SIEMENS

SIMATIC

B.Data V6.0 - System description

System Manual

07/2015

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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠ WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Introduction SIMATIC B.Data

Requirements for energy data management software

Introduction

Energy efficiency is playing an increasingly important role in industry. Rising energy prices, increasing pressure to improve profitability and the growing awareness for climate protection are important factors giving need to the introduction of an energy management system.

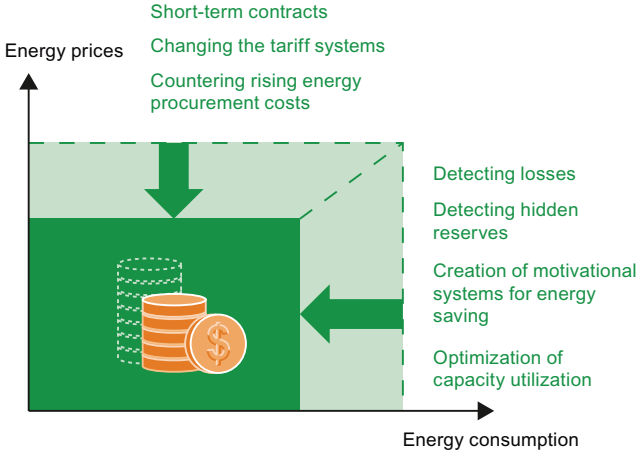
Reasons for the implementation of an energy management system

Lack of transparency in infrastructure processes, changing cost centers and heterogeneous system environments make an energy management system with a comprehensive range of interfaces necessary.

Energy reporting is time consuming. In many cases, there is no automatic recording of measurement data and supply contracts cannot be optimally negotiated because of the lack of transparency.

Reducing costs and creating transparency

SIMATIC B.Data can meet the current requirements for an energy data management system. The system has a positive influence on consumer behavior, opens up new procurement options and thereby helps to save costs. With its automatic energy data acquisition and processing as well as its diverse analytical and prediction capabilities SIMATIC B.Data is the ideal tool for energy data management for now and the future.



SIMATIC B.Data system description

In this SIMATIC B.Data system description, you will become acquainted with the energy data management software SIMATIC B.Data:

- Area of application: Where is SIMATIC B.Data used?
- Concept: How is SIMATIC B.Data structured?
- How does SIMATIC B.Data support energy data management?
- Engineering: How are energy data management tasks implemented?
- B.Data Web: Which range of functions does the browser-based user interface offer?

Key features

SIMATIC B.Data offers an integrated system solution starting with acquisition of energy data and continuing with monitoring and finally automated reporting:

- Monitoring: Monitoring of the current energy situation.
- Controlling: High flexibility in determining performance indicators through the inclusion of consumption and production data. Summary of data in automatically created reports including automatic e-mail delivery.
- Accounting with cost center distribution: User-based accounting of energy and material flows and allocation to cost centers.
- Planning and Prediction: Optimum budget planning and procurement optimization through accurate prediction of energy requirements. Figures recorded can be used as a controlling mechanism.
- Energy efficiency project management: Definition and tracking of energy efficiency measures according to ISO 50001.

Range of service

SIMATIC B.Data provides the basis for an economic energy management system that reduces energy costs, increases energy efficiency and creates the following direct advantages:

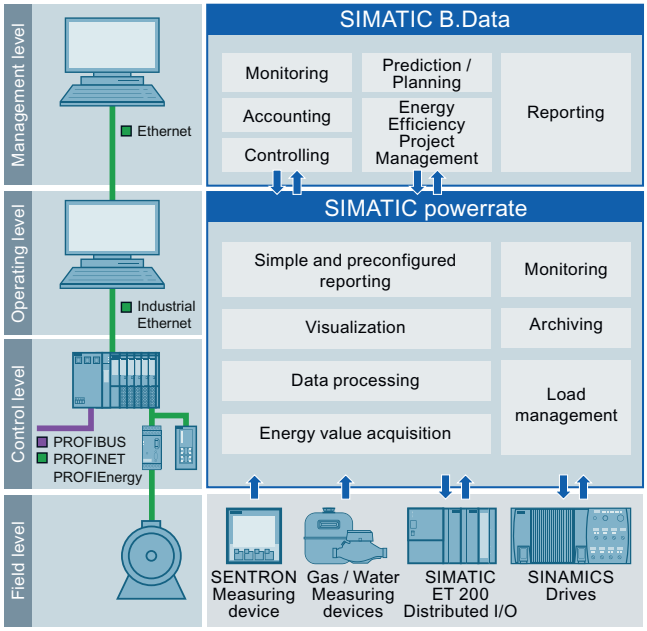
- Provides corporate-wide transparency through complete energy and material balancing of power generation and energy consumption systems.
- Enables usage-based energy cost allocation and facilitates transition to the accounting system e.g., SAP R/3.
- Provides parameters for solid information the increase in efficiency of energy production and energy distribution systems.
- Provides planning reliability through production-related load and demand predictions.
- Supports the energy procurement process.
- Meets the legal requirements for the monitoring and reporting of greenhouse gas emissions (CO2 emissions).
- Less work through automatic management of internal and external energy reporting.
- Supports customers in the continuous improvement of energy efficiency through integrated project management and definition of energy efficiency measures, thereby also satisfying the requirements of ISO 50001.

TIA – Totally Integrated Automation

Two strong partners: SIMATIC B.Data and SIMATIC powerrate

With the SIMATIC B.Data energy data management system from Siemens you invest in an innovative, reliable and convenient system . Based on industry technology it responds to the increasing demands for plant-internal energy management. Even for future challenges you are well prepared. This integrated solution provides you with the potential for long-term optimization.

As a component of Totally Integrated Automation and Totally Integrated Power you will benefit from the integration of products and systems, the use of standard components, a uniform operating philosophy and reduced engineering effort, which ultimately leads to increased system flexibility and productivity, cost reduction and quality assurance.



Specifically, this means:

- Intelligent drive systems can reduce energy consumption as early as on the **field level**. High-precision measuring and field devices deliver consumption values for later evaluation – even for non-electrical energies such as gas or steam.
- SIMATIC powerrate is used for a detailed analysis in the operative environment of the **control and operating level**: Measured variables such as currents, voltages or powers can be measured, standardized, preprocessed and buffered accurately to the second. The measuring data can come from all connected measuring devices from a variety of bus systems, e.g. PROFIBUS, PROFINET, Modbus, M-Bus or S0-Impulse – for this purpose, SIMATIC B.Data has a single point of access: the SIMATIC WinCC archive. At the same time it ensures that peak loads are distributed or unused consumers switched-off through active load management.
- In the **management level** B.Data evaluates the acquired data, creates projections and optimizes e.g., the energy consumption of the next month. The acquired data can be prepared individually and clearly displayed. This means they support, for example, reporting or cost center accounting. The gained insights in turn have an influence on the lower levels.

The interaction between SIMATIC B.Data and SIMATIC powerrate leads to a **continuous improvement process** with the goal of **reducing costs** and **saving energy**.

Application

SIMATIC B.Data is used in a variety of fields, for example:

- Process industry
- Manufacturing industry
- Power plant operators
- Municipal operations




Selected references

SIMATIC B.Data has already been implemented successfully in leading companies. Secure the long-term competitive advantage of your company through improved energy management.

- Infracor GmbH, Location Chemiepark Marl / Germany
  SIMATIC B.Data plays a central role in the acquisition and evaluation of data from a wide range of company sectors. The large number of supported interfaces enables seamless communication between SIMATIC B.Data and the existing systems: EEO for optimization of use, EDIS for energy data accounting and DSIM for steam network simulation.
  Complete reference example (Infracor GmbH)
- Audi AG, Plant Ingolstadt / Germany
  SIMATIC B.Data serves personnel in the area of energy and media supply and those responsible for production costs as a transparent source of information on consumption and operating data.
  Complete reference example (Audi AG)
- Mohn media Mohndruck GmbH, Gütersloh / Germany
  SIMATIC B.Data is based on the process LAN and is the link to the office network. After the fully automated acquisition of the operating data from the field level and the control system, the data is processed according to freely programmable models.
  Complete reference example (Mohn media Mohndruck GmbH)
- LENZING AG, Lenzing / Austria
  SIMATIC B.Data systematically analyzes a variety of data of different energy flows in order to further maximize the efficiency of all processes, ranging from energy generation to the individual production processes.
  Complete reference example (LENZING AG)
- KWS SAAT AG / Germany
  SIMATIC B.Data provides timely and detailed consumption values to 55 cost centers, thereby promoting even greater energy awareness.
  Complete reference example (KWS SAAT AG)

See also

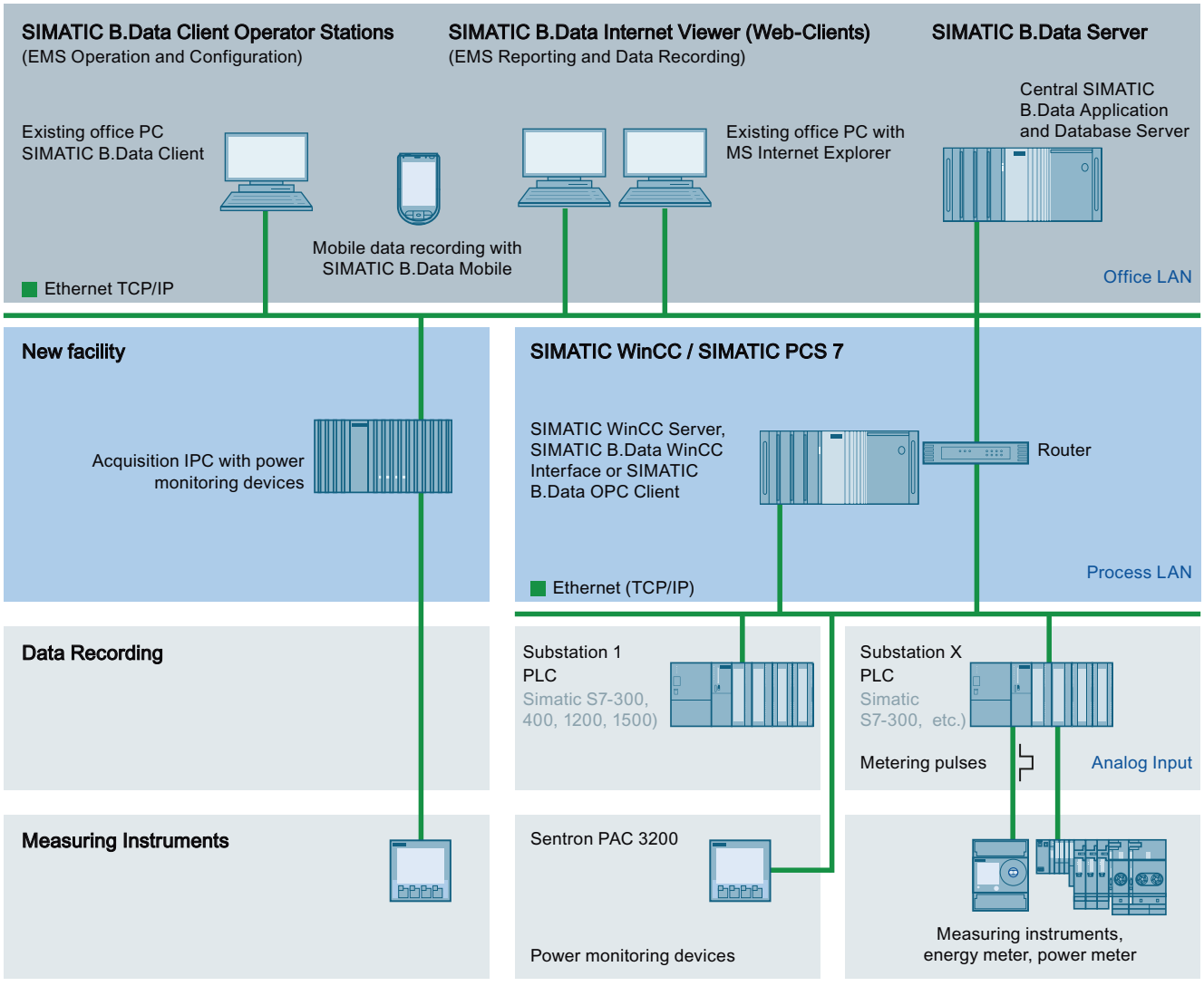
Siemens Industry Reference Center

Concept

Architecture and Scalability

Architecture

B.Data based on a client-server architecture that is easily integrated into your corporate infrastructure. Stand-alone solutions are possible as well as multi-user solutions at various locations. The figure below shows a typical system configuration as an example of a WinCC automation system:



Scalability

B.Data consists of four components that can be installed on one or more computers depending on the existing infrastructure.

Component	Function	Number typically required
SIMATIC B.Data Acquisition Component	Acquires and processes data, such as measurement values.	1 to n[1]
SIMATIC B.Data Application Server with SIMATIC B.Data Database	Establishes communication between the B.Data acquisition component and the B.Data database. Performs calculations and generates reports. The database stores the acquired measurement values and all calculated or generated data, such as reports.	1
SIMATIC B.Data Client	Configuration and operation of B.Data	1 to n[2]
SIMATIC B.Data Web Server	Platform for operation of B.Data via a web browser, e.g. calling of generated reports or charts as well as input of measurement values or energy efficiency measures	

[1] One B.Data acquisition server is required for each acquisition system. Acquisition system refers to a production location for example.

[2] Is automatically installed with the B.Data acquisition server and the B.Data application server.

You can find further information on the system limits of SIMATIC B.Data in the user documentation and the release notes.

Openness through standard interfaces

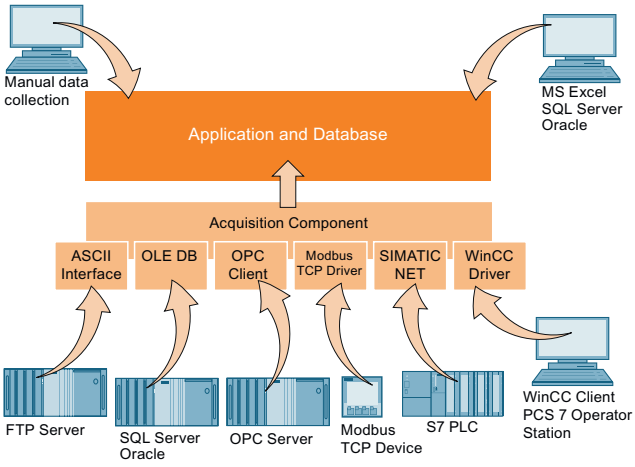
The data required for successful energy management often exist in different formats or systems:

- Data from analog and digital measuring devices
- Historical data from different data sources

In addition to the standardized interfaces with Siemens products such as SIMATIC WinCC or SIMATIC PCS 7, SIMATIC B.Data supports the current standards that you can use to acquire data from different sources.

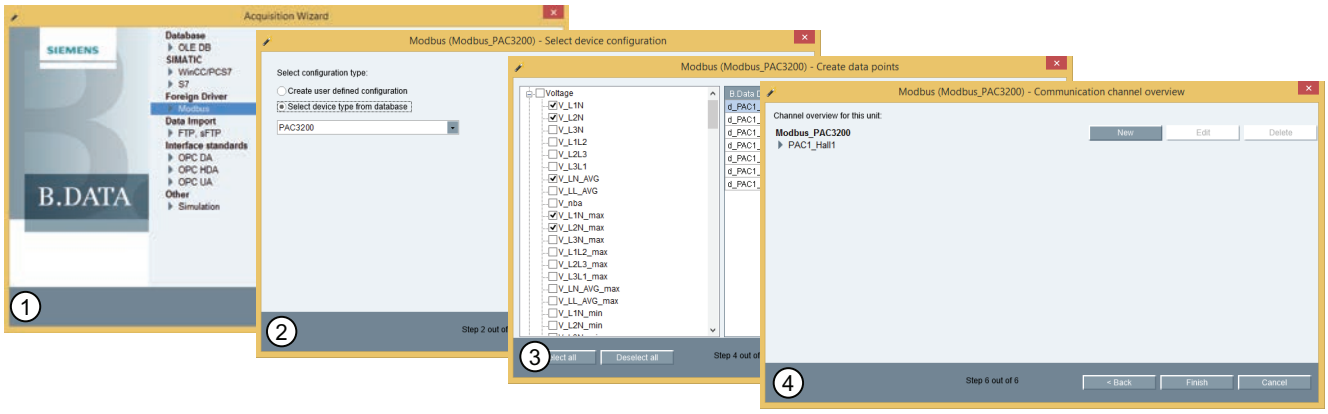
- Acquisition of energy and operational data from the field level via OPC DA, OPC UA-DA or Modbus.
- Acquisition of data from measurement value archives via OPC HDA and OPC UA-HDA.
- Acquisition of data from S7 controllers via SIMATIC NET.
- Acquisition of data from maintenance, production planning and ERP system databases by means of OLE-DB/ODBC drivers.
- Acquisition of energy data via the mobile manual data acquisition.
- Import of ASCII data from the company wide file system, such as CSV or XML via FTP or sFTP.
- Manual entry of the measured and metered value readings.

Depending on the interface used, the data is either imported directly into the database or preprocessed in the SIMATIC B.Data acquisition component.



New wizard for interface configuration

In SIMATIC B.Data, a wizard supports you when configuring the interface via which you want to acquire data.



① Selection of the interface

- "S7" for acquiring data from an S7 controller.
- "WinCC / PCS 7" for acquiring values from a process value archive or compressed archive.
- "Modbus TCP" for acquiring data from measuring devices with Modbus support and Ethernet interface, such as SENTRON PAC measuring devices. The characteristic values acquired by the SENTRON PAC 3200 / 4200 measuring devices are pre-configured in B.Data.
- "OPC-DA / OPC-HDA / OPC-UA" for acquiring data provided by an OPC server.
- "OLE-DB" for acquiring data from Excel spreadsheets or complex databases, such as SQL Server or Oracle.
- "FTP" for acquiring data from ASCII files. Secure transmission via sFTP is supported.

② Select data source from which data will be acquired, for example, a SENTRON PAC measuring device.

③ Select or define measurement values

A data point is created automatically in SIMATIC B.Data for each measurement value.

④ Connection to the data source via the selected interface is configured.

You can now configure an additional data source or create the acquisition structure in SIMATIC B.Data.

Security and Availability

Data protection

SIMATIC B.Data has a three-level authorization concept that prevents unauthorized access to sensitive data:

- Domain
- Authority level
- Functional group

The visibility of B.Data objects is specified with the "authority level" and the affiliation of the "domains". A user can only see an element if both have been assigned the same domain and the authority level of the user is greater than or equal to the level of the element.

The configuration options, for example, generating reports, are limited with the "Functional group".

SIMATIC B.Data supports all standard IT security standards regarding password and login security. The administrator can make the following settings according to the IT security guidelines of a company:

- Increase the complexity of the password with special characters or numbers
- Definition of the minimum password length
- Password change after first login
- Automatic lockout of user after a configurable number of failed login attempts

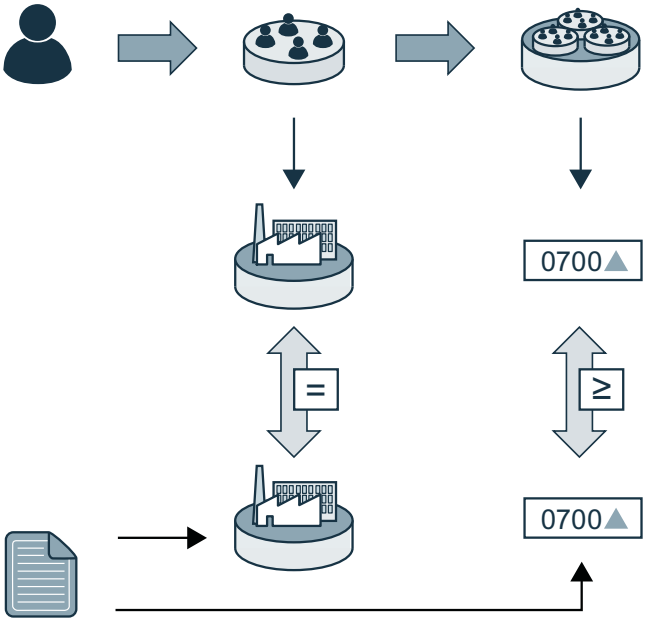
Login to B.Data is possible via the user name or e-mail address. Alternatively, SIMATIC B.Data also supports "Single Sign On".

The user can have a temporary password sent to his configured e-mail address.

Availability

All acquired measurement values are temporarily stored in the acquisition component when the B.Data application server is not available.

The temporarily stored measurement values are automatically added once the B.Data application server is available again.



Users

One or more user groups and functional groups can be assigned to a user.

User group

One or more functional groups or domains can be assigned to a user group.

Functional group

The rights and the level of authority are defined in the functional group. Rights are "create [object]" or "view [object]" for example.

Domain

The domain represents a location of a business for example.

B.Data object

A level of authority and a domain (option) are assigned to each B.Data object. A B.Data object is a folder in the B.Data navigator for example.

Authority level

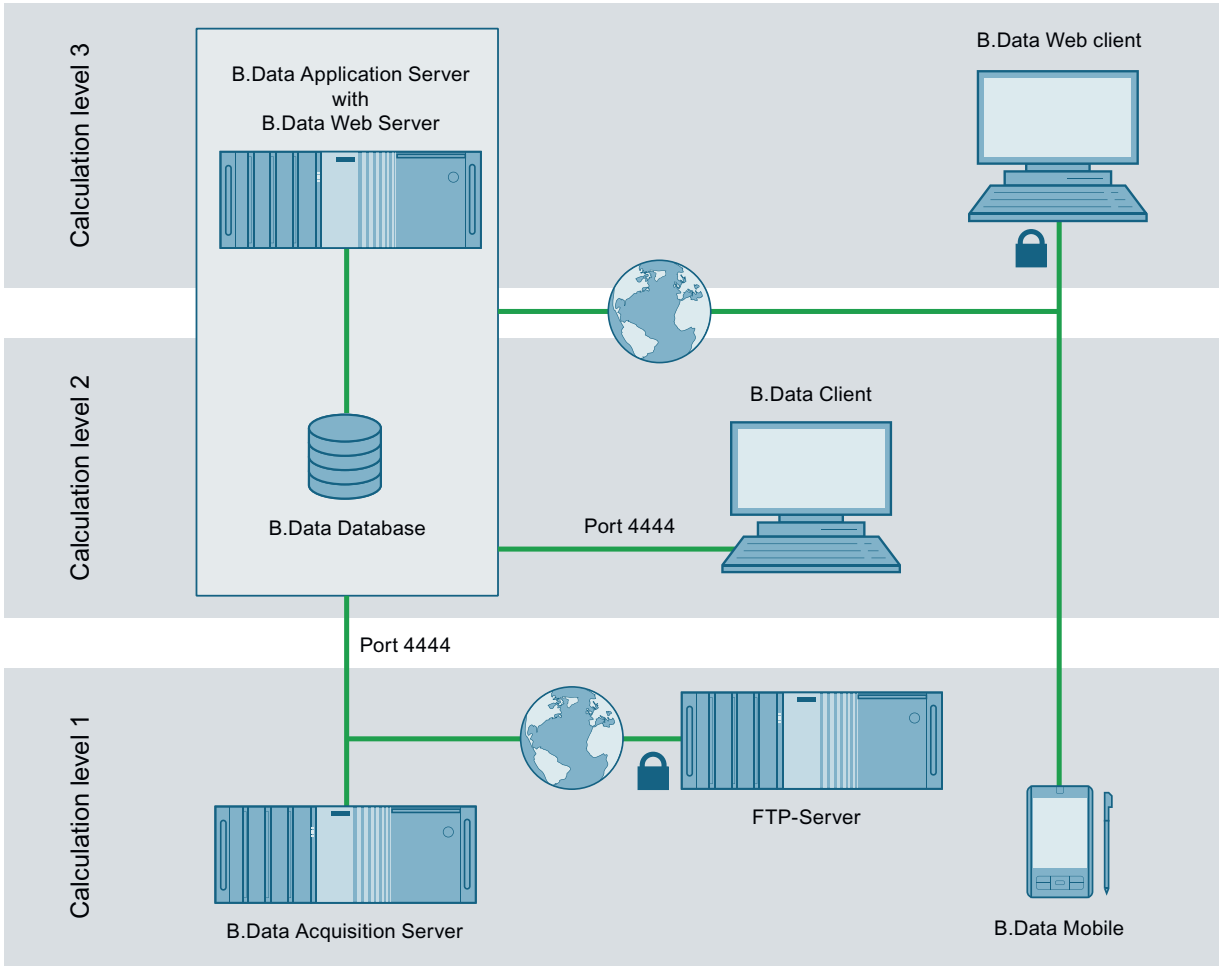
The authority level is a value between 0 and 1000. The authority level is assigned to the parent folder, for example, and inherited by the folders below it.

If the authority level of the functional group is lower than that of the B.Data object, the object will not be displayed to the user.

Communication security

The security of the data transmission is of utmost importance.

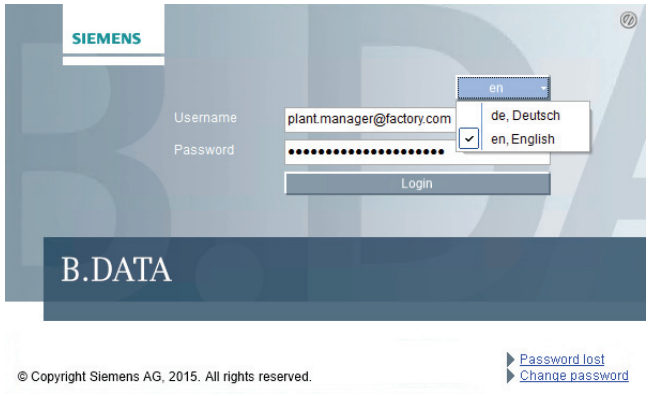
- B.Data Web supports secure communication with the B.Data Server via HTTPS with 256-bit encryption.
- For data acquisition from an FTP server, the safe connection via sFTP is supported.



Multiple languages

SIMATIC B.Data is delivered in the German and English languages by default. The language can be selected when logging on to the SIMATIC B.Data client.

Because SIMATIC B.Data supports Unicode, project-specific porting of the user interface to other languages trouble-free is possible.



Licensing

Introduction

SIMATIC B.Data V6.0 is available in the following lines:

- Professional
- Enterprise

SIMATIC B.Data is licensed according to the number of "Tags" and can be expanded with options.

A "Tag" is a value acquired from **an external measuring point**, which is processed and saved in SIMATIC B.Data. With the "100 Tags" option, for example, you acquire up to 100 measurement values from different measuring points manually or automatically at the same time.

SIMATIC B.Data V6.0 Professional

SIMATIC B.Data V6.0 Professional is recommended for systems up to approx. 5000 Tags. Included in the scope of delivery of the Start Package:

- 50 tags
- 1 SIMATIC B.Data Acquisition Component
- 1 SIMATIC B.Data Client
- SIMATIC B.Data Mobile
- SIMATIC B.Data Web Server incl. 1 Web client
- Oracle database Standard Edition Embedded

SIMATIC B.Data V6.0 Professional	Article no.
Professional Start Package (incl. 50 Tags)[1]	6AV6372-2DF06-0AX0
Tag Package 50[2]	6AV6372-2DF06-0CX0
Tag Package 100[2]	6AV6372-2DF06-0DX0
Tag Package 250[2]	6AV6372-2DF06-0EX0
Tag Package 500[2]	6AV6372-2DF06-0FX0
Tag Package 1000[2]	6AV6372-2DF06-0GX0
Tag Package 5000[2]	6AV6372-2DF06-0HX0

[1]Starting from approximately 250 million saved measurement values, we recommend the Oracle database Enterprise Edition.

[2]You expand the tag count dynamically with the Tag Packages. Can also be used cumulatively.

SIMATIC B.Data V6.0 Enterprise

SIMATIC B.Data V6.0 Enterprise is recommended for systems starting from approximately 5000 Tags. Included in the scope of delivery:

- A choice of 30,000 or 60,000 Tags
- 1 SIMATIC B.Data Acquisition Component
- 1 SIMATIC B.Data Client
- SIMATIC B.Data Mobile
- SIMATIC B.Data Web Server incl. 20 Web clients
- Available with or without Oracle database

SIMATIC B.Data V6.0 Enterprise	Article no.
Enterprise 30,000 with Database[1]	6AV6372-2DF66-0BX0
Enterprise 30,000 without Database[2, 3]	6AV6372-2DF66-0AX0
Enterprise 60,000 with Database[1]	6AV6372-2DF76-0BX0
Enterprise 60,000 without Database[2, 3]	6AV6372-2DF76-0AX0
Powerpack Enterprise, Upgrade from 30,000 to 60,000 Tags	6AV6372-2DF70-0XX0

[1]This version of SIMATIC B.Data V6.0 Enterprise is supplied **with** an Oracle database Enterprise Edition Embedded. This is designed for quantity structures starting from approximately 250 million saved measurement values.

[2]This version of SIMATIC B.Data V6.0 Enterprise is supplied **without** a database. Use of the Oracle database Enterprise Edition is recommended. It must be ordered separately from Oracle.

[3]The order is released via a special sales release by the product management.

Options

The following options can be used in SIMATIC B.Data V6.0 and higher:

SIMATIC B.Data V6.0 options	Article no.
SIMATIC B.Data 3 Web Clients[1]	6AV6372-2DF20-0AX0
SIMATIC B.Data 20 Web Clients[1]	6AV6372-2DF20-0BX0
SIMATIC B.Data 60 Web Clients[1]	6AV6372-2DF20-0CX0
SIMATIC B.Data Client[2]	6AV6372-2DF30-0AX0
SIMATIC B.Data Planning & Prediction[3]	6AV6372-2DF40-0AX0
SIMATIC B.Data Acquisition Component[4]	6AV6372-2DF50-0AX0
SIMATIC B.Data Acquisition IPC[5]	6BK1000-2BD00-0AC0

[1]Maximum 3 / 20 /60 simultaneously logged in users. Can also be used cumulatively.

[2]Fully functional SIMATIC B.Data client for the configuration of the SIMATIC B.Data database.

[3]Extends SIMATIC B.Data with timetable management for prediction and planning of energy consumption.

[4]Additional acquisition component. By default, an acquisition component acquires measurement values from measuring points that are located in the same network as the acquisition component. In case of multiple locations, depending on the network configuration, one acquisition component should be used for each location.

[5]Ready to use solution consisting of the SIMATIC IPC227D hardware and preinstalled SIMATIC B.Data acquisition component. The embedded Industrial PC is configured in a few minutes and is used for data acquisition from one plant unit or a different location.

SIMATIC B.Data Software Update Service (SUS)

A software update service (SUS) is available for each SIMATIC B.Data line, depending on the total Tag count of your licenses.

Owners of a genuine software update service will automatically receive the latest updates for the purchased products.

Product	Article no.
SIMATIC B.Data Professional 100 Tags SUS[1] for max. additional 100 Tags through Tag Packages	6AV6372-2DF00-0DL0
SIMATIC B.Data Professional 500 Tags SUS[1] for max. additional 500 Tags through Tag Packages	6AV6372-2DF00-0FL0
SIMATIC B.Data Professional 5000 Tags SUS[1] for max. additional 5000 Tags through Tag Packages	6AV6372-2DF00-0HL0
SIMATIC B.Data Enterprise SUS[1] for the complete Enterprise line or for Professional starting from more than 5000 additional Tags	6AV6372-2DF70-0XL0

[1]The SUS contract runs for 1 year. The contract is automatically extended by an additional year unless canceled 3 months prior to expiration.

Trial

90-day test version with full functionality, including timetable management (Prognosis & Planning).

SIMATIC B.Data V6.0 Trial	Article no.
SIMATIC B.Data Trial	6AV6372-2DF16-0AX0

Energy data management with SIMATIC B.Data

Monitoring

Basics of Monitoring

Definition

An important component of the energy data management system is the **illustration and evaluation** of **operating data and performance indicators** in order to formulate fields of action for improvements and to achieve cost and consumption **savings**.

Options in B.Data

B.Data monitoring will give a quick overview of the energy and consumption data of your company. B.Data offers the following options for display and evaluation of operating data and performance indicators:

- Current values for display of the current situation.
- Historical as a basis for comparisons and analyzes.

B.Data has the right tool for every type of application: You can, for example, display current and projected operating values together in one chart. Relate produced quantities, consumption, and costs, for example, in a report. Have the relevant data of your company displayed in a dashboard.

See also

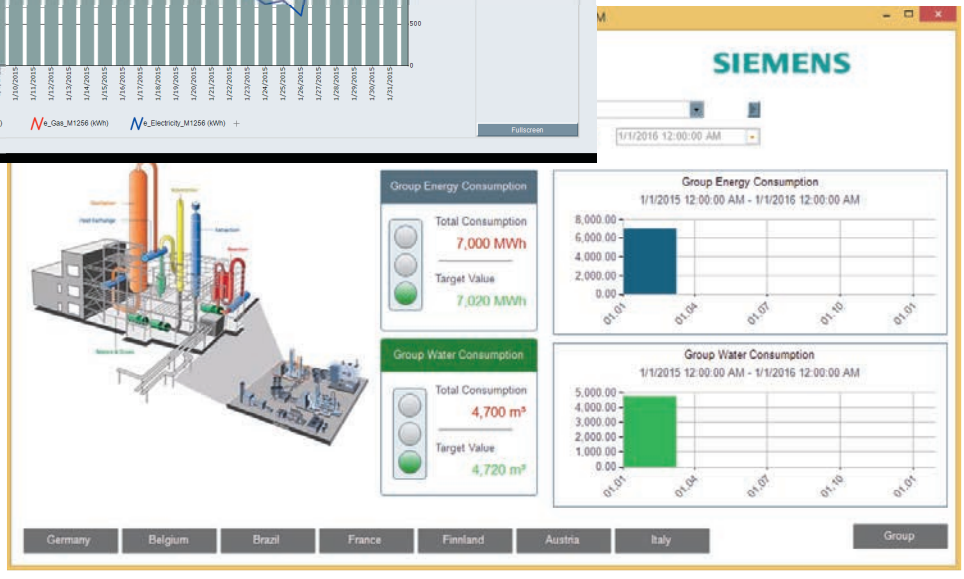
Chart [page 18]

Dashboard [page 20]

Basics of Data Management [page 47]

Manual Data Entry [page 48]

KPI Alarms [page 52]



Chart

Definition

The chart shows current or historical data. The values of different performance indicators can be displayed as trends at the same time.

The display can be configured for each trend individually, for example, as bars, lines or points. Two X axes and up to five Y axes are available. The zoom function helps you to keep an overview in case of comprehensive data.

The views of the individual charts can also be adapted in B.Data Web.

Using the chart

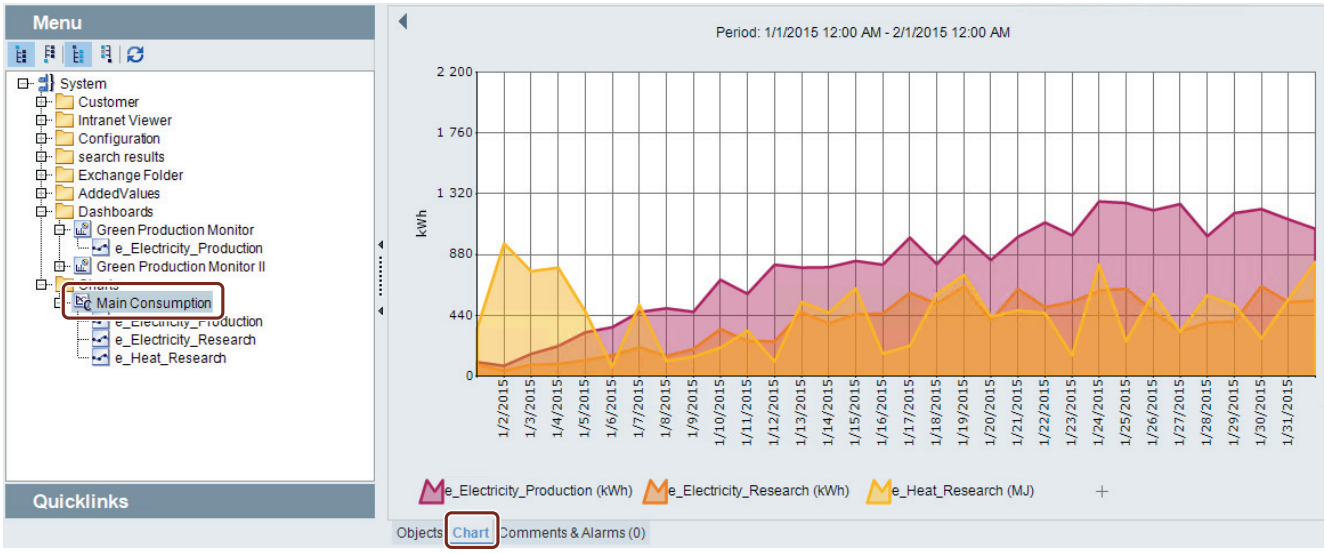
The trends in a chart are scaled automatically and can be displayed on multiple axes. This lets you easily compare trends from different value ranges. In addition to the graphical representation, the strengths are the ability to analyze the dependencies of various operating data, such as quantity produced, as well as planned and actual energy consumption.

Recommended uses

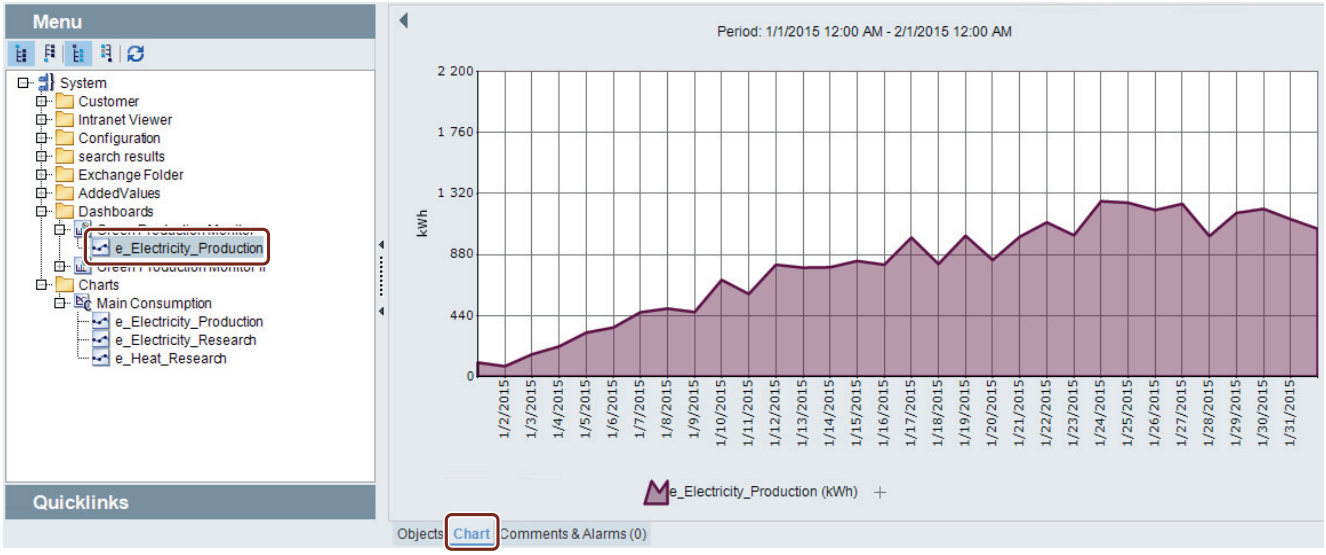
Use the chart for fast visualization of one or more data points directly in the B.Data Plant Explorer or in the B.Data Web. Adapt the time range you want to display with the options at any time. Violated plausibility criteria for individual values (both high and low violations) are indicated directly in the trends. Comment the trends directly in the chart.

Configuring the chart

In B.Data, create one or more objects of the type "Chart" and assign them the data points whose data is going to be visualized. If necessary, you can also add the data points directly in the chart. The "Chart" tab is automatically selected in the working area and you will see your values displayed as trend immediately.



For a quick overview, simply select any data point in your structure. The "Chart" tab in the working area will immediately show you the values of the data point as trend.



You can also use the Trender to display the values. However, it does not offer the same graphical options as the chart. It also cannot be used to input and display comments or alarms.

See also

Basics of Monitoring [page 17]

Dashboard

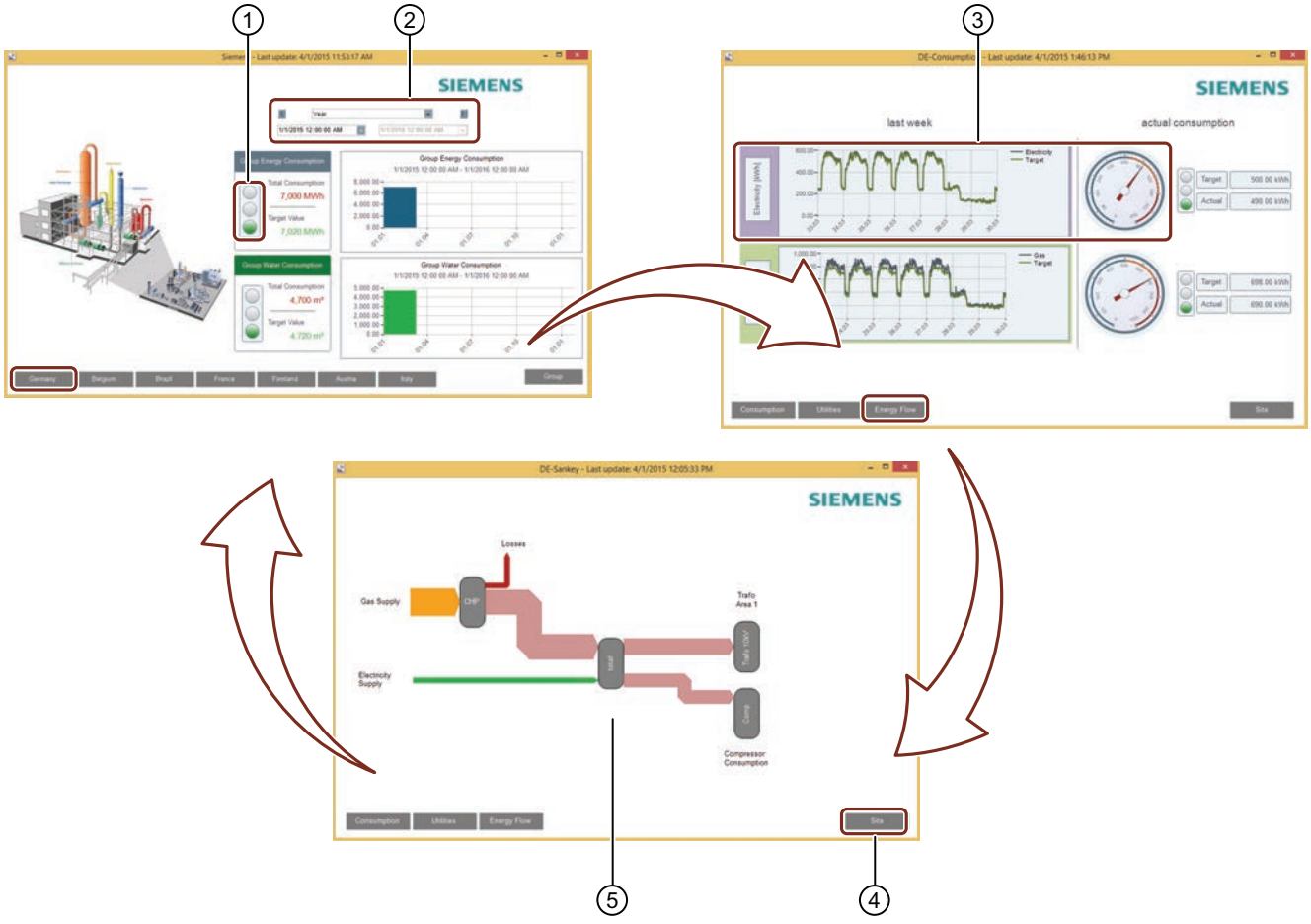
Definition

Historical as well as current energy data and performance indicators are clearly displayed in the dashboard with predefined display objects. The dynamic time range selection guarantees full flexibility for the visualization.

Using the Dashboard

With the Dashboard, you will never lose track of your production and consumption data: Thanks to the easy navigation, you can easily connect multiple Dashboards for maximum transparency. Detailed illustrations for a production site are possible, just as the combination of several production sites for an even better overview and more control. Typical applications are the display of important performance indicators such as consumption or costs. Overviews of weekly or monthly consumption can also be displayed.

The dashboards can be displayed with the Plant Explorer as well as the Web client.



① , ② Selection of pre-configured display objects, such as pointer instrument, diagrams or status indicators.

③ With the "Time selection" display object, you change the time range for selected display objects flexibly during the display. Without change, the time range configured for the dashboard is used. We recommend a 15-minute increment for displaying current values.

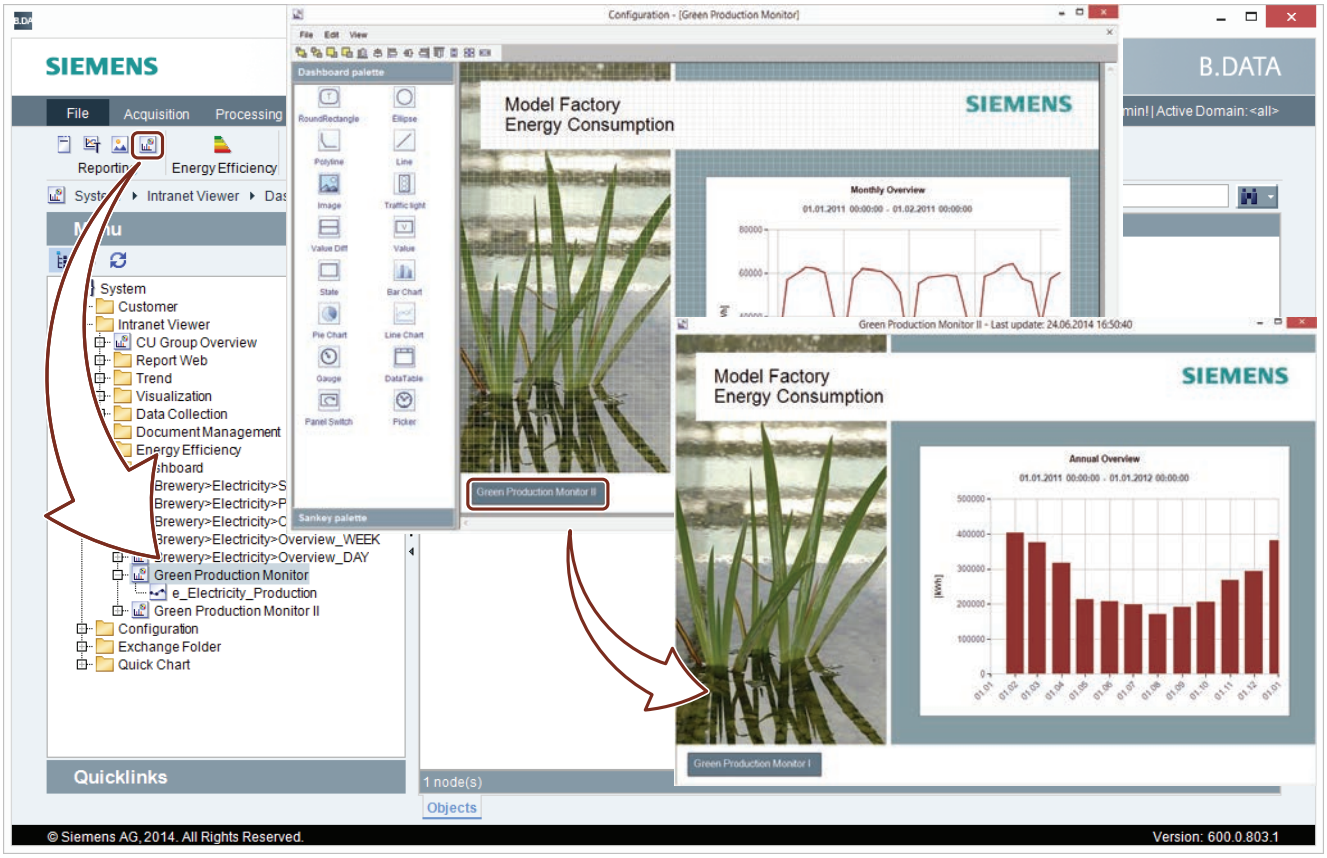
Shifts, for example, are also supported as time ranges. They are configured as user-defined query types and are then available in the time selection. This makes the performance indicators and trends of the individual shifts available at a glance.

④ Buttons for navigating between multiple Dashboards

⑤ Process visualization with dynamic Sankey diagram

Configuring Dashboard

Create one or several "Dashboard" object types in B.Data. The data of the data points assigned to them are displayed. **The content of each Dashboard is freely configurable in a specific editor**: Add the desired display objects from a library to the respective Dashboard and then assign one or more data points to these objects. Finally, add the navigation buttons and assign the desired Dashboard to the respective button.



See also

Basics of Monitoring [page 17]

Performance Indicators [page 23]

Controlling

Basics of Controlling

Definition

Effective energy controlling is based on information of **when** and **where** energy is required. This is the only way that detailed information about optimization and potential savings can be provided. Reliable performance indicators are also the basis for reports as required for implementation of the EU Energy Efficiency Directive 2012/27/EU.

Controlling in B.Data

B.Data is the tool that effectively supports your controlling tasks:

- User-assignable accounting of the energy flows of different media such as electricity, gas, or steam, from the main supply down to sub-distribution systems.
- Determination of performance indicator values with direct reference to production batches or quantities for energy-related evaluation of production equipment.
- Evaluation of the energy purchase invoice of various media by entering counter readings, power and calculation parameters.
- Target-performance-analysis of energy consumption and costs according to predefined reference profiles or parameters.
- Determination and display of statistical parameters such as time lines, distribution of hours or degree day figures.

For the display use the automatic reporting of B.Data: The information is displayed in Microsoft Excel or Microsoft Word and can be prepared there for an overview as a table or diagram. In this way, you generate, for example, monthly reports with current figures in Microsoft Excel, Microsoft Word or PDF format without additional configuration effort. You can find further information in "Calculation level 3 [page 59]".

Performance Indicators

Introduction

Performance indicators are an essential component of energy controlling. Based on a few selected KPIs, the energy manager should be able to estimate the overall energy situation.

Generally, a distinction is made between the one-time analysis method and the continuous controlling method during controlling:

- Analysis: Calculation of levels of efficiency or efficiency indicators
- Controlling process: Comparison of consumption figures or costs, e.g. based on the previous month

Examples of typical controlling reports

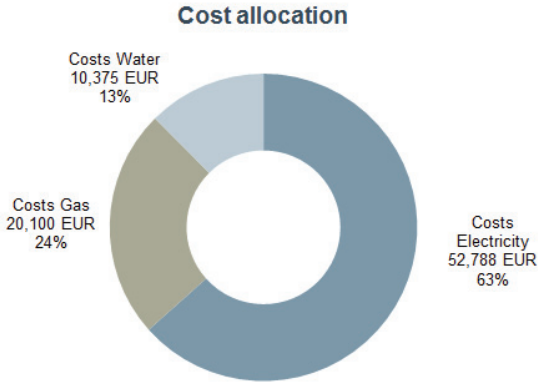
The following figure shows a monthly report that compares the costs of the current period with those of the last period. The period for the previous year is also shown. The objective of the report is to provide the user with an overview of the costs and to point out any irregularities.

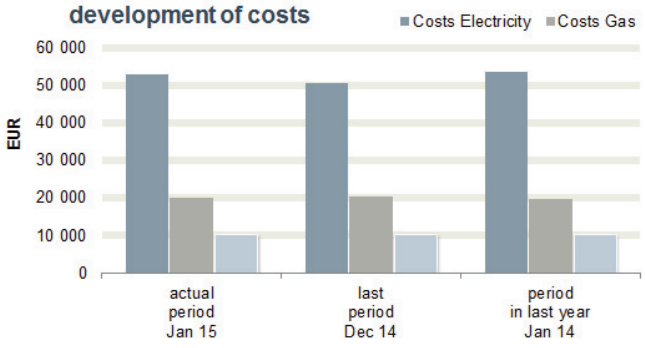
SIEMENS

Author: SIEMENS

Key performance indicators

Period: 1/1/2015 To 2/1/2015
Date: 2/2/2015 8:00 AM





KPI's		Jan 15 actual period	Dec 14 last period	Jan 14 period in last year	comp. last period		comp. last year
Costs Electricity	EUR	52,788	50,552	53,480	4%		-1%
Costs Gas	EUR	20,100	20,400	19,600	-1%		3%
Costs Water	EUR	10,375	10,450	10,225	-1%		1%
Total costs	EUR	83,263	81,402	83,305	2%		0%

Pure consumption or cost performance indicators can only be checked to approximate accuracy. With B.Data, you can relate the performance indicators for consumption and costs. In this way, you obtain significantly more meaningful performance indicators, which you can also compare efficiently using various time zones.

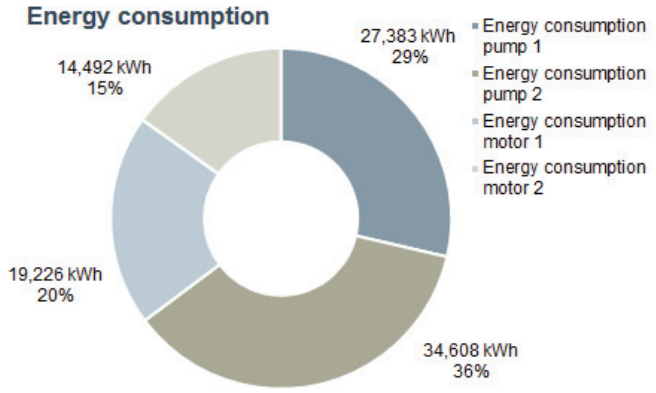
The following figure illustrates the energy consumption per ton. The different time zones "Week", "Since beginning of month" and "Since beginning of the year" provide quick information of possible deviations. In this instance, the energy consumption per ton has already exceeded the previous month and year average after one week. Thanks to this overview, measures can be taken promptly; e.g. the technical monitoring of the consumers.

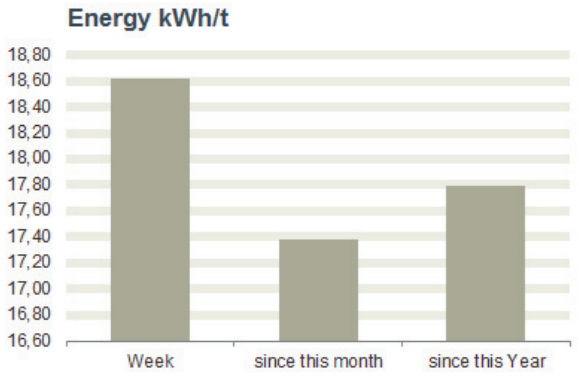
SIEMENS

KPI's batch production

Author: SIEMENS

Period: 1/1/2014 To 1/1/2015
Date: 2/3/2015 8:00 AM





		Week	since this month	since this Year
Number of batches	-	31	113	1248
Total Production	t	21,290	74,160	801,292
Total Material off spec	%	7.15	7.32	7.55
Electrical Energy production	kWh	396,451	1,289,318	14,255,015
Energy consumption pump 1	kWh	27,383	100,052	1,106,199
Energy consumption pump 2	kWh	34,608	126,448	1,398,040
Energy consumption motor 1	kWh	19,226	70,246	776,661
Energy consumption motor 2	kWh	14,492	52,951	585,435
Energy consumption dryer	kWh	760	2,778	30,707
Energy consumption per ton	kWh	18.62	17.39	17.79

See also

Calculation of Plant Efficiency [page 25]

Specific Performance Indicators [page 27]

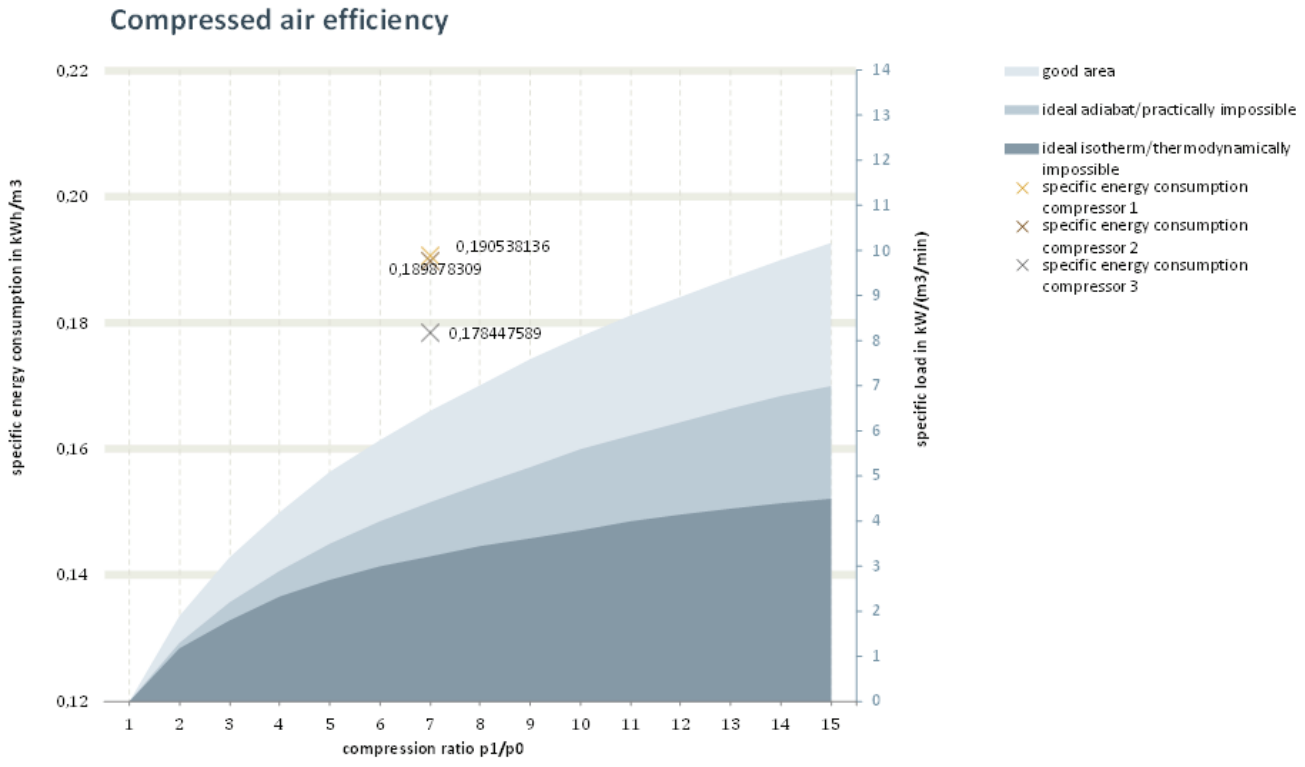
Dashboard [page 20]

Calculation of Plant Efficiency

Introduction

Performance indicator values related to efficiency are important for realizing an increase in the efficiency of energy generation and energy distribution systems. Due to the flexibility of B.Data, plant-specific characteristic curves can be illustrated and the performance indicators calculated accordingly in the system can be displayed.

The following figure shows how the efficiency of an air compressor is verified using compressor-specific characteristic curves.



Example of efficiency calculation

With the help of the above figure, one can easily see that two of the three compressors are generating the required compressed air less efficiently. In particular, "Compressor 1" is very inefficient, such that replacement with a more efficient compressor makes sense. The efficiency of "Compressor 3" is only marginally in the poor range. Therefore, a check for leaks could be performed as an initial measure.

See also

Specific Performance Indicators [page 27]

Benchmarking / Targeting

Introduction

The comparison of data (benchmarking) taking target figures into account (targeting) provides information about one's own energy situation. Usually plant components or different locations are compared with each other. A location working at an especially high level of efficiency could be defined as a target figure for the other locations, for example. A statement on achieving targets is very important for the energy manager and for the management.

You can find a detailed example of the use of benchmarking and targeting under "Sustainability - Emissions [page 30]".

Example

The figure below shows a comparison of consumption data for two months taking into account target figures.

SIEMENS

KPI - Benchmark

Author: Siemens

Period 1/1/2015 To 2/1/2015
Date 2/5/2015 1:05 PM

KEY PERFORMANCE INDICATOR		Value		Lower Benchmark	Upper Benchmark
m_Total_electricity_per_mcig	GJ/t	7.00	WARNING!	7.00	14.00
m_Electricity_PMD_per_mcig	GJ/t	4.50	OK	3.00	5.00
m_Electricity_SMD_per_mcig	GJ/t	3.90	OK	3.00	5.00
m_Electricity_utilities_per_mcig	GJ/t	4.00	OK	3.00	5.00
m_Thermal_energy_PMD_per_mcig	GJ/t	4.50	OK	4.00	9.00
m_Thermal_energy_utilities_per_mcig	GJ/t	4.50	OK	4.00	9.00
m_Compressed_air_per_mcig	m³/t	1,000.00	OK	750.00	1,200.00
m_Vacuum_system_per_mcig	m³/t	1,100.00	ATTENTION!	700.00	1,000.00
m_Wet_exhaust_air_per_mcig	m³/t	9,000.00	OK	5,000.00	10,000.00
m_Dry_and_heated_exhausted_air_per_mcig	m³/t	6,120.00	WARNING!	6,000.00	10,000.00
m_Conditioned_dry_exh_air_per_mcig	m³/t	9,800.00	ATTENTION!	10,000.00	25,000.00
m_Water_per_mcig	m³/t	3.00	OK	2.50	3.50
m_Waste_water_per_mcig	m³/t	1.30	OK	1.10	1.50

Specific Performance Indicators

Introduction

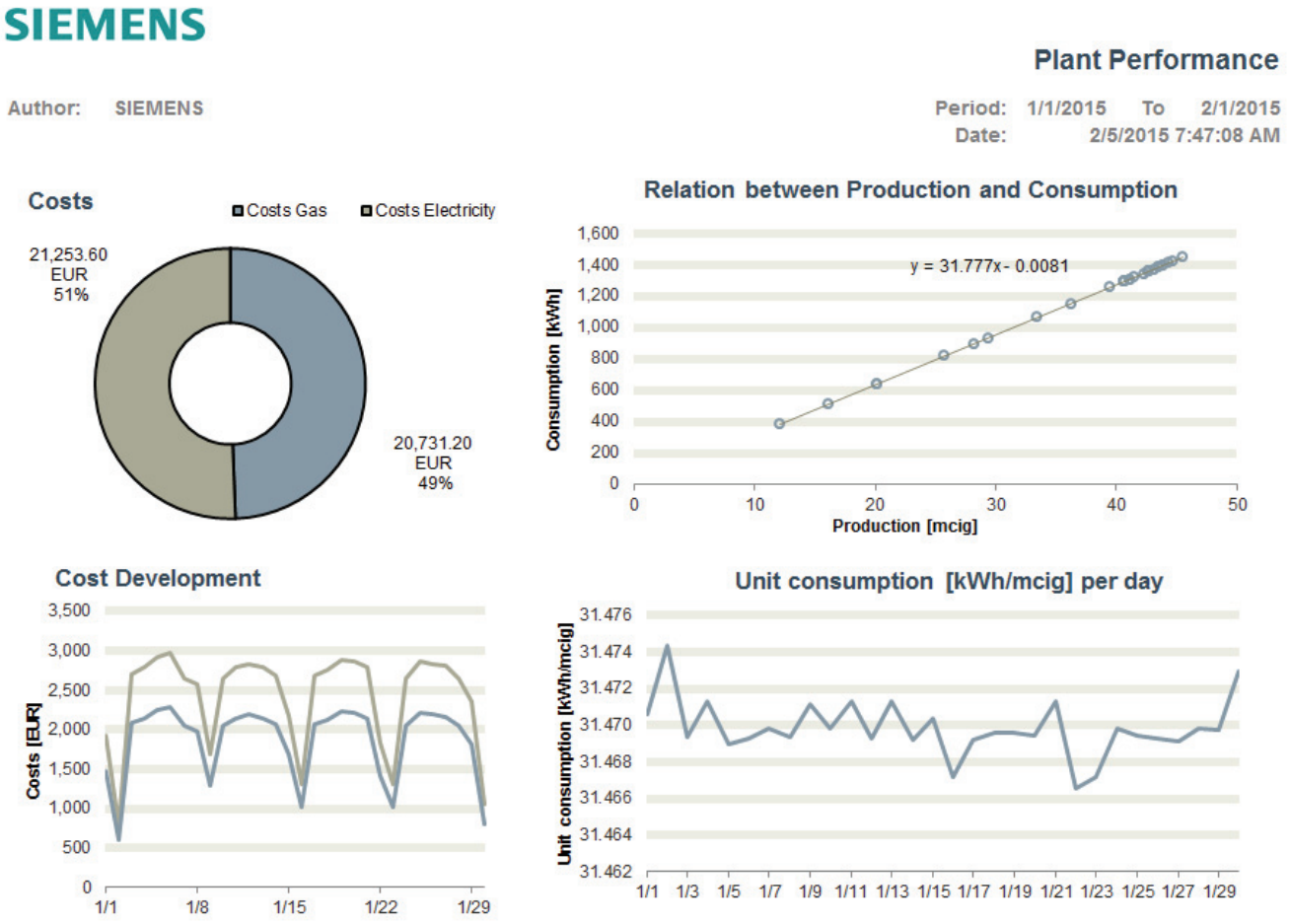
Well-founded statements regarding the efficiency of systems can only be made with the help of specific performance indicators. Using these performance indicators you can also compare different levels of production with one another; e.g. low production versus full capacity. The effects of improvements are measurable in this way.

The calculation of the system characteristic resulting from the regression analysis of consumption and production quantity can, in turn, be used for making a prediction.

Statements or predictions regarding the energy efficiency of a system are provided only through specific performance indicators, for example, by relating the consumption data to the production data.

Regression analysis as a prediction tool

The following figure shows a report in which the energy costs and consumption per unit of production are displayed. The regression analysis at the top right shows the relationship between consumption and production.



With the help of the regression analysis, a linear relationship between production and consumption is established. The calculation of the system characteristic can, in turn, be used for making predictions.

Standardization of performance indicators

If climatic conditions such as temperature or air humidity have to be considered, pure performance indicators quickly lose their significance. Without standardization, energy consumption can only be compared in a limited way. B.Data supports the time-independent calculation of performance indicators based on acquired measurement values. Standardization already takes place in B.Data. The results are output directly in the report.

The figure below shows standardization using the "Daily temperature figure", which plays a role in building management, for example. More heat is used in winter than in summer. An examination of the average daily temperature figure over a year and the related heating costs can provide the necessary arguments for investing in building insulation.

When comparing efficiency the different climate conditions must be considered if production sites are located in different climate zones. Here too, the daily temperature figure plays an important role as a reference value.

SIEMENS

Degree Day Normalization

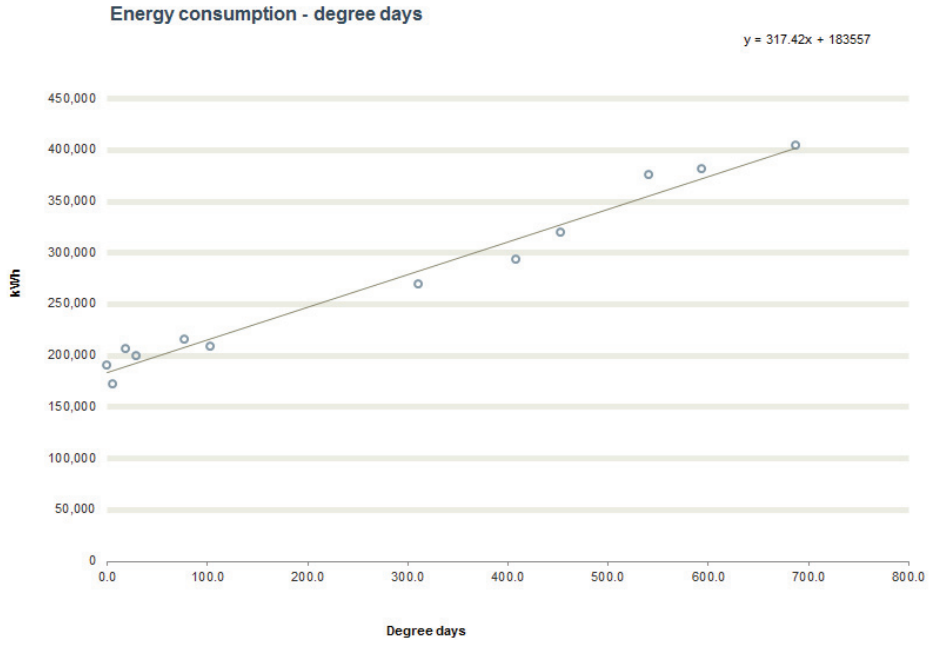
Author: SIEMENS

Period: 1/1/2014 To 1/1/2015
Date: 2/5/2015 1:07:20 PM

Protocol

time	Degree days base 20°C	Degree days base 15°C	Long term mean temp	Heat Consumption	Corrected Consumption	Deviation absolute	Deviation %
1/1/2014	687.8	532.8	572	403,786	335,795	67,991	20%
2/1/2014	540.7	400.7	495	374,352	342,680	31,672	9%
3/1/2014	453.2	298.2	429	318,604	301,597	17,007	6%
4/1/2014	76.5	26.5	295	214,502	826,736	-612,234	-74%
5/1/2014	102.5	37.5	141	208,038	286,274	-78,236	-27%
6/1/2014	29.4	4.4	54	198,744	364,460	-165,716	-45%
7/1/2014	5.8	0.8	16	171,631	472,947	-301,316	-64%
8/1/2014	0.0	0.0	16	189,872	189,872	0	0%
9/1/2014	18.0	3.0	112	206,069	1,281,080	-1,075,011	-84%
10/1/2014	310.2	180.2	299	268,074	258,432	9,642	4%
11/1/2014	408.3	258.3	439	292,936	314,931	-21,995	-7%
12/1/2014	593.6	438.6	541	380,125	346,445	33,680	10%
SUM	3,226.12	2,181.12	3,409	3,226,733	5,321,248	2,094,515	39%

SIEMENS



Energy Situation

Reports are often used to provide an overview of the energy situation. The following figure shows an overview of the energy sources used and the level of CO_2 emissions.

It is quite clear from this example that electricity represents a significant portion of the costs as well as CO_2 emissions. However, the consumption data shows that basically only four energy sources are used. With regard to consumption, electricity is relatively expensive. A change of energy supplier could, for example, be a first measure.

SIEMENS

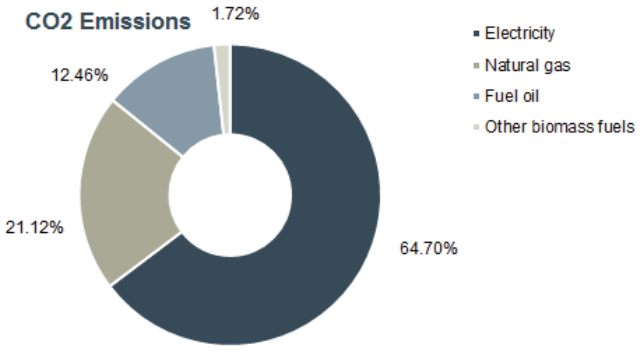
Author: SIEMENS

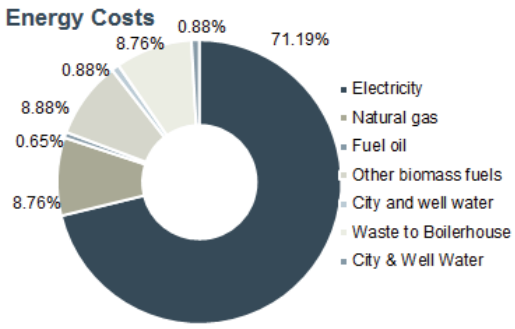
Energy Assessment summary

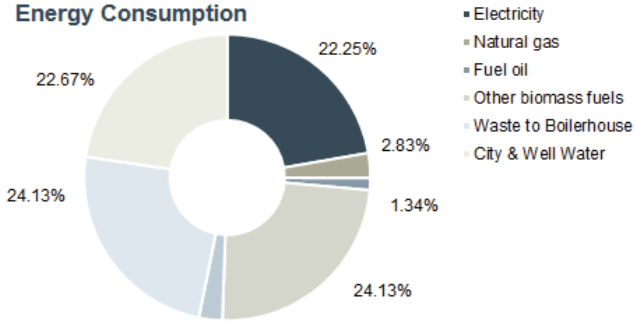
1/1/2015 To 2/1/2015
2/5/15 2:59 PM

Energy Situation - Overview

Energy Source	Consumption [GJ]	Costs [EUR]	CO2 emission [t CO2]
Electricity	187,652	3,260,482	4,372
Natural gas	23,865	406,516	1,427
Fuel oil	11,261	29,679	842
Other biomass fuels	203,495	401,199	116
City and well water	22,325	40,378	13
Waste to Boilerhouse	203,495	401,199	
City & Well Water	191,125	40,376	
Total	843,218	4,579,829	6,770







See also

Sustainability - Emissions [page 30]

Batch-related Energy Evaluation [page 32]

Performance Indicators [page 23]

Calculation level 2 [page 58]

Prediction based on production plans [page 39]

Sustainability - Emissions

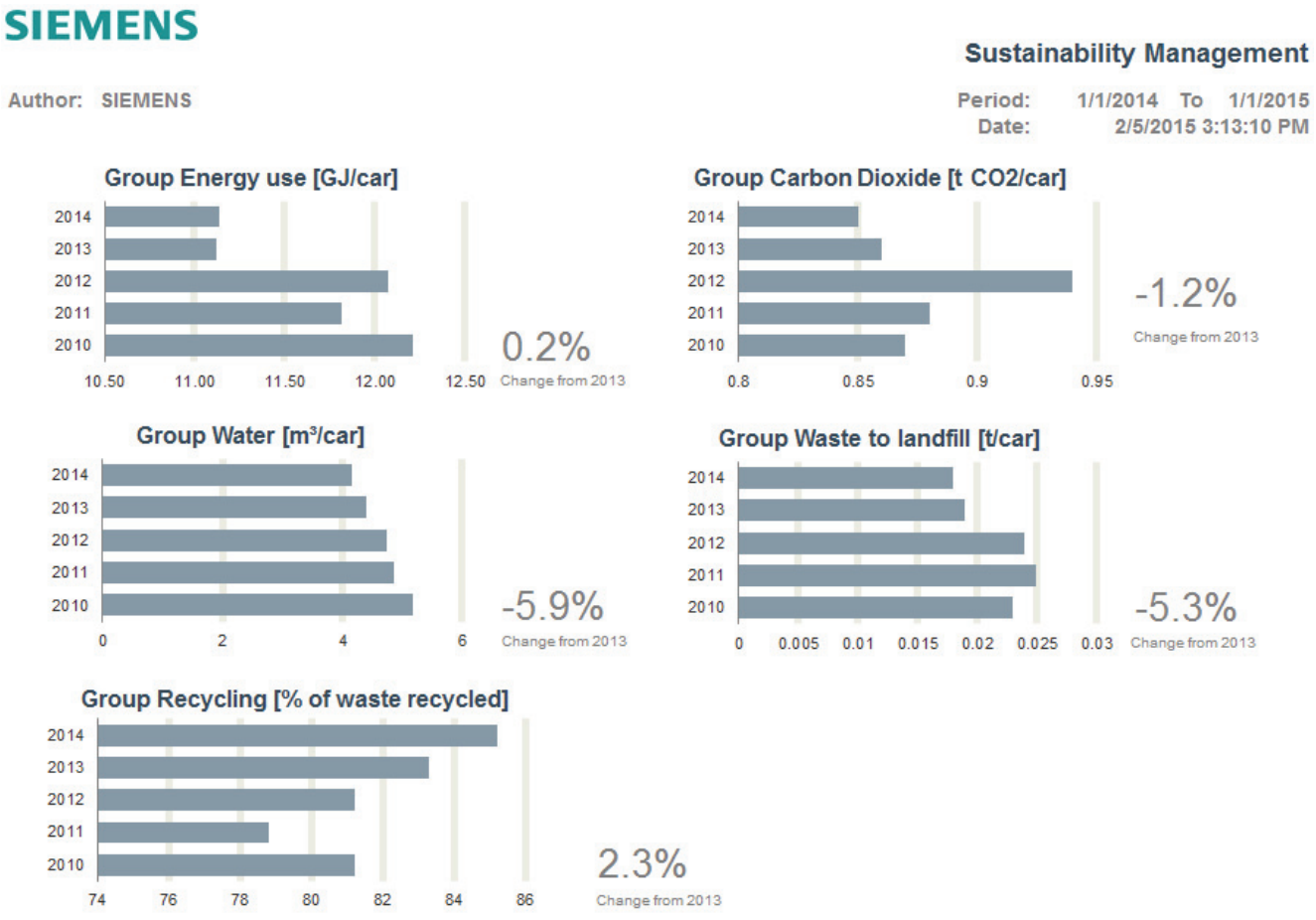
Introduction

Legal requirements often make testing or monitoring and periodic reporting of emissions necessary. Company-wide transparency through continuous balancing of energy and materials with energy production and energy consumption equipment is therefore necessary.

Sustainability

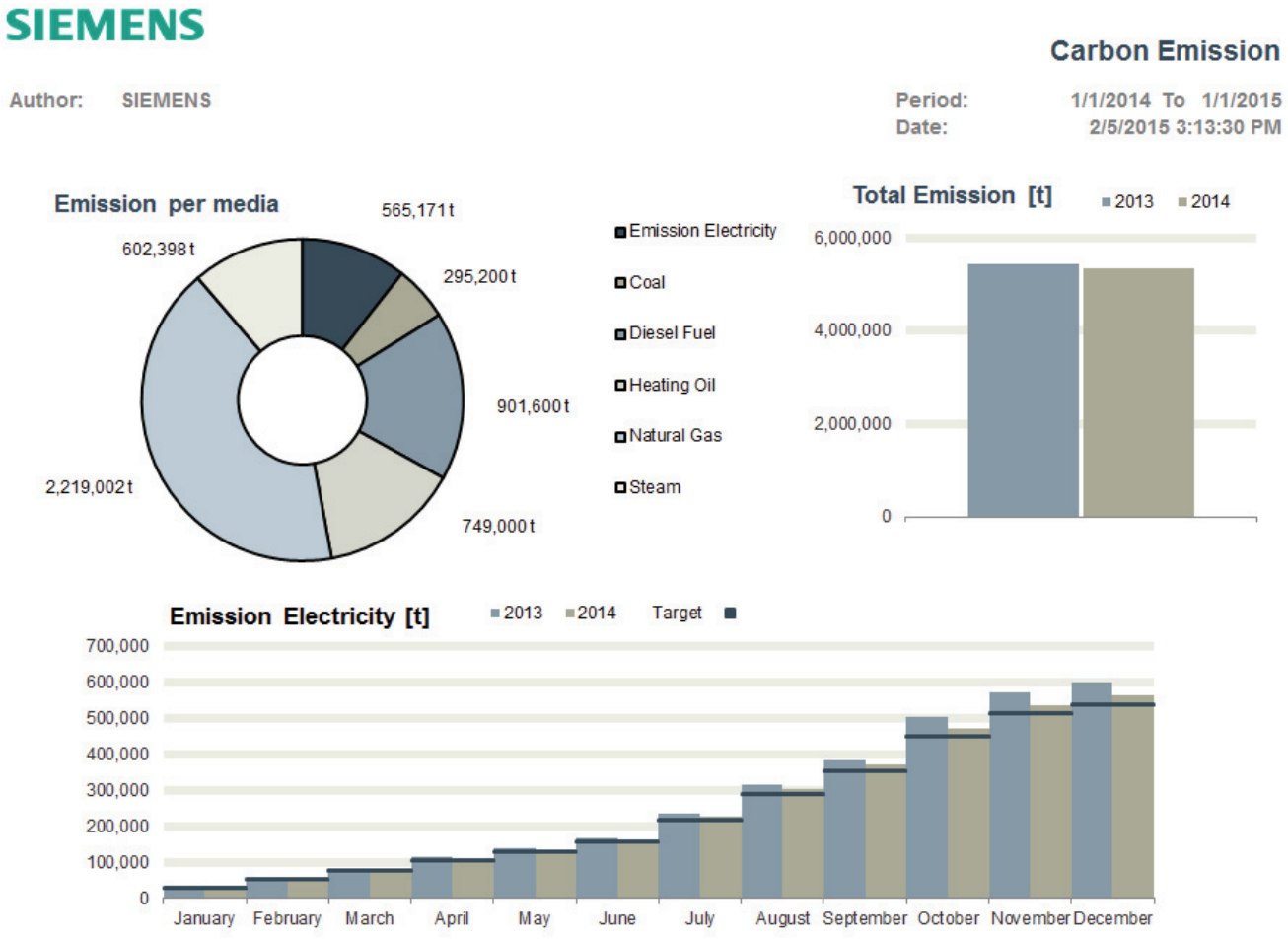
In times of scarce resources, ever-greater value is attached to sustainability. In addition to pure energy consumption, B.Data can also acquire additional data for environmental reports. Carbon dioxide and nitrogen oxides pollute the environment, and professional disposal and solid waste and wastewater incurs additional costs. An overview of all emissions is a basic requirement for defining measures to reduce them and to subsequently implement these measures.

The figure below shows the percentage change of the consumption per energy source and emissions compared to the previous year. B.Data can illustrate these changes for an individual location up to an entire group of companies.



Example of CO_2 emissions and emissions trading

The emission of the greenhouse gas CO_2 is currently of public interest. Exceeding of legal limits may require the purchase of emissions allowances and thereby resulting in additional costs. A cumulative display up to middle of the year sheds light on the current emission situation.



The analysis clearly shows that, although emissions have decreased over the previous year, they are still well above the targets. Based on this evaluation, the following actions are possible:

- Adjust the production portfolio and quantities to the new framework conditions.
- Promptly purchase emissions certificates.

Conversion to B.Data

The calculation of emissions is performed in B.Data in the following way: Create a parameter for each energy source which contains an emission equivalent. Using a simple multiplication you obtain, for example, the amount of CO_2 emitted per kilowatt hour consumed.

See also

Benchmarking / Targeting [page 26]

Batch-related Energy Evaluation

Introduction

If the energy consumption depends on the product being produced and several product lines are being produced in one plant, an energy assessment of the production equipment based on the quantities or batches produced can be useful. With the batch analysis in B.Data, you determine the energy consumption of a product per batch - even across multiple equipment units within a production process. You can break down and compare the energy consumption and the associated costs by batch, product, and equipment.

Conversion to B.Data

You display your equipment in B.Data and define the products and the energy sources involved. The batch information must be provided by the subordinate system: Start, end, and the batch ID. This data is typically transferred to B.Data in 1 - or 15-minute cycles. You can view the batches in B.Data and directly calculate the performance indicators, if required.

The following figure shows a listing of batches for one equipment unit in B.Data as well as the resulting batch report with equipment units, batch ID, batch duration, and energy consumption per equipment unit. Numbers and texts are supported as batch ID.

SIEMENS

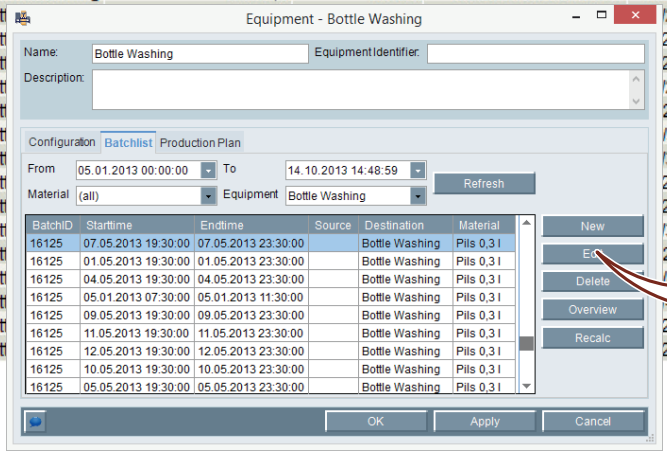
Batch Anaylsis

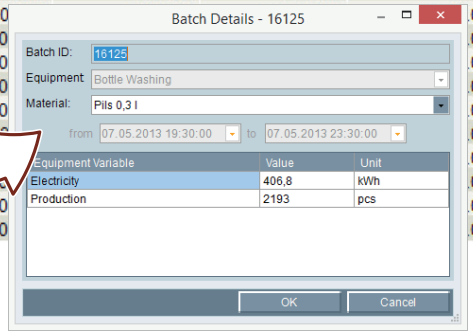
Author: SIEMENS

Period: 1/2/2015 3/1/2015
Date: 2/5/2015 7:42:19 AM

Batch and Material analysis

Equipment	Material	Batch ID	from	till	hh:mm:ss	Electricity [kWh]	Production [lt]
Bottle Washing	Pils 0,5	2458	1/2/2015 5:30:00 AM	1/2/2015 10:00:00 AM	4:30:00	38,500.00	9,665.00
Bottle Washing	no Material	0	1/2/2015 10:00:00 AM	1/2/2015 12:30:00 PM	2:30:00	100.00	0.00
Bottle Washing	Light Beer	13251	1/2/2015 12:30:00 PM	1/2/2015 4:30:00 PM	4:00:00	907.20	5,460.00
Bottle Washing	no Material	0	1/2/2015 4:30:00 PM	1/2/2015 7:30:00 PM	3:00:00	120.00	0.00
Bottle Washing	Pils 0,3	6125	1/2/2015 7:30:00 PM	1/2/2015 11:30:00 PM	4:00:00	369.60	2,225.00
Bottle Washing	no Material	0	1/2/2015 11:30:00 PM	2/2/2015 5:30:00 AM	6:00:00	240.00	0.00
Bottle Washing	Pils 0,5	2459	2/2/2015 5:30:00 AM	2/2/2015 10:00:00 AM	4:30:00	42,350.00	9,635.00
Bot				/2/2015 12:30:00 PM	2:30:00	100.00	0.00
Bot				2/2/2015 4:30:00 PM	4:00:00	1,088.60	5,420.00
Bot				2/2/2015 7:30:00 PM	3:00:00	120.00	0.00
Bot				/2/2015 11:30:00 PM	4:00:00	369.60	2,193.00
Bot				2/3/2015 5:30:00 AM	6:00:00	240.00	0.00
Bot				/3/2015 10:00:0			.00
Bot				/3/2015 12:30:0			.00
Bot				2/3/2015 4:30:0			.00
Bot				2/3/2015 7:30:0			.00
Bot				/3/2015 11:30:0			.00
Bot				2/4/2015 5:3			.00
Bot				/4/2015 1			.00
Bot				2/4/2015 4:30:0			.00
Bot				2/4/2015 7:30:0			.00





Accounting with cost center distribution

Basics for Accounting with Cost Center Distribution

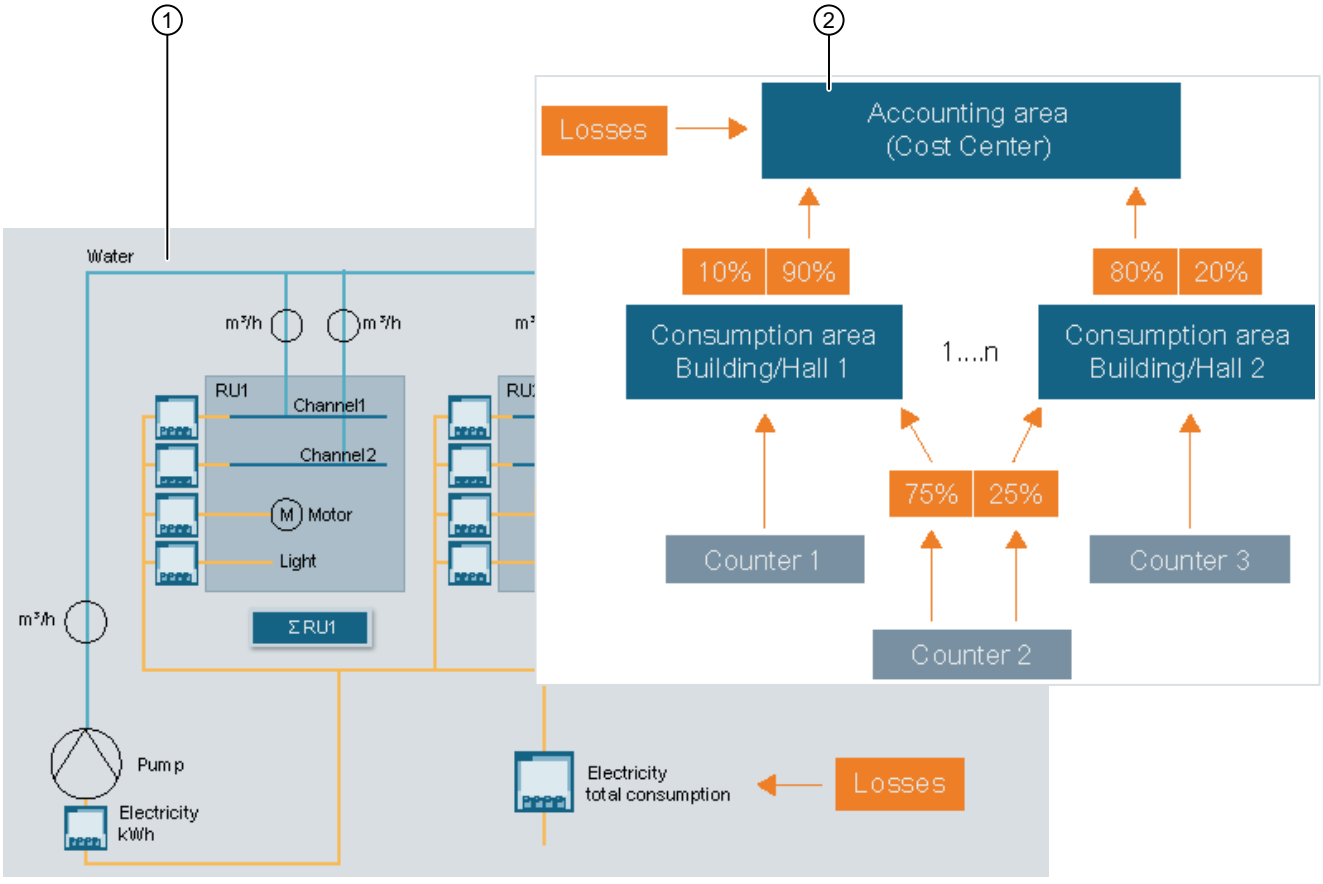
Introduction

Clear allocation creates awareness for saving energy and regulates accountability. Only those who are charged directly with the cost that they cause will be willing to change their behavior. By allocating costs according to the "polluter pays principle" and through incentive systems, cost center managers can accelerate energy-saving measures.

Application

Heterogeneous system environments or mature corporate structures often stand in the way of source-based energy cost allocation.

B.Data enables usage-based reporting of energy and material flows and allocation to individual cost units or products.



① Calculation of consumption data of individual media. Energy requirements and losses are also calculated and apportioned according to energy consumption.

② The recorded consumption values are assigned to a cost center according to percentage consumption keys. The costs are calculated during the breakdown.

PAYG

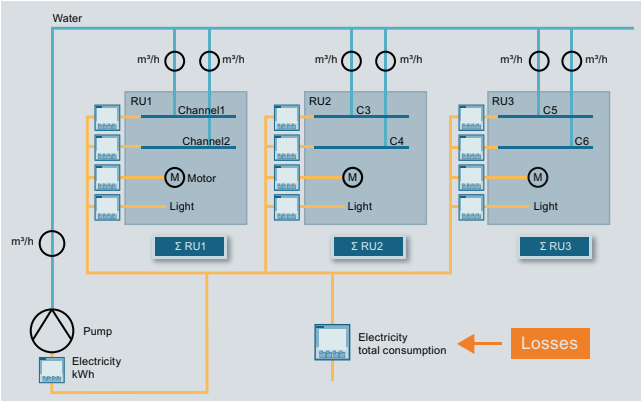
Introduction

PAYG is usually allocated according to either cost or consumption:

- Costs - energy costs can be lowered by switching the energy supplier
- Consumption - energy consumption can be lowered by using more efficient equipment

Example of PAYG according to consumption

The following example shows the consumption of water and power. The consumption data is distributed proportionally to three cost centers, RU1 to RU3. In addition to the pure consumption data, the electrical energy for the pump and feed losses should also be apportioned depending on the consumption.



The B.Data report provides an exact breakdown according to media and the plant components. The resulting costs can be easily determined based on the consumption figures.

SIEMENS

Costs Overview

Author: SIEMENS

Period: 1/1/2015 To 2/1/2015
Date: 2/5/2015 7:44:07 AM

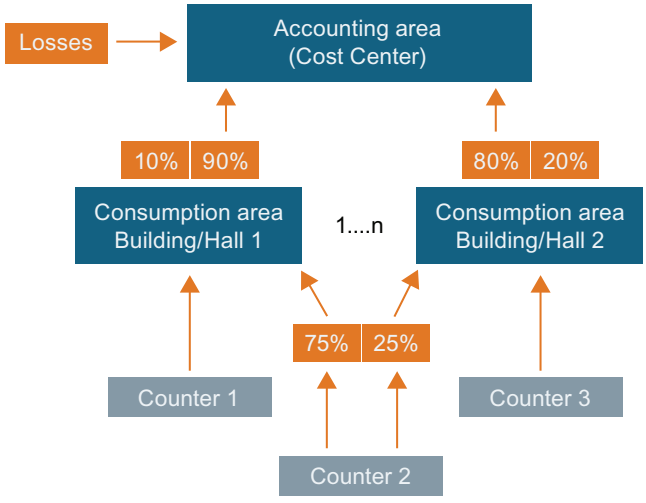
	SIEMENS		total costs 70,829,424 €		total plant						
	Medium	Energy Costs		Unit	Administration building	Tank farm	Water treatment	Production 1	Production 2	air decomposer	Rest
CC 100 % measured	Electrical Energy	absolut	57,464,656	€	5,737,315	2,392,838	1,464,065	17,385,802	19,215,889	10,161,547	**1,107,199**
	81.13%	percentage			10.0%	4.2%	2.5%	30.3%	33.4%	17.7%	1.9%
	Technical Heat	absolut	11,311,006	€	621,873	160,079	3,196,412	4,305,899	2,193,153	48,688	**784,903**
	15.97%	percentage			5.5%	1.4%	28.3%	38.1%	19.4%	0.4%	6.9%
	Room Heat	absolut	1,630,400	€	1,061,127	11,576	308,657	85,811	62,658	5,065	**95,506**
	2.30%	percentage			65.1%	0.7%	18.9%	5.3%	3.8%	0.3%	5.9%
	Natural Gas	absolut	17,600	€	1,760	1,467	1,760	3,755	2,933	2,933	**2,992**
	0.02%	percentage			10.0%	8.3%	10.0%	21.3%	16.7%	16.7%	17.0%
	Sum Rest I	absolut			338,402	59,718	238,872	597,180	557,368	199,060	1,990,599
	Staff Factor I	percentage			17%	3%	12%	30%	28%	10%	
CC < 100 % measured	Compressed Air	absolut	131,940	€	397	26,438	39,681	19,345	19,841	19,841	**6,399**
	0.19%	percentage			0.3%	20.0%	30.1%	14.7%	15.0%	15.0%	4.8%
	Portable Water	absolut	28,917	€	53	1,285	3,909	9,639	12,852	129	**1,051**
	0.04%	percentage			0.2%	4.4%	13.5%	33.3%	44.4%	0.4%	3.6%
	Waste Water	absolut	244,906	€	2,675	2,666	210,461	7,786	11,542	7,594	**2,182**
	0.35%	percentage			1.1%	1.1%	85.9%	3.2%	4.7%	3.1%	0.9%
	Sum Rest II	absolut			258,778	159,248	497,650	398,120	398,120	278,684	9,632
	Staff Factor II	percentage			13%	8%	25%	20%	20%	14%	
	Total Sum	**absolut**	**70,829,424**	€	**8,022,381**	**2,815,314**	**5,961,467**	**22,813,334**	**22,474,356**	**10,723,539**	
		percentage			12.44%	48.31%	16.22%	10.03%	3.91%	4.12%	

Example of PAYG according to cost centers

In the following example, the energy consumption of two workshops will be allocated to one cost center. Counters 1 and 3 are installed in the factory buildings. Counter 2 is mounted on the main distributor, which supplies both factory buildings with electricity.

The distribution keys are often specified by management and are subject to change during the course of a business year. B.Data saves changes to the billing logic automatically. Access to older distribution keys is possible at any time.

For various reasons, not all consumptions are acquired. The missing consumptions are proportionally assigned to the individual cost centers with the help of a correction factor.



In the report, B.Data provides a detailed breakdown of the costs for the two factory buildings depending on the distribution keys, such as the monthly consumption.

Accounting

Author: SIEMENS

Period: 1/1/2015 To 2/1/2015
Date: 2/5/2015 2:21:38 PM

Balance

Consumption Hall 1	kWh	2,050,058
Consumption Hall 2	kWh	1,949,668

Consumption distribution hall 1

Description	Unit	Value	Cost-Center
correction factor		1.0977	
counter sum	kWh	2,050,058	
counter sum corrected	kWh	2,250,409	
40.4	kWh	909,165	CC 3232
24.4	kWh	549,100	CC 3244
35.2	kWh	792,144	CC 5554

Consumption distribution hall 2

Description	Unit	Value	Cost-Center
correction factor		1.1104	
counter sum	kWh	1,949,668	
counter sum corrected	kWh	2,164,900	
25	kWh	541,225	CC 3232
50	kWh	1,082,450	CC 3244
25	kWh	541,225	CC 5554

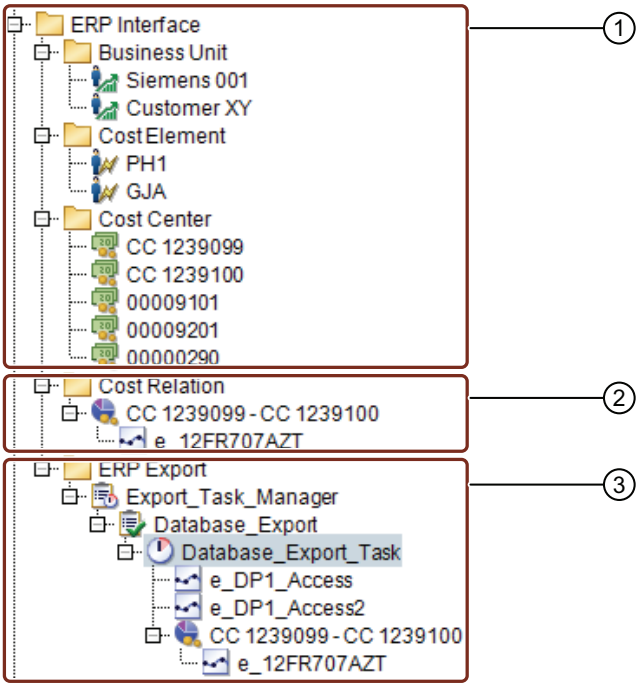
Export of the Data to ERP

Definition

With the ERP interface you transfer the data from one or more cost centers to an ERP system such as SAP. The exchange format of the export file is a versioned XML document.

Conversion to B.Data

B.Data contains all of the objects you need for configuring your cost centers.



① Configuration of the cost center with predefined objects, such as "ERP Domain" or "ERP Cost Element."

② The object "Cost Center Relation" contains all of the necessary information so that the values in the ERP system can be processed further. Simply place the calculated consumption value underneath the object.

③ Export via the Task Management of B.Data. Thanks to the structured content, the individual entries can be explicitly assigned to the items in the ERP system.

Planning and Prediction

Basics of Planning and Projection

Introduction

Planning and prediction are preconditions for effective and sustainable energy management. This is enabled through the most accurate forecast possible of the energy demand and the load curve for one or more sites, buildings, production areas or individual consumers.

The **exact planning of the energy requirement** for a specific time period returns procurement benefits due to the tiered tariff systems of the energy providers. A financial benefit can be achieved under the following circumstances:

- The difference between expected consumption and actual consumption within a defined period of time remains as low as possible
- Load peaks are shifted to times when power generation is cheaper.

With B.Data you always have all relevant information at your fingertips.

Requirements for an energy management system

Load peaks in industrial plants are largely determined by production and its shift or product cycles. The prediction methods can vary in different equipment units: An energy management system must have different methods for predicting; only then are accurate predictions possible.

- In a pump mill, for example, predictions are usually made based on production quantities. The shredder and waste paper units are only in operation as required, which is why forecasting is based on production plans.
- By contrast, shift schedules are used for predictions in the automotive industry.

Conversion to B.Data

B.Data supports the following methods for planning and prediction:

- Production plans (with SIMATIC B.Data Planning & Prediction option)
- Comparison days and shift model
- Daily consumption values

The forecasts can be compared with the actual data in future analyses.

See also

Prediction based on regression analysis [page 39]

Prediction based on shifts

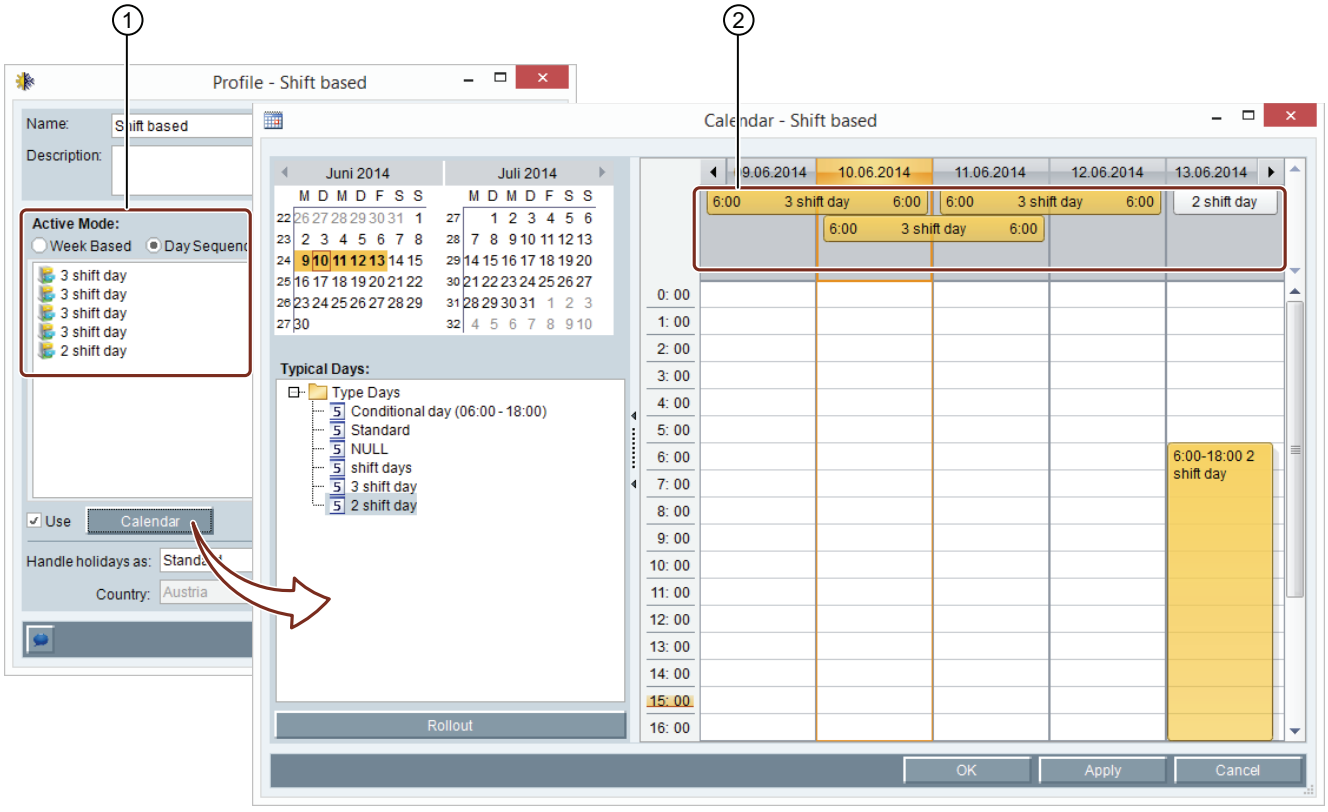
Prediction based on shifts or the comparison day principle uses shifts or type days that are analyzed over a reference time period from the past, such as a quarter. In this analysis phase, you determine the average energy consumption per shift or day at a user-definable cycle, for example, 15 minutes or 1 hour.

The energy demand is calculated depending on the scheduled type days and associated plant operating times.

- Examples of type days: Workday (8 hours), workday (6 hours), workday (10 hours), holiday
- Examples of shifts: Morning shift, evening shift, night shift, special shift

Type days are usually planned on a weekly basis, a flexible schedule without committing to an entire week is also possible. Holidays and other non-working days are automatically considered.

You can always keep the forecasts up-to-date with the help of a calendar, for example, by changing the type days or by moving them to other days of the week.



① Profile definitions based on a calendar week with predefined type days.

② Calendar for clear display and adjustment similar to the MS Outlook calendar management.

The forecast result can also be corrected to compensate for production data or temperature effects in order to provide a uniform basis for comparison. The evaluation of the prediction quality – the comparison with the actual data – concludes the prediction. The result can affect the next prediction.

Prediction based on production plans

Introduction

The production planning-based prediction method is based on the results of the batch analysis in which you determine the material characteristic via the regression analysis $y = k \bullet x + d$. This requires that a stable relationship exists between the energy consumption and quantity/amount being produced.

You obtain the values for *k* and *d* from a batch analysis (material characteristic), *x* stands for the quantity/amount. *y* is the future energy consumption.

The production plan defines which product is produced and in which quantity. For each product, corresponding product parameters are defined for each medium. B.Data also supports you in calculating the product parameters.

Based on the amount to be produced and the duration, you can also determine the amount produced per hour.

The production plan is made available with the SIMATIC B.Data Planning & Prediction option.

Conversion to B.Data

You define the production plan either directly in B.Data or via a predefined MS Excel file. You can of course adopt data from a production planning system; e.g. in "CSV" or "XML" format .

See also

Specific Performance Indicators [page 27]

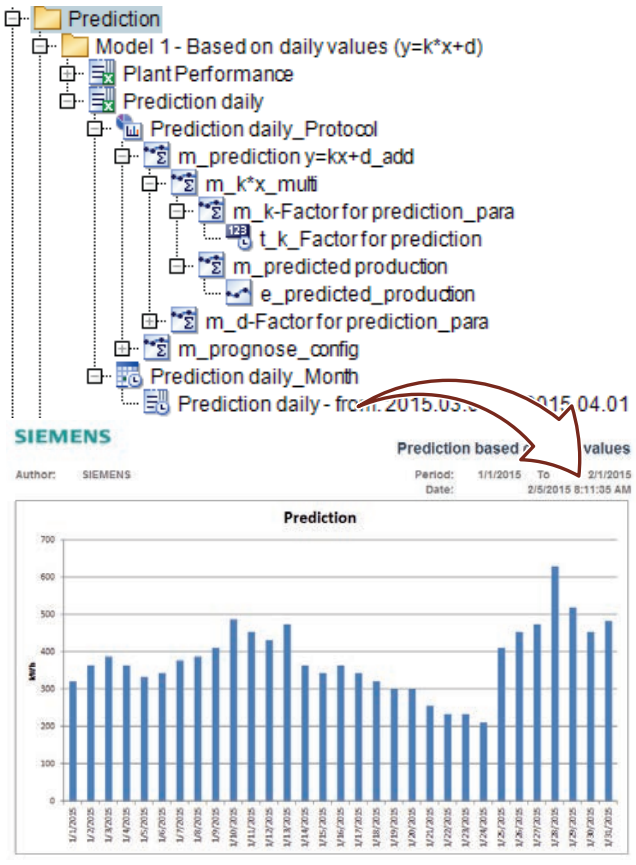
Prediction based on regression analysis

Introduction

In contrast to prediction based on production plans, this type of prediction determines the total energy consumption of the overall production process based on actual values from the past. There is no breakdown of the amount of energy consumed by the individual products. The amount of energy consumed is assigned to each daily production. The prediction then calculates the probable energy demand based on the expected production volume.

Conversion to B.Data

The relationship between the daily production quantities and the corresponding consumption data is determined by means of a regression analysis. The analysis yields the parameters for the linear equation $y = k \bullet x + d$, which is displayed in B.Data. After the definition of the planned production quantities, the prospective energy requirements are calculated and are presented in a report.



See also

Basics of Planning and Projection [page 37]

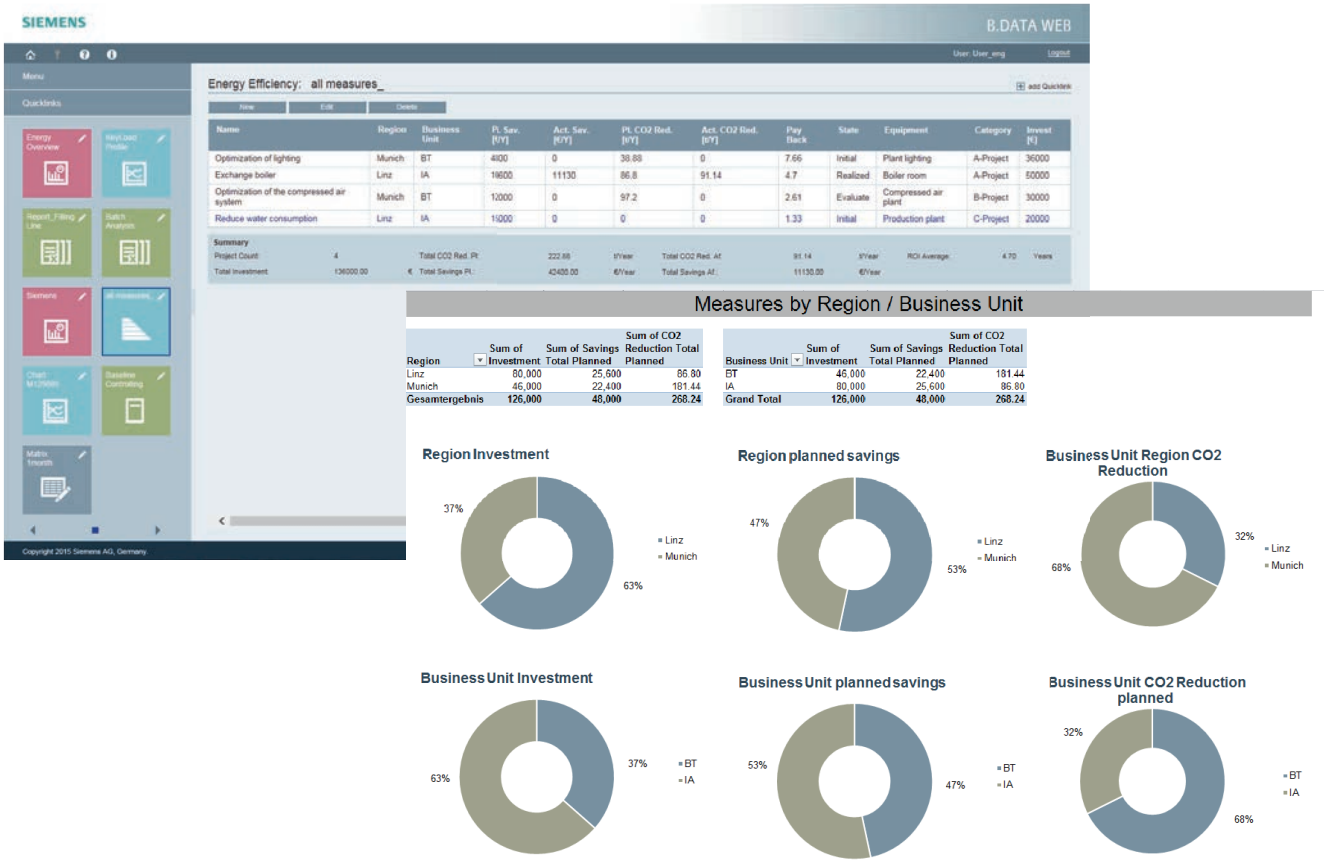
Energy Efficiency Project Management

Basics of Energy Efficiency Measures

ISO 50001 requires, among other things, the definition of energy efficiency improvement measures and their evaluation. ISO 50001 requires the tracking of energy efficiency improvement measures after they are implemented.

One task of the energy manager is to display the estimated saving potential. With consumption and costs, emission savings are also a relevant factor. For a cross-location analysis, it is therefore often necessary to evaluate measures separately according to locations or business units.

B.Data is the tool for increasing demands: With B.Data, the planned measures to increase energy efficiency are entered directly on the B.Data client or on the B.Data Web client. The automatic reporting of B.Data displays the plannded measures to increase energy efficiency clearly and across locations.



Definition of Energy Efficiency Measures

Definition

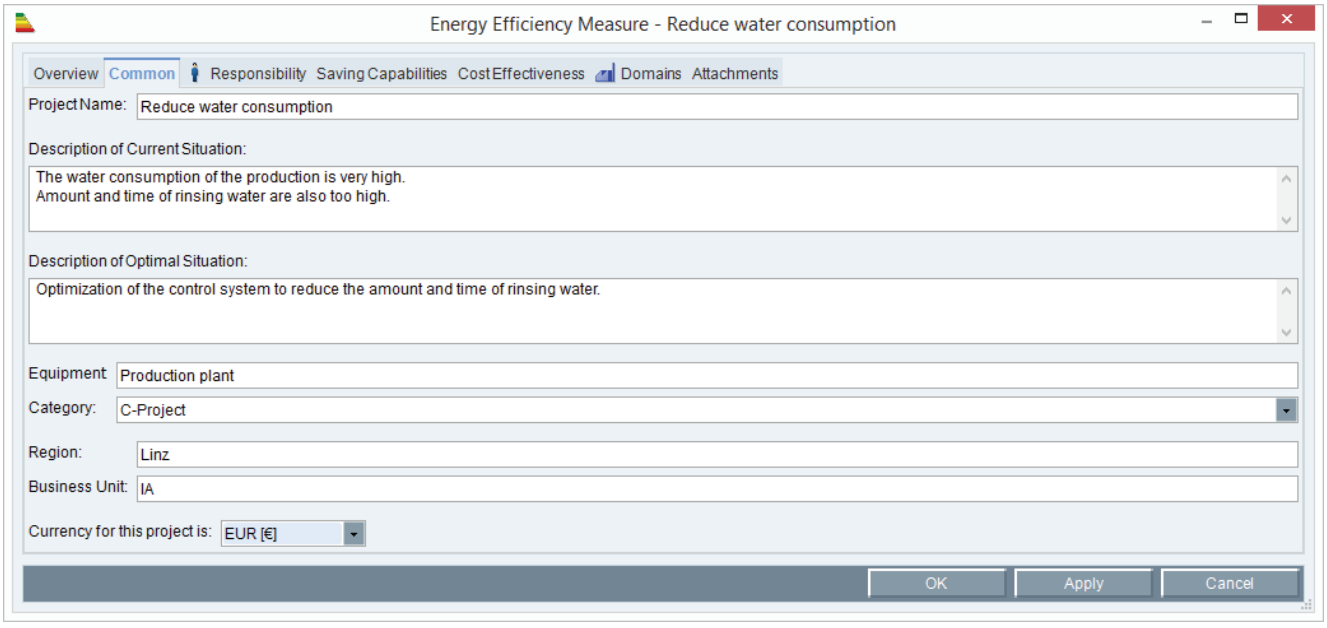
An energy efficiency measure is defined by the following main factors:

- Background: What triggered the energy efficiency measure and what should be achieved?
- Costs / benefits: What are the costs of the measure and how long will it take before it pays for itself?
- State: Who carries out the energy efficiency measure and to what extent has it been implemented?

Managing energy efficiency measures

With B.Data you keep track of all of your company's energy efficiency measures:

- All energy efficiency measures of all of your business locations are recorded centrally in B.Data. Each energy efficiency measure can be assigned to a region, department or even a specific plant.
- Automatic calculation of efficiency based on potential savings and costs of each energy efficiency measure.
- Predefined status for implementation progress of the energy efficiency measures.
- Categorization: Predefined priorities or categories help you to prioritize energy efficiency measures.



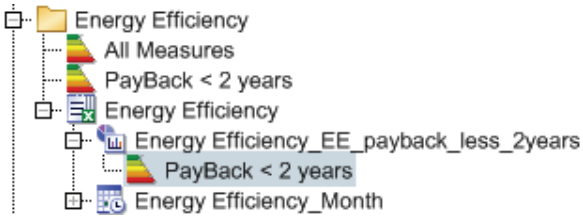
Overview of the Energy Efficiency Measures

Create your own views of the energy efficiency measures

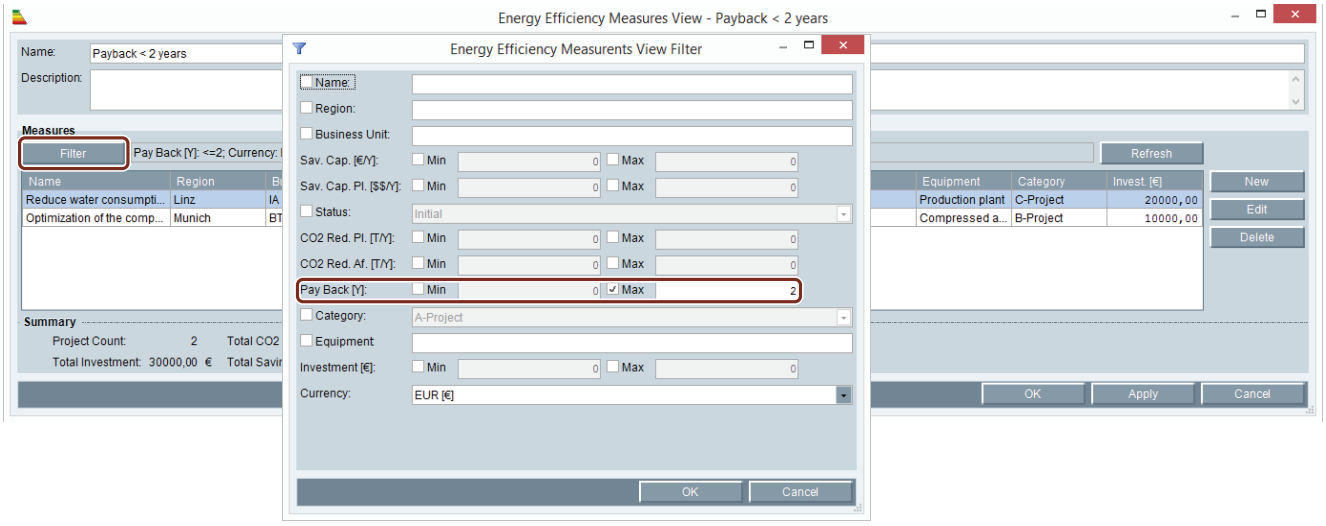
Depending on an employee's position in the company, only certain aspects of the proposed energy efficiency measures may be of relevance, such as the planned CO_2reduction or a specific amortization period.

In B.Data individual views of the measures can be defined and then easily accessed via the Plant Explorer and in the web.

These views can also be used in the automated reporting system and thus output in a report.



The corresponding measures are shown by double-clicking on one of the filters. The filter can be adjusted at any time.



The filters used above shows all energy efficiency measures that have an amortization period of less than two years.

Additional filter options that can be combined are, for example:

- Status
- Region or Business Unit
- Planned savings
- Planned CO_2 reduction
- Planned investment costs

Evaluating Measures

Definition

A predefined module of the automated reporting of B.Data is available for the evaluation of energy efficiency measures. The energy efficiency measures can therefore be presented in table. The reports are based on the views created of the energy efficiency measures.

Energy Efficiency Project Management

Author: siemens

Period: 1/1/2015 1/2/2015

Date: 2/5/2015 08:35 AM

Energy Efficiency Measures

Project Name	Category	Savings Total Planned	Savings Total After	CO2 Reduction Total Planned	CO2 Reduction Total After	Status	Region	Business Unit	Investment	Internal Interest	ROI	NPV	Payback
		[EUR]	[EUR]	[t CO2]	[t CO2]				[EUR]				
Exchange boiler	A-Project	10,600	11,130	86.8	91.1	Realized	Linz	IA	50,000	0.1%	4.25	94,756	4.70
Optimization of lighting	A-Project	10,400	0	84.2	0.0	Initial	Munich	BT	36,000	0.1%	2.86	63,903	3.50
Optimization of the compressed air system	B-Project	12,000	0	97.2	0.0	Evaluate	Munich	BT	10,000	0.1%	17.25	91,273	0.87
Reduce water consumption	C-Project	15,000	0	0.0	0.0	Initial	Linz	IA	30,000	0.1%	5.00	115,826	2.00

Benefits

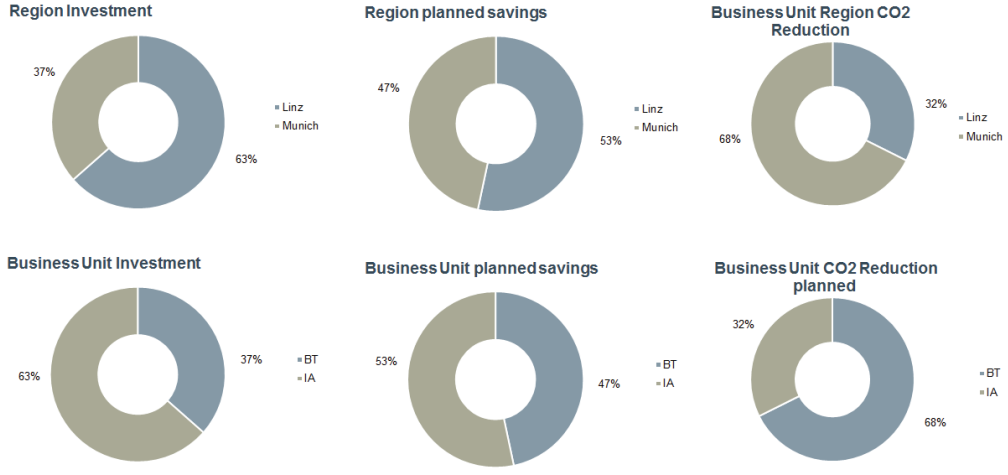
Thanks to the predefined modules of the automated reporting, the measures can be quickly prepared and displayed in a way suitable for management. Comparability between the locations or business units with regard to the planned or executed energy efficiency measures is therefore possible.

The generated reports can be used as an overview, as a basis for decision making or as proof of completed measures, for example.

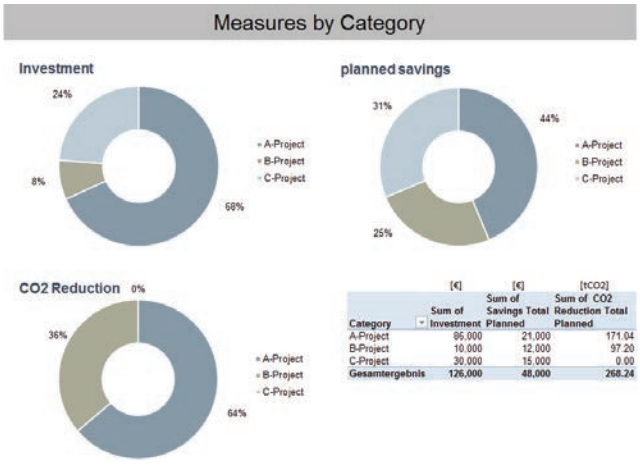
Measures by Region / Business Unit

Region	Sum of Investment	Sum of Savings Total Planned	Sum of CO2 Reduction Total Planned
Linz	80,000	25,600	86.80
Munich	46,000	22,400	181.44
Gesamtergebnis	126,000	48,000	268.24

Business Unit	Sum of Investment	Sum of Savings Total Planned	Sum of CO2 Reduction Total Planned
BT	46,000	22,400	181.44
IA	80,000	25,600	86.80
Grand Total	126,000	48,000	268.24



Another evaluation method is the prioritization of energy efficiency measures based on predefined categories. Based on factors such as investment, planned savings and CO_2reductions, the results may vary greatly – but there may also be some potentials.



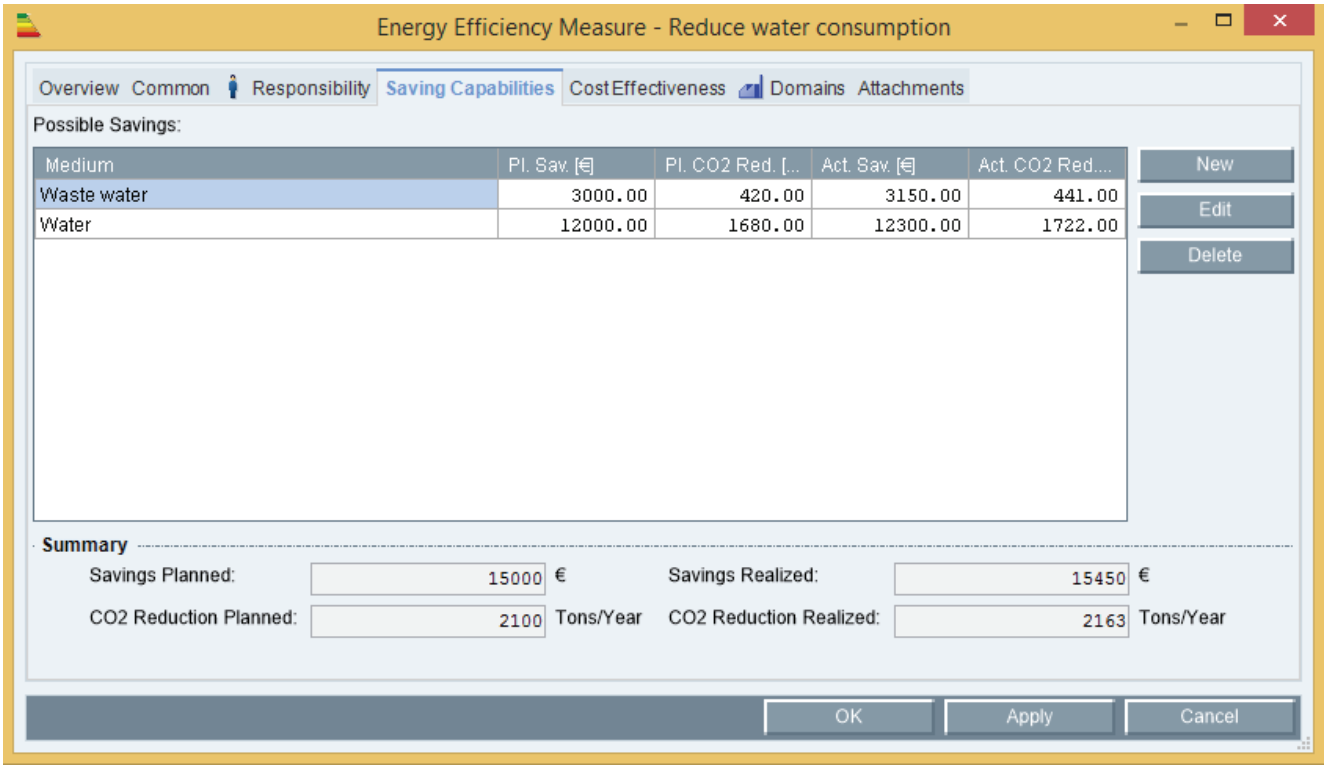
See also

Definition of Energy Efficiency Measures [page 41]

Overview of the Energy Efficiency Measures [page 42]

Evaluating the Implemented Measures

When an energy efficiency measure has been completed, the cost effectiveness must calculated. For this purpose a comparison of the planned savings and the savings actually realized based on the actual values is necessary. This data is entered into B.Data directly. The savings are documented in this way and can be output in reports at any time.



Engineering with SIMATIC B.Data

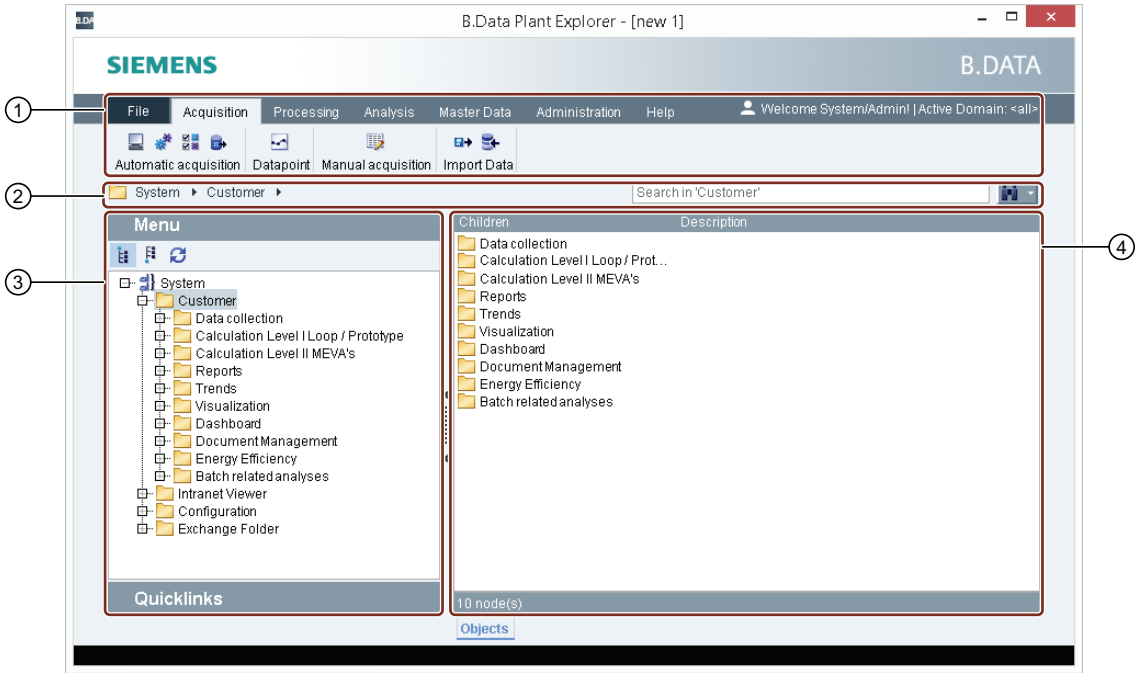
The Plant Explorer

Plant Explorer as a Navigation Tool

The **Plant Explorer** is the Windows-based **user interface** of **B.Data** that enables intuitive working. You configure all of the objects you need for energy data management in your organization in the Plant Explorer:

- You configure the objects that contain your operating data, such as data points or parameters. Thanks to the object-oriented approach, you use an object in several places, such as for calculating performance indicators or in reports. Modifications will automatically be reflected in all points of application and are simultaneously recorded in change management - the reproducibility of older configurations is always assured.
- You evaluate your operating data or performance indicators with the help of reports or the Quick Chart.
- You display your operating data and performance indicators in a visualization or dashboard.
- You configure the interfaces that provide you with operating data, such as Modbus, WinCC, or OPC. This is completed quickly and easily using a wizard.

The grouped structure and the user-friendly tool tips of the Plant Explorer ensure that you easily get the desired result of your configuration.



① **Menu bar**
The menu bar contains all buttons for system operation organized in categories.

② **Navigation bar and quick search**
The navigation bar shows the current position in the project tree in text form.
The quick search is a simple full-text search. The search result is displayed in the display area ④ .
When you click on the search result, the position of the search result in displayed in the project tree ③ .

③ **Project tree**
You create objects that you need for energy management in the predefined "System" root in the project tree.
You can structure the project tree, for example, according to locations or function. You create favorites for frequently required objects in the "Quicklinks" area.

④ **Display area**
The display area shows details of the object that you selected in the project tree.

Main Functions of the Plant Explorer

Control center for your energy data management

The Plant Explorer represents your work environment for all of your energy data management tasks:

- Definition of data points (tags)
- Manual entry of data
- Definition of measurement functions for determining KPIs
- Initiation of reports
- Creation and viewing of Dashboards
- Viewing of Charts and Trends
- Export and import of configuration data

Objects in B.Data

You organize the objects needed for this work in a tree structure. The objects can be explicitly identified by their names. Once an object is created, you can use the "Copy" function to use it elsewhere in the project tree, such as in a report or in a calculation. A change to the object affects all points of use. By contrast, cloning creates a copy of the object with identical settings but with a new name.

Object Properties

Any predefined object properties such as "Created by" or "Department" can be assigned to an object. In addition, you can define your own properties. Properties have the following advantages:

- You can search for these properties.
- You can use these properties in reports.

Search

The quick search is available in the Plant Explorer.

It is a full-text search and the result is a list of all items that contain the search term. The results are shown in the display area. You can filter the result list, by entering terms in the quick search field again.

Data Management

Basics of Data Management

Definition

The basis for accurate energy data management is the **quality of the collected data** with respect to **reproducibility** and **plausibility**.

Options in B.Data

B.Data offers the following options for detecting and correcting irregularities in the recorded data:

- Plausibility checks by using predefined limit values, e.g. during manual data entry or in a regular report on the data quality
- Automatic notification when limits are violated
- Substitute value methods for correcting incorrect values or filling gaps in a series of measurement values
- Automatic logging of all relevant user actions

Furthermore, B.Data has counter management which, in addition to the recording of counter readings, also controls counter overflows or replacements.

See also

Basics of Monitoring [page 17]

Data Validation [page 47]

Manual Data Entry [page 48]

KPI Alarms [page 52]

Change Management [page 54]

Counter Management [page 55]

Data Validation

Introduction

For precise analyses and predictions, correct measurement data is absolutely essential. Normally the data of many measuring points are recorded, processed, and transmitted in an industrial plant. Errors that occur in data series must be recognized by the energy data management software and made available to the energy manager in a clear format so that measures can be derived from them.

B.Data offers three methods for this purpose:

- **Reports** provide an overview of the data quality of the acquired values, for example
- **Substitute value methods** for automatically filling in gaps or correcting faulty values.
- The **Service cockpit** is a clear representation of the hardware status and informs you in which of the configured interfaces the gaps have occurred.

Reports

B.Data offers the following plausibility checks with which the quality of data from data points can be checked in a report.

Plausibility checks	Delivered Results
Reference datapoint deviation	Low and high limit value violations, based on the configured limit values of the reference data point. Gaps in the series of measurement values are shown separately.
Gaps	Number of gaps, based on the expected target value, such as four 15-minute values within an hour.
Max. increase	High limit value violation based on the configured limit
Min Max	Low and high limit value violations, based on the configured limit values.
Status not OK	Number of entries with this status including timestamp.

The plausibility checks can be summarized in a common report, for example.

SIEMENS

Validation Report

Author: SIEMENS Period: 1/1/2015 2/1/2015
Date: 2/5/2015 3:37:22 PM

Total Overview

Gaps	2
Min. Deviation	3
Max. Deviation	1
Max. Rise	1
Status not OK	0
Deviation to a reference DP	0

Substitute value methods

Gaps and values in a measurement series marked "invalid" can be automatically filled or corrected while they are being recorded (or during subsequent calculation).

B.Data offers to the following substitute value methods for this purpose:

- Using the measured value of a different data point
  If a measuring point is designed to be redundant, the measured value of another measuring point is used if there is a gap in the series of measured values.
- Using the last valid value
  If a gap occurs, the last valid measured value of the measurement series is entered.
- Using a constant value
  The value of a "constant" configured data point is entered instead of the gap.
- Using historical value
  Instead of the gap, a value with the same time stamp is used, but from the day before, for example.

The use of substitute value methods and the related corrections are considered to be a "change" and are logged and colored accordingly – also in a report. You have access to the measurement series at different times with activated "Versioning." This ensures, for example, the reproducibility of the reported results.
If you do not use an automatic substitute value method you can correct incorrect values manually.

Manual Data Entry

Introduction

Manual data input is a frequently occurring phenomenon even though the degree of automation in an industrial environment is currently rather high. Interrupted connections during automatic acquisition, counters that cannot be acquired or failure of a sensor require manual data input.

B.Data provides three tools for this purpose:

- **Matrix** for entering values.
- **Mobile data acquisition** for acquiring values with a mobile device with its own data management. You can select this acquisition when there is no server connection via the network or if a large number of manual measuring points must be acquired. The use of predefined read routes is helpful in this connection.
- **Measurements editor** for editing previously recorded measurement values.

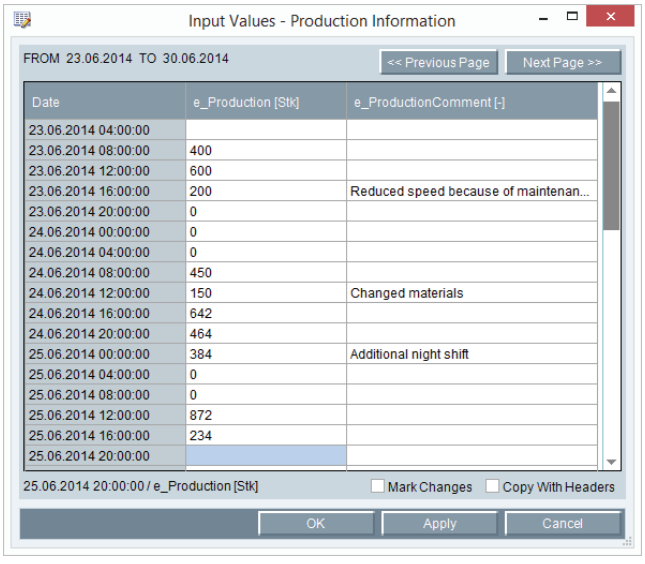
Matrix

Use the matrix to enter new values for one or more data points. Typical applications are for example:

- Entering measurement values of a counter whose values are not automatically acquired.
- Entering target values as a basis for comparisons.
- Entering production data or comments.

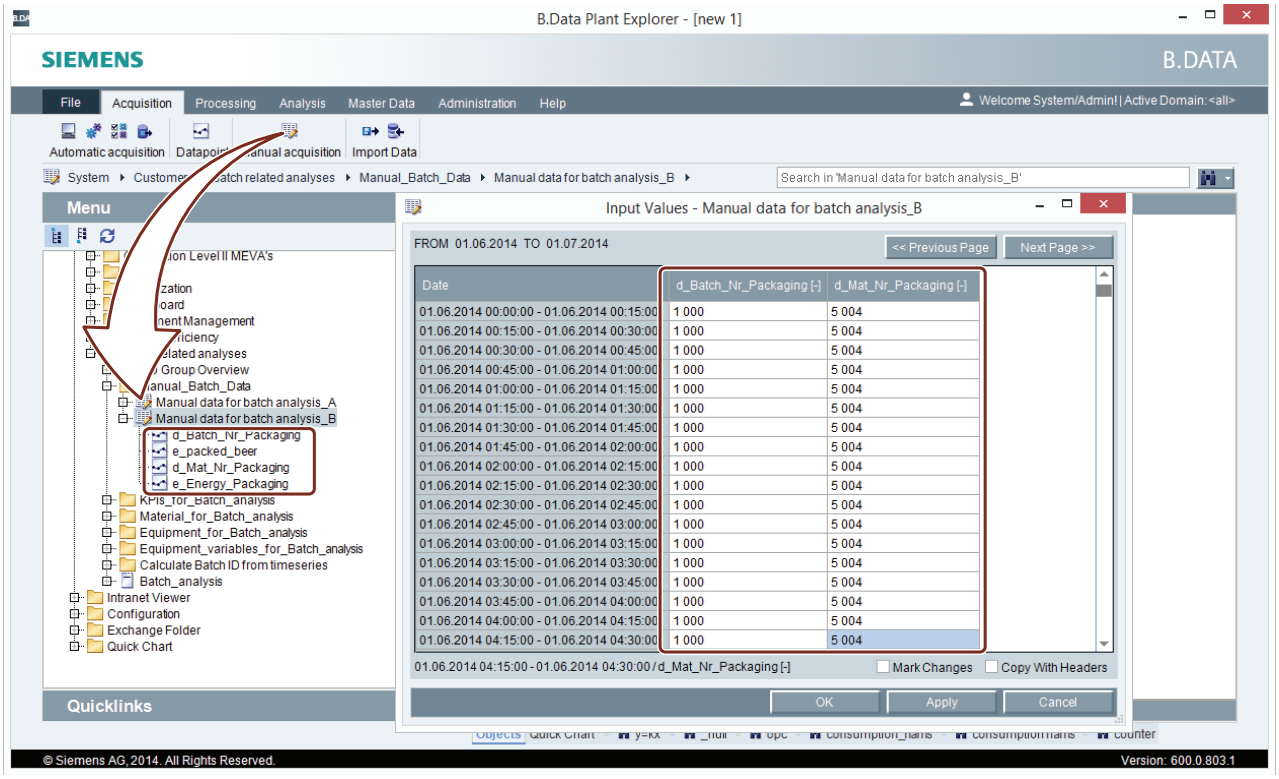
A plausibility check takes place as early as the input and incorrect values are highlighted in color. You can use historical values as guideline by displaying old data values. If you already have the values available in tabular form, you can easily transfer them with Copy&Paste, e.g. from MS Excel.

You can also use the matrix for the display of measurement values in table form only. A transposed display of lines and columns is also available.



Configuring a matrix

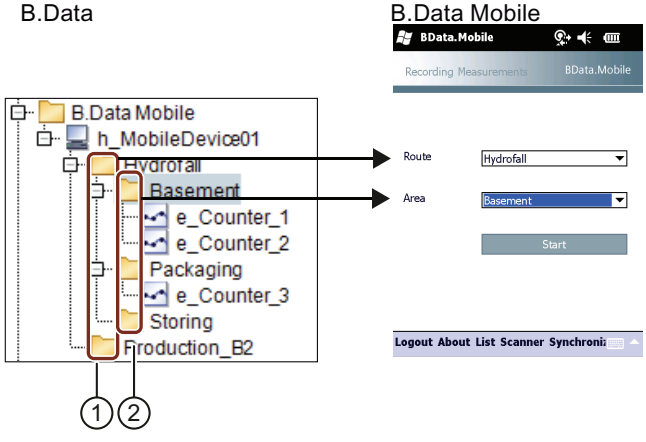
You create a matrix as an object for manual acquisition. Just as with a data point, you set query periods and cycle times. Then you assign the matrix the desired data points. Each data point is displayed as a separate column with timestamp. You then assign the required values per timestamp.



Configuring mobile data acquisition

In B.Data, you assign the data points that you want to acquire with the mobile device to the hardware object. For a better overview, you create a folder structure with a maximum of two levels that you use, for example, to reproduce the production site. In addition, you may define an existing folder structure as a route for a read-off operation. The figure below shows how a folder structure in B.Data is mapped on the mobile device.

When you connect the mobile device after the first synchronization to the B.Data client, the measurement values are synchronized automatically.

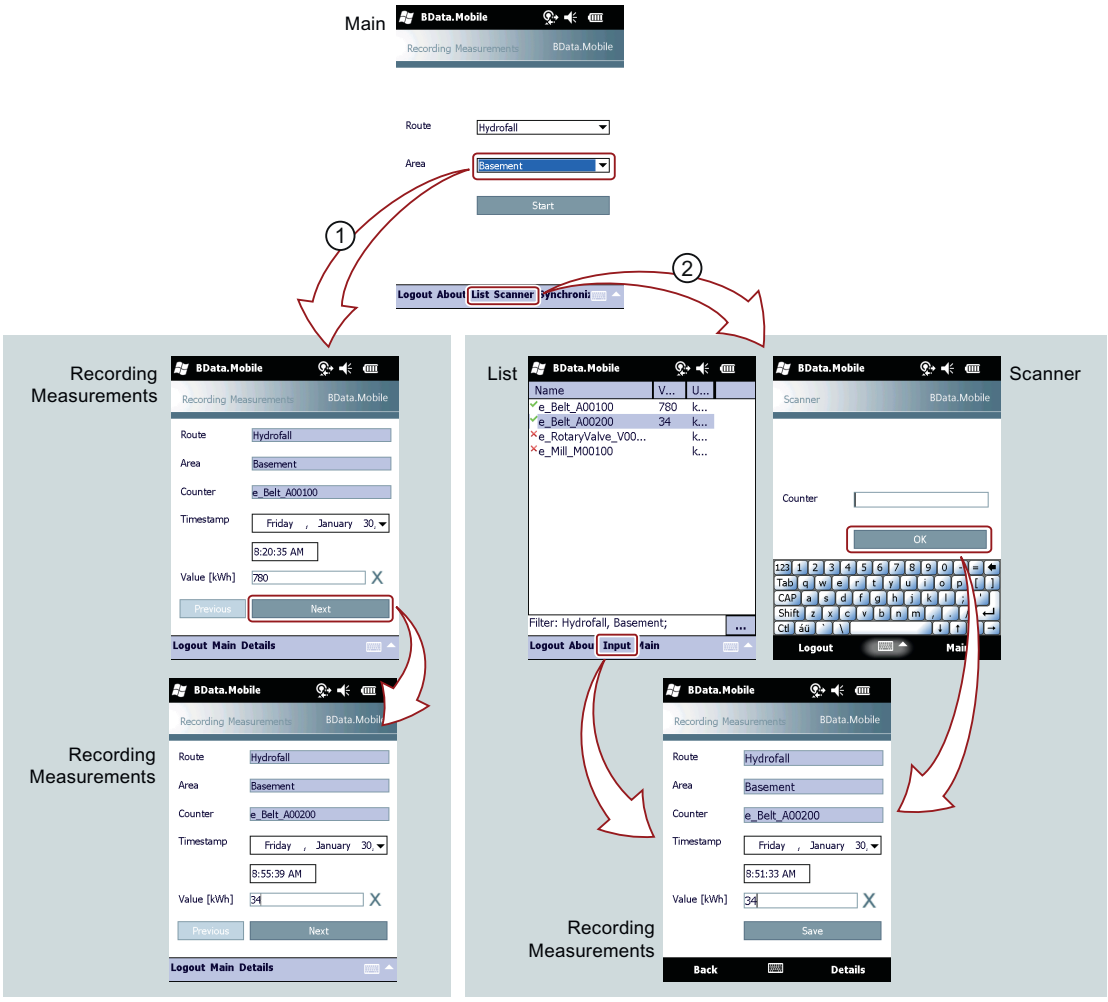


① Folders of the first hierarchy level are organized on the mobile device under "Route".

② Folders of the second hierarchy level are organized on the mobile device under "Area". The content of the selection list depends on the "Route" selected under ① .

Mobile data acquisition

You can also use a mobile device, such as a PDA, for reading off counter contents. B.Data supports the following acquisition methods.



① Define a route

If you are reading off multiple counters at regular intervals, define a route in B.Data. You use a route to define the order in which the devices are read off locally. The mobile device guides you through the route and provides you with additional information, such as the last value, as well as high and low limits.

② Identify counters individually

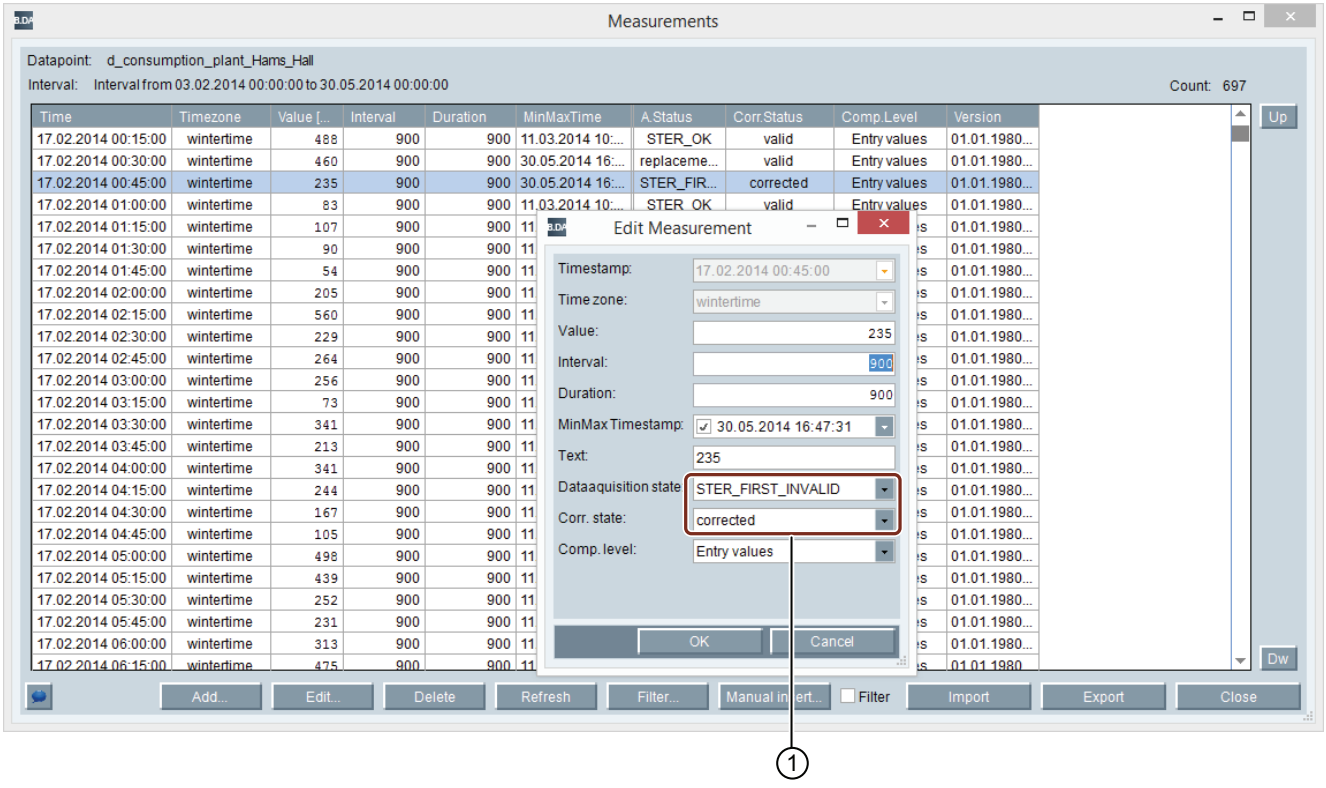
If you are manually reading off counters only rarely or in exceptional cases, identify the counter on the mobile device. If the mobile device has a scanner, you can also uniquely identify a counter using a bar code.

Measurements editor

In measurements editor to edit the recorded measurement values of a data point. All changes are logged in the B.Data Logging Editor for full traceability. Use the Export in CSV format for more extensive changes: Then you can easily edit the measurement series in Micrsoft Excel and then re-import.

For maximum clarity a filter function that allows you to filter for all categories is also available. You can define up to four filters and link them to logical operators.

The measurements editor can be accessed via the shortcut menu of the data point.



① The status for recording and correction is stored for each entry. If you edit values, you must adjust the status accordingly.

Note: Automatic value adjustments are assigned a separate status.

See also

Data Management [page 47]

Data Validation [page 47]

Change Management [page 54]

KPI Alarms

Definition

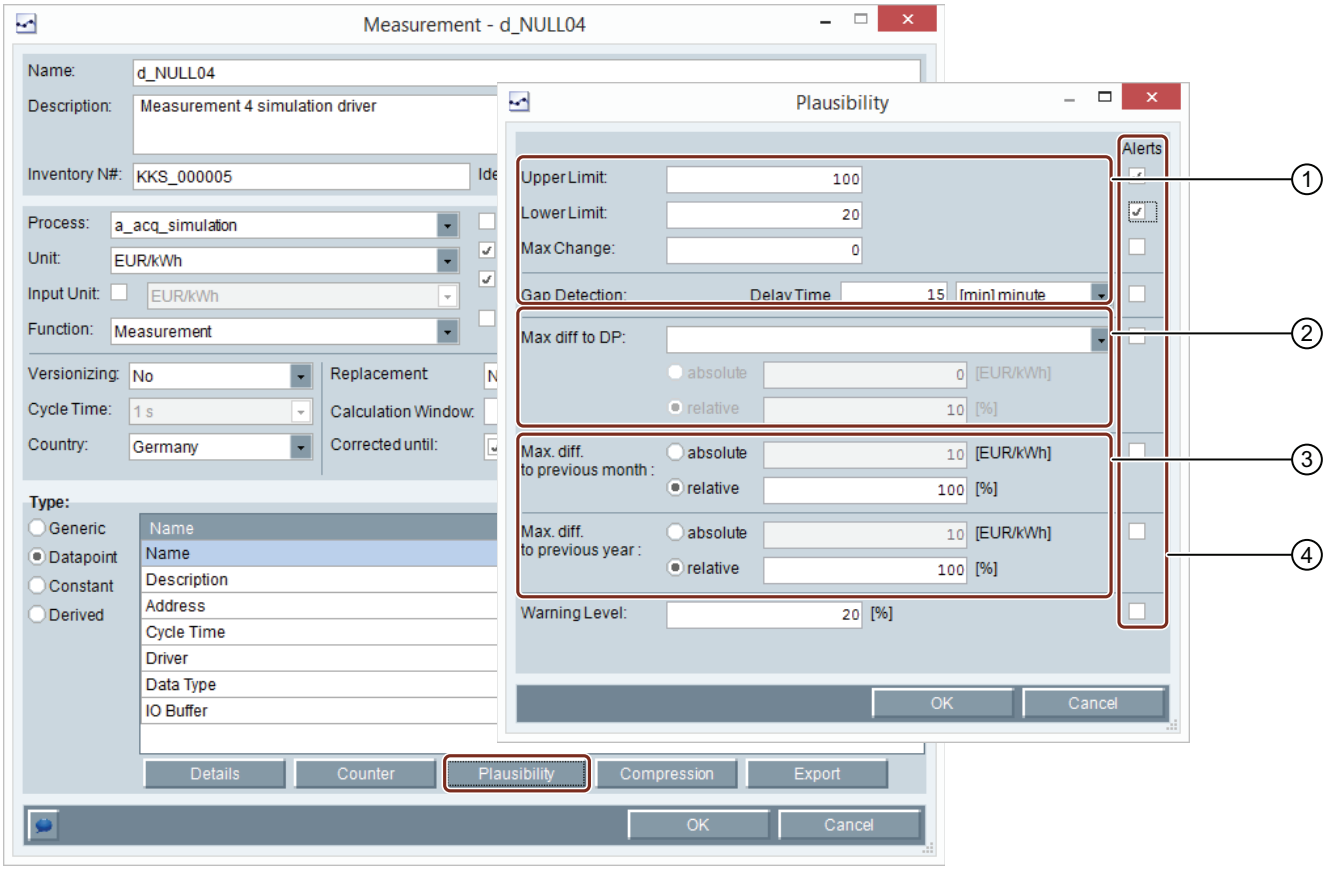
You will be notified by an alarm if the configured limit values of measurement values and performance indicators have been violated. Limit value violations are entered in the "alarm list." You can use filters to create your own "alarm lists". Optionally, the notifications can also be sent via e-mail or displayed in the Windows taskbar. You can also define reminder intervals if an alarm is not confirmed within a certain time span.

Use

Use the alarm function for timely notification of irregularities or significant over / under use of energy consumption. The alarm function is also helpful for monitoring predicted consumption figures: Were the assumptions made incorrect or were they too high or too low? You will be notified in a timely manner if there are significant differences. Then you can also notify the energy supplier and correct energy demands.

Configuring limit value monitoring and the alarm function

The limit values for each data point are defined under its properties. Activate the "Alarm" for each limit value if needed. Addition to setting limit values, you can also use comparative figures, for example, the consumption values of the previous month.



① Limit value definition based on absolute values and the maximum change of a measured value between intervals.
These values are also used as input values in a matrix or in the measurements editor.

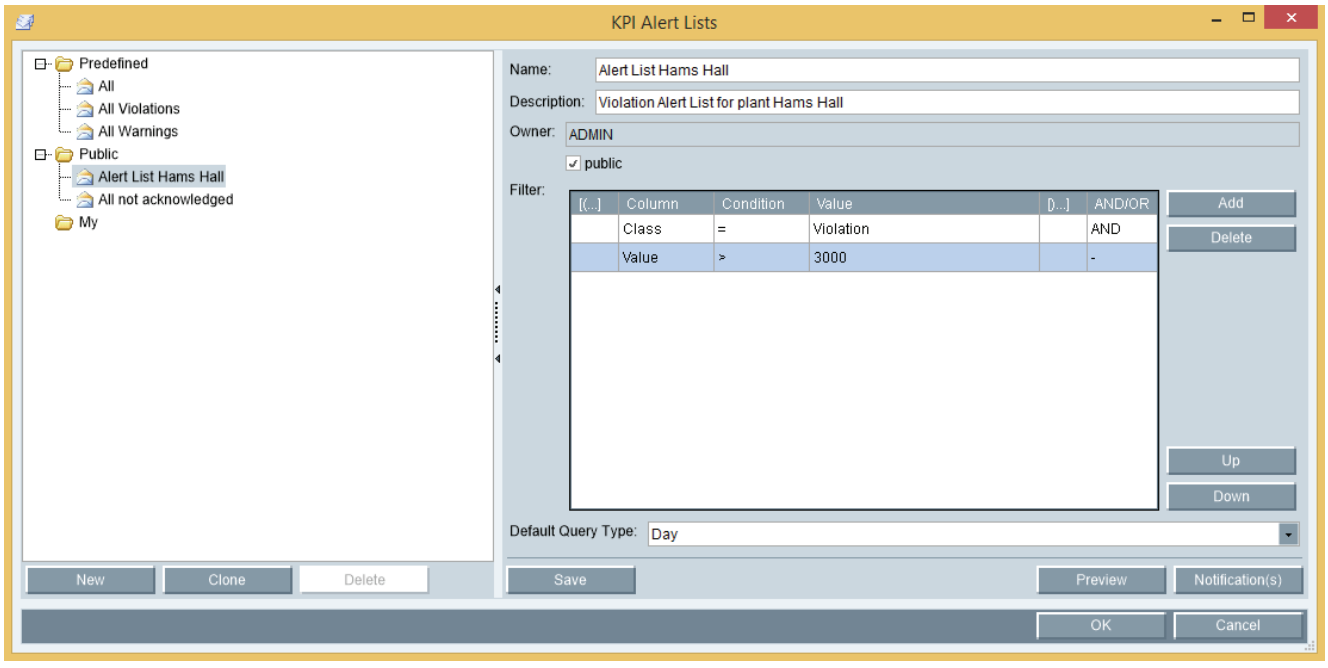
② Limit value definition based on the maximum deviation from the values of a reference data point with target values.
Application example: target/actual comparison

③ Limit value definition based on the maximum deviation from the values of the previous month or year.
Application example: target/actual analysis

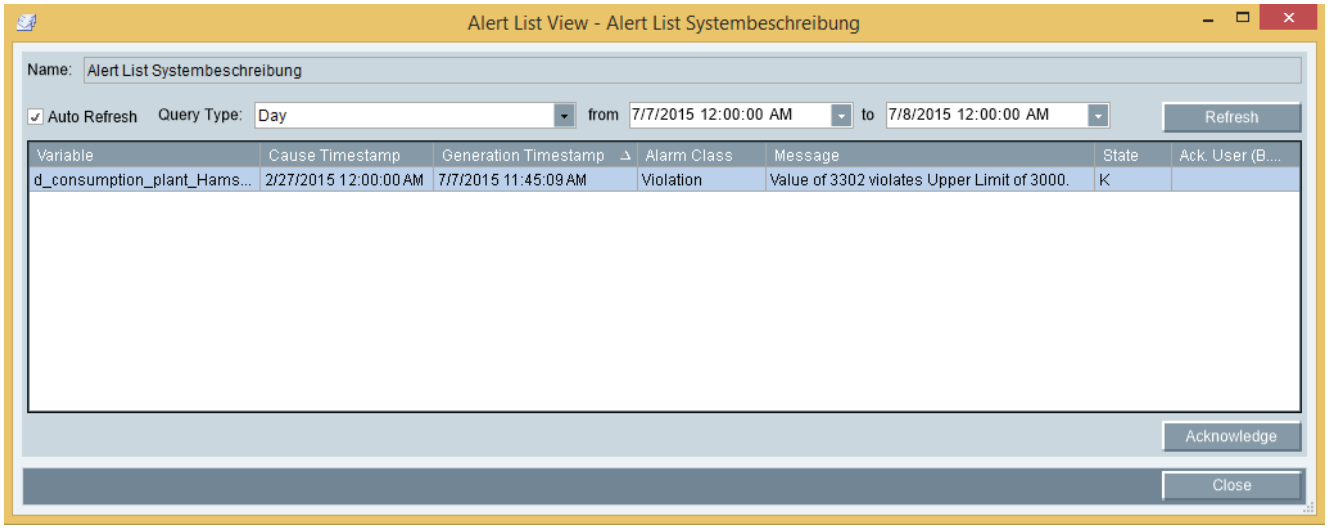
④ Activation of the alarm function. An entry in the alarm list is generated if one of the entered limit values is violated.

Configuration of the alarm lists

The different data points can be combined in lists for alarming. You can assign criteria for display in the respective list once again. Here you can also define if and how employees are informed about a limit violation.



The preview shows all alarms of the data points of the selected list and the selected time range which meet the previously defined criteria.



See also

Basics of Monitoring [page 17]

Manual Data Entry [page 48]

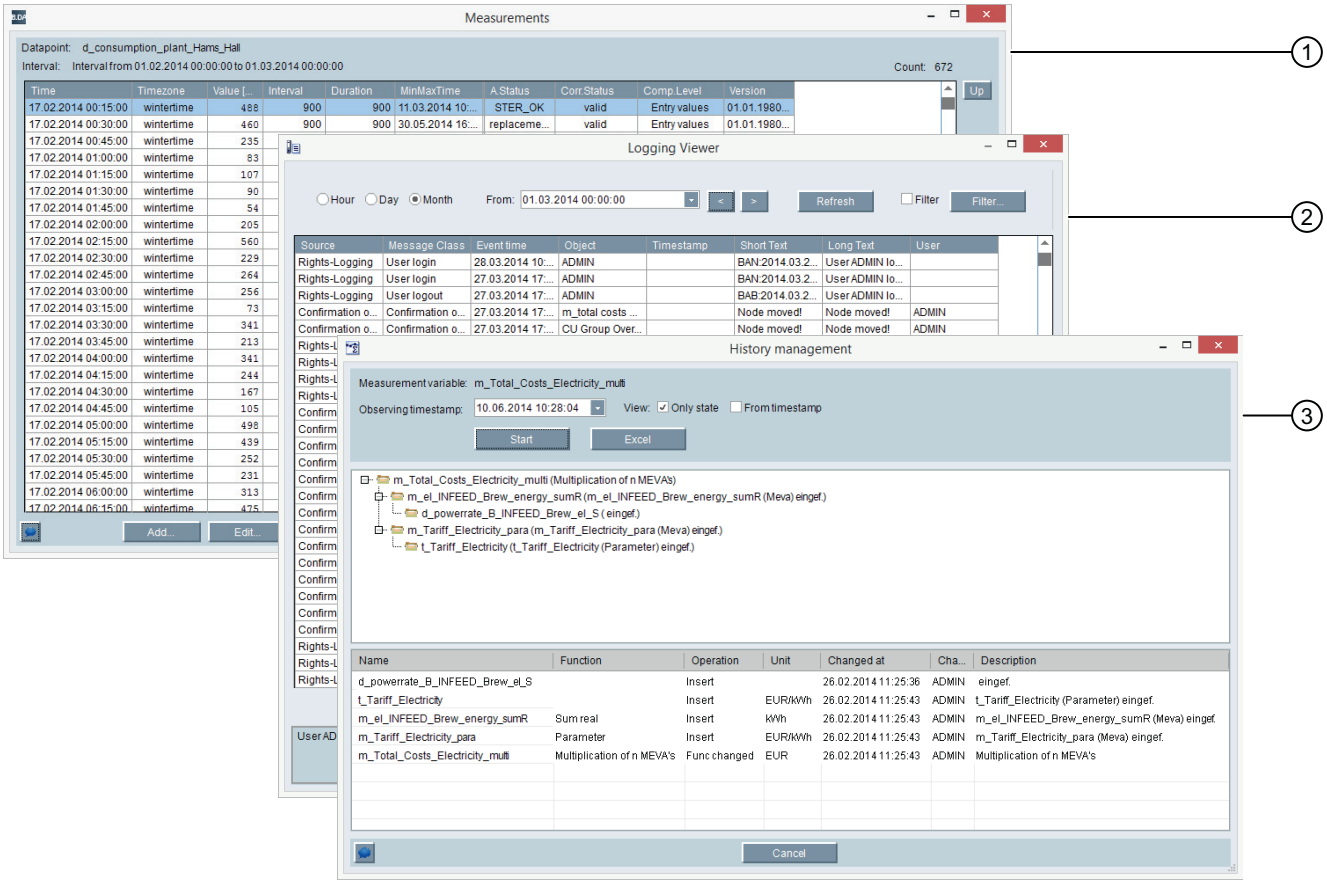
Change Management

Introduction

In addition to the versioning of measurement values, complete traceability of changes within the framework of auditing compliance is important. The calculation basis may change several times during the course of a year when using cost center-based consumption data for energy accounting. With B.Data you can reproduce the billing logic and record the user actions.

Tools for change management

The following tools are essentially available in B.Data:



① Measurement value editor for editing measurement values. All changes are logged in the B.Data Logging Editor for full traceability.

Additional information: Manual Data Entry [page 48]

② Logging Viewer for viewing system and error messages. The following events i. a. will be logged:

- The log on/out of users
- Changes to objects, such as deleting or creating

The Logging Viewer can be started from the ribbon command bar under "Administration."

③ Historicization of measurement variables and reports. Changes are logged in the billing model in the Plant Explorer. Historicization is important for the reproducibility of evaluations or if verification is required for environmental issues (CO_2 emissions). When you assign a derived data point to a billing model, you can also set a validity. When generating reports, simply specify the model date. The report is then generated with the billing model applicable at this point in time.

The historicization can be opened from the context menu of a measurement variable, a derived data point or a report.

Counter Management

Definition

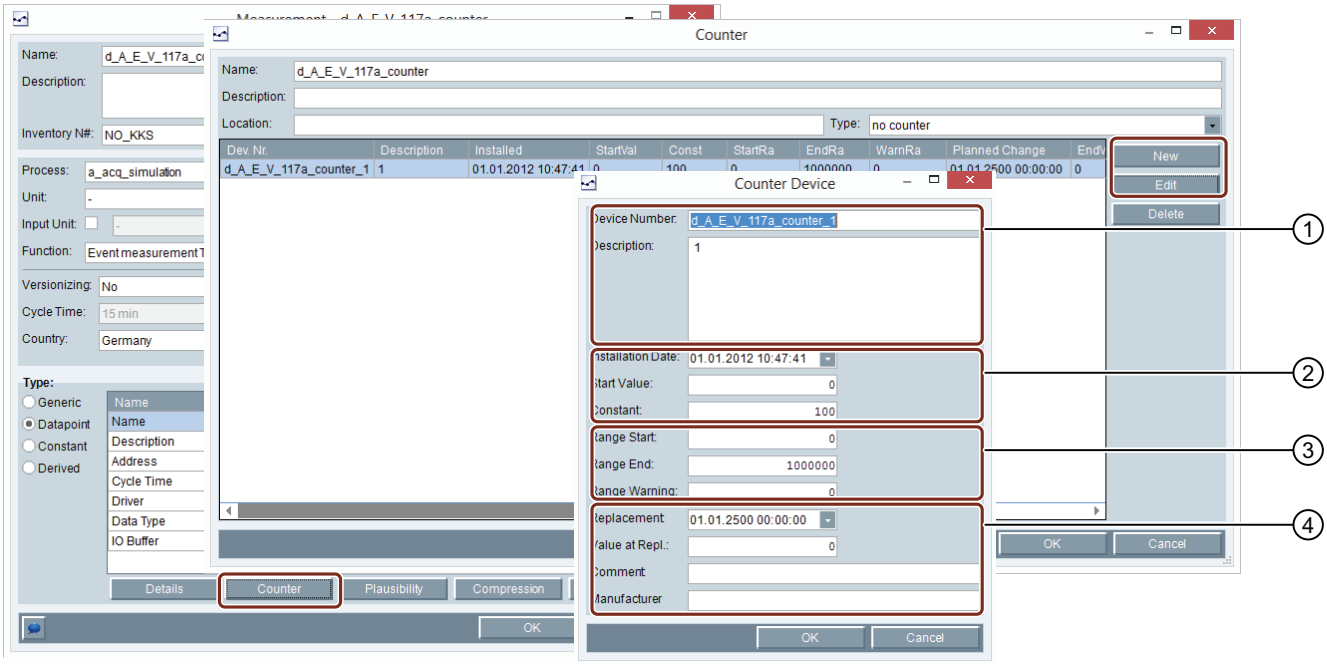
In addition to recording just the consumption data the reading of the counter can also be recorded and stored in the database. The consumption is calculated in B.Data from the difference of the counter readings.

Using the counter management

Many different counters with different counting ranges and characteristics are in use in industrial plants. Factors such as counter overflows or counter replacement are considered for correct calculation of the consumption values. Information on installation location and installation date are required in order to carry out maintenance work on short notice. All these factors must be considered by energy data management software.

Configuring the counter

In order for B.Data to acquire counter values, you create a data point. Then configure the counter in the properties of the data point. If the counter has already been operating for some time, simply enter the current reading as the "start value" in B.Data. Even replacing the counter is not a problem with B.Data: simply add the new counter and enter the current reading.



① Unique identification of the counter

② When installing the counter: enter the date, start value and either a converter or counter constant

③ Information on the counting range of the counter

④ When replacing the counter: enter the date, reading and optional additional information.

Calculating consumption based on counter readings

B.Data provides the following options for calculating consumption values from counter readings:

- Automatic compression during the measurement value acquisition
  You can generate an additional measurement series based on counter readings while recording is in progress, e.g. compression to hourly values.
- Using measurement functions for calculating the consumption data
  B.Data contains special measurement functions by default for processing counter readings, for example, when used in reports.

Data Processing

Calculation level 1

Definition

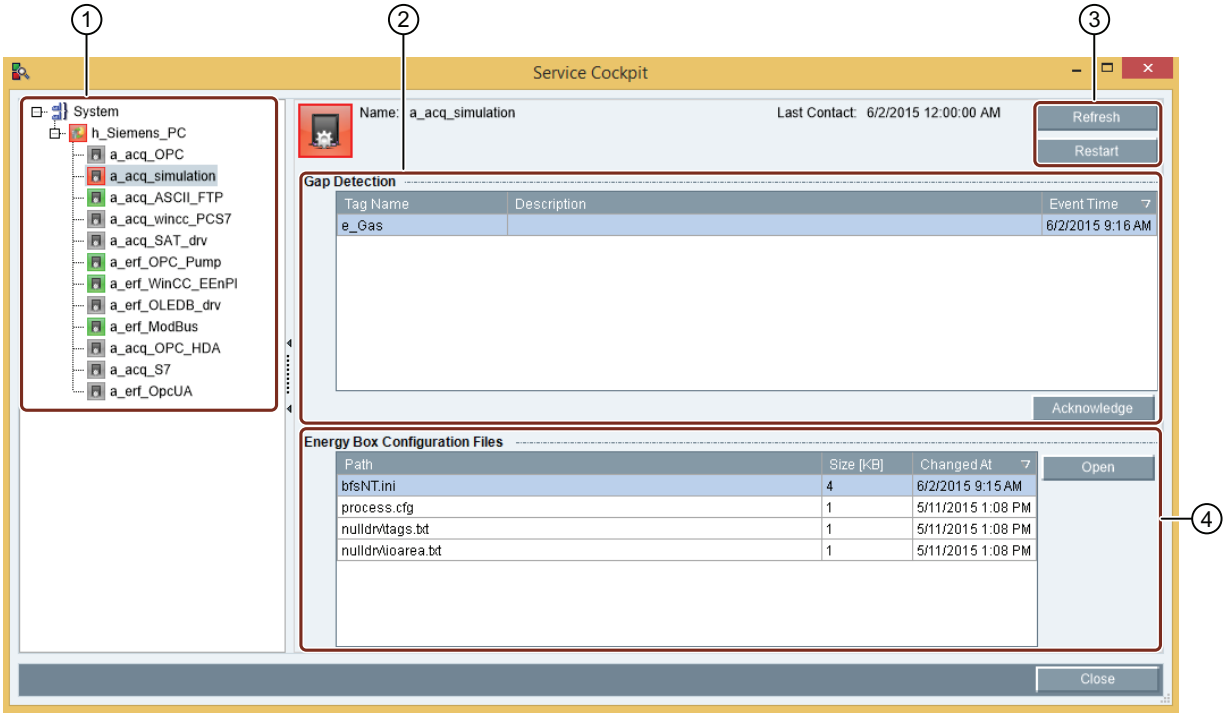
"Calculation level 1" relates to the real-time conditioning of measured values in the acquisition components of B.Data. The measured values are not entered into the B.Data database until they have been conditioned.

Principle

The following options are available during preprocessing:

- Compression of measurement values during import
  Use the pre-defined compression levels to create all of the values you need from the recorded values and then use them for subsequent calculations or analyzes.
  Example: The power consumption is recorded in 15-minute increments. Even during recording, the consumption values are compressed to hourly and daily values and the average daily consumption is determined.
  The following compression functions are available:
  - "Maximum," "minimum" or "average"
  - "Hourly values," "daily values" or "annual values"
  - "Counter difference (overflow, change) without range", or "Count value difference with overflow, counter replacement"
- Processing of measured values in a freely-configurable accounting system
  For example, if fluctuating environmental conditions affect measurement results, use the formula editor for defining and configuring new calculation functions. You can either make use of predefined functions or create your own functions with a simple programming language. The separation into algorithm and parameter assignment ensures a high degree of reuse.
  Typical applications are for example the heat calculation of boiler plants or calculating the efficiency of cogeneration plants.

For a clear display of the status of all acquisition components, you use the "Service Cockpit".



① Status of the acquisition components:
- Green: Active
- Gray: Disabled
- Red: Error during data transmission.

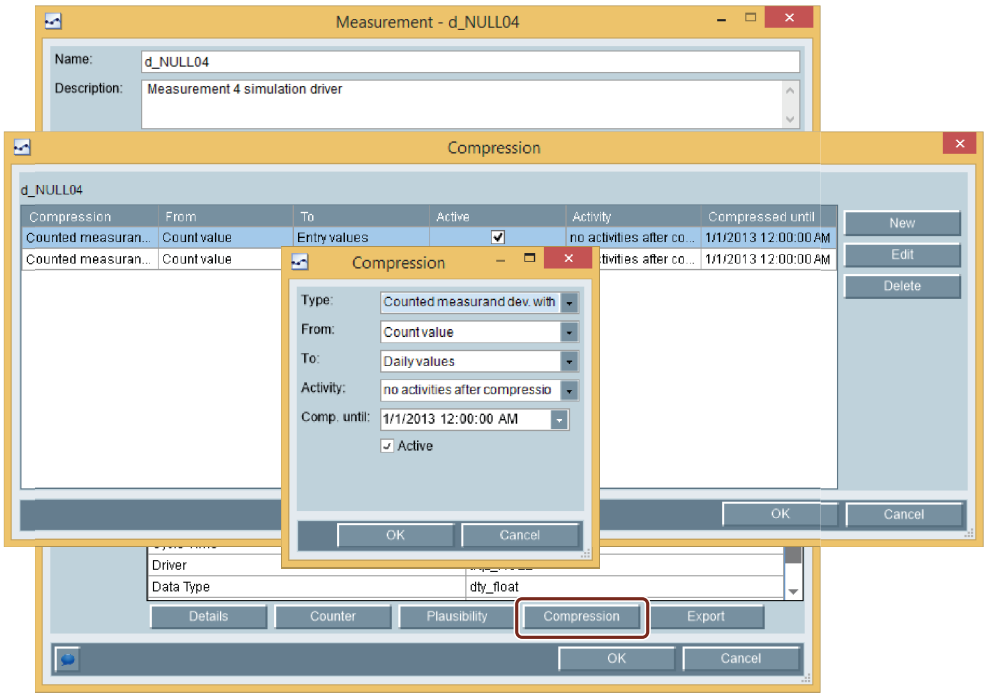
② Detailed information about the error. At a minimum, the "Gap detection" must be activated for a data point.

③ Restart of an acquisition component.

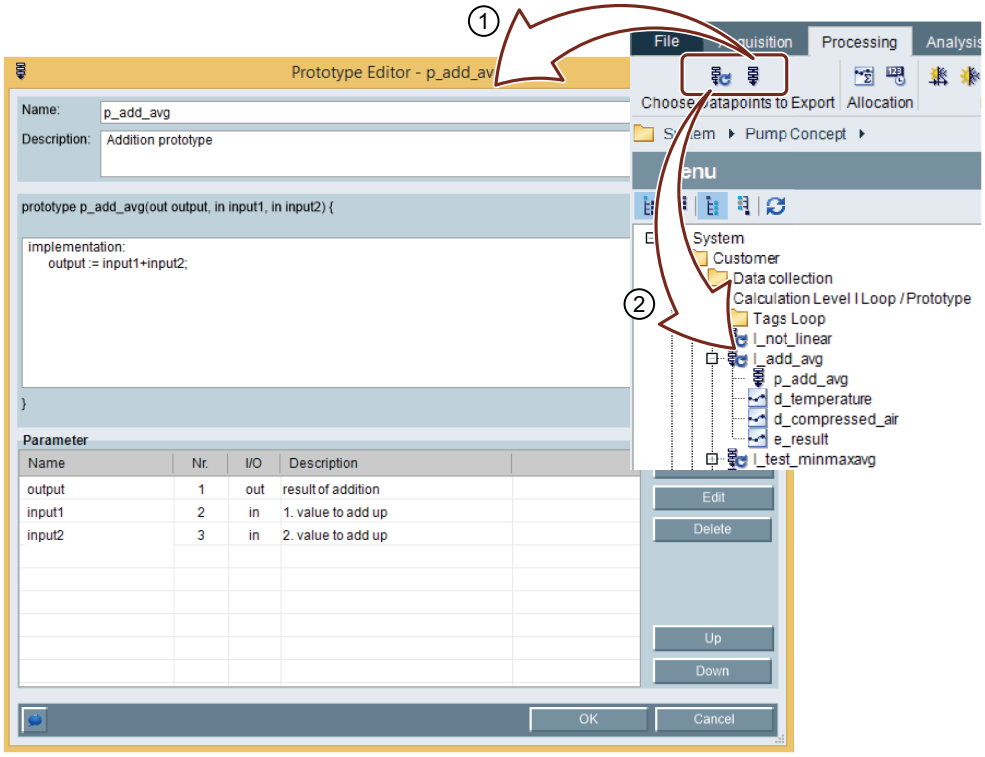
④ Management of the acquisition component:
- Access to configuration files
- Overview of installed software products
- Import of software updates

Configuration

- Compression of measurement values during import:
  You can easily configure the different compression levels for each measurement point in B.Data.



- Processing of measured values in a freely-configurable real-time accounting system:
  You can configure the allocation with the objects "Prototype" ① and "Loop" ② . You define the parameters and algorithm in the prototype. You assign a prototype to each loop and then supply it with values. The separation into algorithm and parameter assignment provides you with a flexible allocation system.



Calculation level 2

Definition

"Calculation level 2" is the object-oriented and time-independent calculation of performance indicators on the basis of the recorded measurement values. B.Data enables energy source-related cost allocation with "Calculation level 2."

Use

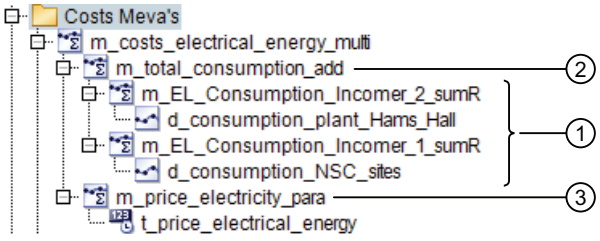
Effective energy controlling is based on information of when energy is needed where. The calculation and allocation of energy costs for plants, customers or cost units according to the polluter pays principle and support of the processes Bottom Up(measurement) and Top Down (allocation) also creates incentives for saving energy within the company:

- Allocation of the energy requirements of departments, plants, customers or cost units according to percentage distribution keys and absolute quantities on a percentage basis.
- Reports oriented to customers or cost centers, distribution keys, and counters
- Reproduction of hierarchical accounting structure (calculation model)
- Classification of consumption quantities, such as labor cost, service fee or tax.
- Transfer to accounting system, such as SAP R/3

Configuration

Use ready-made database functions which allow you to establish hierarchical accounting structures in the form of a tree in the Plant Explorer for the processing of performance indicators. In this way, the user can understand the billing at any time.

The principle is simple: A database function calculates the result with values provided by data points, parameters or other performance indicators. The return value of the database function can be reused as a parameter for another database function or in a report.



① The two database functions summarize the recorded consumption values of the two measuring points. The respective results are used as input parameters by the database function "m_total_consumption_add."

② This database function adds the two sums of the calculated consumption values and transfers the total to the database function above it.

③ This database function multiplies the calculated consumption with the price ("m_price_electrical_energy") stored in B.Data. Thereafter, the result is displayed in a report.

See also

Calculation level 3 [page 59]

Calculation level 3

Definition

"Calculation level 3" refers to the time-independent processing and displaying of measurement values in reports. Microsoft Excel or Microsoft Word is used to visualize the reports.

To prepare the data exported from B.Data, the full Microsoft Excel or Microsoft Word functionality can be used, including statistical functions such as correlations or regression analyses. Furthermore, the results data can be prepared using graphs or diagrams.

Application

Detailed records and professional presentations of the performance process provide the basis for reaching decisions. For this reason, efficient processing and presentation of information is now also regarded as a crucial competitive factor. The automatic reporting of B.Data supports you in making rapid and logical decisions.

- Efficient creation of company-specific reports for each department and for satisfying any need for information.
- Information related, system-wide picture of different business units for a holistic view of your company.
- By defining time zones, reports can be output in a country's local time.
- Unburdening of personnel by the workflow system of B.Data:
  - Automatic and cyclic calculation of performance indicators and accounting results (task management).
  - Automatic generation of standard analyses for predefined periods, such as day, month, shift, year.
  - Automatic sending of evaluations to the printer in the company-wide printer network.
  - Automatic sending of analyses and bases for allocation via e-mail attachment to recipients inside and outside of the business unit.

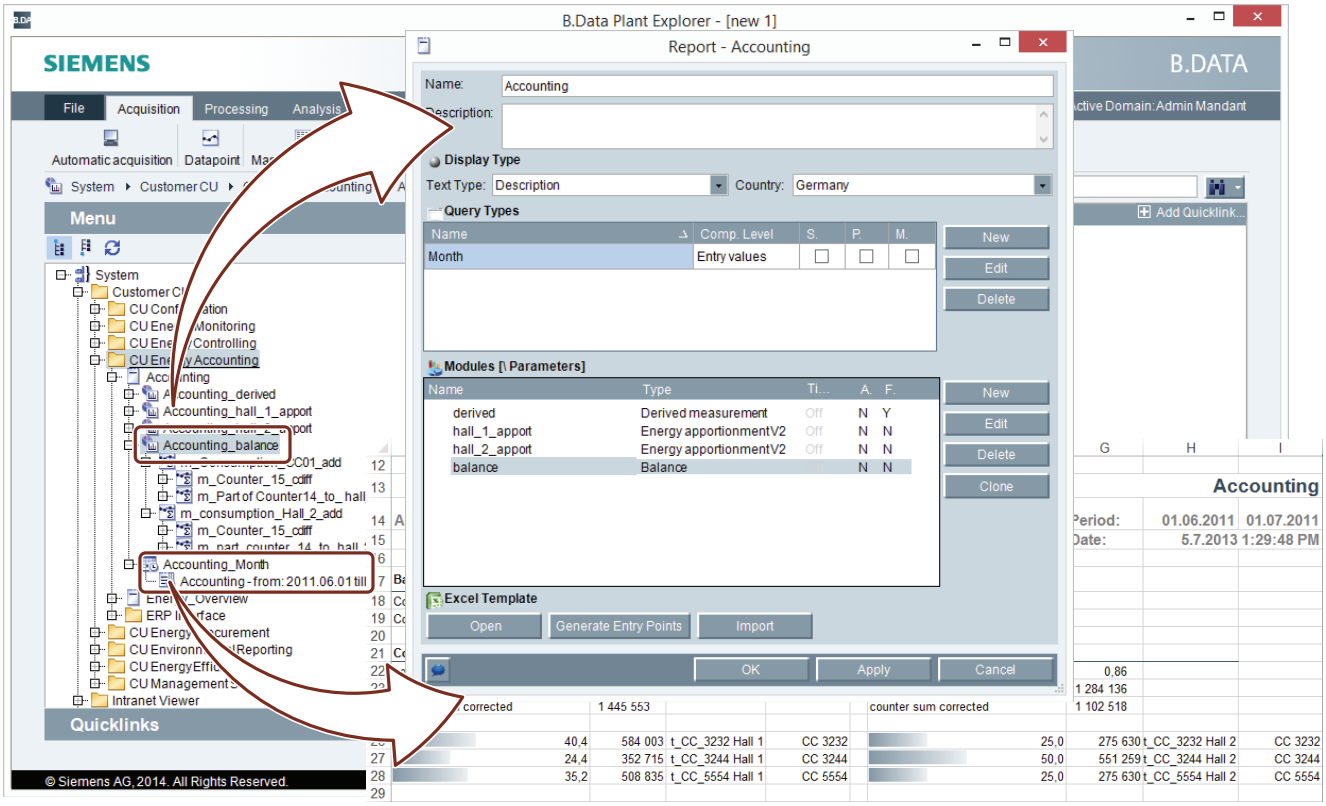
When generating reports you have access at all times to report configurations from the past (historicizing) and different versions of measurement values (versioning).

Configuration

Use ready-made modules for the configuration of the report. The module type defines the appearance. Many different module types are available in B.Data. The following module types are used most frequently:

- Query module: Returns values without allocation, e.g. measurement values of a month up to the day.
- Balancing module: Returns a resulting value for a time period, e.g. the monthly energy costs.
- Protocol module: Returns values for all intervals of a time range, such as energy costs of a month up to the day.

In a report, you define the timeframe and timezone and add the desired modules. Each module is supplied with values from its assigned measurement variables. After the Excel or Word template has been generated, the final report result is stored in the Plant Explorer and can be accessed with a double-click.



From a finished report result, you can generate a template for similar reports in B.Data, for example, when you need individual reports for production lines with a similar structure. Reports that have been acquired manually so far, can be accepted for automatic processing in B.Data. Changes to the template affect all reports that are generated in the future, which are based on this template. The templates are centrally managed in B.Data.

B.Data Web

General Functions

Definition

B.Data Web is a browser-based user system of the B.Data energy data management system. With B.Data Web you use the Internet / Intranet to provide a predefined group of users, such as the energy managers of individual production areas or operators, a selection of Plant Explorer content for the input of measurement data.

Navigation

B.Data Web and the Plant Explorer have a similar structure. In the window pane on the left, the available objects are shown either as quick links or as elements in the tree structure of the Plant Explorer. The window pane on the right displays detailed information of the selected object.

B.Data Web is used for the following tasks:

- Viewing reports and initiating new reports
- Viewing charts and configuring new charts
- Viewing Trends and initiating new Trends
- Viewing visualizations
- Viewing and editing manual data acquisition
- Accessing documents and loading new documents to the B.Data database
- Creating, editing and viewing energy efficiency measures
- Viewing Dashboards

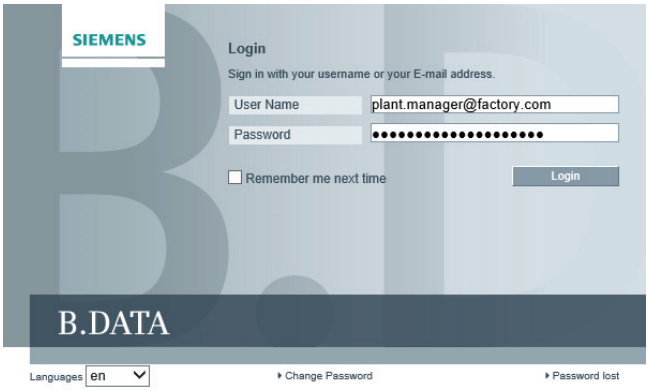
The functions in detail

Introduction

B.Data Web provides access to all important elements of the B.Data client on the browser.

Access to B.Data Web

The user logs on to B.Data Web with his B.Data username and password. This ensures that only authorized users log in:



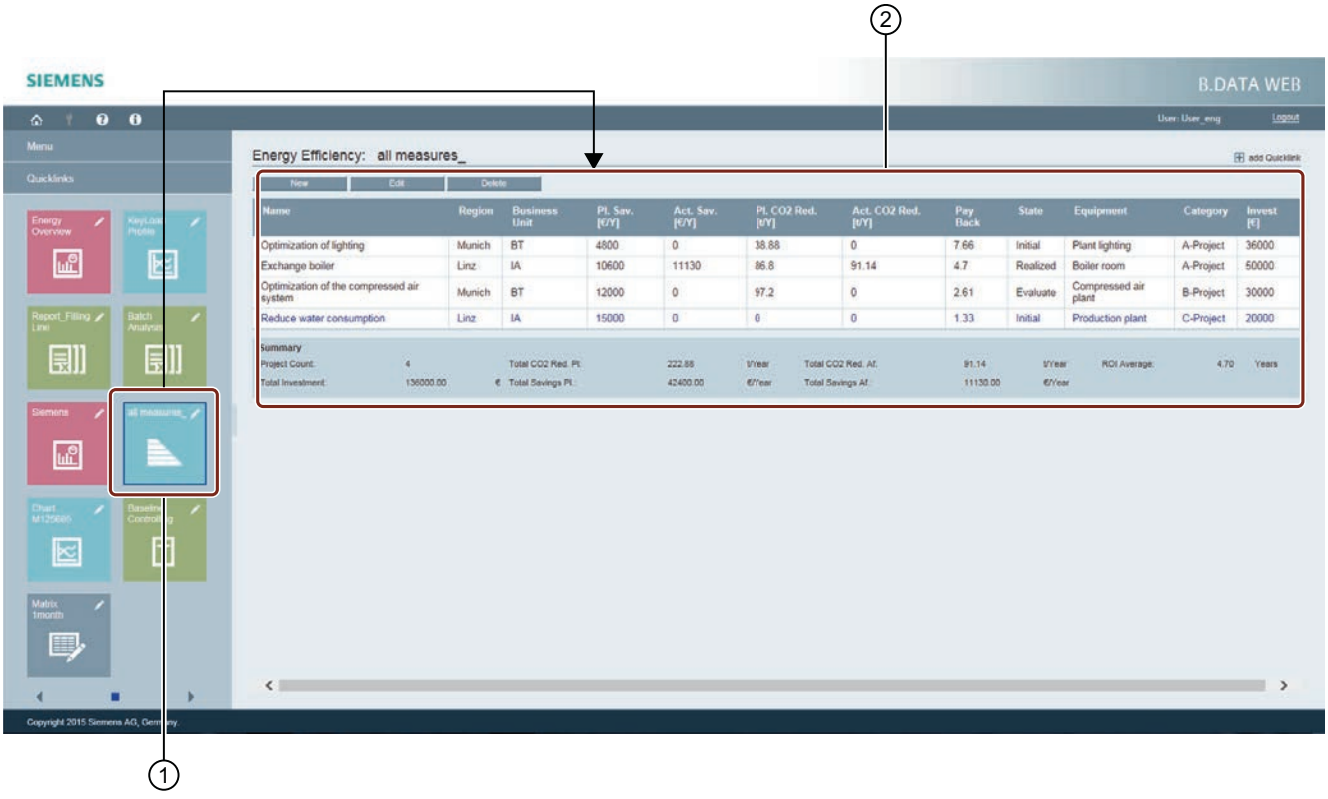
Dashboards

Dashboards have the same range of functions in B.Data Web as in the B.Data client.

For more information on the control options, go to "Dashboard [page 20]".

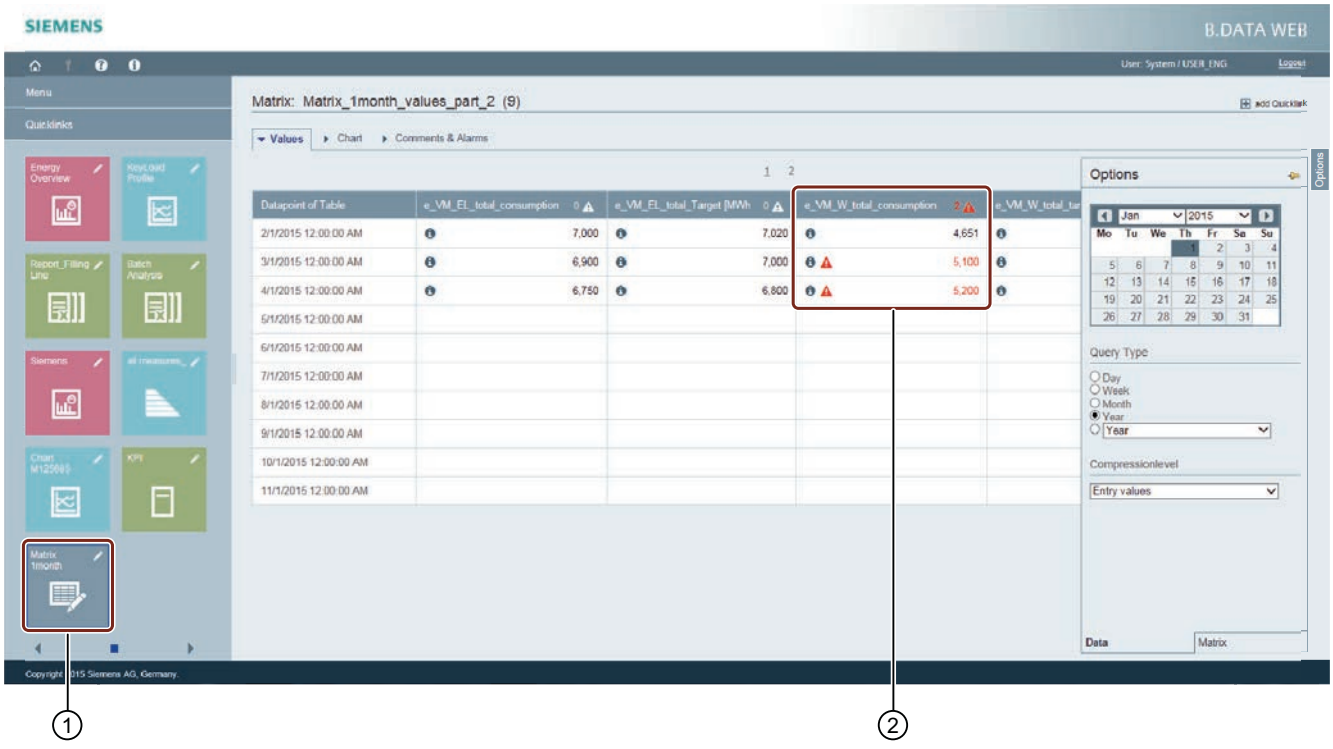
Energy efficiency measures

The planned energy efficiency measures can be viewed and edited. The measures can be quickly accessed with the quick links ① .
First you see a summary of the individual measures ② .



Matrix

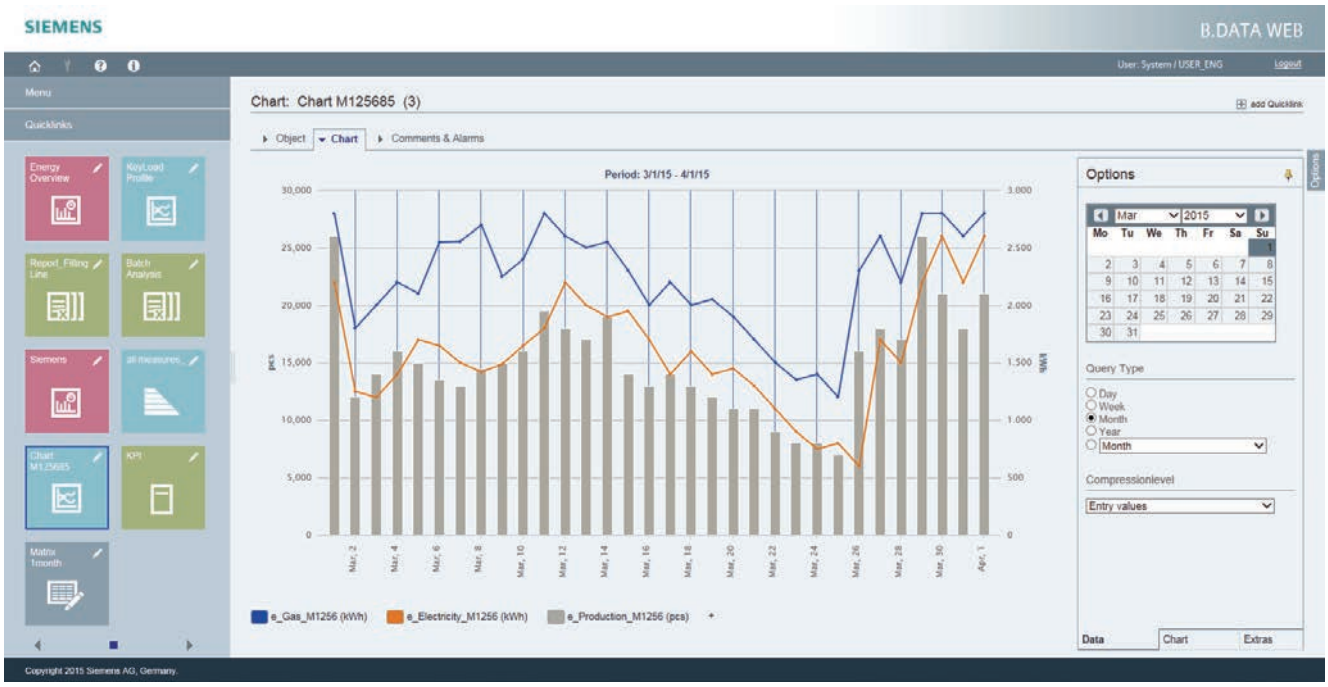
With the matrix ① you input or output data directly in the browser for a time range configured under "Options". Input values are automatically transferred to B.Data and the configured limits are checked. Deviations are highlighted in red and there number is displayed as well ② . The permitted limits are shown when you move the mouse pointer over the red icon.



You can also import existing measured values from a file and display the result immediately:

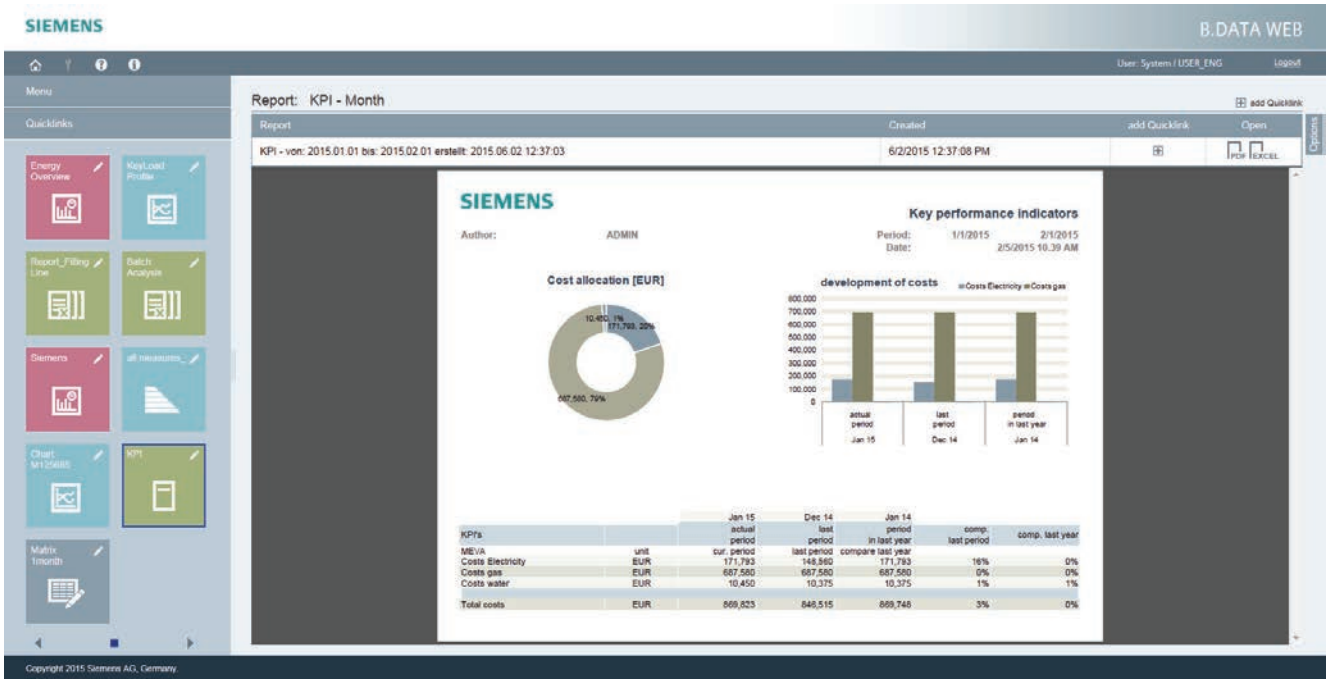
Chart

In the browser, you can also access the charts configured in B.Data and adjust the configuration individually, for example, add additional axes or change the diagram type. Additional information on the chart is available at "Chart [page 18]".



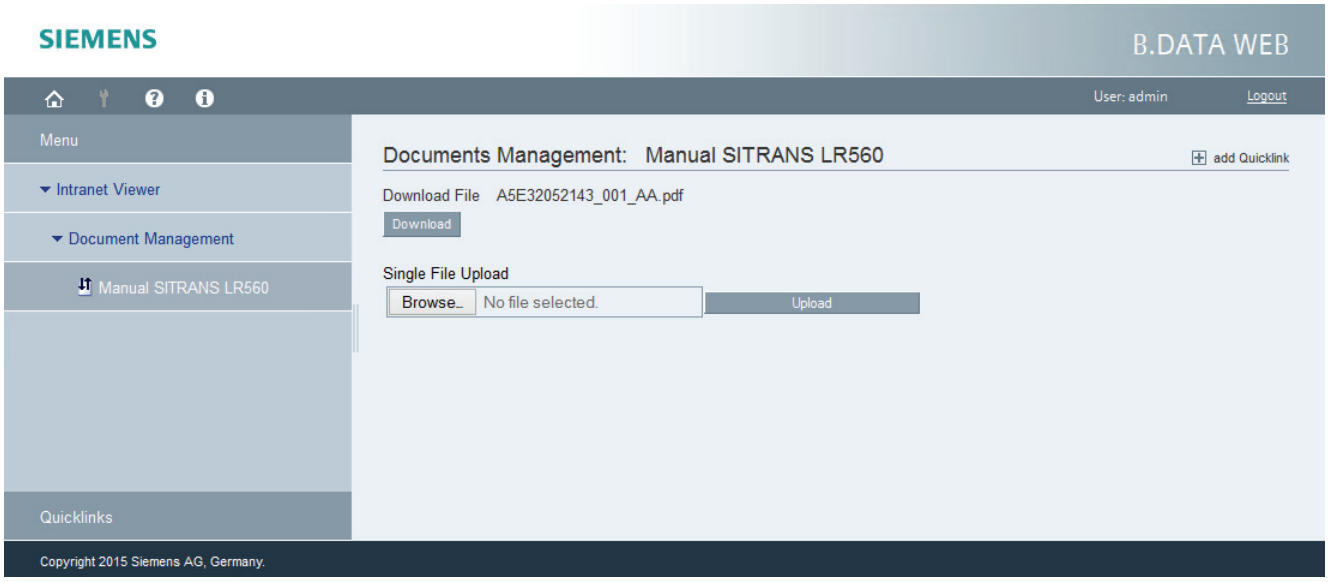
Reports

B.Data Web gives you access to reports that have already been generated; you can display them directly in the browser as PDF preview or download them as a file. You can also generate new reports, for example, from other time ranges or with other query types.



Files

The browser gives you access to the B.Data document management at any time. This way you can download, for example, operating instructions, circuit diagrams or tariff information of the energy supplier. If required, you can upload new documents or update existing documents.



Additional information

You can find additional information about SIMATIC B.Data on the Internet: http://www.siemens.com/Bdata