EMC manual

System description

Building Technologies

SIEMENS

Siemens Switzerland Ltd
Industry Sector
Building Technologies Division
Gubelstrasse 22
6301 Zug
Schweiz
Tel. +41 41-724 24 24
www.siemens.com/sbt

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1 About this document

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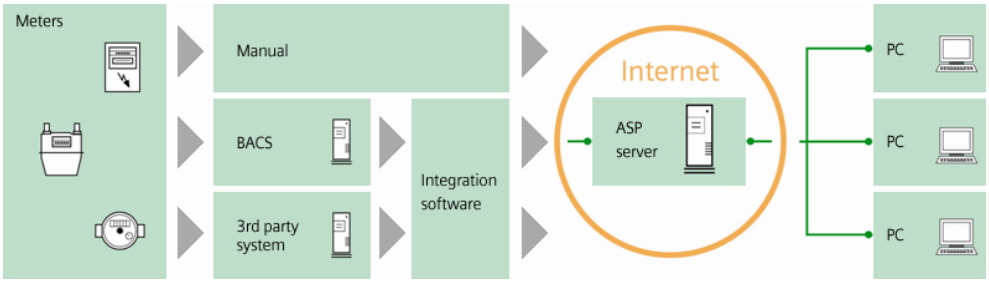
2 Energy management via the Internet

Only by keeping a continuous record and analysis of energy consumption data is it possible to identify potential savings and evaluate the success of optimization measures.
By highlighting external influencing factors (weather compensation) and making comparisons with defined set points (target energy figures), EMC helps customers make reliable judgments about the consumption of energy.

2.1 Functionality

EMC is based on ASP (Application Service Providing) technology. The consumption data is logged on a central Siemens Internet server, under a secure personal user account. The consumption data is logged either manually via a standard Web browser, or automatically. EMC can be operated and reports can be invoked from any standard PC with Internet access (preferably with Internet Explorer) as illustrated below.



Application Service Providing

Application Service Providing (ASP) is the official term for applications which are made available by a service provider over the Internet rather than being provided locally.

There are numerous advantages to ASP:

- Cost-savings in relation to local hardware and software
- Updates and upgrades are free of charge when using this service
- Customers can access their own data from anywhere and at any time
- Running the applications in a professional data center ensures minimal down-time and a high degree of security
- The content of the customer's applications remains confidential, because the Application Service Provider only supplies the professional infrastructure.
- All saved data are the property of the customer.

2.2 Energy management with EMC: the benefits

EMC, the Internet-based application, makes light work of monitoring and controlling energy consumption

EMC is cost-effective
No upfront hardware/software investments
Maintenance of central IT infrastructure by Siemens

EMC is intuitive
Intuitive operation via web browser
Minimal training needed

EMC is efficient
Efficient, decentralized input/transmission of meter readings
Extensive user management depending on the know-how and access rights of your staff members

EMC is decentralized
Selective access at all times and from any location

EMC increases productivity
Easy access to your energy consumption data from any internet working place
Meter reading reminder per email and SMS
Automated meter readings (optional)
Direct input of data into EMC on location reduces necessity for manual transfer of data

EMC allows online/remote support
Remote training can be held simultaneously for staff at different locations

EMC is a flexible, modular strategy
EMC grows with your requirements and needs

EMC protects your investment
Regular back-up of all data
EMC is being continuously improved; upgrades to the functionality become available to customers immediately

2.3 Scope

Energy monitoring and control systems are required to fulfill a wide range of requirements, extending from the simple logging of consumption data to complex analysis of a variety of consumption control features.

Energy management systems are required to satisfy widely varying requirements. This is why EMC is modular in structure. This means that different functions and reports can be made available, depending on the required area of emphasis.

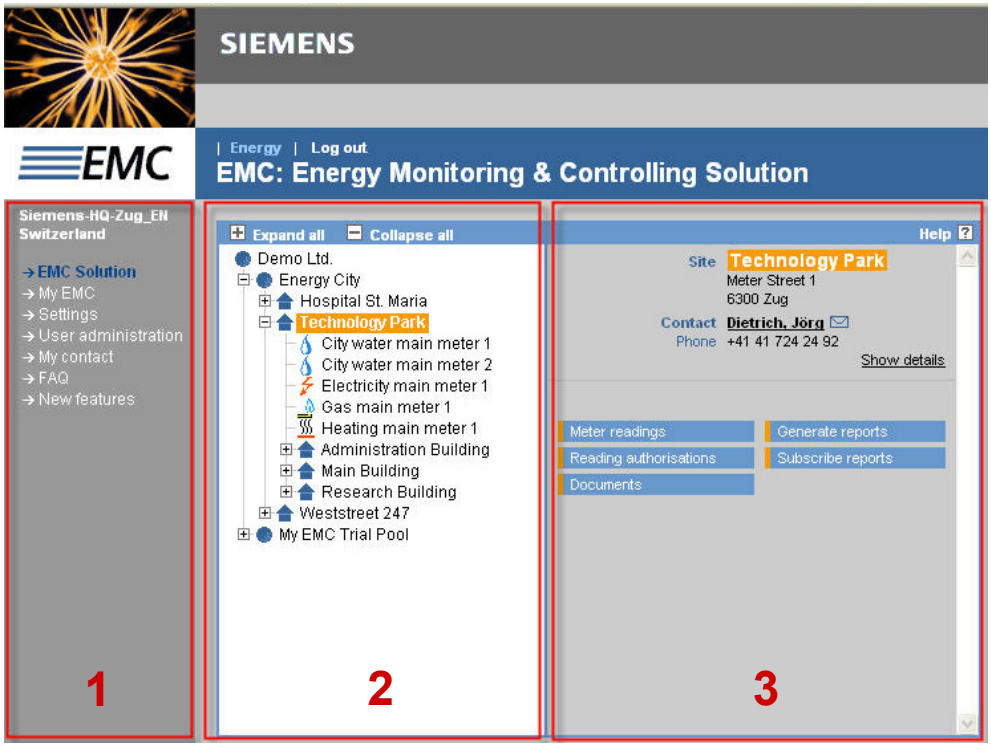
The following functions are provided as a supplement to the basic package:

- **Weather-adjustment**
  Balancing of consumption values based on meteorological data.
- **Automated meter readings**
  Integration of various, automated meter value recording systems.
- **Controlling**
  Comparison of current consumption to budget values.
- **Costs**
  Display of costs based on price models.
- **Environment**
  Evaluation of various emission values.
- **Benchmarking**
  Display and comparison of consumption-based characteristic values.
- **Load profiles**
  Evaluation of load profiles.

3 EMC structure

Intuitive operation and continuity of design ensure the user-friendliness of EMC. Even users unaccustomed to Web applications will quickly find their way round EMC.

The EMC user interface is clearly divided into three areas.



1 Navigation menu

The navigation menu (**pane 1**) on the left side of the screen is displayed all the time and provides direct access to all the main features. In addition to forms for manual logging of meter values, this pane also includes administrative functions, such as user administration.

2 User structure

The user structure (**pane 2**) is the central part of the application, and shows the sites with associated buildings and meters in the appropriate structure. All consumption reports can be invoked directly via this tree structure.

3 Functions menu

The display in the rightmost pane in the application (**pane 3**) is directly related to the node (building, object etc.) or meter selected in the user structure (in pane 2) and shows all the functions available in this context. From here, for example, you can log meter readings or budget values or set up and modify sites and buildings. The functions actually displayed depend on the access rights of the user concerned.

Language support

EMC is a multilingual program. At present it supports 19 languages (including English, German, French, Spanish, Chinese and Korean, for example). The preferred language can be selected by the individual user.

3.1 Reporting

The EMC energy reporting feature is notable for its clear structure and easy-to-read display of relevant values. It helps the energy manager decide quickly whether or not there is a need for corrective action in the field of energy management.

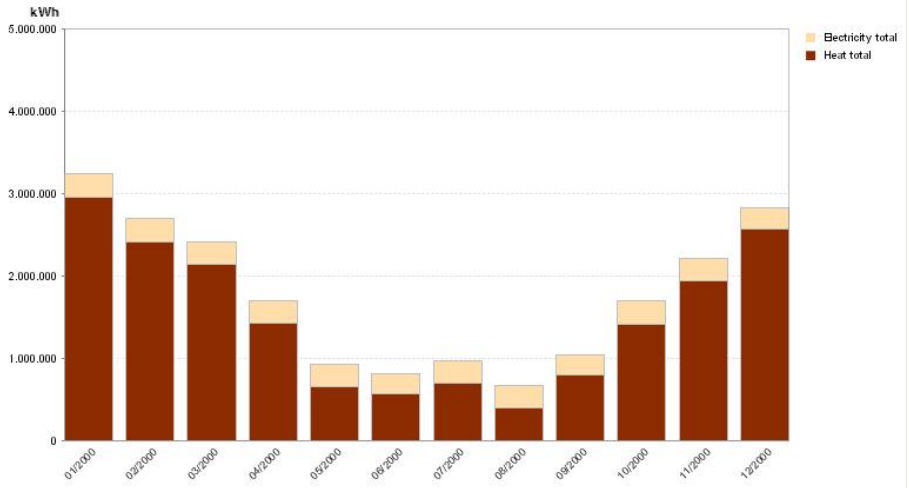
Main consumption

EMC

Organisation **Siemens-HQ-Zug_EII**
Node **Energy City [Main meter]**
Path **Energy City**

Start date **1/1/00**
End date **12/31/00**
Resolution **monthly**

Overview | Heat | Electricity | Water | Cooling | Performance Indicator | Create PDF



	Date	Energy total	Heat total	Electricity total	PI Heat total	Water	Cooling
		kWh	kWh	kWh	kWh/m²	m³	kWh
1	01/2000	3,251,024.21	2,950,141.46	287,275.75	35.54	6,143.95	13,607.00
2	02/2000	2,703,904.19	2,415,419.94	274,097.34	29.10	6,143.15	14,386.91
3	03/2000	2,416,186.31	2,134,732.49	270,978.72	25.72	6,642.95	10,475.09
4	04/2000	1,699,101.23	1,426,712.46	262,963.77	17.19	6,263.05	9,425.00
5	05/2000	941,773.71	656,494.98	274,033.73	7.91	6,436.12	11,245.00
6	06/2000	820,271.55	560,666.53	246,990.02	6.76	6,584.72	12,615.00
7	07/2000	972,153.27	699,361.17	261,955.10	8.43	6,737.28	10,837.00
8	08/2000	685,977.43	401,654.93	271,934.50	4.84	6,930.45	12,388.00
9	09/2000	1,045,528.08	788,351.18	244,874.90	9.50	6,957.05	12,302.00
10	10/2000	1,704,353.89	1,413,903.29	275,625.60	17.03	6,985.95	14,825.00
11	11/2000	2,216,994.85	1,941,141.15	266,838.70	23.39	7,133.05	9,015.00
12	12/2000	2,839,125.12	2,560,767.82	265,241.30	30.85	6,674.95	13,116.00
	Sum	21,296,393.84	17,949,347.40	3,202,809.43	-	79,632.67	144,237.00
	Average	1,774,699.49	1,495,778.95	266,900.79	18.02	6,636.06	12,019.75

Example: Main consumption report

The benefits in detail

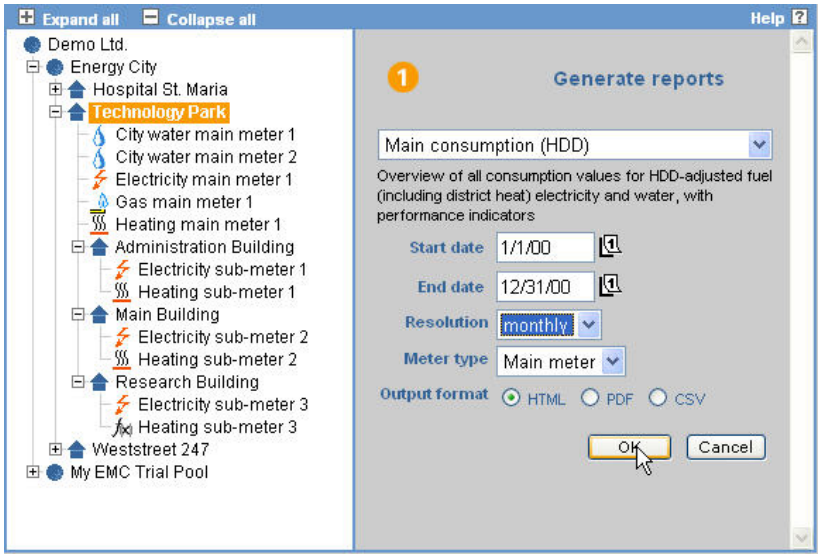
- Most reports are made up of several different sheets (views). An easy-to-read summary of results is supported with a useful number of additional detailed views.
- Because of the uniform layout of all the reports, even those who do not use the reporting feature regularly can find their way around without difficulty.
- Color coding helps with the legibility of all the charts and graphs.
- When generating node comparison reports, one or more nodes can be selected on the basis of various criteria (e.g. types of building).

3.1.1 Generating reports

Reports can be generated for all nodes in the hierarchical structure (customer, building pool, site, object and element). Meter data is automatically summarized and grouped by medium and meter type. Reports normally include tables and graphs.

Creating a report

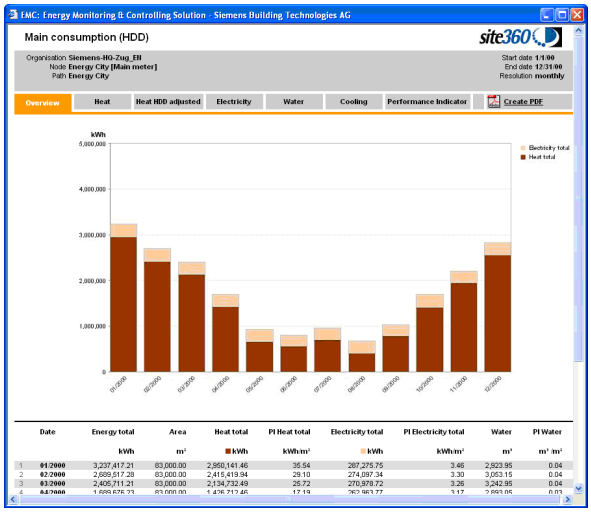
A report is generated either for a node (as in the following example) or directly for a particular meter. Different reports are provided, depending on which of these options is selected. For every report, you can select the time period covered, the resolution (e.g. every 15 minutes or monthly) and the type of meter to be included.



The report can be generated in the following file formats:

- **HTML:** Web format for on-screen display.
- **PDF:** Non-editable standard format, for local storage and printing.
- **CSV:** Standard (ASCII) text format for further processing, e.g. with MS Excel.
- **PPT:** PowerPoint for direct integration in presentations.

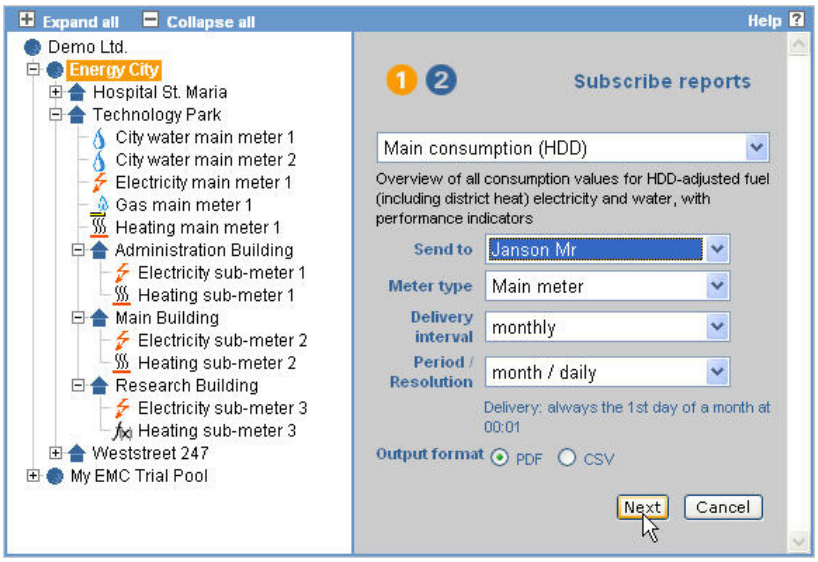
Sample report Main consumption



Report favorites

Individually selected reports can be stored as favorites and as an option be subscribed to in the form of hourly, daily, weekly, monthly, quarterly, half-yearly or annual e-mails. The reports are transmitted as PDF files for saving and printing, or in

CSV format (ASCII) for further editing. Report favorites allow quick access to important reports, especially when dealing with large, complex structures.



3.1.2 Exporting reports

All reports can be saved on a local hard disk as CSV (comma-separated values) files, to allow further processing of the consumption data (e.g. with Microsoft Excel). Diagrams and graphs can be inserted into other applications via the clipboard.

3.1.3 Reports in the standard package

The standard package includes the following reports:

- Main consumption
- Main consumption, CO_2 emissions
- Main consumption, node comparison
- Main consumption, year-on-year comparison, cumulative
- Detailed consumption
- Detailed consumption, node comparison
- Detailed consumption, year-on-year comparison
- Meter reports

For more information refer to the associated report documentation.

3.2 Meters and media

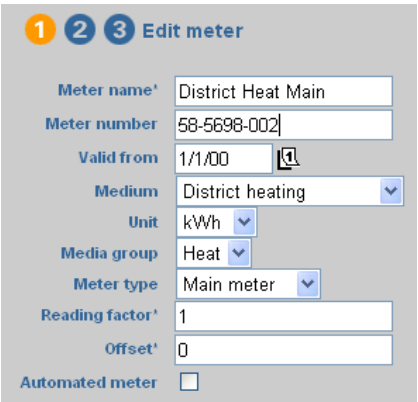
3.2.1 Meters

EMC operates with four different types of meter:

- Main meters
  The main meters register energy consumption in a central location (e.g. the district heating transfer meter belonging to the utilities company)
- Sub-meters
  These measure a part of the energy flow recorded by the main meter (e.g. the heat meter for one floor of a building)
- Invoice meters
  It is possible to enter the consumption as reported in the utilities company bill.
- Other meters
  Other meters register other consumption and media data (e.g. outdoor temperature)

Setting up meters

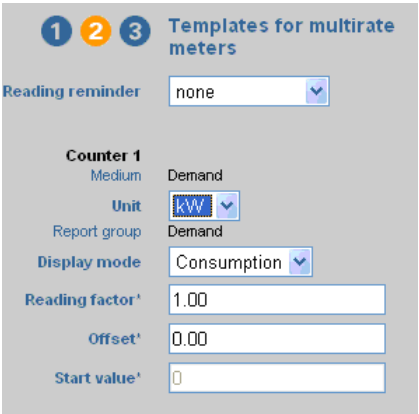
The application allows you to set up the contractually agreed number of meters.



All meters can be configured freely in EMC in relation to the medium, units, period of validity etc.

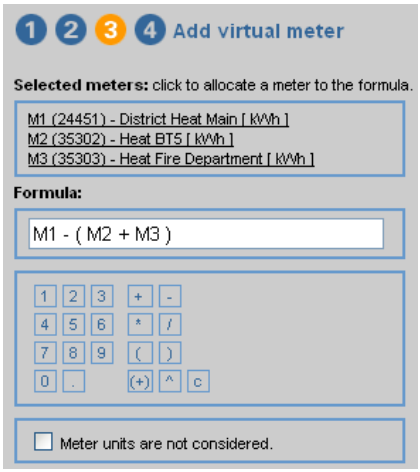
Multi-rate meters

Multi-rate meters are electricity meters with separate registers for power and consumption, or for different tariffs.



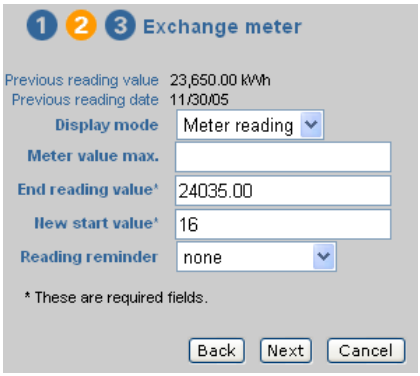
Virtual meters

In addition to physical meters, EMC also supports virtual (i.e. calculated) meters.



Meter replacement

For meters that need to be replaced on site, EMC includes a meter replacement function, which allows you to document the process, at the same time ensuring the continuity of the data.



3.2.2 Media

The following media are part of the standard package

- Bio heat
- Bio oil
- Biogas
- Coal
- Demand
- District heating
- Domestic hot water
- Electricity for cooling
- Electricity for heating
- Electricity, high rate
- Electricity, low rate
- Electricity, no tariff
- Electricity, single rate
- Electricity, special rate
- Fuel oil, extra-light
- Fuel oil, heavy
- Fuel oil, medium
- Fuel wood
- Heat
- Liquid petroleum gas
- Natural gas
- Photovoltaic energy
- Reactive energy
- Refrigeration
- Running hours
- Solar thermal technology
- Spring water
- Steam
- Temperature
- Volume
- Waste water
- Water
- Wood chips

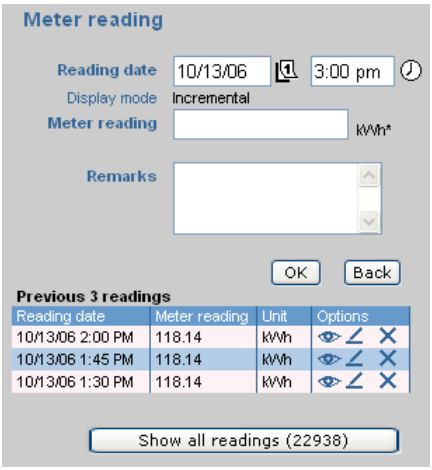
3.2.3 Manually entering meter and consumption data

Individual meter readings

Meter or consumption data is handled in a central database. The person responsible enters the data on site via the Web browser (decentralized data entry). If the meter is not read regularly, the data is balanced out with daily interpolated values.

Individual meter readings can be entered by selecting a meter from the tree structure.

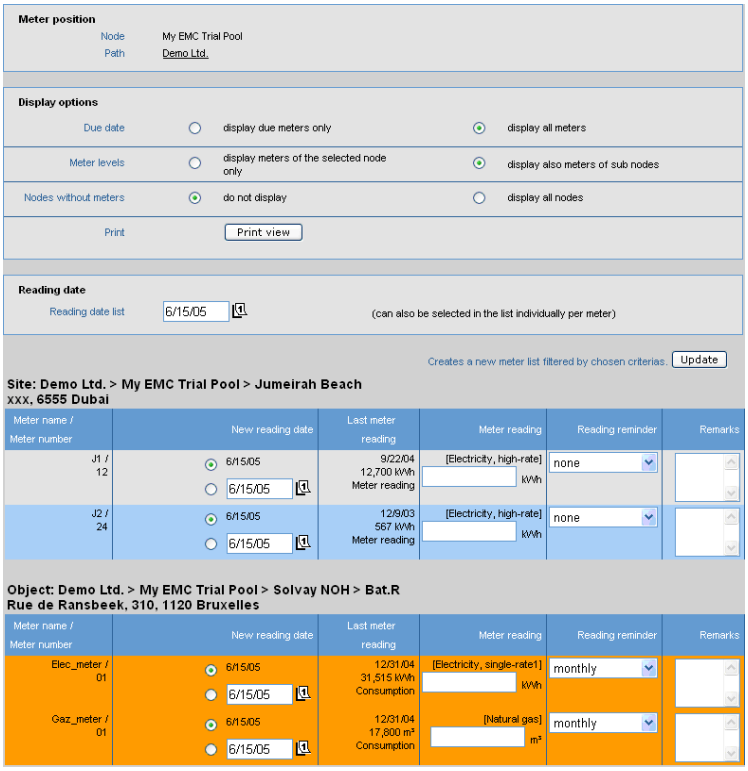
All previous meter readings can be displayed with the **Display All Readings** option.



Multiple meter readings

EMC includes a "My Meters" option to simplify the manual entry of data. This feature produces a list of all meters for each node, with the date and previous reading, and fields for the current date and current values. Other options allow the display of specific meters, e.g. only those for which a reading is due. Meters for which a reading is due are highlighted in a different color.

List of meters with display options



Printed version of meter list

A special print view is available for noting down the meter readings when going physically from one meter to another or from building to building.

Print Cancel

EMC: Energy Monitoring & Controlling Solution

Building pool: Demo Ltd. > My EMC Trial Pool
Contact: Baum_EN, Thomas Phone: +41 41 742 24 99

Meter name/ Meter number	Last reading	New reading date	New meter reading	Remarks
3201_EM01 / 01	**9/9/04 1,500 kWh**		kWh	

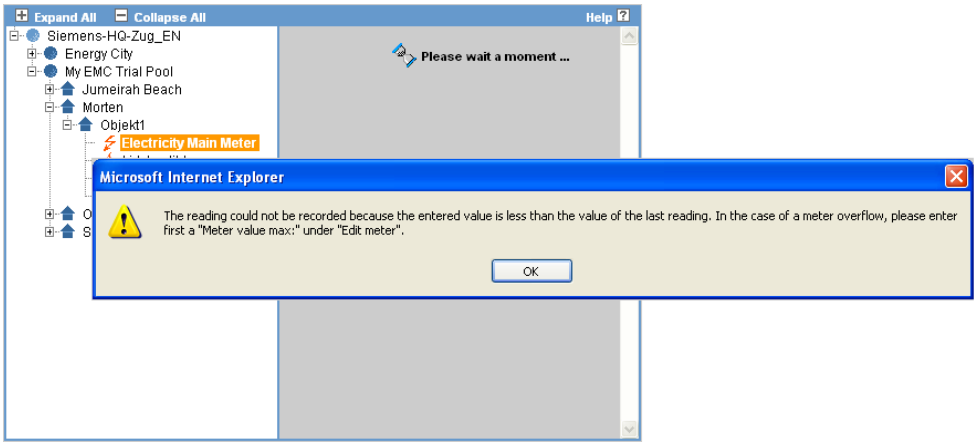
Object: Demo Ltd. > My EMC Trial Pool > Morten > Objekt1, Her , 1234 Der
Contact: Baum_EN, Thomas Phone: +41 41 742 24 99

Meter name/ Meter number	Last reading	New reading date	New meter reading	Remarks
Electricity Main Meter / 12	**10/13/04 300 kWh**		kWh	
kjdcbwdjhbc / 098908	**8/12/04 6,700 m³**		m³	
Main Heat Meter /	**12/12/04 600 kWh**		kWh	
Test1/ 01	**1/1/03 0 kWh** **0 kW**		kWh [Electricity, single-rate1] kW [Demand]	

Plausibility check

As meter readings are recorded, they are checked for plausibility. If a given reading is lower than the previous reading, a warning message is issued.

The plausibility check identifies not only questionable meter readings, but also overruns (where the maximum reading has been reached and the counter mechanism starts again at zero).



3.2.4 Automatic reminders

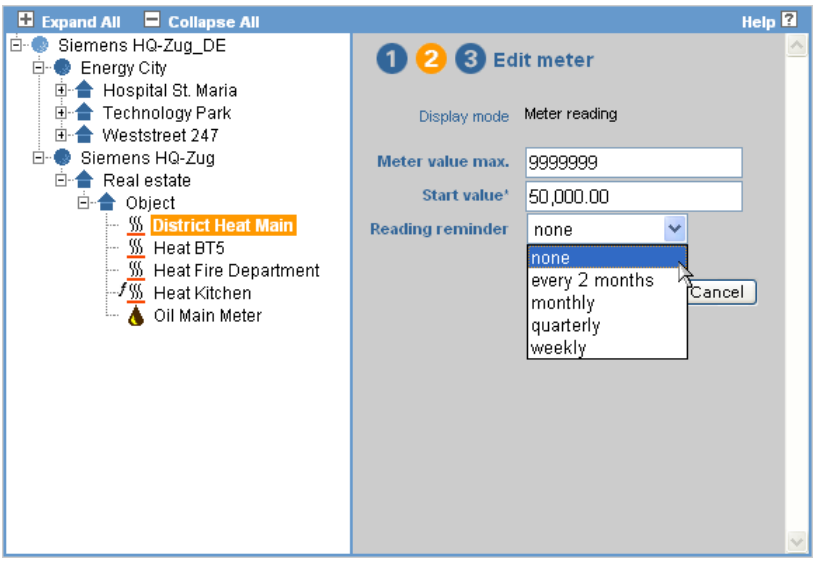
The automatic reminder feature helps ensure that meters are read at regular intervals.

First reminder

The first reminder is sent by the planned reading date.

Reminders can be sent at the following intervals:

- Weekly
- Monthly
- Every two months
- Quarterly



Second reminder

If no readings are entered, a second reminder is sent after the planned reading date.

All reminders are sent by e-mail and include a link to the "My meters" list, in which the meters for which a reading is due or overdue are highlighted in color. The meter list is attached as a PDF file.

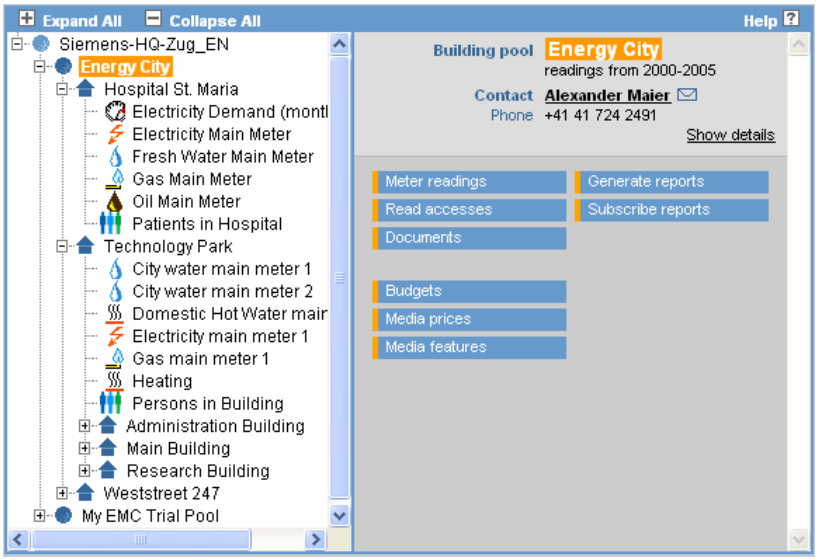
In the "My profile" settings, all users can also activate an SMS reminder in addition to the e-mail reminder. (Note: the SMS reminder feature is optional.)

3.3 User structure/other functions

The user structure allows intuitive and effective structuring of the meters based on the functions used and the reports required.

User structure

Any number of structural nodes can be set up at the different hierarchical levels ("Building pool", "Site", "Object", and "Element"). Meters can be allocated to each of these nodes.



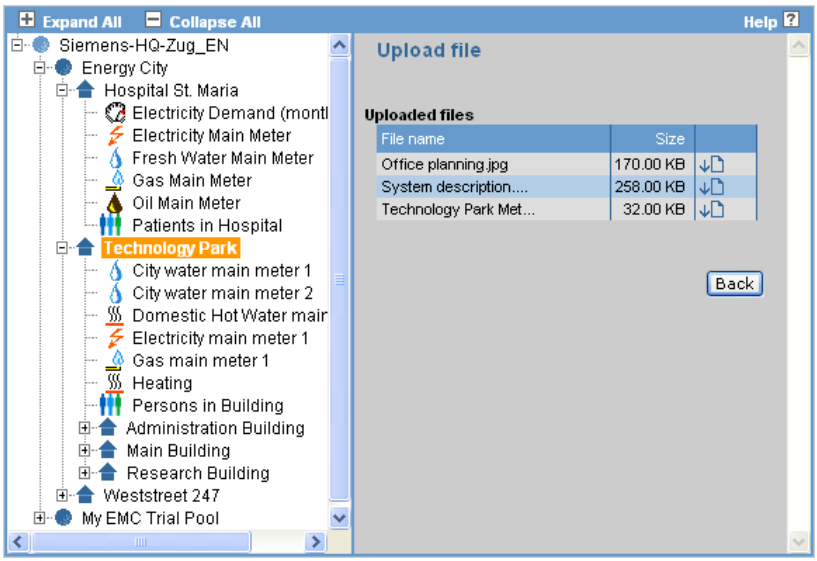
Energy reference areas

An individual energy reference area can be assigned to each site and object. The energy reference areas are totaled automatically on the basis of the user structure. Newly defined or modified areas are allocated a time stamp which is automatically taken into account in the reporting function.

Attaching documents

Users can attach files containing additional information (file formats such as doc, .xls, .pdf, .jpg etc. but not executable files such as .exe or .bat).

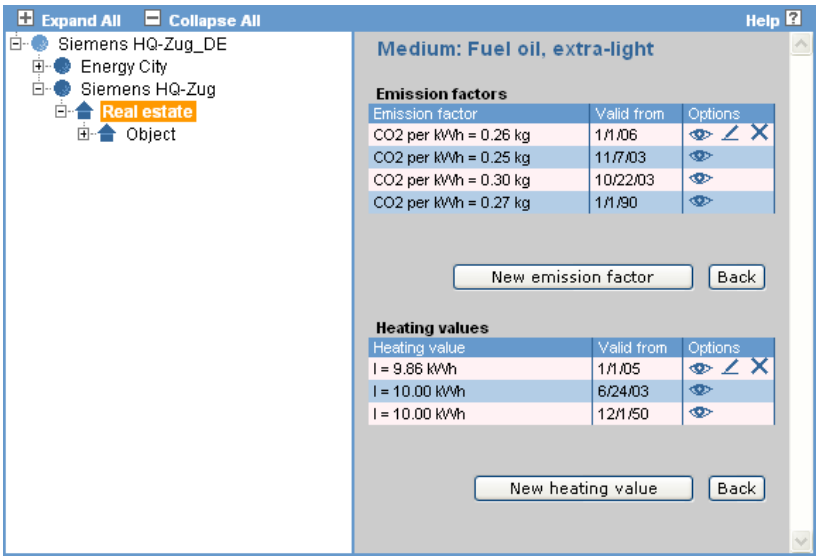
These files can be used for action lists, service and object documentation or documents for maintenance management. The documents can be opened in an Internet browser and saved locally if required.



3.4 Media properties

Emission factors

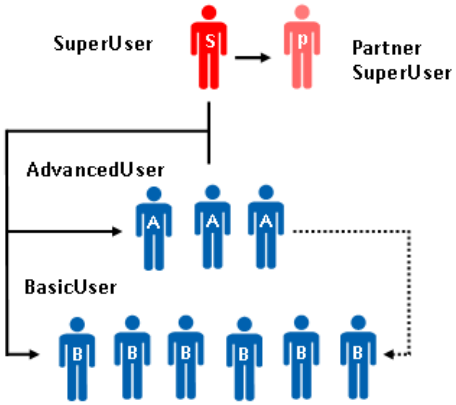
The CO_2 emissions associated with energy consumption can be displayed for all CO_2-emitting media. Consumption values can be converted into the required units [kg CO_2] by use of emission factors. Newly defined or modified emission factors are assigned a time stamp which is automatically taken into account in the reporting function.



Calorific values

For heating media measured in volumetric units, individual calorific values can be assigned to each node. Newly defined or modified calorific values are allocated a time stamp which is automatically taken into account in the reporting function. This facility can be used, for example, to display heat consumption in kWh based on a gas volume measurement in m^3.

3.5 User management and access rights



Different access rights can be assigned to different users, depending on their role and level of expertise.

This makes it possible to specify which staff can view which structure nodes and meters, and who can modify or, if appropriate, delete values.

3.5.1 User roles

SuperUser

The **SuperUser** has access to all the functions of the EMC application.
Only one person in the customer's organization can be assigned this role.
The SuperUser can set up accounts for SuperUser **deputies**.

Deputy SuperUser

Deputy SuperUsers automatically have the same rights as the SuperUser.

AdvancedUser

Each object (site, building etc.) can be assigned to **an AdvancedUser,** who has the following rights:

- **Read-only access**
  e.g. generate and subscribe to reports, or generate meter lists
- **Write access**
  e.g. set up new buildings and meters, or enter meter data
- **Delete access**
  e.g. delete values, meters or entire buildings

BasicUser

Each object (site, building etc.) can also be assigned to a **BasicUser,** who has the following rights:

- **Read-only access**
  e.g. generate and subscribe to reports, or generate meter lists
- **Write access**
  Valid only for the entry and editing of meter readings (not replacement of meters)
- **Delete access**
  Valid only for the deletion of individual meter values

Partners

The SuperUser can set up **Partner SuperUser** accounts and then allocate these partners (e.g. external contractors) to specific sites or buildings. Partner SuperUsers have the same rights as the SuperUser, but can display only their "own" part of the structure.
Partner SuperUsers have their own user administration facility, and can set up their own users and assign them to sites and/or objects within their "own" part of the structure. This means that the SuperUser can delegate user administration tasks to

a partner. This ensures that the administration of even large-scale projects with numerous sites and users is manageable for the SuperUser. Partners cannot set up additional partners.

EMC safety feature

Meters deleted by a user or partner are automatically moved to the "Recycle Bin" of the SuperUser account. It is then up to the SuperUser to confirm the deletion of the meter or reinstate it.

3.5.2 Access rights

Read access

One person within the structure is responsible for each node. However, the SuperUser can assign read access to any number of people. Access rights apply to the node for which they are granted, and any subordinate ("child") nodes. Users can also assign read access to other users, but only for that part of the structure for which they are responsible.

Access rights

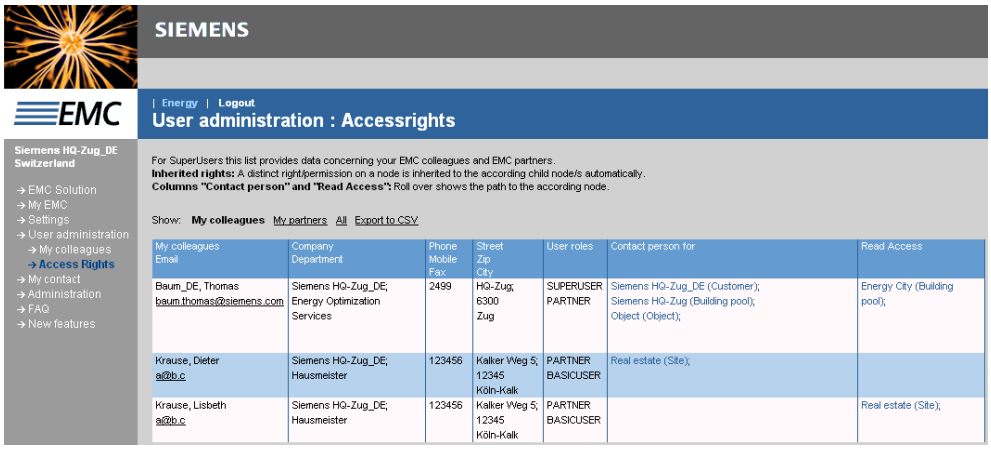
Passwords are known only to the user concerned. When setting up a user account, the SuperUser assigns a password to that user. The user is required to change the password immediately. If the user forgets the password, it can be reset by the SuperUser at any time. The user is notified by e-mail.

More than one user at a time can log into the EMC application. This makes it possible to offer remote support or to answer specific detailed questions over the phone.

Overview of access rights for the SuperUser

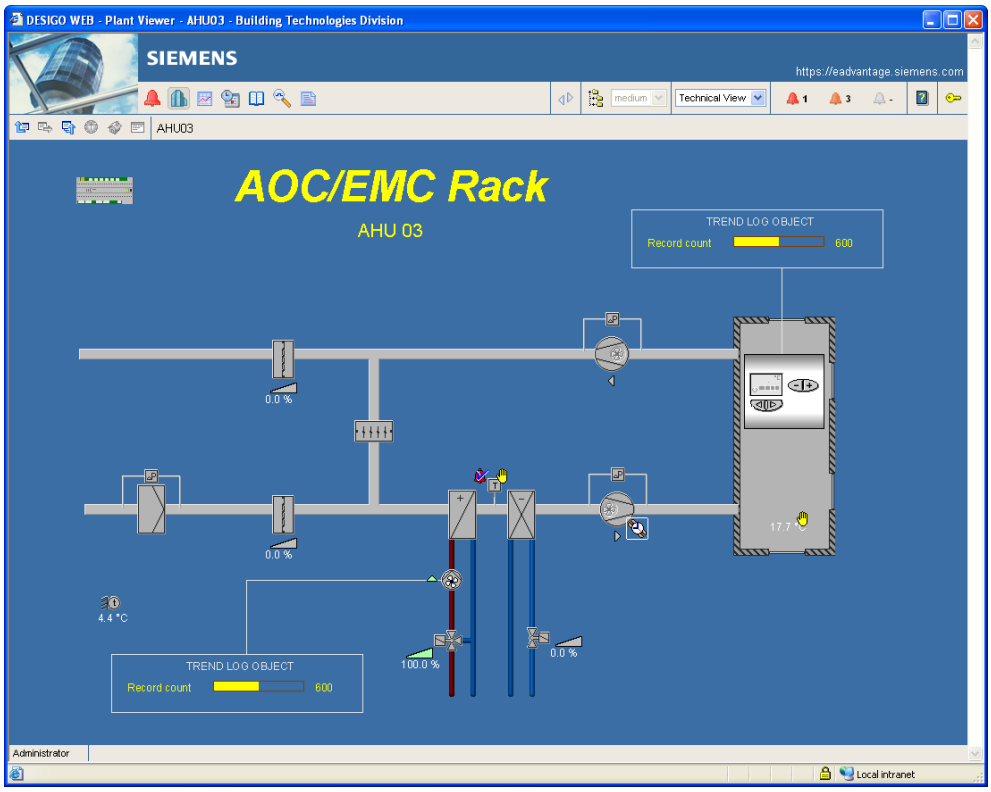
This is a list, available to the SuperUser, containing the administrative data of EMC colleagues and partners.

Inherited rights: The specific access rights to a node are automatically passed down to the subordinate ("child") nodes.



3.5.3 Remote access

EMC supports efficient and secure access to building automation and control systems using e.g. DESIGO Web on the customer network.



EMC additionally allows for remote energy management in building automation and control system. This function is based on a harmonized Siemens remote service platform (common Remote Service Platform – cRSP), used in numerous other Siemens areas.

This access allows for carrying out the following functions from a machine with Internet connection, depending on the functionality of the building automation and control system:

- Operation and monitoring (plant pictures)
- Display of trend profiles
- Alarm handling

Remote operation is available for all systems featuring a web interface (e.g. APOGEE GO, DESIGO web server, DESIGO PX Web). Bidirectional connection between EMC and the remote network is established via dynamic VPN (virtual private network). Numerous measures guarantee a secure connection, e.g. encryption, professional router management coupled with active supervision of all connections. Remote access is logged via user name and time stamp (start/end of connection).

Remote access can be enabled or disabled for each user.

3.6 Energy certificates

Overview

Many countries demand energy certificates for buildings in accordance with statutory provisions. Energy certificates are established based on various calculations and guidelines.

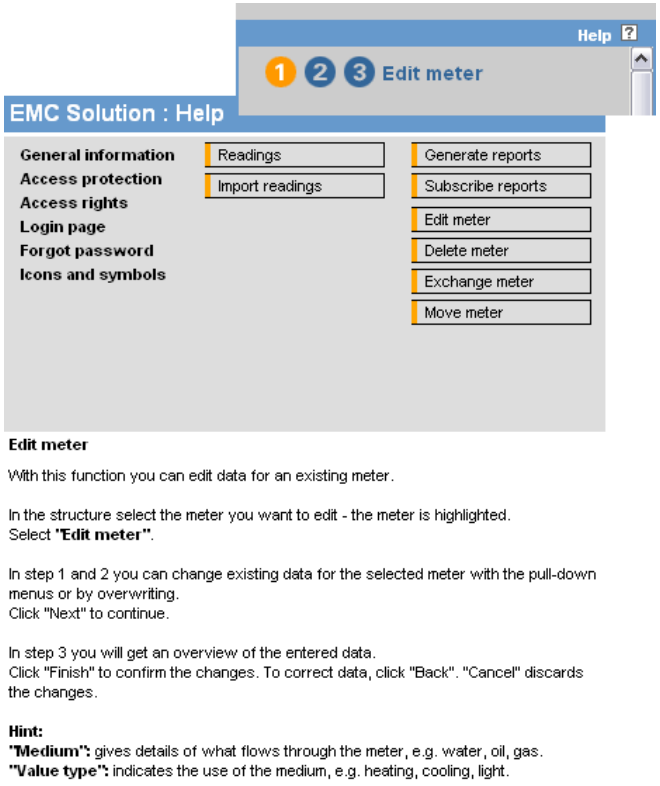
Storage

Energy certificates can be stored in EMC on any node within the overall structure. A validity period can be added as an additional feature to each certificate.

Nodes containing an energy certificate provide certificate information in a clear and transparent node details display.

3.7 Online help

EMC provides context-sensitive online help for all the main functions and helps answer questions.



3.8 Security

The application and database servers required for EMC are located in a Siemens data center. The server farm runs in a "demilitarized zone" (DMZ) with professional firewalls which protect the application both from the Internet and from the Siemens intranet.

The application and the data are located on separate servers. There is no access to the database server via the Internet. The database server can be accessed only via the EMC application, located on the application server. An encrypted connection (128-bit SSL) is used for communication with the EMC application server. A user name and password are required for access to the application.

Data backup

The data is backed up automatically at regular intervals:

Backup intervals
- Daily backup of new and modified data
- Weekly backup of all data

Retention period for backup data
- 4 weeks for all server data

Features of the server farm

- Data transfer between the PC/browser and the EMC server is protected by 128-bit SSL. This is the same encryption technology as is used by banks for secure e-banking.
- 8 Mbps bandwidth to the Internet (the Internet provider is Siemens)
- 155 Mbps backbone
- Encryption of data transferred between the application server and the user
- UPS (uninterruptible power supply) with a guaranteed emergency power supply of 100 minutes
- 24-hour monitoring of operations (buildings/rooms, hardware/servers, software/applications)
- Strictly controlled access rights
- Optimum operating conditions guaranteed
  - Air conditioning system
  - Fire detection system
  - Water and fire protection (F90)

Server monitoring

All EMC server and software components are monitored automatically. Special components are configured and operated as redundant components. In the event of a failure, the management station provides notification and associated steps are introduced immediately.

Data ownership

Although the meter readings, documents and other information maintained in EMC are stored on servers in the Siemens data center, this data remains the property of the customer.

4 Optional modules

Energy management systems are expected to fulfill an extremely varied range of requirements. This is why EMC is modular in structure. This means that different functions and reports can be provided, depending on the required area of emphasis. Customers can add as many optional modules to the standard package as they need to deal with their particular energy-related concerns.

4.1 Weather adjustments (WEA)

Function

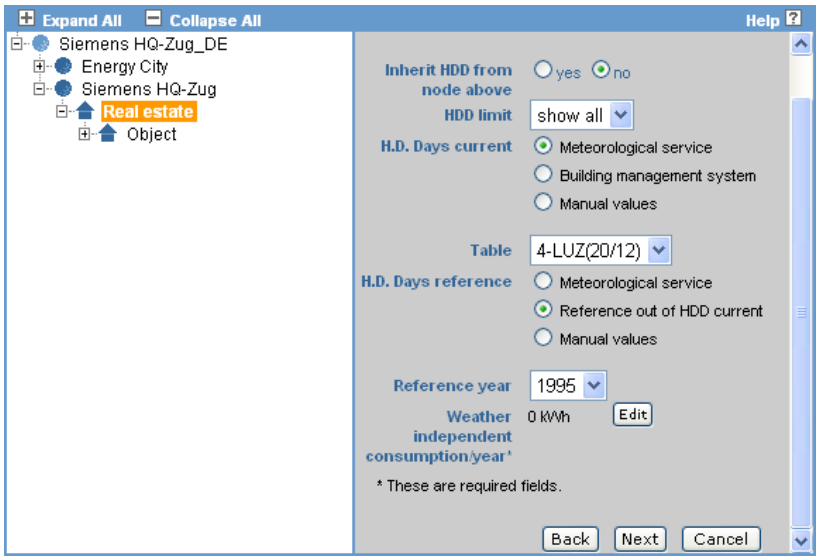
This option counteracts the influence of the weather, so that meaningful comparisons can be made with previous years or with buildings in other locations. Weather adjustment is carried out based on standards (e.g. VDI3807).

The outdoor temperatures or heating degree days used for weather compensation can be integrated in various ways.

- **Meteorological institute**
  Data transfer is carried out automatically in consultation with the corresponding institute (e.g. DWD and ZAMG) and offers the best possible data quality.
- **Building automation and control systems/data loggers**
  Outdoor temperature sensors connected to customer systems can normally also be used for weather compensation. The quality of the data is primarily dependent on the location of the sensor. For precise information on the scope for using the installed systems, contact your local Siemens office.
- **Manual tables**
  If data is not transferred automatically, degree days can also be maintained in manually entered tables.

Parameter setting

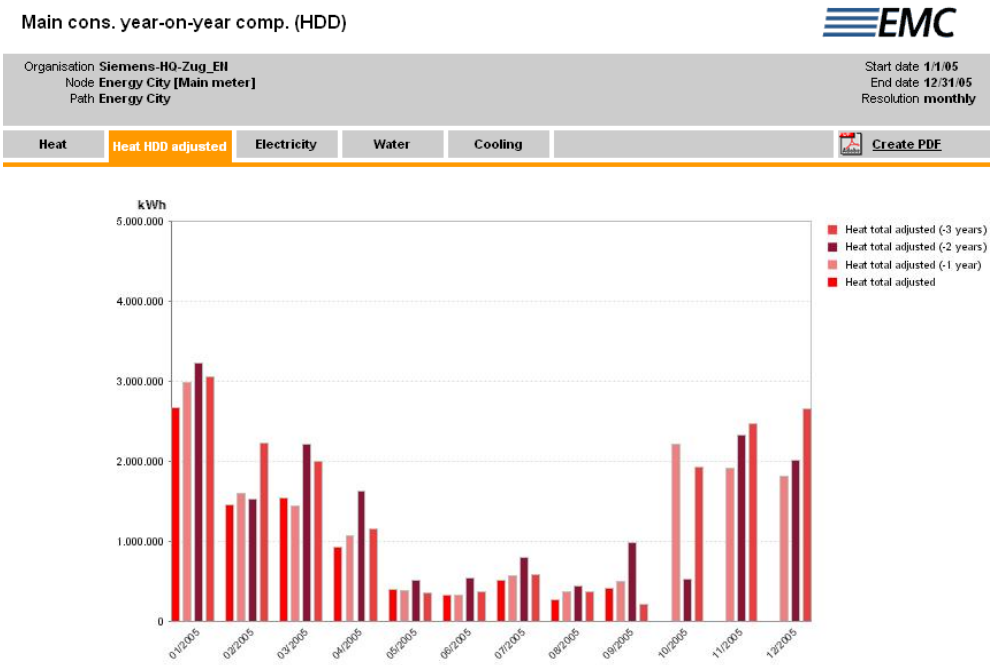
The weather adjustment parameters are selected in the relevant places in the EMC user structure.



Additional reports

Dedicated reports for weather adjustments facilitate the detailed analysis of consumption values:

- Main consumption (HDD)
- Main consumption, node comparison (HDD)
- Main consumption, year-on-year comparison (HDD)
- Main consumption, year-on-year comparison, cumulative (HDD)
- Main consumption cooling
- Climate data
- Heat/HDD



	Date	Heat total adjusted	Heat total adjusted (-1 year)	Heat total adjusted (-2 years)	Heat total adjusted (-3 years)
		kWh	kWh	kWh	kWh
1	01/2005	2,667,698.18	2,975,982.15	3,229,727.36	3,058,880.84
2	02/2005	1,457,548.17	1,594,727.54	1,526,953.13	2,217,148.52
3	03/2005	1,540,459.13	1,442,834.83	2,211,431.04	2,000,638.39
4	04/2005	926,010.05	1,062,195.64	1,625,835.63	1,159,589.43
5	05/2005	397,541.08	384,426.32	507,662.62	349,578.98
6	06/2005	318,285.54	321,395.04	536,100.75	364,907.07
7	07/2005	504,624.58	560,586.01	795,647.50	585,703.49
8	08/2005	266,723.68	360,783.89	434,819.39	360,871.95
9	09/2005	408,841.42	489,410.69	983,043.76	203,948.49
10	10/2005	-	2,208,439.15	521,207.13	1,922,903.01
11	11/2005	-	1,909,406.54	2,322,910.32	2,469,239.47
12	12/2005	-	1,815,344.40	2,012,049.70	2,648,182.87
	Sum	8,487,731.83	15,125,532.20	16,707,388.33	17,341,592.51
	Average	943,081.31	1,260,461.02	1,392,282.36	1,445,132.71

Example: Main consumption, year-on-year comparison (HDD-adjusted)

4.2 Automated meter reading (AUT)

Function

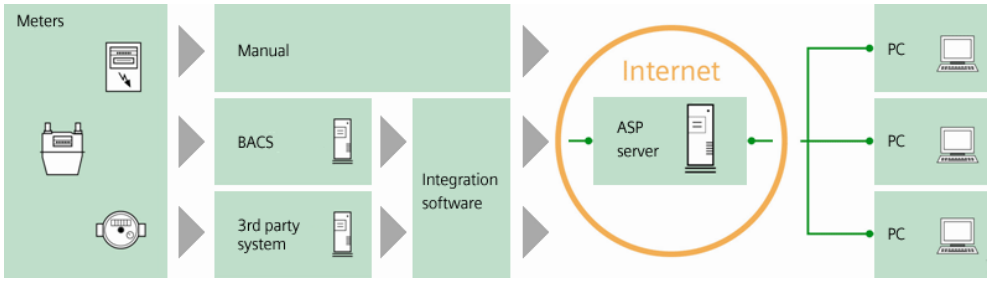
The automated meter reading feature delivers values every 24 hours or every 15 minutes (load profiles) for a detailed analysis of energy consumption.

Topology

EMC can handle data (consumption values, measured values, …) from different systems. The integration options are as follows:

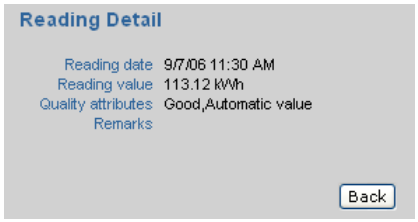
- Building automation and control systems (APOGEE Insight, DESIGO Insight, SICLIMAT, ...)
- Third-party systems by automatic data import
- Third-party systems by web interface

Other connections (e.g. for SAP) can be provided on request.



Data quality

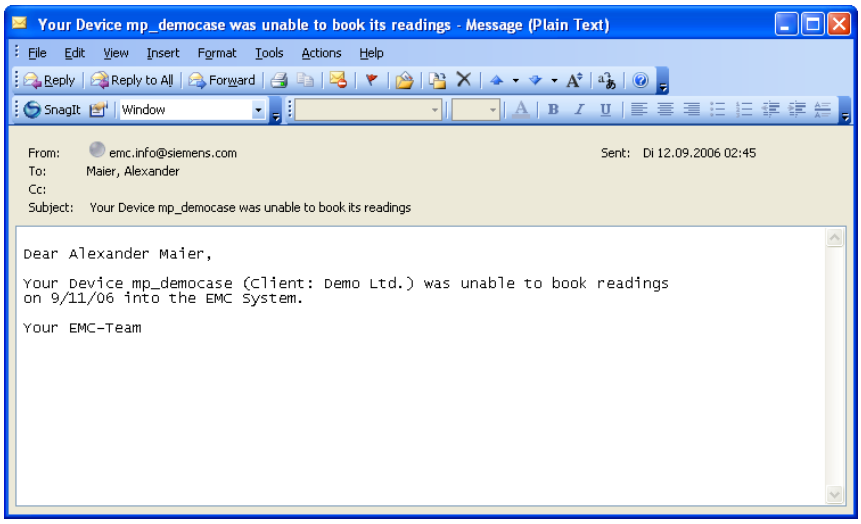
All integrated products and systems transmit attributes relating to the quality of the data. This enables unreliable values (e.g. from a faulty measuring sensor) to be filtered out of the EMC reports.



Further, automatically imported values can be overwritten manually.

Monitoring

Automatically logged meter data is transmitted regularly. EMC monitors this process. In the event of an error, the relevant user is notified by e-mail.



Data quality

Automatic data can be monitored for data integrity as well as deviations.

The following properties can be monitored:

- Missing values
- Negative values
- "0" values

Warning and alarm limits are provided for deviations of values (deviation in percent from a historic mean).
Notification occurs via email or SMS (as desired).

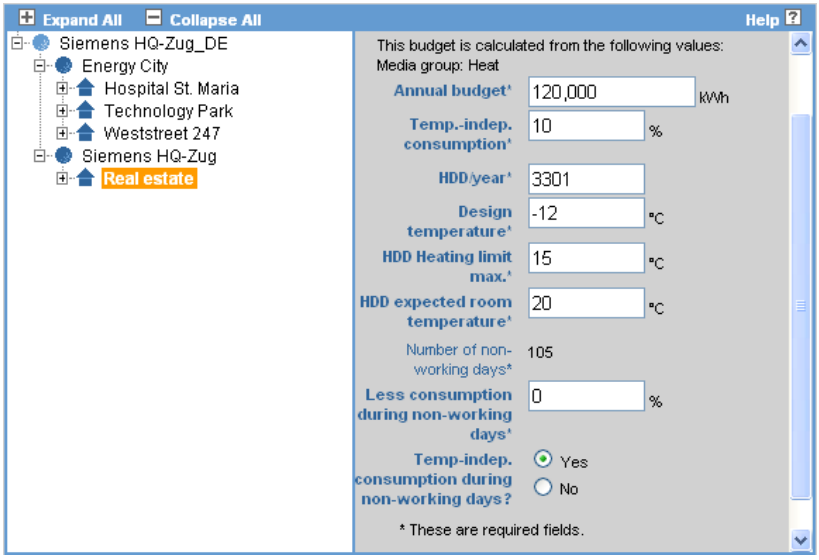
4.3 Controlling (CON)

Function

The Controlling package helps users to see where the energy consumption deviates from the budget values. This is a means of monitoring defined targets

Budgets

Two different budget types are available in EMC. Consumption-based budgets and cost budgets. They are calendar-based in dependence of media (distinction between working days and non-working days) or temperature-based (see example). Cost budgets are only calendar based.



Additional reports

Additional reports are available for controlling purposes:

- Main consumption, budget
- Main consumption, budget, node comparison
- Main consumption, budget, cumulative
- Detailed consumption, budget
- Detailed consumption, budget, node comparison
- Detailed consumption, budget, cumulative
- Energy signature

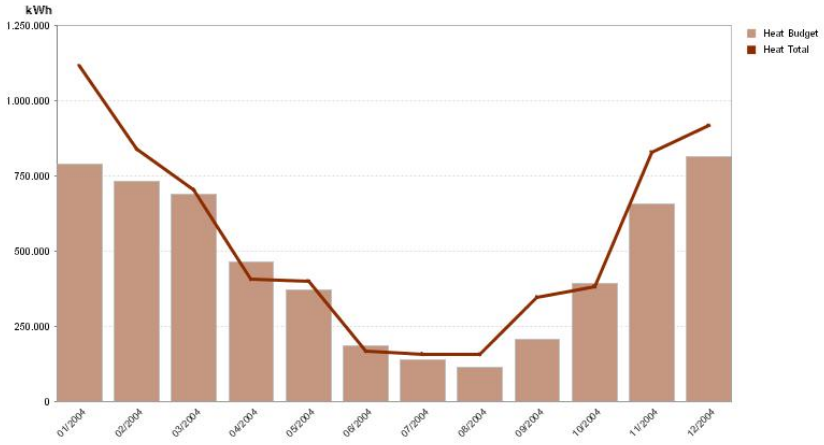
Main consumption budget

EMC

Organisation **Siemens HQ-Zug_DE**
Node **Technology Park [Main meter]**
Path **Energy City > Technology Park**

Start date **1/1/04**
End date **12/31/04**
Resolution **monthly**

Overview | Heat | Electricity | Water | Cooling | Create PDF



	Date	Heat Total	Heat Budget	Heat Diff. abs.	Heat Diff. rel.
		kWh	kWh	kWh	%
1	**01/2004**	1,114,150.55	789,900.91	324,249.64	41.05
2	**02/2004**	839,443.13	732,111.24	107,331.89	14.66
3	**03/2004**	702,817.09	686,948.43	15,868.66	2.31
4	**04/2004**	405,584.07	463,093.37	-57,509.29	-12.42
5	**05/2004**	399,095.96	370,153.09	28,942.87	7.82
6	**06/2004**	166,928.24	183,582.21	-16,653.97	-9.07
7	**07/2004**	157,790.02	138,510.02	19,279.99	13.92
8	**08/2004**	155,800.65	112,771.91	43,028.74	38.16
9	**09/2004**	345,959.54	207,035.17	138,924.37	67.10
10	**10/2004**	381,514.14	392,042.52	-10,528.38	-2.69
11	**11/2004**	827,173.06	657,091.43	170,081.63	25.88
12	**12/2004**	915,985.94	813,594.41	102,391.53	12.59
	Sum	**6,412,242.39**	**5,546,834.71**	**865,407.68**	-
	Average	**534,353.53**	**462,236.23**	**72,117.30**	**15.60**

Example: Main consumption, budget

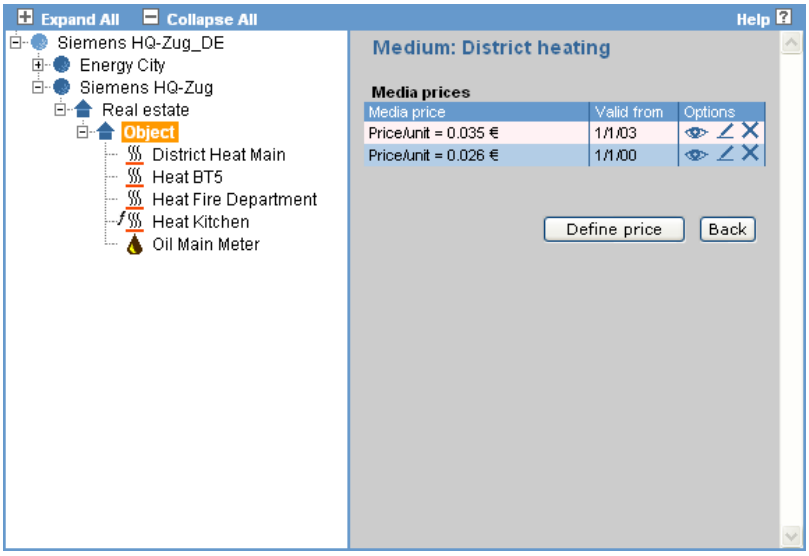
4.4 Costs (COS)

Function

Here, the costs resulting from the consumption of energy are displayed, with an option for comparing energy costs per building

As with all other media properties, prices, too, can be entered for each node in the structure. Currently, EMC provides standard support for a mixed-price model with an annual proportion of fixed costs (fixed costs + factor * consumption).

Other price models can be enabled by arrangement with your local Siemens office.



Additional reports

The costs associated with the consumption values can be displayed in the following reports:

- Main consumption, costs
- Main consumption costs, node comparison
- Main consumption costs, year-on-year comparison
- Main consumption costs, year-on-year comparison, cumulative
- Main consumption costs, overall overview area performance indicators
- Main consumption costs overall overview special performance indicators
- Main consumption costs, budget
- Main consumption costs, budget, node comparison
- Main consumption costs, budget cumulative

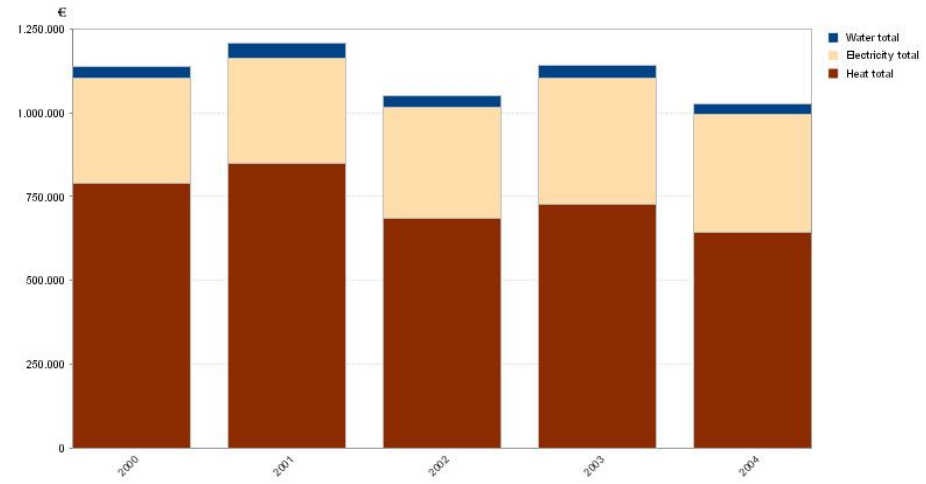
Main consumption costs

EMC

Organisation **Siemens HQ-Zug_DE**
Node **Hospital St. Maria [Main meter]**
Path **Energy City > Hospital St. Maria**

Start date **1/1/00**
End date **12/31/04**
Resolution **annually**

Overview | Heat | Electricity | Water | Cooling | Performance Indicator | Create PDF



	Date	Energy total	Heat total	Electricity total	Water total
		€	€	€	€
1	**2000**	1,136,721.70	789,566.40	311,850.50	35,304.80
2	**2001**	1,208,128.10	849,608.80	313,924.90	44,594.40
3	**2002**	1,050,516.06	684,590.36	332,555.30	33,370.40
4	**2003**	1,140,540.28	726,511.68	376,693.40	37,335.20
5	**2004**	1,024,975.42	642,783.24	352,557.78	29,634.40
	Sum	**5,560,881.56**	**3,693,060.48**	**1,687,581.88**	**180,239.20**
	Average	**1,112,176.31**	**738,612.10**	**337,516.38**	**36,047.84**

Example: Main consumption costs

4.5 Benchmarking (BEN)

Function

This option allows the display and comparison of additional consumption-based performance indicators such as kWh/person.

This makes it possible to produce meaningful reports which provide an overview of the energy consumption values as a function of another, additional value. EMC differentiates here between specific performance indicators (e.g. kWh/person) and characteristic values for area (e.g. kW/m^2).

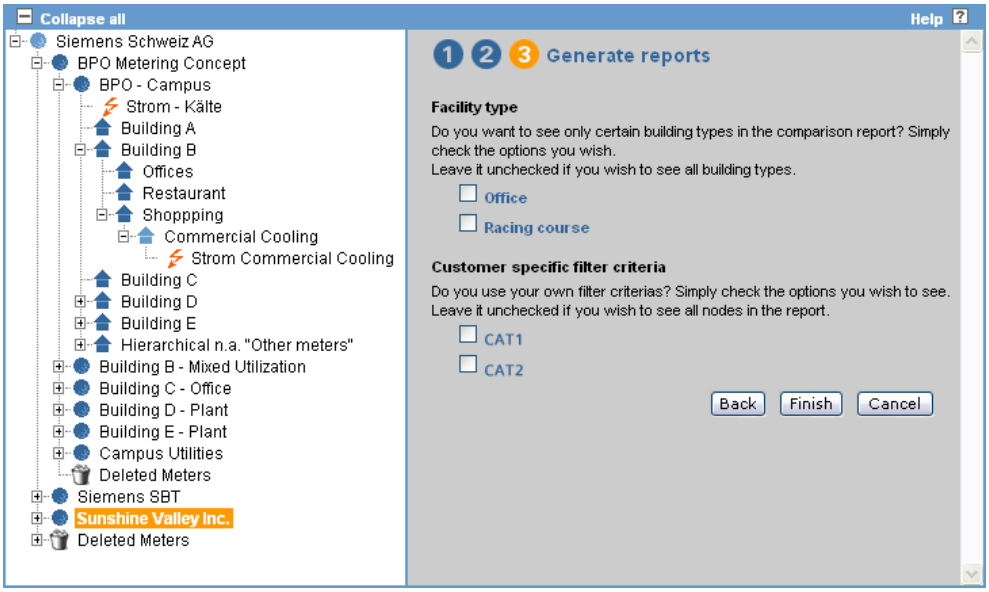
Additional aspects

For this additional function, the following additional “media” can be used:

- Services
- Persons
- Production units
- Nights
- Turnover

Filter

Use filters of individual building types to ensure that only comparable objects are added to the evaluation.



Example: Object filter

Additional reports

The following reports are available for displaying the various performance indicators:

- Main consumption, specific performance indicators
- Main consumption, specific performance indicators for node comparison
- Detailed consumption, area performance indicators
- Detailed consumption, area performance indicators for node comparison
- Detailed consumption, specific performance indicators
- Detailed consumption, specific performance indicators for node comparison
- Main consumption, overall overview of area performance indicators
- Main consumption, overall overview special performance indicators
- Detailed consumption, overall overview of area performance indicators
- Detailed consumption, overall overview of special performance indicators

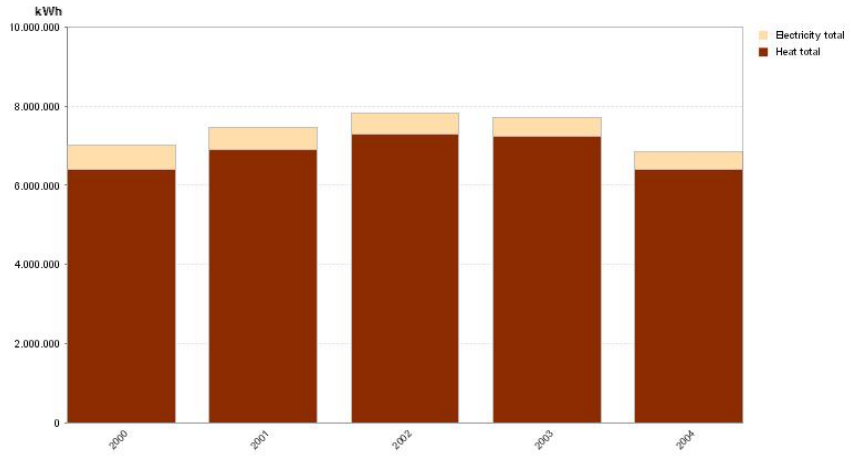
Main consumption specific PI

EMC

Organisation **Siemens HQ-Zug_DE**
Node **Technology Park [Main meter]**
Path **Energy City > Technology Park**

Start date **1/1/00**
End date **12/31/04**
Resolution **annually**

Overview | Heat | Electricity | Water | Cooling | PI | Create PDF



	Date	Energy total	Persons	Heat total	PI Heat total	Electricity total	PI Electricity total	Water	PI Water
		kWh	Unit	kWh	kWh/Unit	kWh	kWh/Unit	m³	m³/Unit
1	**2000**	7,010,368.64	76,947.00	6,402,984.21	83.21	607,384.43	7.89	16,871.67	0.22
2	**2001**	7,455,158.60	66,871.00	6,912,054.30	103.36	543,104.30	8.12	24,392.00	0.36
3	**2002**	7,825,087.94	72,653.00	7,291,567.04	100.22	543,520.90	7.48	14,457.00	0.20
4	**2003**	7,718,303.06	62,111.00	7,233,284.42	116.46	485,018.64	7.81	14,314.00	0.23
5	**2004**	6,847,789.03	61,028.00	6,412,242.39	105.07	435,546.64	7.14	13,688.80	0.22
	Sum	**36,856,707.27**	**339,610.00**	**34,242,132.36**	-	**2,614,574.91**	-	**83,723.47**	-
	Average	**7,371,341.45**	**67,922.00**	**6,848,426.47**	**100.83**	**522,914.98**	**7.70**	**16,744.69**	**0.25**

Example: Main consumption performance indicators

4.6 Environment (ENV)

Function

The analysis of emission levels is growing in importance. The environment package from EMC can be used for a detailed analysis of emissions.

Mathematical models for analyzing additional emissions (CO, CO_2, C_xH_y, NO_x, SO_2, dust) are available.

Additional media

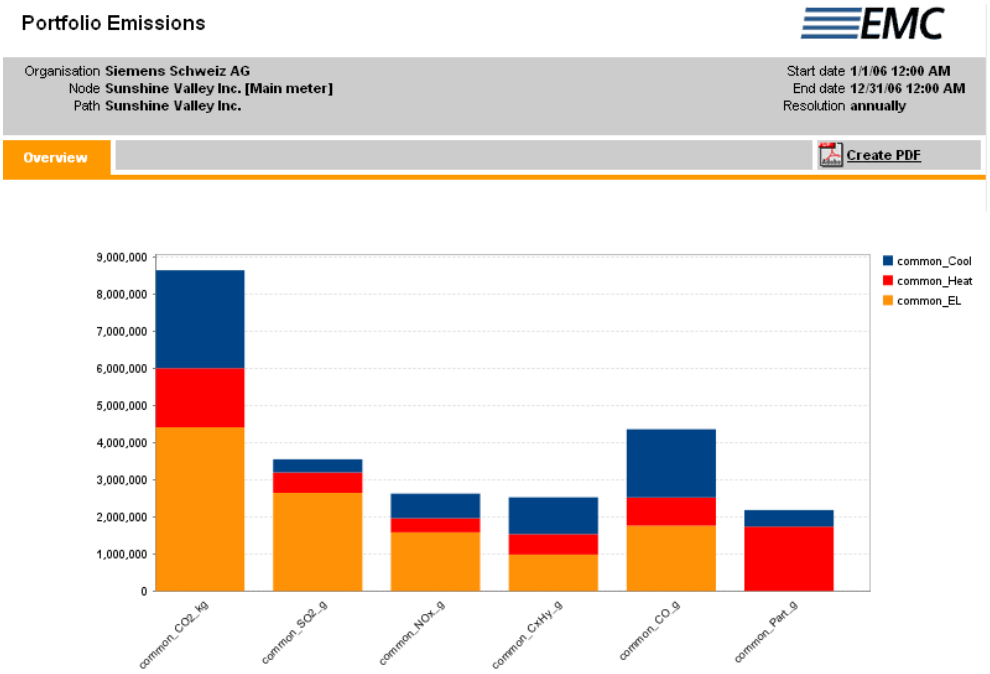
For this additional function, the following additional media can be used:

- Groundwater
- Rainwater

Additional reports

In addition to the "Main consumption, CO_2 emissions" report, which is part of the standard package, the following reports are available:

- Main consumption, emissions
- Main consumption, CO_2 emissions, node comparison
- Main consumption, CO_2 emissions, year-on-year comparison



		common_Total	common_EL	common_Heat	common_Cool
1	common_CO2_kg	8,642,589.71	4,416,025.11	1,589,747.64	2,636,816.96
2	common_SO2_g	3,556,069.99	2,649,615.07	550,929.05	355,525.88
3	common_NOx_g	2,630,683.72	1,589,769.04	377,266.37	663,648.31
4	common_CxHy_g	2,530,745.66	989,189.62	552,008.99	989,547.04
5	common_CO_g	4,364,567.82	1,766,410.04	761,274.06	1,836,883.72
6	common_Part_g	2,187,026.36	5,299.23	1,737,319.77	444,407.35

Example: Emissions main consumption

4.7 Load profile

Function

Analysis of load profile data is a decisive component of a comprehensive energy management process. Load profiles can be evaluated for individual days, weeks, months and years. A load duration curve is also available to determine power demand for an object.

Additional media

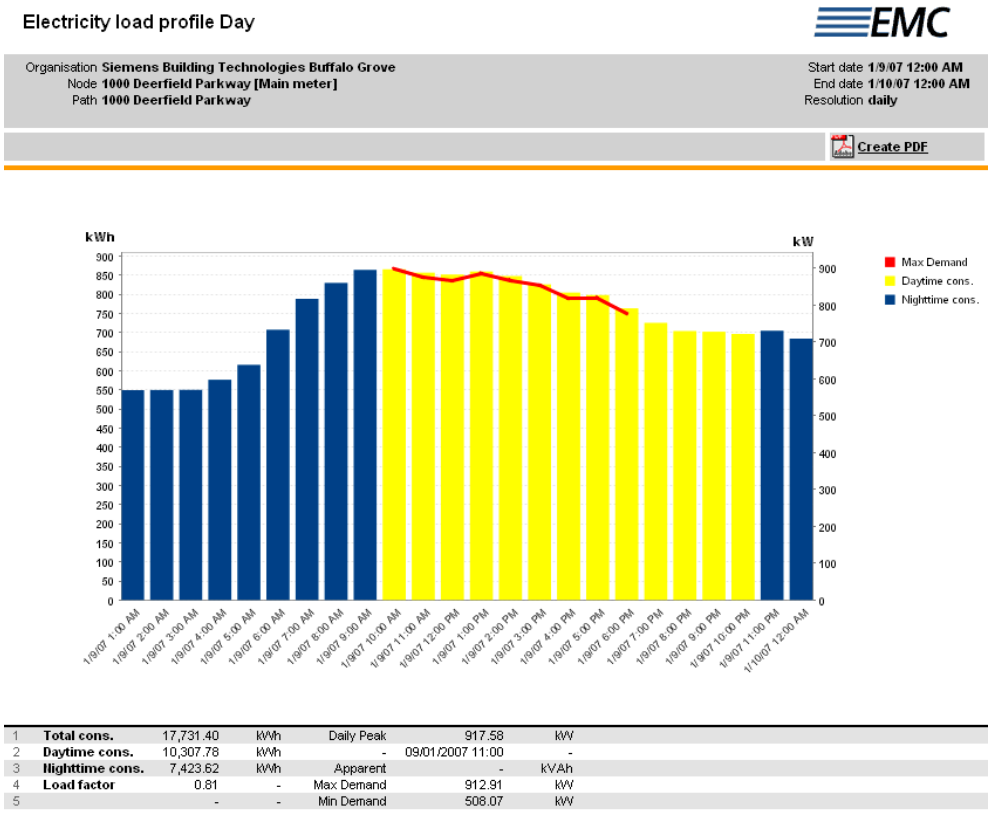
The following supplemental media is available this function:

- Electricity time-based rates (differs between high/low rates based on time differences)

Additional reports

The following reports are available for displaying the various performance indicators:

- Daily load profile
- Weekly load profile
- Monthly load profile
- Yearly load profile
- Continuous load profile



1	**Total cons.**	17,731.40	kWh	Daily Peak	917.58	kW
2	**Daytime cons.**	10,307.78	kWh	-	09/01/2007 11:00	-
3	**Nighttime cons.**	7,423.62	kWh	Apparent	-	kVAh
4	**Load factor**	0.81	-	Max Demand	912.91	kW
5		-	-	Min Demand	508.07	kW

Example: Daily load profile

Siemens Switzerland Ltd
Industry Sector
Building Technologies Division
Gubelstrasse 22
6301 Zug
Schweiz
Tel. +41 41-724 24 24
www.siemens.com/sbt