly**- „The AVReporter application contains many built-in reports and device drivers already, making the system building process a lot faster and less frustrating.” (Hexeis, System Integrator)
The aim was to design a highly competitive, complex **reporting and real-time data visualization tool** that could be **learned quickly, implemented easily** and made accessible to all users on several levels.

Special attention was given to **data source integration, creating complex expressions**, providing numerous reporting options, and easily configuring automated delivery.

The result was an easy to use, yet **powerful and flexible reporting tool**, suitable for small and enterprise applications with **scalable licensing options**.
AVReporter Energy Management Software has been designed to meet most individual needs, demands. The modular structure supports the integration of the easy to choose software components serving the end-user's specific requests.

The Entrance Package is an entry level energy management software solution at low cost. It contains the higher level software packages reporting and analysing functionalities. It is a great option for trial or pilot projects.

The right solution to cover the energy management, monitoring needs and requirements of local enterprises (factories, office buildings, stores etc.), as it contains most standard analytical and reporting functionalities.

Suitable solution for more individual corporate needs (individual reports, analytics, modelling functionalities) and practical aid for the integration of industrial communication devices.

The Intermediate edition is recommended for end-users, who also wish to connect to external data sources (BMS, ERP, Production Management System, etc.).

The Advanced Edition is an energy management solution for integrated systems and global energy management projects.

The next slide will provide an overview of the modules of AVReporter.
AVReporter v4.0 Structure

**User Interface level**
- Quick Report & Dashboard Building
  - End-users can create reports and dashboards easily, no programming skills are required.
  - BR, EMS Modules, Dynamic Dashboard

**Data Management level**
- Data Quality Manager
  - Missing data calculation, value calculation from previous value, etc.
- Virtual Value Calc.
  - Database calculation with historic data
- Rollover
  - Consistency in monitoring and calculating on-going consumption data
- Forecasting
  - Calculates forecast values, based on specific indicators, e.g. production, temperature etc.
- TOU calculator
  - Peak and Off Peak, First shift, second shift, third shift, etc.
- UD calculator
  - Calculate UFER, DCR, Power Factor Inductive and Power Factor Capacitive

**Integration level**
- Realtime Module
  - Direct communication to measurement devices (Modbus TCP or RTU), real-time measurement readings, controlling functions, virtual meter calculation
  - Realtime Device Manager
- OPC Connection Module
  - Integration of the most common industrial systems through OPC servers (SCADA systems, PROFIBUS devices, BACNET, LON bus, etc.)
  - AVR OPC Configurator
- OnBoard Data Importer
  - Reading data from the on-board memory of data concentrators, network analytics, meters, sub meters etc. (FTP, CSV import, etc.)
  - OnBoard Data Manager
- Database Integration Module
  - External ERP, EMS, BMS, Production management systems database integration (XLS, XML, OBDC connection, etc.)
  - AVR Connection Center

**AVReporter Database**
- Data Management Service
  - BR, EMS Modules, Dynamic Dashboard
  - Data Quality Manager
  - Virtual Value Calc.
  - Rollover
  - Forecasting
  - TOU calculator
  - UD calculator

**Business Intelligence**
- Supports complex calculations, analytics, feeds the decision making process. Suggests changes according to energy efficiency targets and acts.
- BI Module

**Cost Allocation and Billing**
- Manual logging of data, editing and validating.
- CAM

**Data Editing**
- Data Editor & Mobile Clients

**Alarm & Events**
- Alarm and event browsing management, alert functions
- Alarm Browser
AVReporter User interface level

- DESKTOP, WEB & MOBILE ENVIRONMENT, CLOUD SOLUTION
- QUICK REPORT BUILDING
- ADVANCED REPORTING & ANALYSING
- REALTIME VISUALISATION AND MONITORING
- ALARM AND EVENT MANAGEMENT
- MANUAL DATA ENTRY
AVReporter can be installed using a Desktop Standalone/Server-Client solution, Web based solution, and Mobile solution; this combination is used to meet the specific requirements for access to individual sites for International or Multi-site applications.

**ONE APPLICATION PLATFORM**

- Real-time view
- Alarm & Event Management
- AVReporter Energy Management and Monitoring
- Reports & Dashboards
- System Integration

User interface: Desktop, Web & Mobile Environment, Cloud Solution
User interface: Desktop, Web & Mobile Environment, Cloud Solution
Desktop solution is advised for customers where...

- there are rigid IT restrictions
- energy management system network is separated from company network
- standalone application is used
- big data handling and logging required on client side (big data handling within one report requiring intensive CPU and IO performance, only possible in desktop mode efficiently)
- Complex calculations, analytics and mathematical engineering analytic procedures need to be completed at high quality level.

Customers who prefer web-based solution

- multinational companies, where users create dashboards and reports that can be scheduled to share with other users
- multi-user and Security Access Level Management are necessary, each user with a unique login name and password that manage their access to menus and features
- where there are lot of clients and users, therefore the complete applications installation and management would be too difficult

Mobile solution is advised for customers where...

- alarming the staff at end-user level like facility/utility/energy manager is highly important at any time
- manual data entry is required where connecting communication is not available or possible
- Management needs up-to-date dashboards and information supporting the decision making process

Customers who prefer cloud solution

- governmental buildings, shopping centers, small businesses, who do not wish to maintain IT infrastructure, or where IT security is not such an issue; could be advantageous for wide-spread measurement areas, as well.
User interface: Quick report building

One of AVReporter’s unique and core strengths is the ability to satisfy the needs of an end-user, who needs a simple and quick reporting and analytical tool and also serve those, who wish for high complexity reports and in-depth analytics.
User Interface: Quick Report Building

Quick Report Building

User can create just the right view and summary of their data easily in both web and desktop environment by the wizard. Due to the simple user interface, preparing a report does not require any particular professional knowledge.

Benefits:

• AVReporter includes a host of built-in reports and dashboards, the users keep the control of their system and able to adjust the reports, dashboards etc. themselves, without the need to involve an IT specialist.
• A comprehensive Template Library is at hand minimizing the need of custom reports, additional engineering fees and installation
• Minimizing the need for additional costs, increasing the solution’s overall competitiveness
• Users do not have to have specialist IT knowledge to operate the system flawlessly, only basic office skills are required, therefore the solution will be liked by staff and often used making the implementation of EMS more favourable

It takes only few clicks by AVReporter to create following reports:

• Trend analytics (Line, Column, Area, CUSUM, Aggregation chart, etc.), Min/Max reports
• Performance and production utilization reports (example: Surface Mapping Report)
• Consumption and Rating reports (gas, power, water, heat, air, etc.) in a Column and Pie Chart
• ABC Rating reports, for accurate building classification according to their energy consumption
• Simple calculations can be made by using consumption data so that emission calculation (carbon emission) and cost allocation calculation will be possible.
• Analysis of the data by applying mathematical and statistical methods - Regression & Forecasting analysis (demand calculation)
• Histogram report, TOU chart, KPI reports, Cos Phi Chart, etc.
Unique or individual reports and complex analytics (Business Intelligence functionalities)

AVReporter provides solution for those, who need completely unique or highly individual reports: by applying mathematical and statistical curves, individual loggings, search funnel requirements and individual models.

Typical examples of unique or individual reports providing advantage:

- **Cost Allocation** by department, sub-tenant, or process.
- **Production KPIs** can be created to track and summarize energy performance by manufactured product or production unit.
- **Comprehensive Reporting Utilities** – the complete record of all utilities can be tracked and reported.
- **Energy Cost Invoicing** - complies with local authorities or accounting departments.
- **Custom formatting** (e.g. office buildings - invoicing of monthly consumption).
- **Reports for the maintenance process** (load times and utilization monitoring reports)
- **Summary reports for the corporate management**
- **Reports, dashboards needed for certifications** (FMG, energy audit, ISO50001, NABERS reports, LEED, local governmental compliance, etc.)
The **Business Intelligence module** is a complex application that permits users (management and engineers) to link multiple data sources together in order to **create complex reports, complete with advanced query and data analysis and modeling tools.**

Custom calculations can also be configured in **AVReporter using scripts** over and above the calculation methods outlined above. In this way, AVReporter offers **unlimited possibilities for processing the original data into the required KPI’s for any business.**
Real-time Visualisation and Monitoring

• one second refreshing time speed (depending on hardware environment)
• Simple template device creation possibilities
• Generate real-time screens by more schema (accordance with installation places, cost allocation places, etc.) – fast screen creation for lots of meters
• Quickly add user-friendly real-time dashboard creation (lot of graphical objects) designed screen creation – example: switchgear status and measurements for the facility manager
• Same screen real-time and historical information
• Control functions for digital and analogue values (user access level management for controls)
User interface: Alarm & Event Management

- **Desktop, Web and Mobile environment:** alarm, event management and alarm summary report creation possibilities, email sending, etc.

  - Simple filter settings possibilities
  - Customize alarm settings for user requirement
  - Alarm group creation (separate alarms for utilities)
  - Support Root Cause Analysis
  - Notification for alarm acknowledges (support maintenance activities)
  - Create alarm queries and reports
  - Export functions
  - Multi language alarm messages
  - System event log
By the aid of AVReporter it is possible to import data values into the system from desktop application, excel, smartphone. This functionality is highly useful when data needed from meters with no communication surface. Or when the input of cost, emission values is needed to further use in the reports.
AVReporter Integration level

- DIRECT COMMUNICATION TO FIELD DEVICES (MODBUS TCP OR RTU)
- CONNECT TO DATA CONCENTRATOR
- CONNECT TO OPC SERVER (SCADA, PROFIBUS, BACNET, LON, etc.)
- CONNECT TO EXTERNAL DATA SOURCE (BMS, ERP, etc.)
One of the most important strengths of AVReporter is its **ability to communicate to several systems and data sources.** This ability also offers easy integration to existing systems without requiring any change or modification making the corporate **integration process defectless.**

Within AVReporter there is a surface called **Component Store** created to make the System Integrators’ job quicker and less frustrating. The Component Store contains device drivers ready to download.
AVReporter Integration: Direct communication (Modbus TCP or RTU)

AVReporter makes reading, logging of meter data simple regardless of the measuring devices’ types (electricity, temperature, water, gas, PLCs, etc.).
AVReporter Integration: Connect to data concentrator

AVReporter enables users to get data from the inner memory of data concentrators. This could be beneficial when the distance between the server and the devices is faraway (e.g.: integration of the devices of a shopping center into one system), when the data’s flow requiring it or when the connection is not steady in avoidance of the data loss.

AVReporter Web Client

AVReporter Desktop Client

Managers

Engineers

Upload logged data from on-board memory (example: FTP connection)
AVReporter Integration: Connect to OPC server

AVReporter supports OPC connection so the integration of industrial systems is smooth: SCADA, BMS, field devices via PROFIBUS, BACnet, LON protocol.
The AVReporter application’s AVR Connection Center module ensures the easy connection to external data sources, allowing users to get data from for example SAP systems (produced items, cost allocation data, sub-metering, sub-billing etc.). In the case of integrating external systems into one, all data can be accessed via the surface of AVReporter (consumption data, energy consumption of production per product, cost information etc.). Connecting them all into AVR and visualise all data on its surface takes out the need to switch between systems each time, reducing administration procedures and possible confusion excel sourcing, aiding the comfort of the user, as well.
AVReporter Integration: Connect to external data sources

Main features:

- The **AVR Connection Center** is a powerful database linking and management tool.
- It is used to configure links across a **broad range of data sources** and allows the user to completely manage what, how, and how often source data is collected.
- Incoming data can be filtered, rolled-up, or pre-calculated before it is stored in the AVR database.
- **Complex efficiency calculations**, data modeling, virtual points, and data quality are all possible using the AVR Connection Center.
- It can connect to weather service sites, data coming from these sites can be used for **forecasting**.

- **Imports data** from MS SQL Server, Oracle, MySQL, XML data sources, WEB services, Mail Servers, Excel files, CSV files, FTP data sources, etc.
- **Exports data** to MS SQL Server, Oracle, MySQL, XML data sources, WEB services, Mail servers, Excel files, CSV files, FTP data sources, etc.
- **Supports complex calculations** on the source data (SQL commands, VB.NET functions, etc.)
- Allows custom functions using **Visual Basic .NET scripts and SQL queries**
- Can **pre-process source data and store the results in the AVReporter database**
AVReporter Data Management level

- DATA QUALITY MANAGEMENT
- TIME OF USE CALCULATION
- UFER AND DCR CALCULATION
- FORECASTING CALCULATION
- VIRTUAL VALUE CALCULATION
- ROLLOVER CONFIGURATOR
Running search, filtering, modifications and calculations on the data within the AVReporter database (logged, imported from external database etc.) is possible. AVR Data Management Service module is looking after this process, typically for the following:

- Data filtering, swapping and validating based on set criteria(s).
- Creating virtual values based on historic data (creating virtual meters, CO2 emission calculations, cost calculations etc.).
- On-peak and off-peak or shift based consumption calculations.
- Forecasted consumption data calculations based on data rows of the past (e.g. forecasted consumption data calculations taking the production line’s past consumption and production quantities, and the forecasted production values).
AVReporter Data Management: Forecasting calculation

The following picture explains the Forecasting module’s simplified operational process. In this example The Forecasting module works based on the basis time period’s production and consumption data, also taking the future production plan into account calculating the expected consumption.

Past production data and its consumption data

Query with based interval

AVReporter Database

Regression engine (Linear or Polynomial Regression)

Query with future independent variable

AVReporter Database

Forecasting calculation for future interval

Insert forecasting data Into database

AVReporter Database

Expected Consumption

The expected production data based on the production plan
AVReporter Energy Management Solution

- AVREPORTER INTEGRATION INTO EXISTING CORPORATE ENVIRONMENT
- AVREPORTER LOCALIZATION
- BUILD UP YOUR AVREPORTER ENERGY MANAGEMENT SOFTWARE
- TECHNICAL SUPPORT
- SUMMARY OF BENEFITS OF AVREPORTER
- PARTNERS, REFERENCES
AVReporter’s integration into existing corporate environment

The AVReporter application maintains a complex user-management system, it provides two ways for the integration into existing corporate environment:

- **The AVReporter (IIS) user-management**, when the user’s identification will be obtained for entry with username and password.
- **Integration into the user’s Active Directory**, in this case the AVReporter will recognise the user on entry based on the Windows Authentication and according to this the set user rights will be given.
AVReporter’s multilingual support together with its multi currency ability allows AVReporter to be deployed as a single central global energy management solution while supporting local language and currency at each site. This is ideal for deploying an AVReporter solution in a phased or fiscal scenario, as well as, accommodating multi-cultural teams working with the same data.
AVReporter localization

- **On the fly multi-language and multi-currency options** enable AVReporter to be used in multinational environments. Customization possibilities: language, currency, date format, custom reports and dashboards, corporate formatting standards.
- **Managing different currency and time-zones**
- **AVReporter comes with 14 languages today, and can easily have new languages added**
AVReporter software provides a **scalable solution** that can be applied to small, medium and even global applications. Your first installation of AVReporter at one site can **easily be expanded without loss of time or expense**. The system can then be expanded according to your schedule and budget.

AVReporter has modules designed for specific users, such as energy managers, that greatly facilitate their **reporting and data analysis** needs. Additional modules are planned and can easily be added as required without any modifications to your existing installation.
AVReporter has an Online powerful multilingual Knowledgebase (Component Store, troubleshooting, technical documentations, flash trainings and videos, examples, etc.) and an attentive Tech Support Team.
Because of the modular structure the system integrator can pick and choose the correct and most cost effective solutions.

AVReporter provides a hardware independent solution allowing any make’s, brand’s component to connect within the system (ABB, Schneider Electric, Siemens, Janitza, Carlo Gavazzi, Entes etc.)

There is no need for specific software environment, the installation is quick and simple.

System building is fast due to the template real-time screens, dashboards and reports, no need for special IT/ programming knowledge.

The control can be kept with the end-user as the system is completely open and can be operated by staff easily; the openness allows system integrator to fulfil individual requirements.

The user surface is designed to be highly user-friendly aiding the learning process of the end-user, making sure the application is used regularly and willingly.

It is easy to integrate into existing corporate system(s) because of the flexible connectivity, also supporting a one surface display to make processes transparent and more convenient to follow.

One application to access information on desktop, web and mobile environment.

AVReporter is ready to handle big data and its display.

The System Integrators can complete modifications in their own office once the system is up and running, because of the backup/restore functionality, then they can update the system on site.

The system building can be team work, more PCs can work on the same project at the same time saving time, ensuring reaching tight deadlines or just simply utilise workforce better.

The editing functionalities can be accessed web and desktop environment, too.

If control function is required on the real-time screen, it will be accessible over web and mobile surface, as well.

The system supports the simulating work mode by this, system building and testing without devices is possible.

Strong and attentive technical support is available with every AVReporter purchase (courses, on-line courses, documentation, comprehensive technical forum).
Partners, References

[Logos of various companies]
Thank You!

QUESTIONS?