

EFFICIENT MANUFACTURING

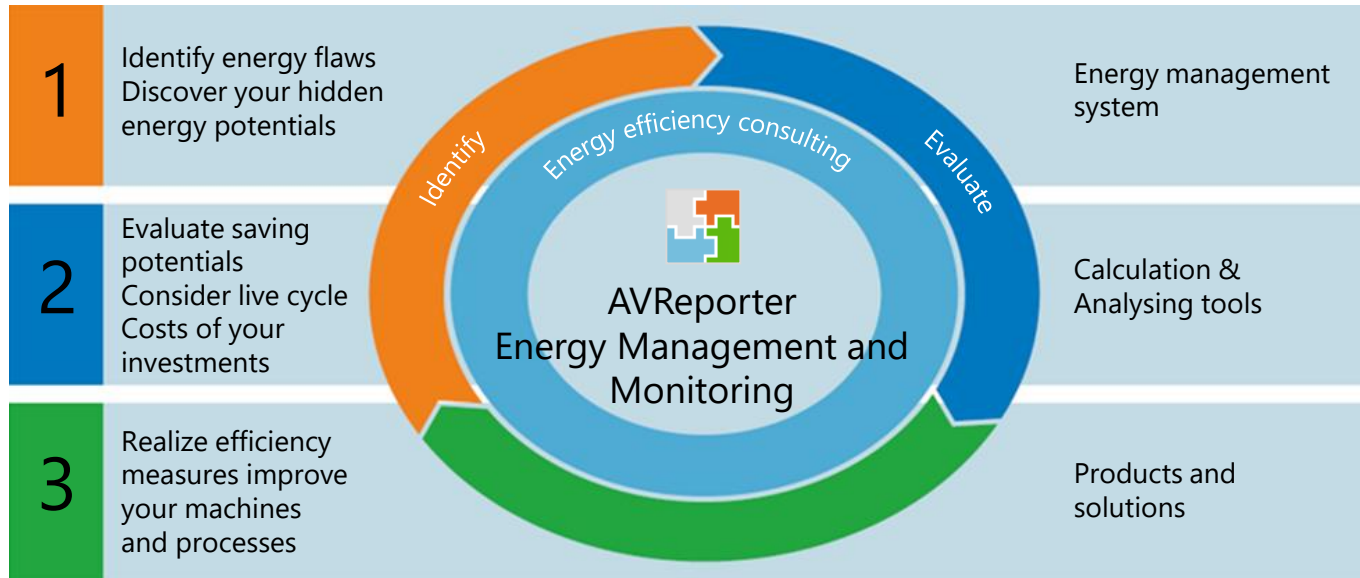


AVReporter
easy to use, easy to apply

Steps to implement an Energy Management System

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.



Device Twins store state information about IoT devices (parameters, set point values, properties, etc.).



Machine learning



IoT Device Twin



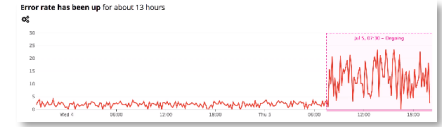
AVReporter IoT



UI & Reporting Tools



Anomaly Detection - Immediately identify when a system or process is experiencing an exception condition



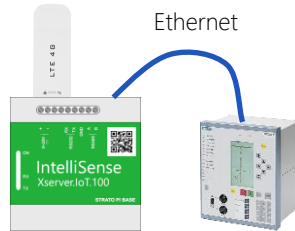
IoT Explorer

Easy and fast real-time cloud monitoring and diagnostics

Engineering reporting and analysis

3G 4G

Ethernet



RS485



PLCs, Meters, Protection relays

3G 4G



RS485

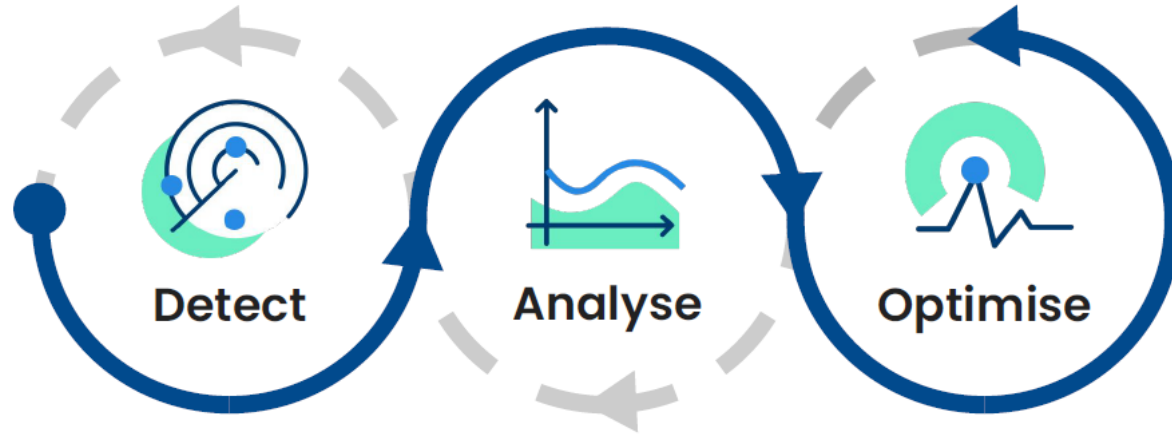


Meters, Storages

The energy intelligence journey with AVReporter

Analyse consumption and
evaluate **savings** with
real-time energy data

Increase your
energy efficiency
performance



Detect

Analyse

Optimise

Detect your energy efficiency
potential and get
recommendations

24/7 **automated**
& proactive AI based
energy management

Energy efficiency
awareness

Established in 2003 SEWS's Hungarian factory is manufacturing and selling wiring harness components. It is part of the Sumitomo Electric Wiring Systems – Europe (SEWS-E), one of the world-wide leading companies in its field.

Questions and aims

How much energy per item do we consume???

Compare production lines and shifts???

Separation of the building's and production's energy consumption???

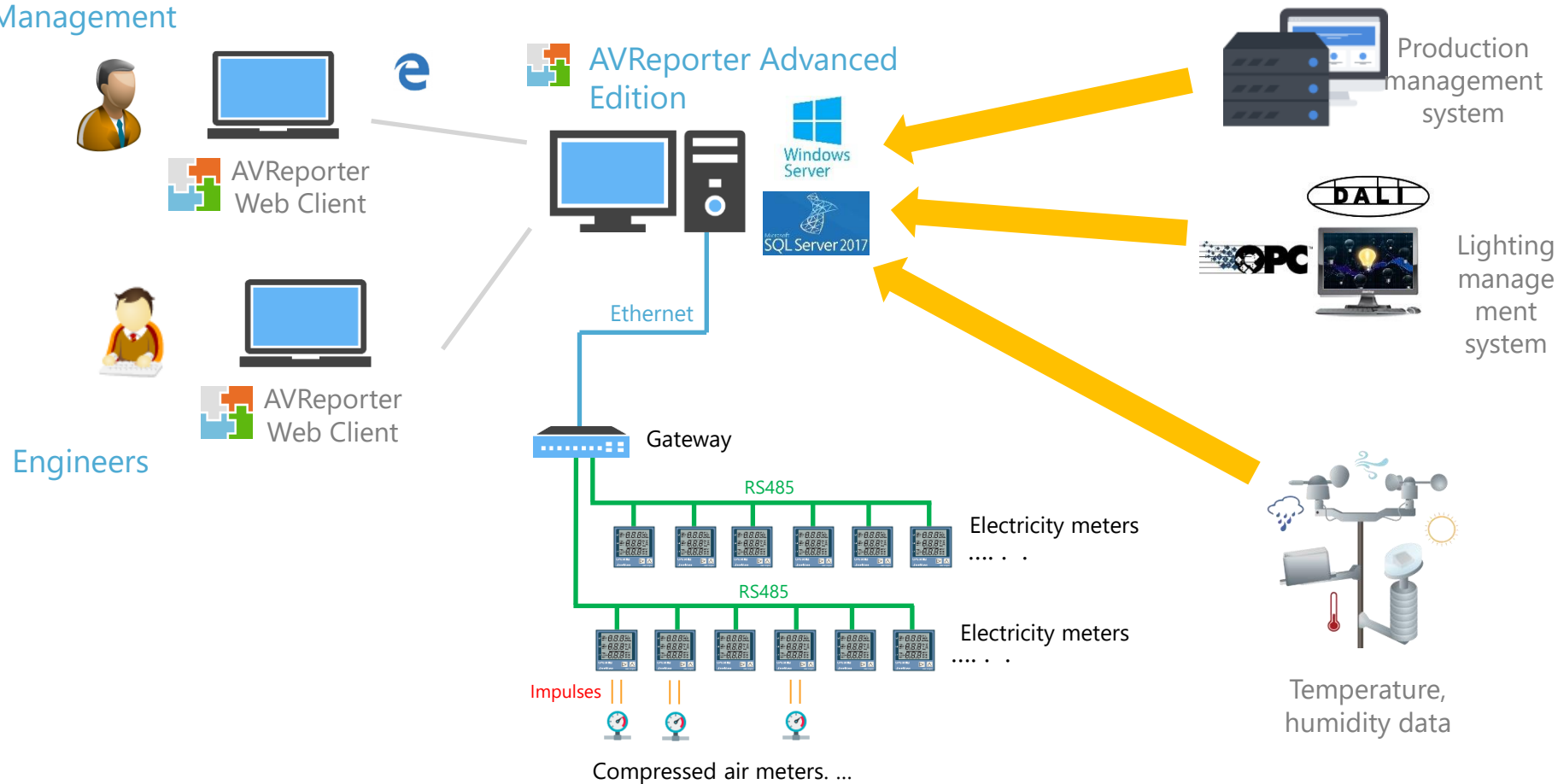
Increasing energy efficiency???

Cost per unit???



The topology of the Sews energy and information management system

Management

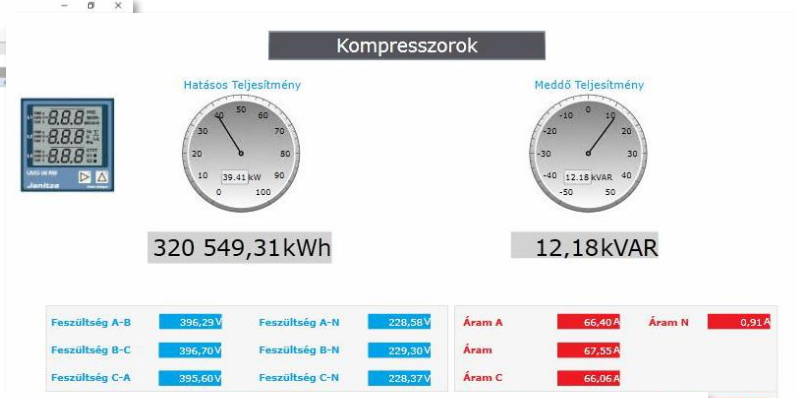
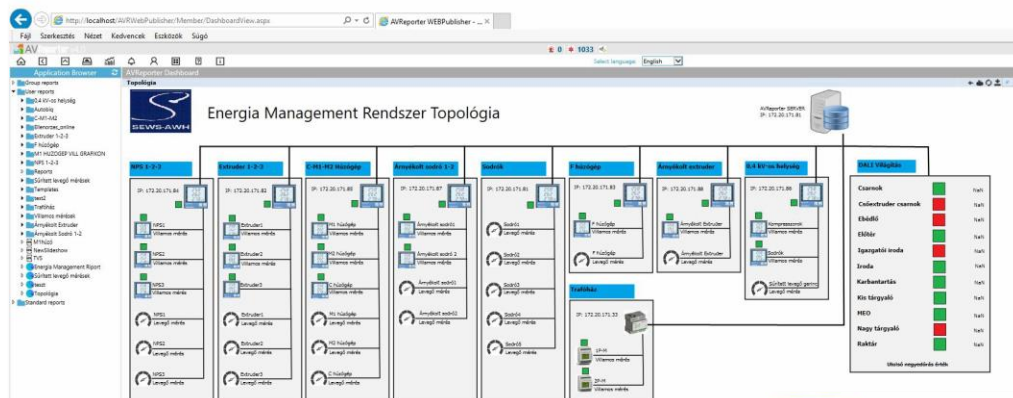




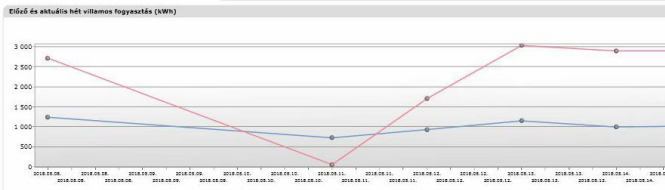
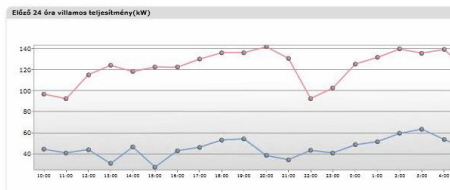
The client's expectations

- Instead of many separate systems to have **one surface for all data** handling and analytics (integrating systems- ERP, SCADA, production management etc)
- **Easy to handle, user-friendly environment (multilingual support)**
- Open system, so the **end-user can own the system** (currently local energy managers and facility managers creating the new reports, analytics themselves)
- **Seamless reports specifically for the management** (automatically times report creating and sending)
- Cost share, internal costs and **energy allocation per** item/facility/building
- **Reports to support maintenance process** (shift times, occupancy management reports etc)
- **Analytics to support certificate requirements** and compatibility assurance documentation (energy audits, ISO 50001 Industry 4.0, etc.)

Sews energy and information management system



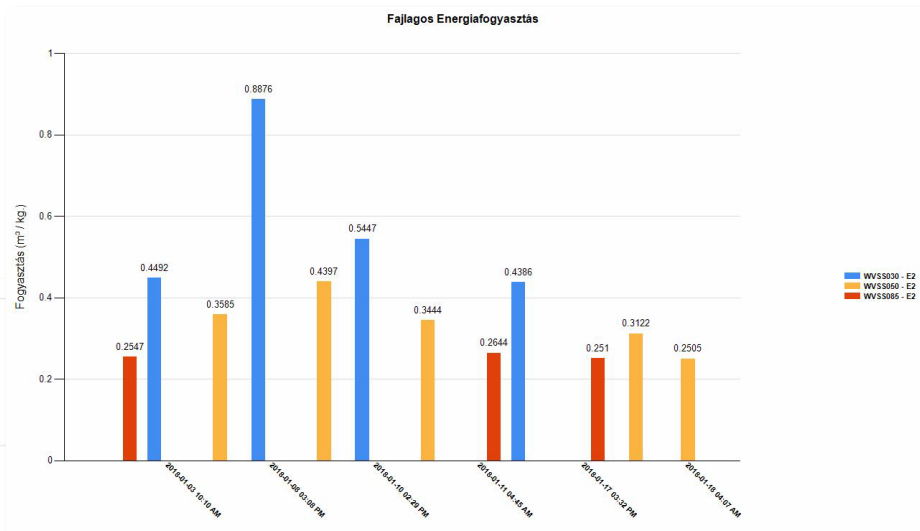
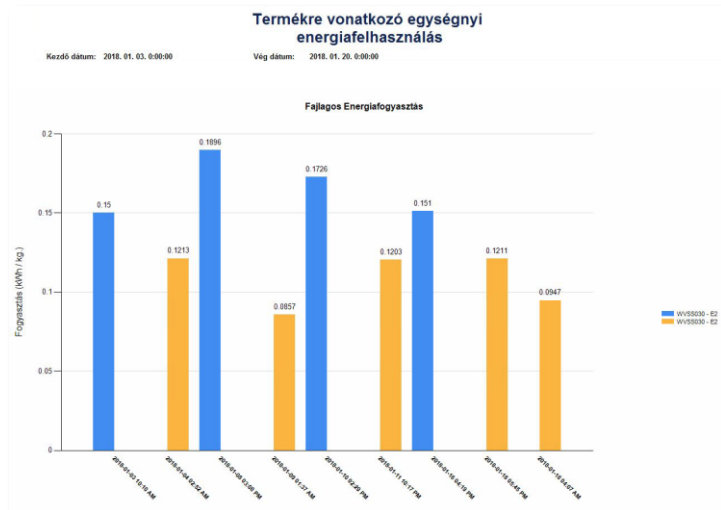
Villamos mérések 0.4 kV-os helység



Sűrített levegő C - F húzóág



Sews energy and information management system



GYÁRTÓSOR NEVE	TERMÉK NEVE	GYÁRTOTT MENNYISÉG	MÉRTEKEGYSÉG	KEZDŐ DÁTUM	VÉG DÁTUM	GYÁRTÁS IDŐ (perc)	FOGYASZTÁS TÍPUS	FOGYASZTÁS (m³)	FAJLAGOS FOGYASZTÁS (m³/kg)	FAJLAGOS FOGYASZTÁS (m³/norma)
E2	DRYA1035	4103	Kg	2018-02-05 12:10 PM	2018-02-06 11:43 AM	1351	SURL_EXT	834,50	0,2034	203,3878
E1	DRYA1035	33	Kg	2018-02-06 07:35 AM	2018-02-06 09:55 AM	10	SURL_EXT	36,00	1,0909	1090,9091
E2	DRYA1035	3922	Kg	2018-02-10 10:08 AM	2018-02-11 08:54 AM	1290	SURL_EXT	879,30	0,2242	224,1968
E1	DRYA1035	5009	Kg	2018-02-16 09:12 PM	2018-02-18 02:28 AM	1632	SURL_EXT	646,20	0,129	129,0078
E1	DRYA1035	5925	Kg	2018-02-25 08:12 PM	2018-02-27 07:12 AM	1931	SURL_EXT	899,10	0,1517	151,7468
E2	DRYA1035	1131	Kg	2018-02-28 10:44 AM	2018-02-28 10:49 PM	590	SURL_EXT	335,70	0,2968	296,817

Apollo factory: Brief introduction



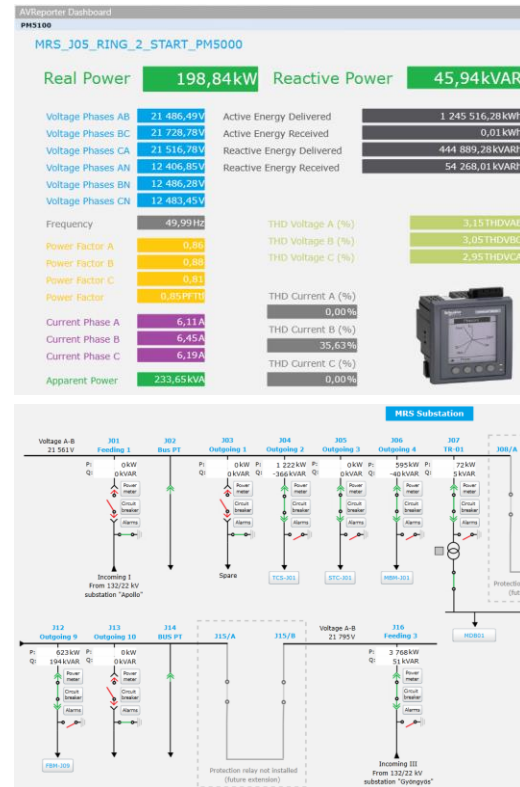
- Apollo Tyres Ltd. headquarters located in Gurgaon, India. The company produces two kinds of branded products - Apollo and Vredestein, and its products are available in over 100 countries.
- The **main purpose of implementing the Energy Management System** was to provide a powerful management tool that becomes the decision making faster, easier and **Apollo will be able to determine the price of one unit of product**. Using the AVReporter software it also might be helpful to prevent loss of production, loss of time and consequently saving of money.



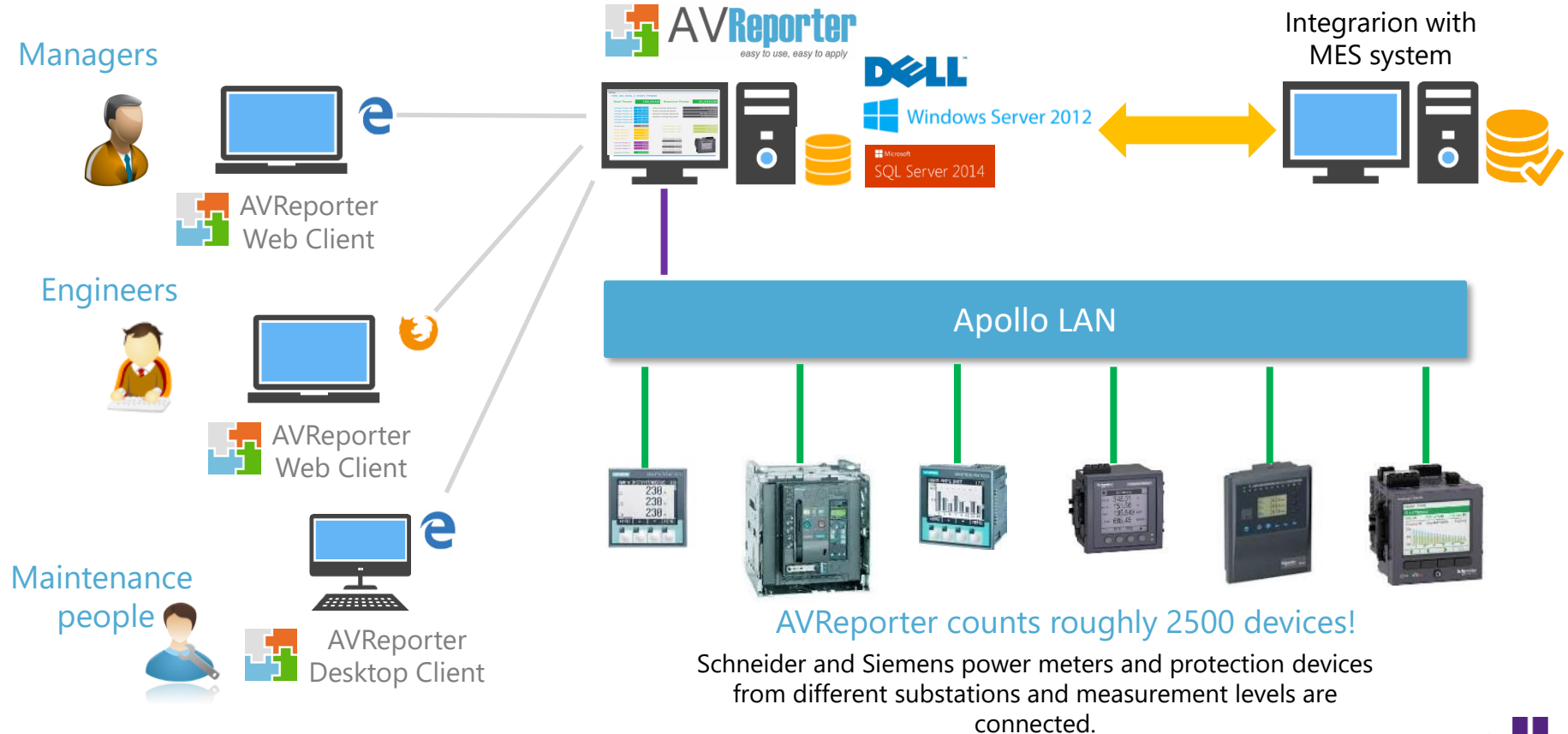


Energy management Software main requirements:

- **Collect data from protection devices and electrical power meters**
- **Connection to MES (manufacturing execution system) systems**
- Real-time Monitoring of consumption and subscribed-power optimization
- **Event and alarm management – e-mail sending**
- Reduce peak demand and power factor penalties
- Monitor and calculate applied energy performance
- **Quick report building web and desktop environments**
- Information can be accessed by web browser interface
- **Multi-User and Security Access Level Management**
- **Analysis of the data by applying Machine Learning**
- Support customization for Apollo style (colors, fonts, logo, report formats, etc.).
- Information to be stored in one location and shared across the organization



Apollo AVReporter Energy Management architecture

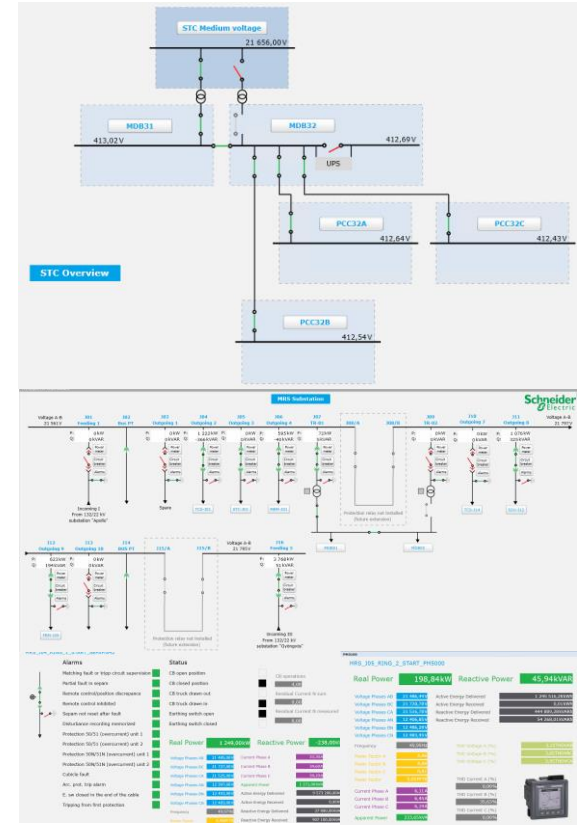


Apollo project: Real-time Visualisation and Monitoring



Real-time Visualisation and Monitoring - requirements

- **One second refreshing time speed** - fast operation is required)
- **Simple template device creation possibilities** - easy tracking of changes by user
- **Generate real-time screens by more schema** - fast screen creation for lots of meters
- **Quickly add user-friendly real-time dashboard creation** - single line diagram creations
- **Same screen real-time and historical information**
- **Easy navigation by menu buttons for each stations** – quick access to information
- **Disturbance readings from Power meters** – to ensure network quality analysis
- **Alarm, event management** - support maintenance activities (SMS message sending)

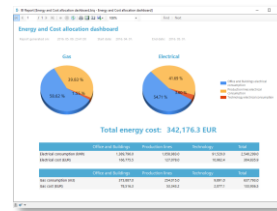
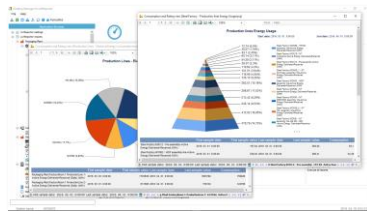
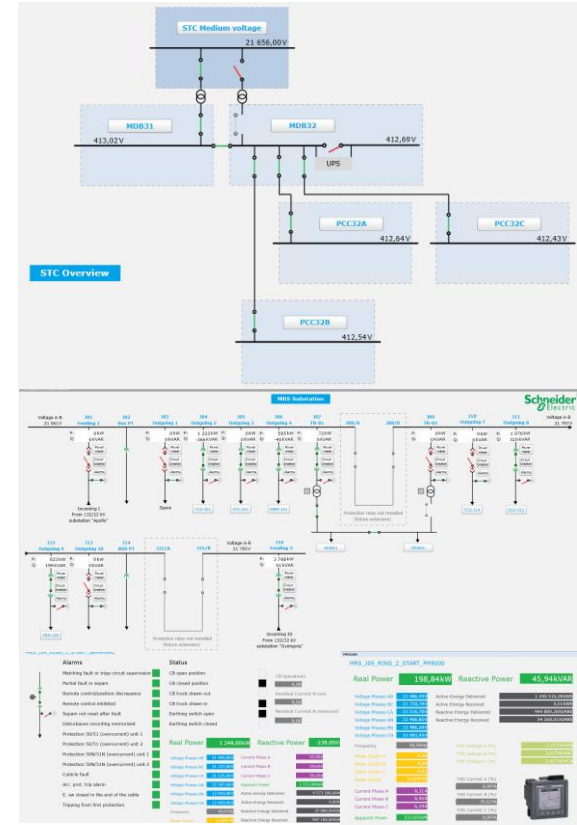


Apollo project: Real-time Visualisation and Monitoring



Real-time Visualisation and Monitoring – integrated devices

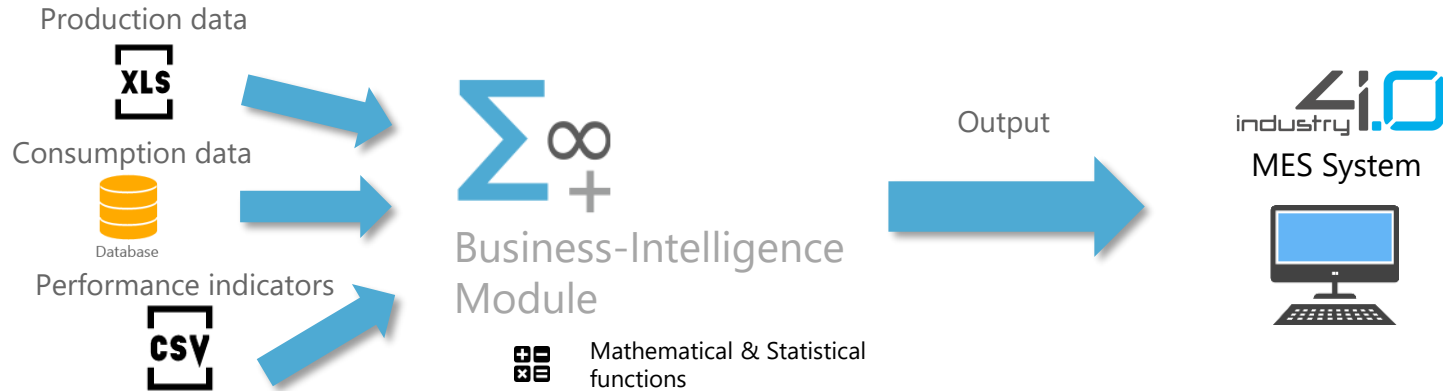
- Basically, there are 9 monitored substations in the plant, which can be divided into medium and low voltage substations.
- There are approximately 2500 devices
- In medium voltage system, there are Schneider Sepam protection devices and PM5000 power meter devices and they must be read via EGX gateway.
- In low voltage system, there are Siemens 3WL, 3VA protection devices and PAC4200, PAC3100 meter devices and they must be read via PAC4200 gateway.



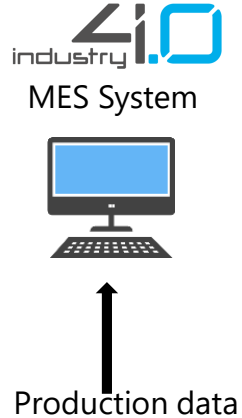


Requirements

- **Determine the cost per current produced product (Price per unit)**
- **Determine the exact cost per total product**
- **Determine the cost of product per shift**
- **Easy cost places creation by user**
- **To Support complex calculations**

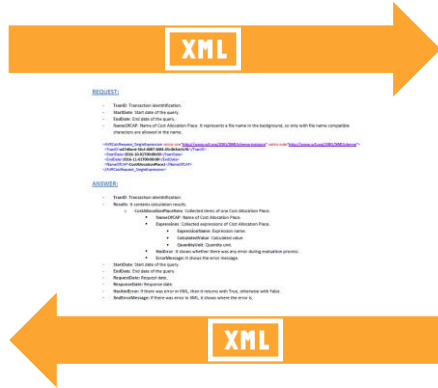


Apollo project: connection to the MES system



Request:

- Transaction ID
- Name of Cost allocation place
- Start date
- End date



Answer:

- Transaction ID
- Name of Cost allocation place
- Consumption



AVReporter



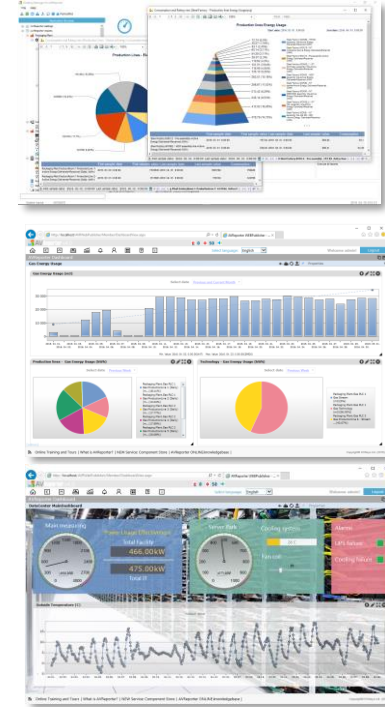
WCF Service

AVReporter
database



Business-Intelligence
Module

Calculate Cost allocation place
consumption (example: Production Line
1 = Meter1 + Meter2 - Meter4)





Velux questions and targets:

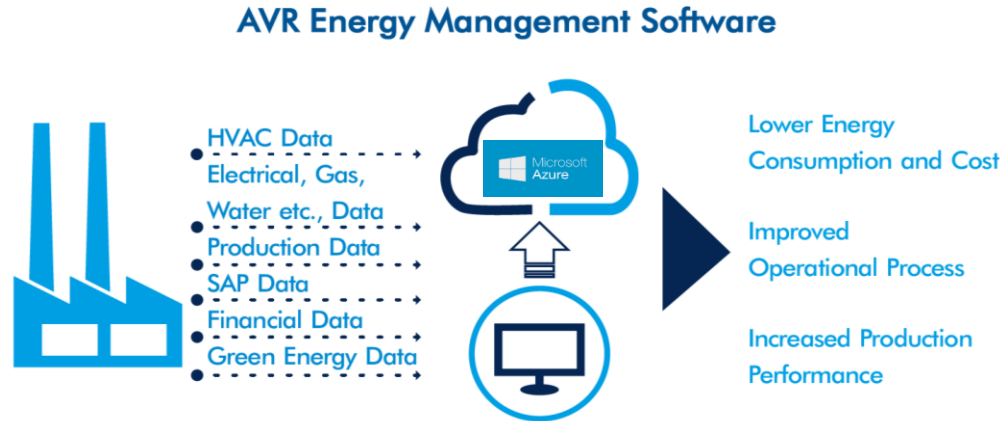
How improve efficiency ??? Compare production lines & Factories ???

Energy use/Product ??? Energy Cost/Product ???

How decrease energy cost ???

Solution:

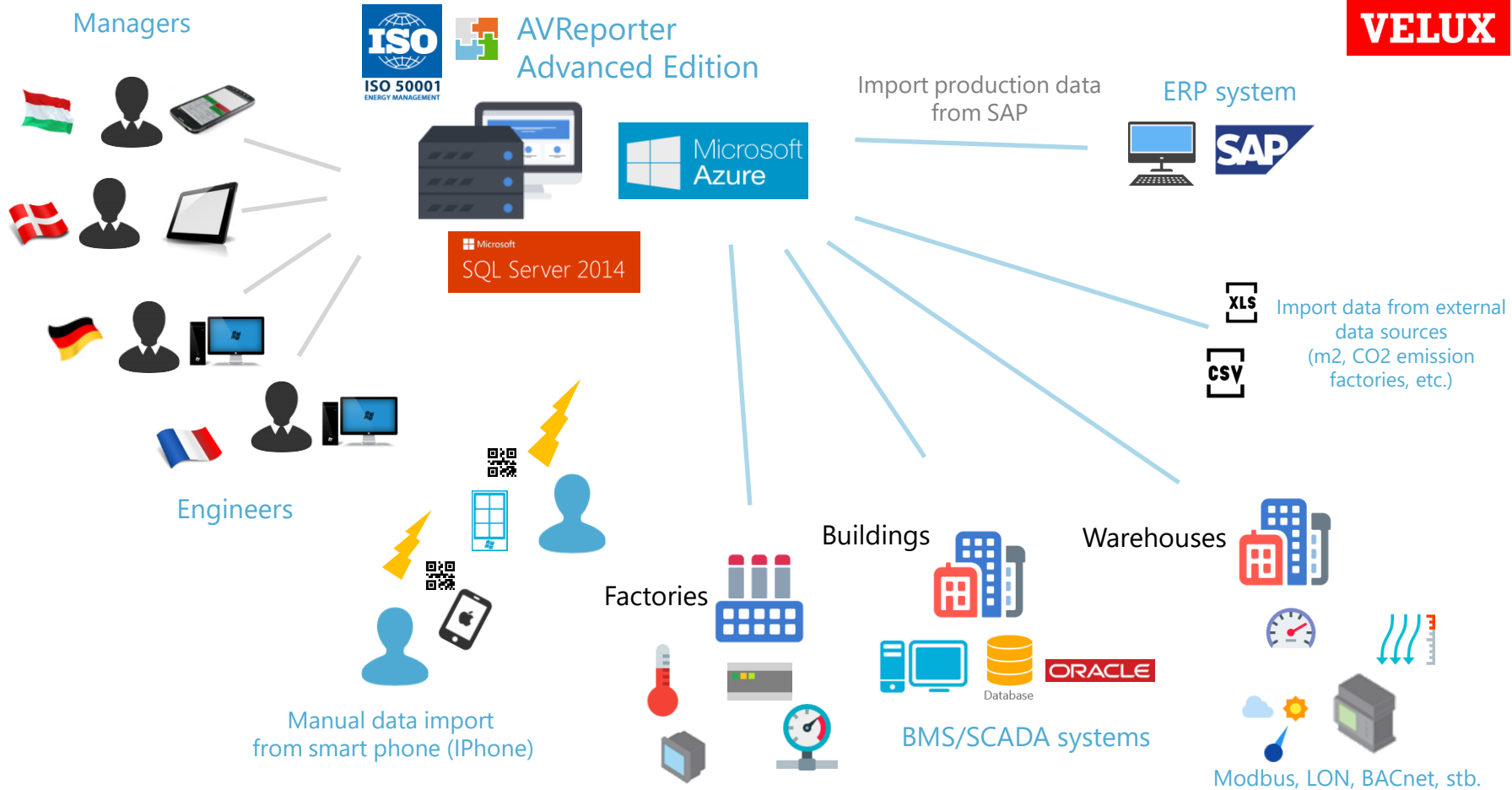
- Monitor and measure processes
- Identify energy flaws
Discover your hidden energy potentials
- Analysis by the different departments concerned:
production, maintenance, accounting, site management, etc.

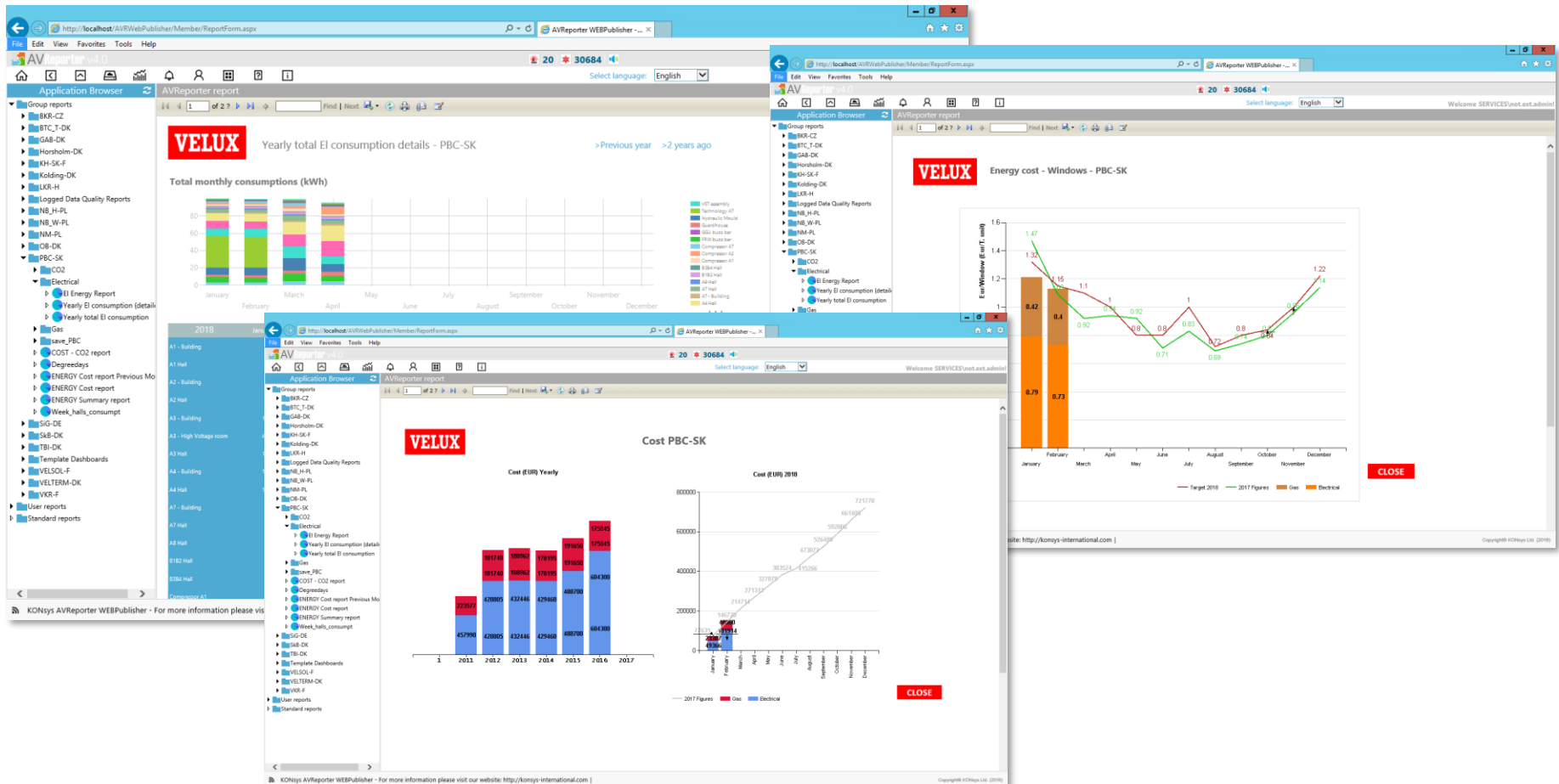


Velux Energy Management topology



VELUX





**Thank you for
your attention.
Any questions?**

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