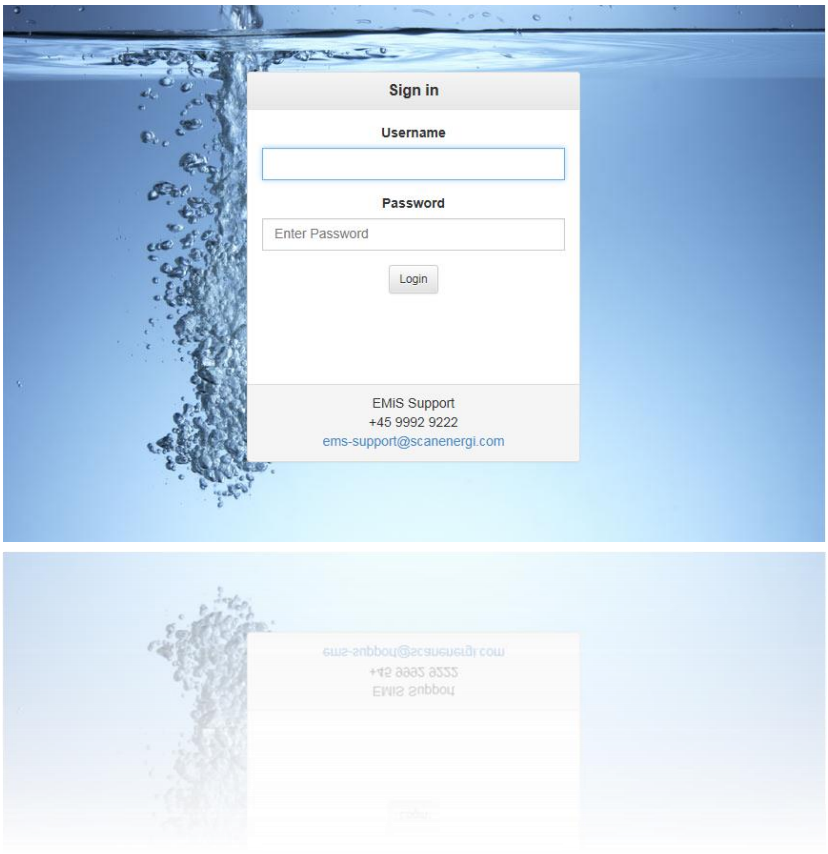

Montage™ Utility Intelligence System

Montage™ is the most advanced software for optimizing energy use, reducing waste and cutting cost

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User Reference Guide

Applicable for version 9.6
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About Us

Scanenergi optimises energy consumption for hundreds of enterprises, who reap the benefits of improved efficiency and performance. Our clients slash up to 30% off their power bills and reduce CO_2 climate impact.

Employing more than 150 people, our clients include not only global industrial groups, but also small, medium and large companies in Africa, Asia, Denmark, Europe and North America.

We work in partnership with our clients, where we adapt our products and services to meet individual clients' needs. The goal of every partnership is to improve the client's competitiveness and reduce CO_2 emissions.

Scanenergi offers energy optimisation – nothing else. And we've been doing it for more than a decade. Our focus is on identifying, prioritising and implementing energy optimisation measures in close partnership with our clients, and we make sure that they pay the best price for the energy they use. Furthermore, we help our clients to finance energy optimisation to ensure that benefits are realised in full.

Our software

In order to guarantee savings from the delivery of energy optimisation projects, both the client and Scanenergi require a system that reliably presents management information on the status of our energy projects across all departments and energy cost centres. The system that we implement on all our projects is our own utility management software tool, Montage™.

Montage™ is a centralized, fully web-based software system providing overview, transparency and a comprehensive performance management toolkit. It can be seen to be the organisations eyes-and-ears identifying excess energy, water and waste data dynamically, resulting in improved operational efficiency, cost savings and more informed management decisions impacting the entire organization.

Our services

To assist you in maximising the return on investment in the software, Scanenergi offers a range of implementation and training services, such as:

- Requirements Workshop – capturing the needs of all stakeholders.
- System Configuration – assistance in setting up the software.
- Upgrade services – upgrade your data and system knowledge in order to make optimum use of new releases.
- Historical data import – get started by viewing real site data.
- Installation and testing – install on-premise or have Scanenergi to host it for you.
- Super-user and user training – build the right level of knowledge across the organisation.
- Baseline and Target-setting Workshop – ensure accurate performance measures are in place to maximise savings opportunities.
- Advanced training – optimise the use of the system with education in the use of some of the more advanced features.

If you require any further information about these services or require a quotation, please contact a member of the Montage Team on +45 9992 9222 or support@montageum.com.

Montage Plus™ support and maintenance packages.

The Montage Plus range of support and maintenance packages are available to provide support to the end-users whilst ensuring the license is fully maintained. Montage Plus will ensure you receive the latest maintenance updates to the core software, whilst also offering attractive financial discounts for future functionality releases. The customer Support Helpdesk provides access to experienced staff capable of resolving issues in the current web-based versions of the software.

The Helpdesk is available from 08.00–16.00 pm Central European Time, Monday to Friday (excluding UK or Denmark statutory holidays). The Montage Helpdesk is available to all members on:

Telephone (Direct Montage Helpdesk)	+45 9992 9222
Facsimile	+45 9992 9201
E-mail:	support@montageum.com

TABLE OF CONTENTS

1 HOW TO USE THIS MANUAL

1.1 Intended audience

This document is applicable for users of Montage version 9.0 and above.

1.2 Terms

Throughout the document you will see phrases spelled with capital letters where you would not normally expect to see capital letters, such as "a Node is assigned a Utility type". This indicates that these words; "Node" and "Utility" refer to Montage terminology and not just the normal meaning of the word.

For ease of reference these terms are also listed alphabetically in the Glossary of Terms in section 8.2.

1.3 Document structure

The document opens with an **'Introduction to Montage'** which briefly explains the purpose of the software, its main features and summarises for users of previous versions of the software, what is new in the latest version.

The part of the section entitled **'Montage at a Glance'** provides a series of screenshots of the most commonly used areas of the system. These screenshots contain balloons which reference tables that define these functions and corresponding page numbers.

This section is then followed by **'Using Standard Functions'** which describes all the key functions in Montage and how they are used. This section is aimed at the occasional rather than the experienced user and purposely DOES NOT explain how to customise these functions, as these are considered to be more advanced techniques, which in turn are described in section entitled **'Using Advanced Functions'**.

After this section is the section on **'Configuring Montage'** which details the actions necessary to amend an existing structure or create a new one by adding/removing nodes.

Thereafter, the document is aimed at the more technical person, and is entitled **'System Administrator Functions'**. This section covers topics such as adding new Users and assigning security permissions as well as the translation tool and server-related information.

The document concludes with a **Glossary of Terms** and some **Appendices** of supporting information.

1.4 Training

This document although it can be considered comprehensive in nature, cannot be expected to replace hands-on instructor led training. Montage training courses delivered by Scanenergi trainers (or by a Certified Training Partner) combine theory with hands-on exercises to ensure a complete knowledge transfer of the system. 'Learning-by-doing' is very much our philosophy with software training and the best way to learn is by being taught by those experienced in training Users and Super-users.

2 HOW TO USE THIS MANUAL

This section introduces the purpose of the Scanenergi's energy and water management software tool (Montage™), together with identifying the new feature enhancements over previous versions.

2.1 Overview

Montage is an information management tool that gives you the power to control utilities, materials and waste in your organization. As a web-based application, Montage interfaces with existing IT and management systems to consolidate your view of the business, to reduce energy usage and to optimize cost savings potential.

2.1.1 Easy to use

Montage combines features and functions of both spread sheets and databases with an easy-to-use front end. Although it is a complex and powerful IT tool, using leading-edge technologies, comprehensive features and a familiar browser all help to make day-to-day operations simple, quick and effective.

2.1.2 Energy Monitoring and Targeting (M&T)

As the basis of your M&T programme, Montage will reduce energy usage and ensure optimal cost savings. Not only can you set sophisticated baselines and targets but as your performance levels improve you can then reset them without losing track of the previous ones, creating a continuous cycle of improvement.

2.1.3 Central Repository for Energy Data

It also provides a systematic information infrastructure, receiving data from multiple sources and making them available in a central data repository whereby providing a highly accurate assessment for energy and environmental programmes.

2.1.4 Report Generator

Montage reports provide you with clear, concise information on your progress towards targets, giving you early warning of failure so that corrective action can be taken.

2.1.5 Analysis Tool

With powerful features such as multiple regression analysis and CUSUM (Cumulative sum control chart), Montage can quickly analyse data and quantify the relationships between energy use, product mix and production levels.

2.2 Quick reference to what's new in Montage 9

If you are experienced in using previous versions of Montage (versions 6, 7 or 8) you'll notice that the version 9 platform includes a number of striking feature enhancements, major improvements to existing features, minor improvements to assist with general usability of the software, as well as some general improvements aimed at delivering improved system performance. Some of the most notable improvements are described below. The first section 2.2.1 covers the key differences between Montage 8 to Montage 9. This section is mainly kept in this document for users upgrading directly from Montage

8 to Montage 9.6. Thereafter, section 2.2.2 summarises the key differences between Montage version 9.0 and version 9.6.

2.2.1 Highlighting the key differences between Montage 8 and 9.

Section(s)	Montage 9.0 enhancements over version 8.x	Page
NEW FEATURES		
5.1.2.10	**Forecasting** The ability to predict consumptions, costs, emissions and other values for future periods.	125
4.10	**Montage Messages** The ability to send messages and reports to other Montage users. Also create exception conditions that will trigger alerts.	82
4.2 5.3	**Dashboard Reporting** Select the most important report modules and display them together in the form of a personal dashboard available on login.	39 150
4.9	**Report favourites** Specify which screens, reports and functions are most commonly used and assign them to 'Favourites' for ease of access.	79
MAJOR IMPROVEMENTS TO EXISTING FEATURES		
5.1	**Report flexibility** All reports are now generated from one, fully customisable template.	102
  4.3.5.1 4.8.4	**Data validation indicators** Colour coded values available as well in the: Navigator Summary screen as Reports to show the validity of the data.	 48 76
5.5	**Custom Report Menu Structure** Users can configure their own menu structures for ease of navigation and report selection.	161
6.3.2	**New Node Setup Screen** A redesigned Node Setup screen to ease configuration and save time. Allows for multiple selections of conditions without the need to save after each action.	202

5.6.2	**Enhanced Baseline/Target Setting Tool** Baselines and targets now display advanced statistical and graphical interpretation.	164
4.6	**Enhanced Search facility** Search by any condition of the node e.g. Memo, Utility, Reading value, Dates etc.	59
MINOR IMPROVEMENTS TO EXISTING FEATURES		
6.2	**New icons** Additional icons added to the icon file for ease of use.	189
4.11.2.2	**Park Meter Readings** Meter readings can be 'parked' whilst they are investigated. Parked readings will not be taken into account when calculating consumptions.	92
5.1.2.11	**PDF printing options** Reports can now be specified as Landscape or Portrait with flexibility about where to assign page breaks.	126
5.1.2.5	**Child node memos** Memos assigned to child nodes can now be included in Memo reports.	113
6.4.1	**Improved security to include Definitions** Added security permissions prevent Definitions created for use on one Site (or Node) being changed by a user on another site.	210
GENERAL IMPROVEMENTS		
	Calculation speed Optimisation of code has resulted in a reduction in the calculation speed ranging from 5-25% depending on the action.	
	Screen navigation speed Navigation up and down the tree structure and when moving between screens is between 2 – 4 times more efficient than the previous version.	
	Node configuration Between 2 – 10 times faster depending on the complexity of the setup.	

2.2.2 Highlighting the key differences between Montage 9.0 and 9.6

The most significant change has been in the ability to calculate output data on demand such that reports are now available at intervals down to 1-minute.

At the same time the different frequencies of day, week, month etc. have been replaced by just one base frequency, which is typically set to daily, normally midnight to midnight. Longer frequencies are still available but they are now calculated from the base frequency.

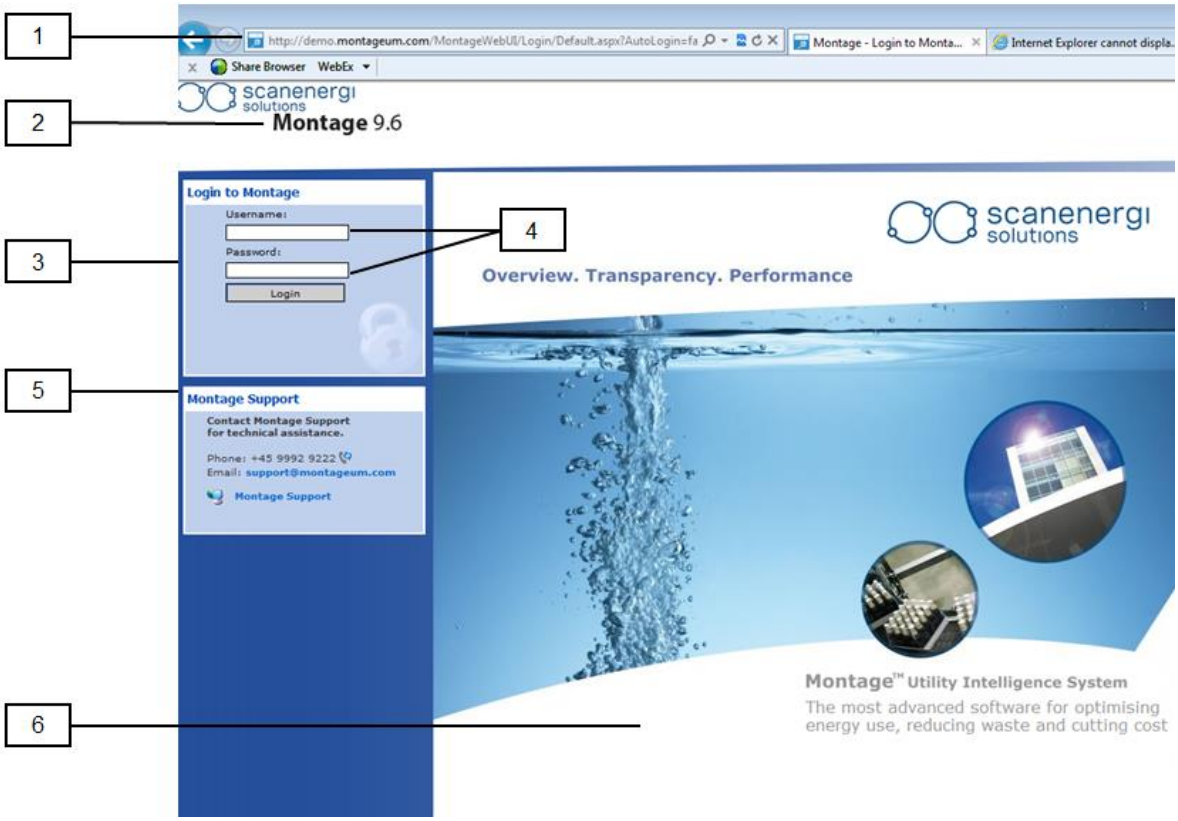
Section(s)	Montage 9.6 enhancements over version 9.0	Page
NEW FEATURES		
	Batch Reporting The ability to report consumptions on specific production batches. *(This is sold as a separate module and will therefore not be active on all installations).*	Not included in this manual
	Consumption Survey The ability to design surveys that will capture consumption and cost data from users across the organisation, without the need for training in Montage. *(This is sold as a separate module and will therefore not be active on all installations).*	Not included in this manual
MAJOR ENHANCEMENTS		
Error! eference source not found.	**Frequency Management** Changes have been made to the process of calculating data to allow for higher frequency data management. All data is now calculated into a base frequency (e.g. daily) from which higher and lower frequency calculations are driven.	**Error! Bookmark not defined.**
4.8.3.2	High Frequency Reporting Data can now be reported at 'Near Real-time' allowing for analysis in minutes and hours as well as days and weeks.	74
IMPROVEMENTS TO EXISTING FEATURES		
5.3.5	**Dashboard functions** Users can create multiple dashboards, each with their chosen layout. Dashboards can also be created on behalf of other users. Dashboard reports can also now include Memo reports.	156
4.3.1.1	**Quick dates** More options added to support the higher frequency data.	42

7.5.3	**Navigator default preferences** Users can now specify preferred settings when using the Options panel.	249
4.10.5	**Montage Messages** Intervals allow for alerts to be triggered at intervals up to 15 minutes. Test the alert trigger against the latest data before activating. Search feature added to allow searching by name, subject, sender and recipient.	86
5.1.2.4	**Meter Reading Report** Create a report containing the most important meter (meter reading, previous reading, last reading date etc.)	110
	Charts and Reports New colour pallet for use on pie and bar charts. Module setup shows last modified date, time and user name. Date/Time format selector	
5.5	**Organise Homepages** The ability to sort the list of homepages in alphabetical order for ease of management.	161
	Data import Numerous features have been added to allow for more flexibility in importing data files.	
	Specify the functions for each role The System Administrator can now have access to the functions and role table that determines what functions the Administrator, Manager, User and View can access. A new role can also be created.	
TECHNICAL IMPROVEMENTS		
	Support now provided for: .docx and .xlsx now supported. 64 bit server	

3 MONTAGE 9 AT A GLANCE

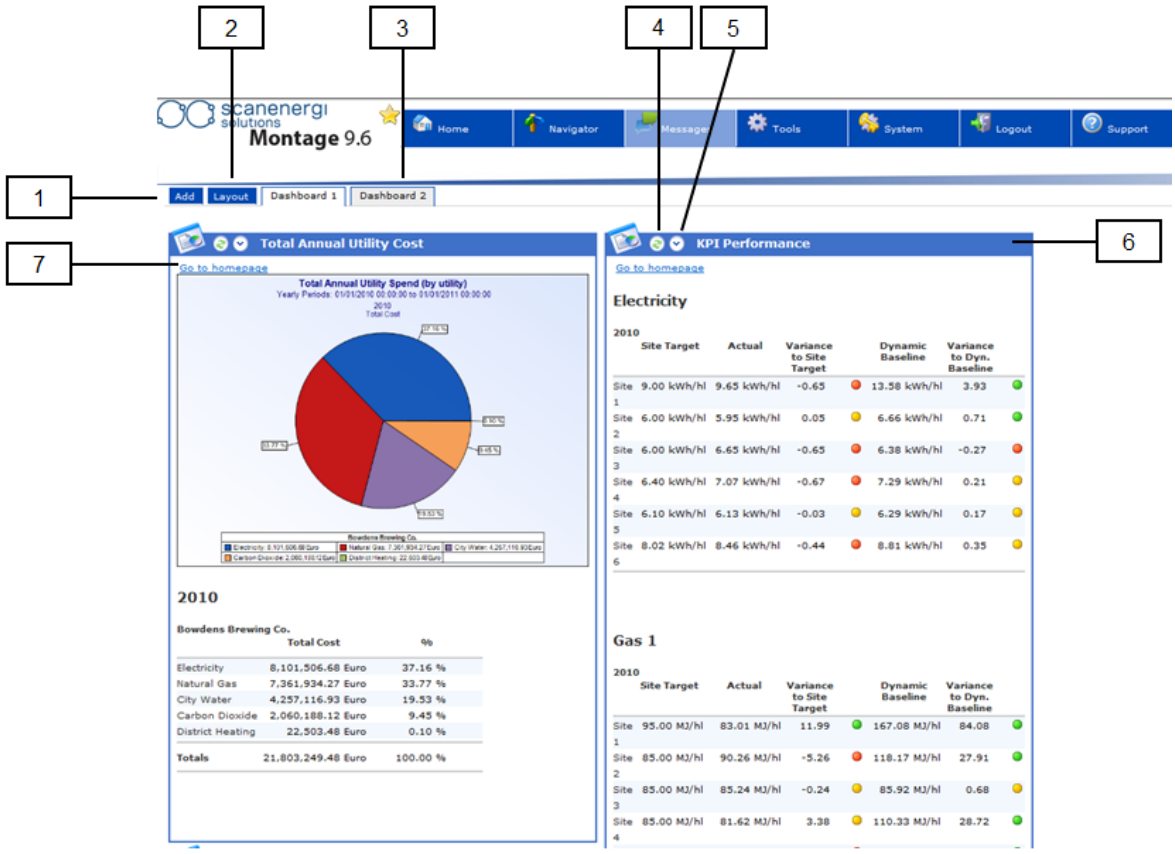
This section provides screenshots and a function summary of the most commonly used areas of the software. Refer to the corresponding tables for page numbers where you can find additional information about the specific function.

3.1 Login Screen



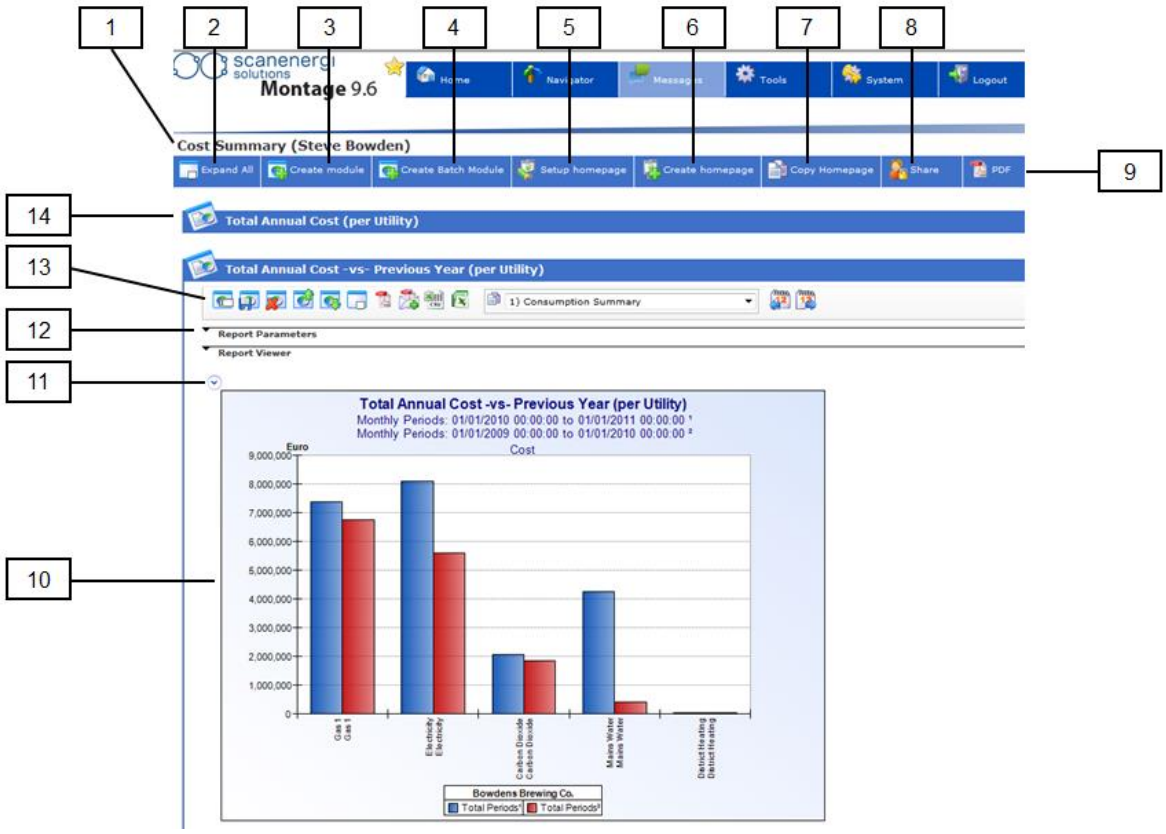
Ref	Login Screen Functions	Section	Page
1	Application address (also known as URL)	4.1	38
2	Application name and version number	4.1	38
3	Application Login area	4.1	38
4	Username and Password entry fields	4.1	38
5	Montage Support contacts and quick links	4.1	38
6	Welcome screen	4.1	38

3.2 Dashboard screen



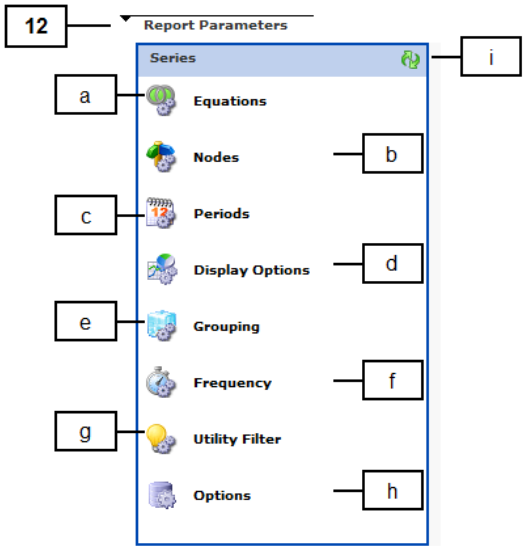
Ref	Dashboard Screen Functions	Section	Page
1	Add a new report module to the Dashboard	5.3	150
2	Specify the dashboard template to determine the screen layout	5.3	150
3	Switch between dashboards (if more than one is active)		
4	Manually refresh the report module		
5	Access the report parameters to edit the report	4.2.1	40
6	Report module	5.3.1	151
7	Link to the homepage containing the selected report module		

3.3 Homepage screen



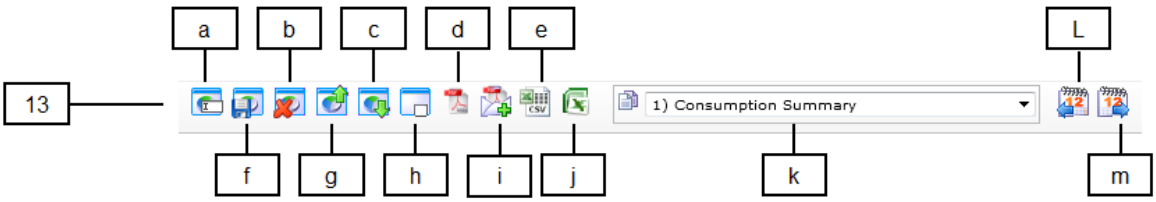
Ref	Homepage Screen Functions	Section	Page
1	Homepage title	4.7.4	64
2	Show allow report modules in expanded mode		
3	Create a new homepage report module	5.2.2	131
4	Create batch module (only active if enabled on License)		
5	Setup the homepage title, default settings and access levels	4.7.4	64
6	Create a new homepage	4.7.4	64
7	Copy the entire homepage (incl. report modules)	4.7.7	66
8	Settings for providing read/write access to other users	4.7.8	67
9	Open or Send the entire homepage (incl. all modules) to a PDF file	4.7.6	65
10	Report viewer displaying the report module	4.8.3	72
11	In-report options for configuring the module display		
12	Report parameter settings for report configuration	See 12. below	
13	Report module functions	See 13. below	
14	Report module title (collapsed report)	4.8.2.1	69

12. Report parameter functions



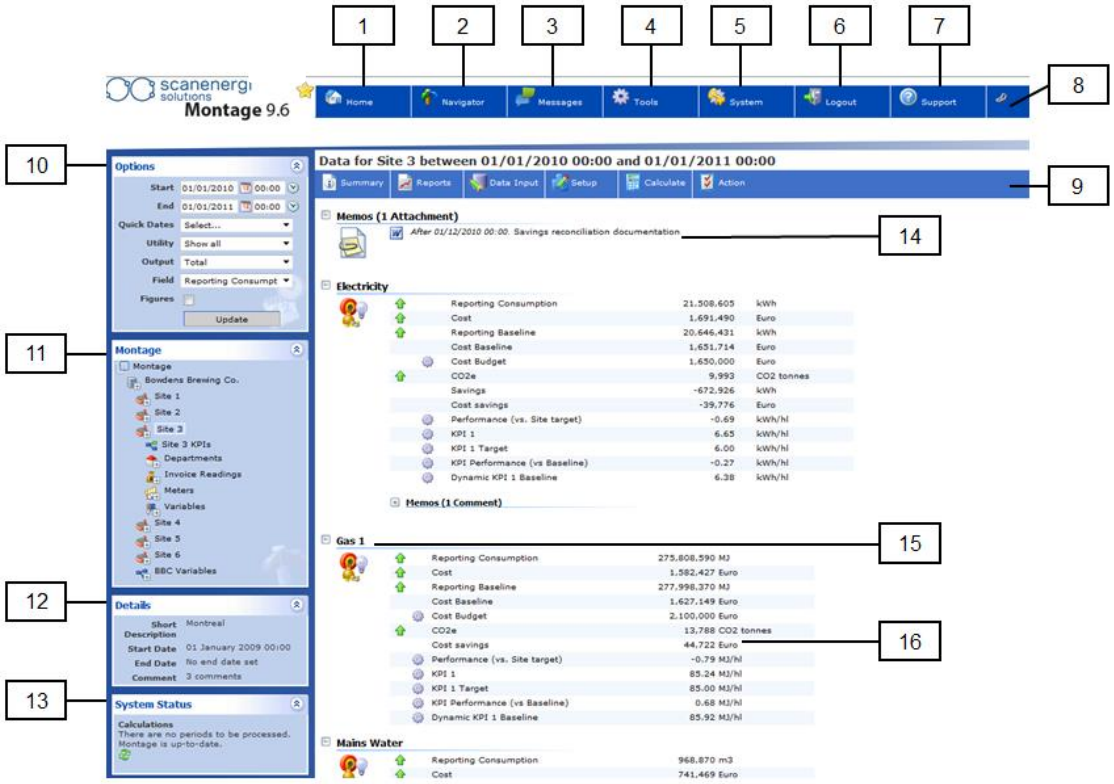
Ref	Report parameter Functions	Section	Page
12a	Add/Edit report equations.	5.1.2.1	104
12b	Select the node(s) to be included in the report.	5.1.2.2	106
12c	Select the Start and End dates for the report, and whether the report will compare previous periods.	5.1.2.3	107
12d	Select the required report type (Pie, Bar, Text).	5.1.2.4	110
12e	Specify how the data fields will be grouped in the report.	5.1.2.7	116
12f	Select a reporting frequency and Intervals (Minutes, hours, days, weeks, months and years).	5.1.2.8	121
12g	Select which utility types to include in the report.	5.1.2.9	124
12h	Options determining how the report will be displayed when exported to PDF, whether it will include forecasted data and the preferred data and time format.	5.1.2.11	126
12i	Manual refresh of the report module to reflect any changes.		

13. Report module functions



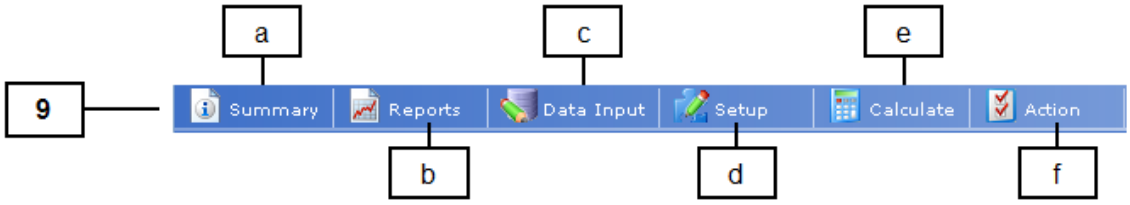
Ref	Report module Functions	Section	Page
13a	Select to change the title of the report module	4.8.2.1	69
13b	Delete the report module	4.8.2.3	70
13c	Move the module one place down on the homepage	4.8.2.4	70
13d	Export the active report module as a PDF	4.8.2.6	70
13e	Export the report data into csv format	4.8.2.8	71
13f	Save the active report module	4.8.2.2	69
13g	Move the module one place up on the homepage	4.8.2.4	70
13h	Set the active report module to open collapsed or expanded	4.8.2.5	70
13i	Send the active report module as a PDF file via Montage Messages	4.8.2.7	70
13j	Export the report module to Microsoft® Excel		
13k	Copy the active report module to a selected homepage	4.8.2.9	71
13L	Change the report period to include data for one period back from the Start date	4.8.2.10	71
13m	Change the report period to include data for one period after the End date	4.8.2.10	71

3.4 Navigator screen



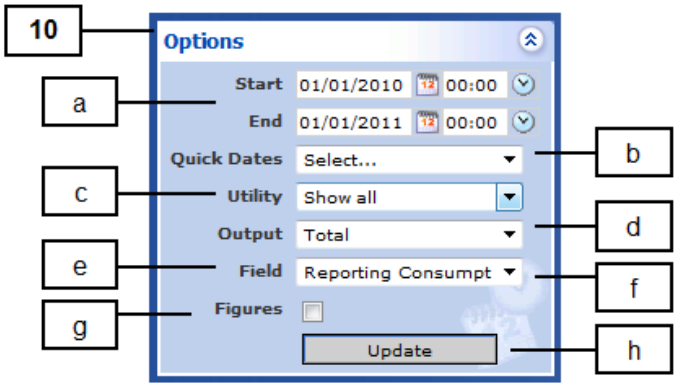
Ref	Navigator Screen Functions	Section	Page
1	Returns the user to their default Home screen or Dashboard	4.7	62
2	Returns the user to the Navigator	4.3	41
3	Accesses the Montage Messages function	4.10	82
4	Tools menu (incl. options for target setting, reading forms, imports)	3.6	25
5	System menu (incl. options for User profiles, Language preferences)	7	240
6	Log out of the system or change the user password	4.1.2	39
7	Select Support to access the Technical Support information and Licence information	7.7	254
8	Update the URL with the details of current settings (useful to share with the Support Desk when assistance is required)		
9 & 10	The Navigator sub menu and options	See 9 & 10 below	
11	The Navigator tree	4.3.2	45
12	Details of the node highlighted in the navigator (e.g. a description of the node, the start date and end date of the node).	4.3.3	46
13	System Status displays the status of the calculations.	4.3.4	46
14	Displays details of the memos assigned to the node or utility.	4.4	50
15	Utility type assigned to the highlighted node	4.3.1.2	43
16	Node field assigned to the utility for the highlighted node.	4.3.1.4	44

9. Navigator sub-menus



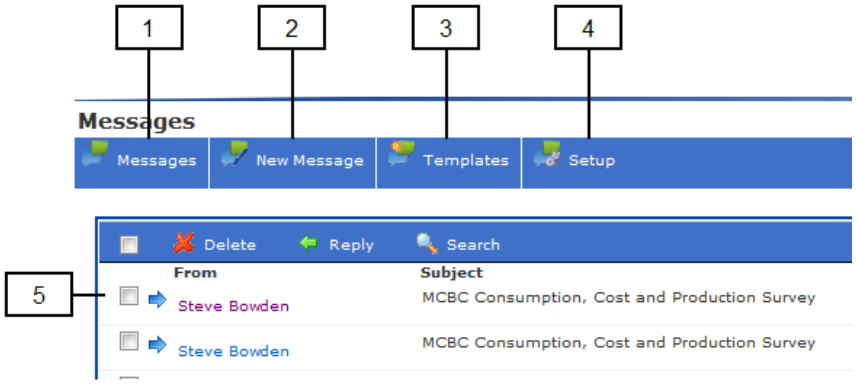
Ref	Navigator sub-menus Functions	Section	Page
9a	Returns the user to the Summary screen in the Navigator	4.3	41
9b	Access to the Navigator report menu	4.5	53
9c	Provides access to the Memo entry screen	4.4.1	50
9d	Provides access to the Setup menu for editing the highlighted node: - Attributes, and - Node Fields	 6.2 6.3	 189 198
9e	Runs a calculation specific to the highlighted node	6.7.4	237
9f	Action menu allows for nodes to be: - Created - Moved - Copied - Deleted	 6.2.3 6.2.4 6.2.5 6.2.6	 194 194 195 196

10. Options panel functions



Ref	Navigator sub-menus Functions	Section	Page
10a	Specify the Start and End dates and times for the data range.	4.3.1.1	42
10b	Select a pre-defined period from the list (e.g. Last full month)	4.3.1.1	42
10c	Specify the utility you wish to display (All utilities, Electricity, Gas etc.).	4.3.1.2	43
10d	Specify the output you wish to display (e.g. totals, per shift, weekend).	4.3.1.3	43
10e	Specify which NodeField's data to display in the navigator reports as default and in the navigator tree	4.3.1.4	44
10g	Place a tick mark in the box to display the selected NodeField (Field) data in the navigator tree.	4.3.1.4	44

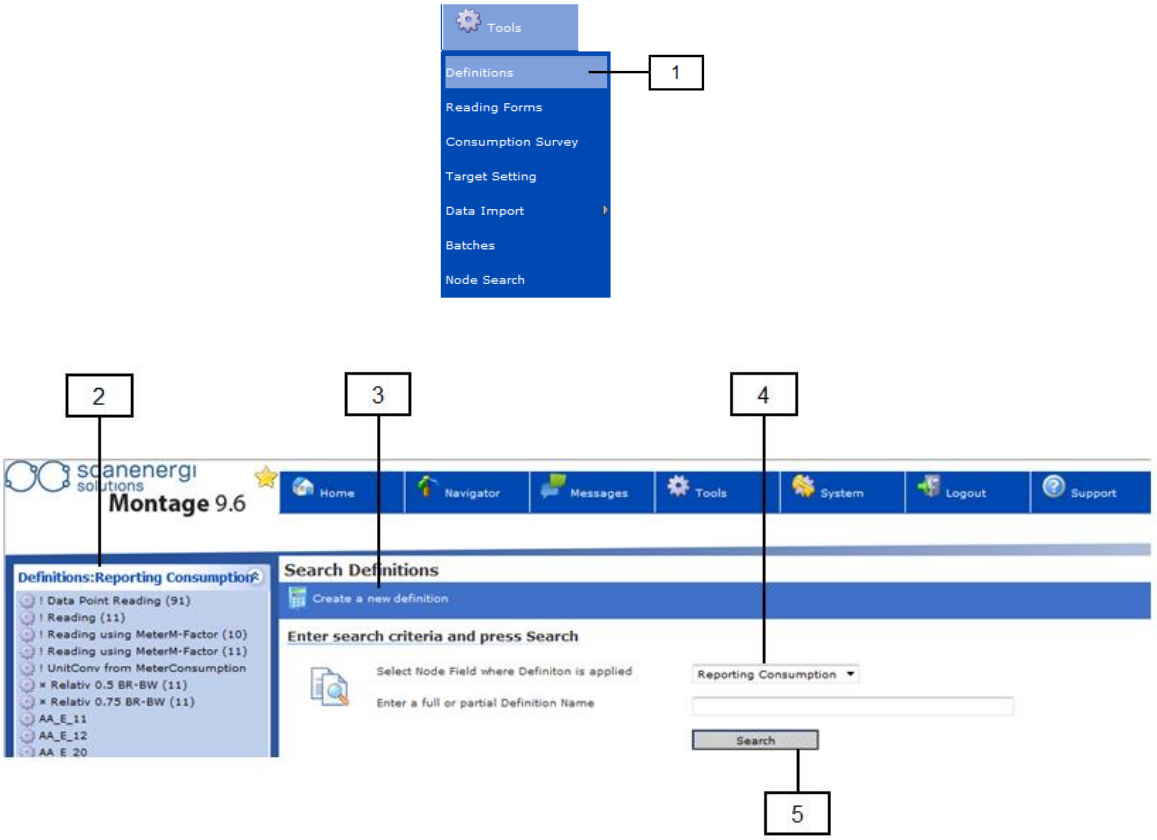
3.5 Montage Messages



Ref	Montage Messages Functions	Section	Page
1	Returns the user to the main Messages screen (as displayed above)	4.10	82
2	Takes the user to the screen for creating a new message	4.10.1	82
3	Displays the list of templates that have previously been created	4.10.2	83
4	Allows the user to specify settings for how messages should be sent and received	4.10.7	87
5	Panel displaying the details of the Messages		

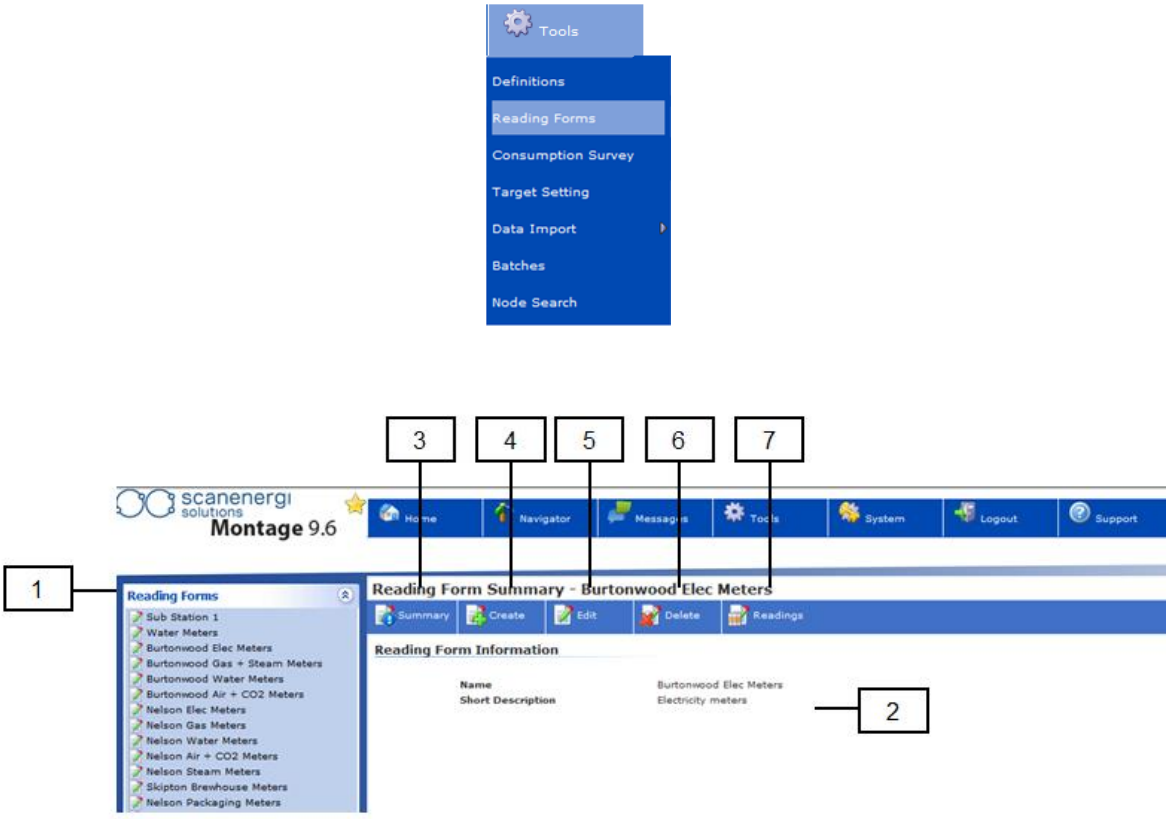
3.6 Tools menu options

3.6.1 Definitions



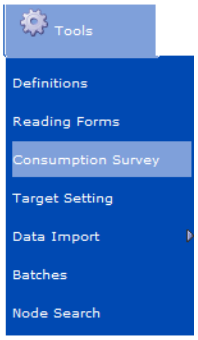
Ref	Definitions Functions	Section	Page
1	Opens the Definitions screen	6.4.1	210
2	Presents a list of predefined definitions	6.4.1	210
3	Allows new definitions to be created	6.4.1	210
4	Allows the user to filter definitions by type (Consumption, Cost)	6.4.1	210
5	Searches the database for all requested definitions	6.4.1	210

3.6.2 Reading Forms



Ref	Target Setting Functions	Section	Page
1	Displays a list of the available Reading Forms	4.11.3	94
2	Displays the name and description given to the selected Reading Form	4.11.3	94
3	Returns the user to the screen showing the name and description of the Reading Form		
4	Takes the user to the screen to create a new Reading Form	4.11.3.4	97
5	Displays the Edit screen so changes can be made to the selected Reading Form	4.11.3.4	97
6	Deletes the selected Reading Form		
7	Displays the form to enable meter readings to be manually entered	4.11.3.1	95

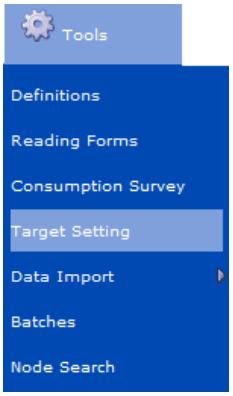
3.6.3 Consumption Survey

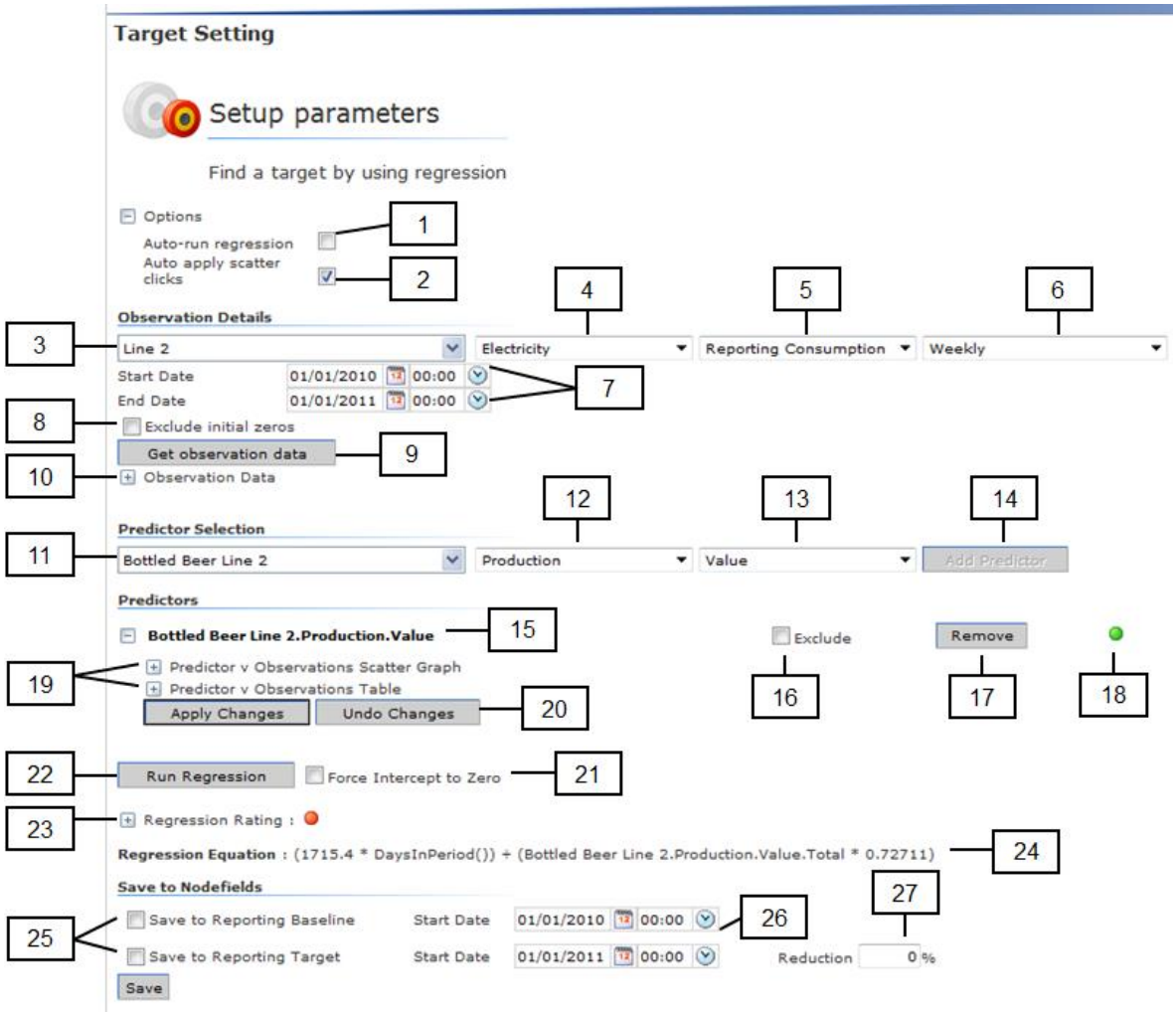


Please note that the option for the Consumption Survey will only be available if this functionality has been activated in the License key. This is provided as an add-on module and therefore does not form part of the functionality included in the base license.

Please contact support@montageum.com for further information.

3.6.4 Target Setting

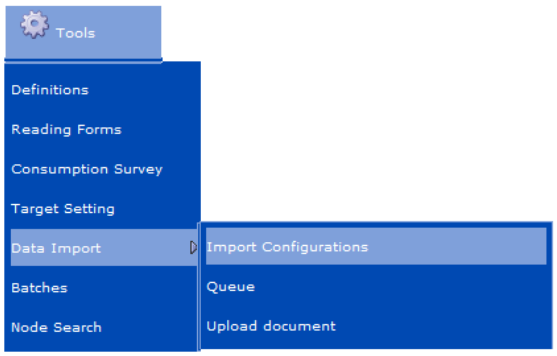




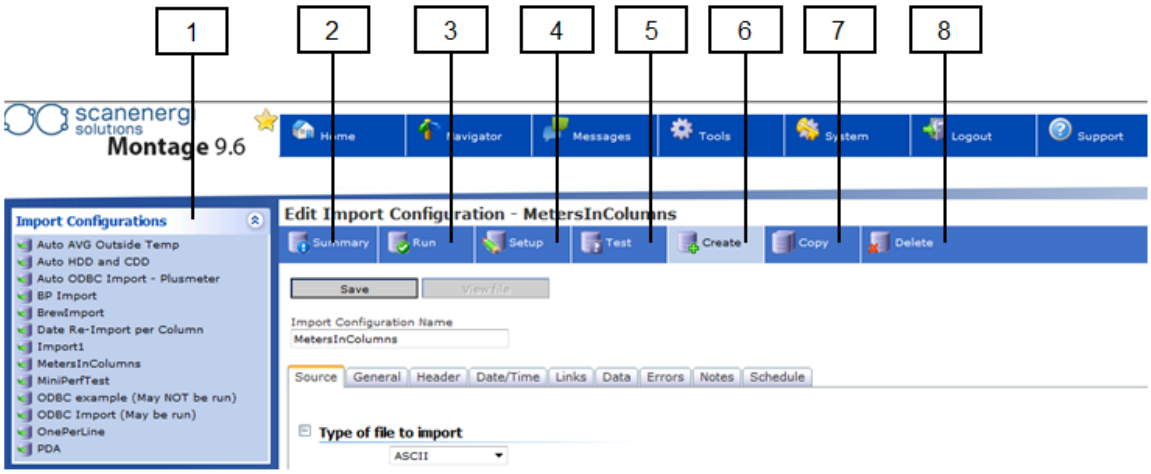
Ref	Target Setting Functions	Section	Page
1	Will automatically run regression calculations after any change is made to the	5.6.2	164
2	Will automatically remove datasets from the regression when points are deselected on the scatter screen.	5.6.2	164
3	Select the subject node for the regression	5.6.2	164
4	Select the Utility type for the subject node	5.6.2	164
5	Select the Node Field for the subject node	5.6.2	164
6	Select the reporting frequency for the subject node	5.6.2	164
7	Select the Start and End date for the required data range	5.6.2	164
8	Exclude data that contains zero readings	5.6.2	164
9	Select to retrieve the corresponding data set	5.6.2	164
10	Select to present the observation table complete with data that will form part of the regression calculation	5.6.2	164
11	Select the required predictor value from the node tree	5.6.2	164

12	Select the Predictors Utility type	5.6.2	164
13	Select the Predictors Node Field	5.6.2	164
14	Select to add the Predictor to the regression calculation	5.6.2	164
15	Displays the title for the Predictor and shows it has been selected	5.6.2	164
16	Used for multiple regression calculations that will have more than one predictor, this will exclude the chosen predictors values from the calculation	5.6.2	164
17	Removes the Predictor from the calculation	5.6.2	164
18	Indicates the quality of the chosen data set	5.6.2	164
19	Select to display the results of the regression as a scatter graph and in a Table.	5.6.2	164
20	Any changes made to the calculation can be applied or removed (only required if 1) and 2) are unchecked, else it will automatically calculate.	5.6.2	164
21	Force the regression line to pass through origin. In other words disrespects any base load (intercept) found.	5.6.2	164
22	Runs the regression analysis based on the data entered		
23	Indicates the quality of the regression analysis and when expanded shows the statistical results of the regression in the form of an Anova table.		
24	Displays the resulting regression equation		
25	Save the resulting equation as a baseline and/or target.	5.6.2	164
26	Specify the Start dates for the baseline/target	5.6.2	164
27	Indicate whether the target should include a % reduction from the equation.	5.6.2	164

3.6.5 Data import

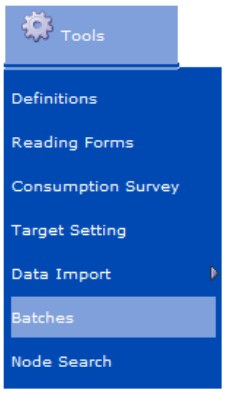


Please note only the main Import Configurations Setup is shown below. For more in depth descriptions and images of the other import functions refer to Section 4.12.3(Queue) and 4.12.1(Upload document).



Ref	Import configuration	Section	Page
1	Displays a list of the available Import Configurations	4.12	99
2	Shows when the import was last run, if it is scheduled to run automatically plus any additional notes.	4.12	99
3	Runs the import	4.12	99
4	Displays the Setup screen showing the configuration tabs (as shown in the above picture)	4.12	99
5	Runs a test import to highlight any setup errors before activating	4.12	99
6	Creates a new import configuration	4.12	99
7	Copies an existing import configuration	4.12	99
8	Deletes and existing import configuration	4.12	99

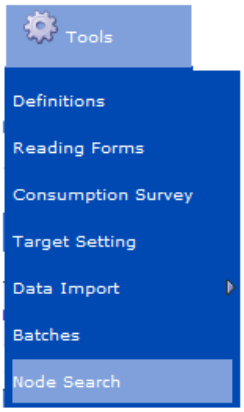
3.6.6 Batches

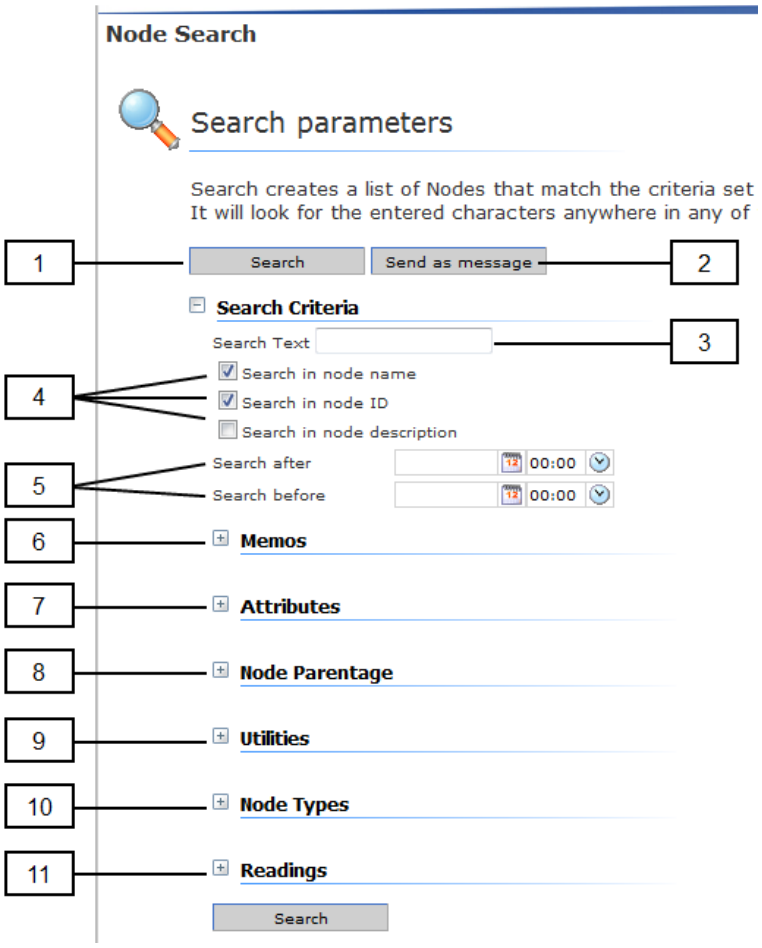


Please note that the option for reporting product Batches will only be available if this functionality has been activated in the License key. This is provided as an add-on module and therefore does not form part of the functionality included in the base license.

Please contact support@montageum.com for further information.

3.6.7 Node Search

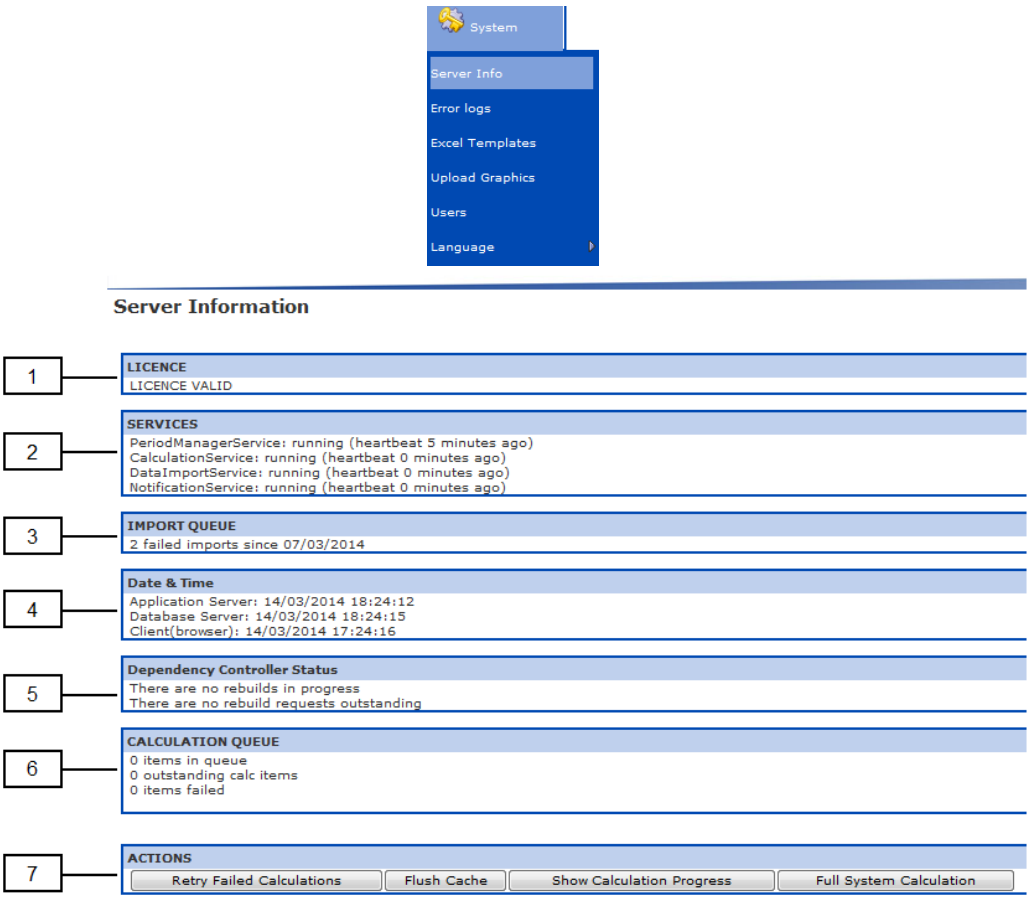




Ref	Node Search	Section	Page
1	Starts the Search	4.6	59
2	Saves the search results and places them in Clipboard for use with Montage Messages	4.6	59
3	Enter any text characters that will form part of the search criteria	4.6	59
4	Specify the fields that should be searched (if known)	4.6	59
5	Specify a date range for the search period	4.6	59
6	Include or exclude Memos in the search	4.6	59
7	Filter the search criteria by specifying which node attributes should be included in the search criteria	4.6	59
8	Filter the search criteria by specifying the parent node that should be included in the search criteria	4.6	59
9	Filter the search criteria to include specified utility types (e.g. Electricity only)	4.6	59
10	Filter only using certain node types (e.g. Data Points, Branches etc)	4.6	59
11	Search to include meter reading criteria (e.g. all meters with less than 100 readings within the specified period)	4.6	59

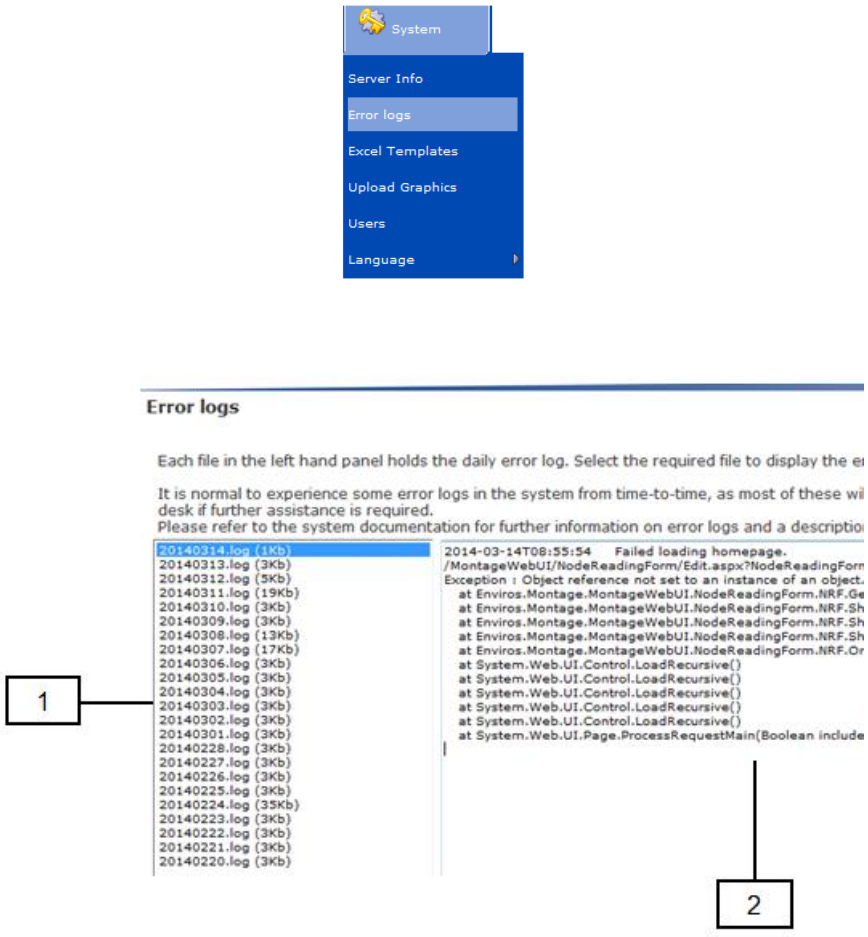
3.7 System menu options

3.7.1 Server Information



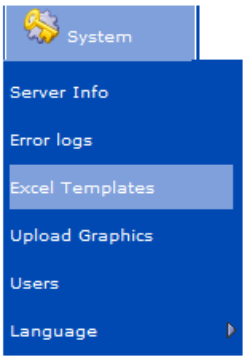
Ref	Server Information	Section	Page
1	Indicates the status of the Licence (valid or invalid)	7.1	240
2	Shows the current status of the four main services which support the software's main functions. The heartbeat indicates whether the service is operating as expected.	7.1	240
3	Shows the status of the import engine, and the details of any calculation failures.	7.1	240
4	Displays the current data and time settings on both the server and client side.	7.1	240
5	The dependency controller manages the data to be calculated and assesses which nodes will be impacted by the newly calculated data and provides an estimated calculation time in the System Status area in the Navigator.	7.1	240
6	Shows the current status of calculations.	7.1	240
7	A list of actions that can be performed by a System Administrator in the event the system requires some minor maintenance.	7.1	240

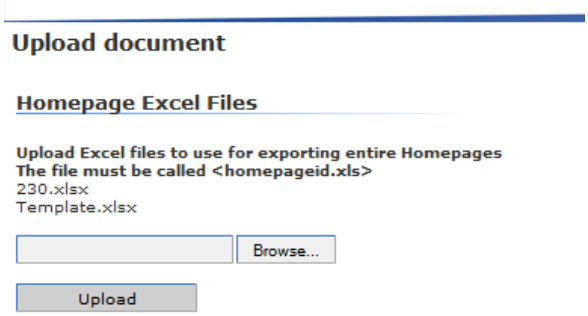
3.7.2 Error logs



Ref	Error logs	Section	Page
1	Displays a list of the most recent error log files	7.2	242
2	Provides details of the error to assist with troubleshooting.	7.2	242

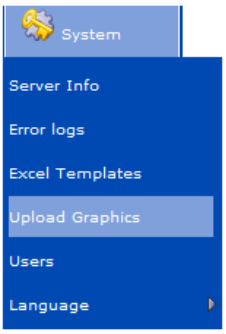
3.7.3 Excel Templates

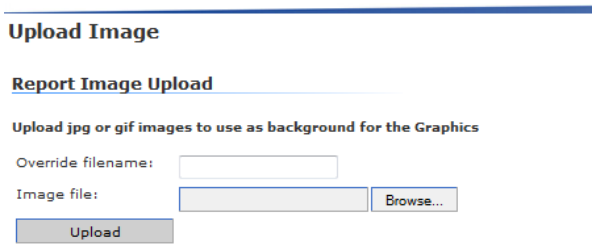




Provides a simple Browse function allowing Excel files to be uploaded to the server and made accessible when exporting Homepage report modules to the chosen Excel file. See Section 7.3 page 243.

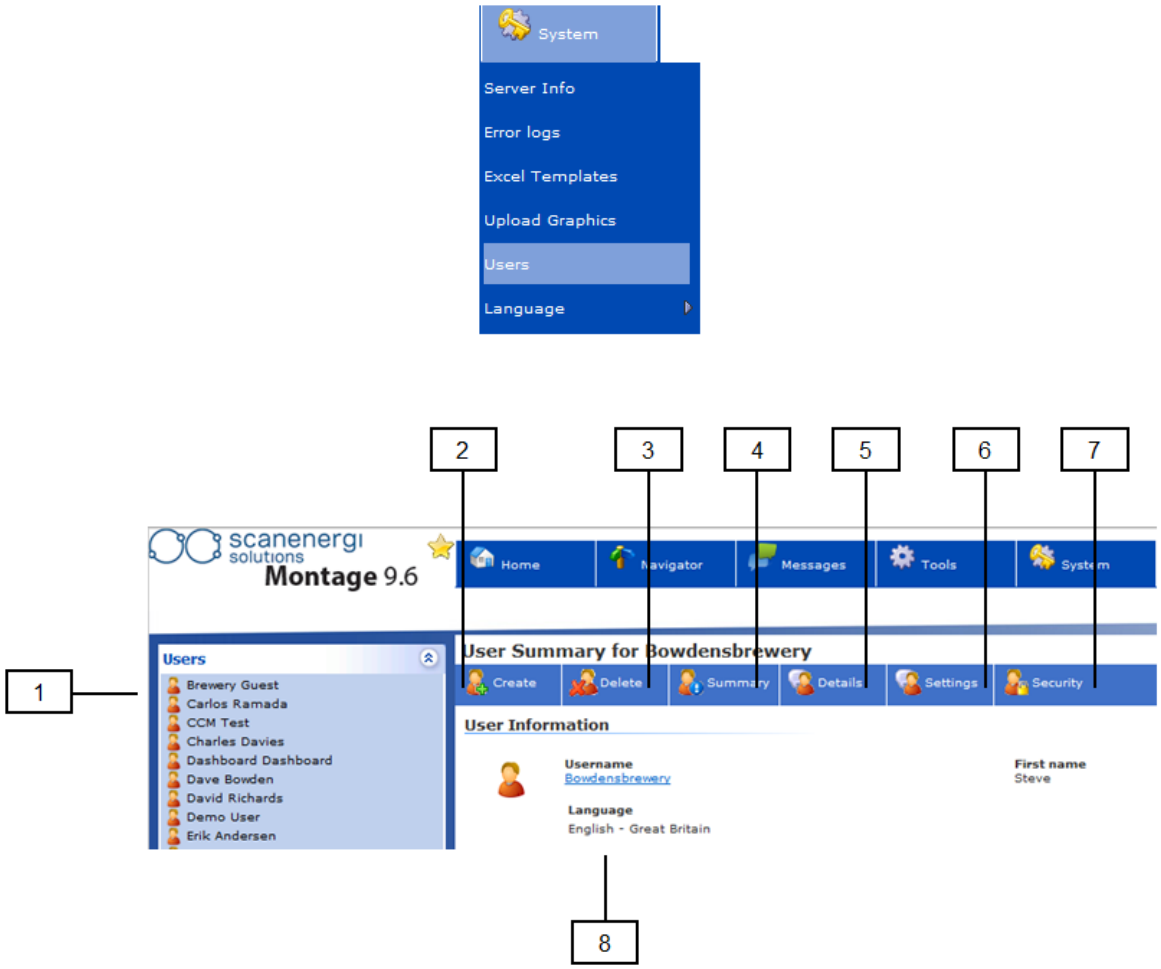
3.7.4 Upload graphics





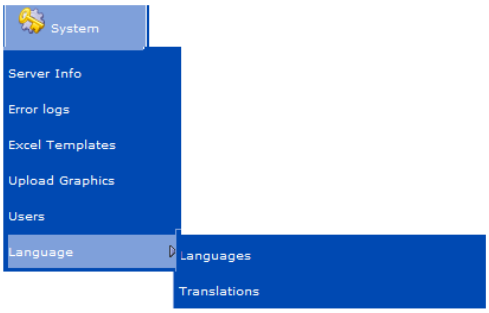
Provides a simple Browse function allowing Image files (.jpeg or .gif) to be uploaded to the server and made when creating Graphics reports. See Section 7.4 page 244.

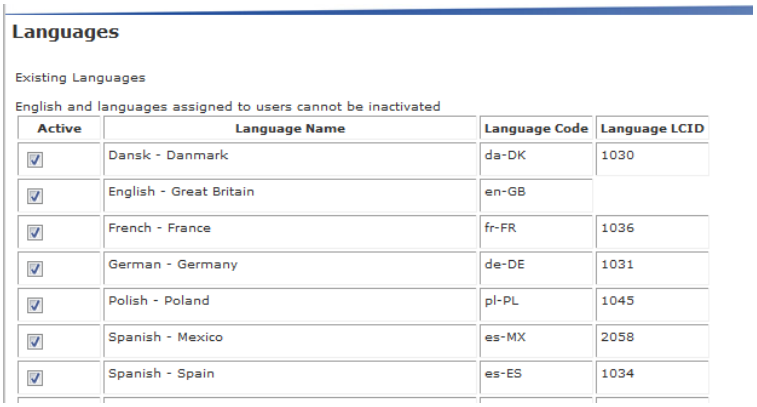
3.7.5 Users



Ref	User Setup	Section	Page
1	Displays the full list of users.	7.5	245
2	Create a new user.	7.5	245
3	Delete the selected user.	7.5	245
4	Displays the summary information of the selected user (Username, user role, available nodes to access)	7.5	245
5	Displays the users details (username, password (hidden), contact address)	7.5	245
6	Shows the users preferred settings (Language, email management and navigator default settings)	7.5	245
7	Specify the users role and node access	7.5	245
8	Summary screen (partly shown)	7.5	245

3.7.1 Language





Languages

Existing Languages

English and languages assigned to users cannot be inactivated

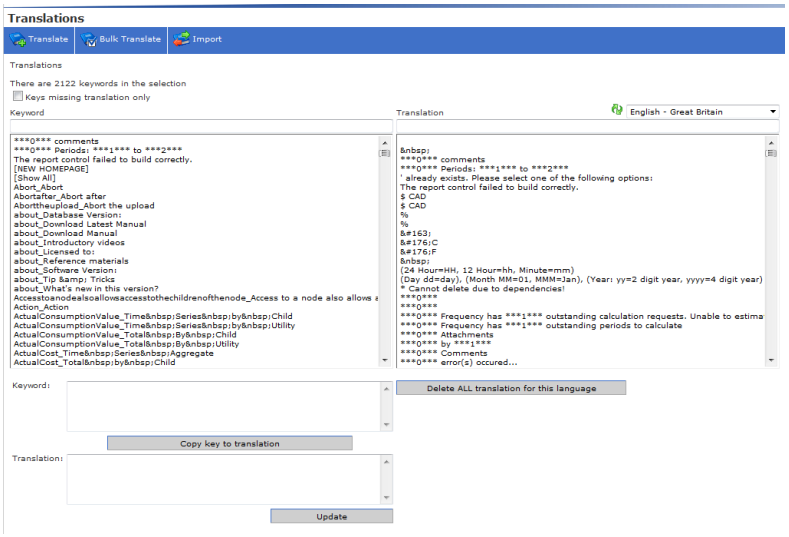
Active	Language Name	Language Code	Language LCID
☑	Dansk - Danmark	da-DK	1030
☑	English - Great Britain	en-GB	
☑	French - France	fr-FR	1036
☑	German - Germany	de-DE	1031
☑	Polish - Poland	pl-PL	1045
☑	Spanish - Mexico	es-MX	2058
☑	Spanish - Spain	es-ES	1034

Languages.

Allows the user to specify which language they would prefer to have as their default.

Language packs can be activated and deactivated on the Licence, and additional packs purchased as required.

See Section 7.6 page 250



Translations.

The tool used to make new language packs and change keywords to terminology the user prefers. (Note: such changes will be reflected by all users who use this language pack).

See Section 7.6.3 page 251.

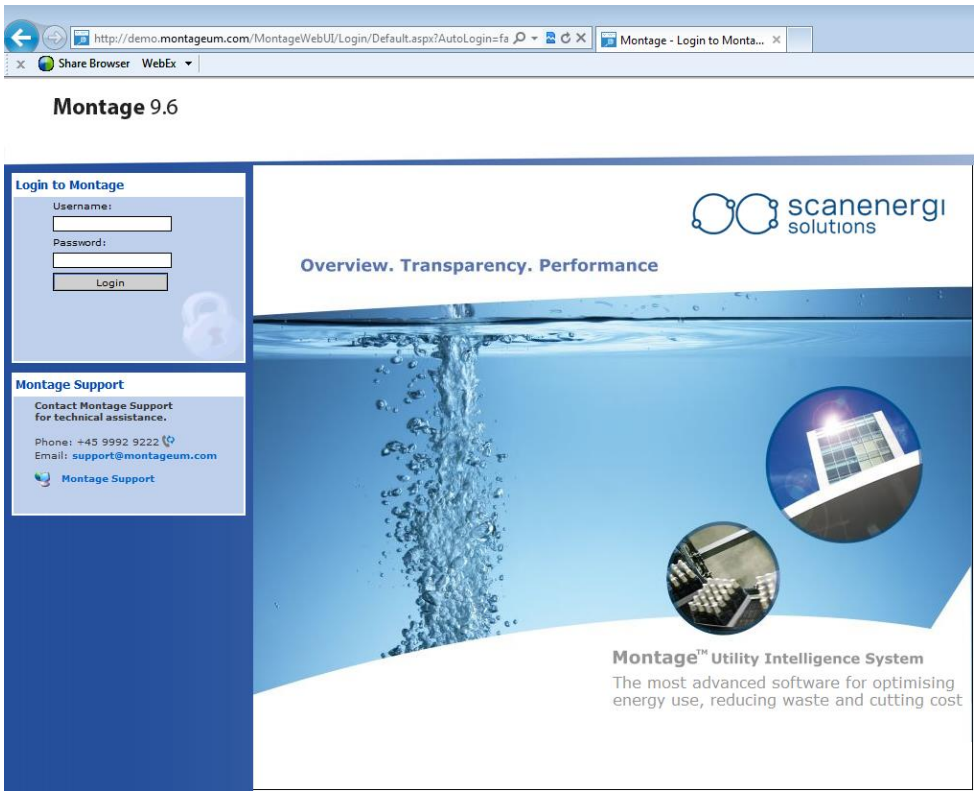
4 USING STANDARD FUNCTIONS

This section describes some of the standard functions you'll make use of regularly in Montage. This section informs on how to use these functions (once they have been made available) but DOES NOT inform on how to configure them or customise them to meet your specific needs. For this you should see Section 5 'Using Advanced Functions' and is aimed at the more advanced user.

We start this section by explaining the standard login procedure, although your system may have been configured to recognise you by your Windows® login in which case so you may skip the login procedures and proceed to section 4.2.

4.1 Logging in

To access Montage you need to log in with the Username and Password supplied to you by your System Administrator. You will also need to log on if your system times out due to inactivity.



4.1.1 To log in:

- Open Microsoft® Internet Explorer (IE) version 7, 8 or 9. When using MS IE version 8 you must use the compatibility mode.
- In the address field of IE, type in the web address for Montage. This will now take you to the Welcome screen of Montage.
- Enter your Username and Password, and then click on the Login button.

Once logged in, you will be taken to one of the default pages that may have been assigned to your user profile. Initially, there will be no defaults set and therefore you will be taken automatically to the empty homepage screen (see Section 4.7 for creating homepages). Alternatively, you could be directed to your own Dashboard report

displaying a number of report modules that have been previously chosen by you (see Dashboard section 5.3) or another Montage Favourite screen (See Favourites section 4.8.4).

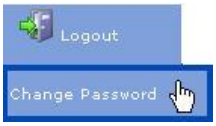
Important warning

Although it is possible, it is strongly advised to only open one instance of Montage at any one time; only one Internet application Window and only one Tab if you are using Internet Explorer version 7 or later. Otherwise you will be likely to experience error messages due to mis-synchronization between the server's image of your PC and the various instances of your browser. In the worst case it may corrupt your data!

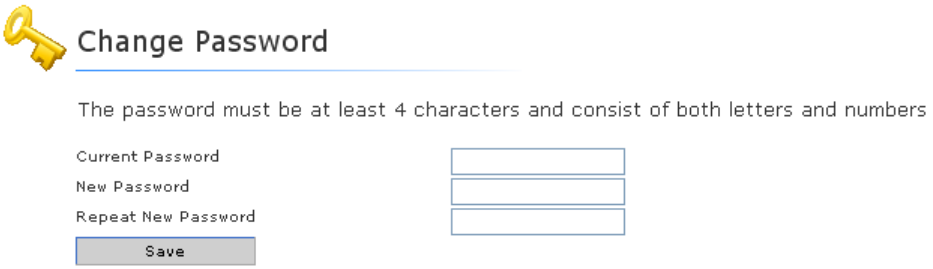
4.1.2 Changing your password

The first thing you should do, once you have got your password from the System Administrator is to change it. Until you do that, you will not be the only one knowing your password. It is also good practice to change your password at intervals.

To change your password, select Change Password from the Logout menu.



Enter the password used to login to Montage, and enter the new password you wish to use. Enter the same password again in the Repeat New Password field. Then press Save.



- You must enter the current password to make sure that no one else can change your password if he/she happens to use your PC just after you have been using Montage and then left without logging out.
- You must enter the new password twice to make sure you have not by accident mis-typed the new password.

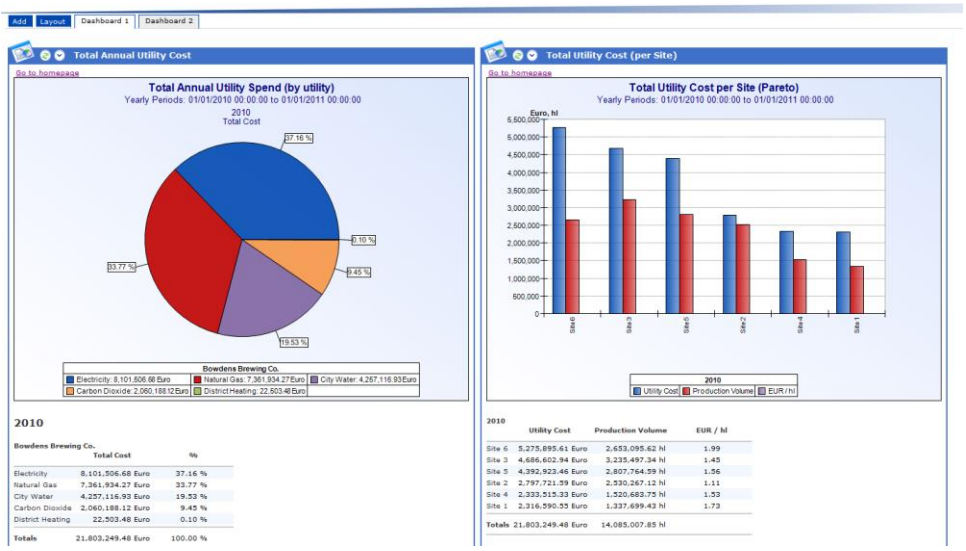
If you forget your password, you should ask the Montage Administrator or your System Administrator to provide you with a new password. It is not possible for Montage to tell you what your password was.

4.2 Using Dashboard Reports

Dashboard reporting is new to Montage 9. It is designed to allow individual users to place a selection of critical report modules in an arrangement that allows these reports to be displayed immediately (on one screen) for instance upon login.

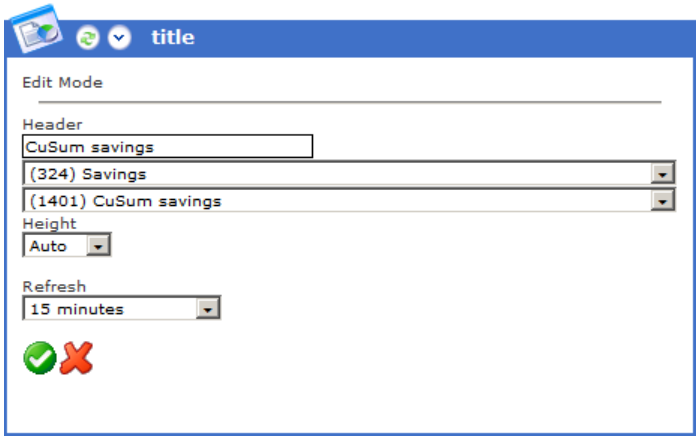
The screenshot below shows an example of one such Dashboard. The dashboard layout has been specified by the user to be split into two columns, although a three column layout is also available.

The Dashboard is quite commonly set to be the default screen to appear after login. You can always go to your Dashboard by selecting it from the Home menu, or, if it has been set to be the default screen simply by pressing the Home button.



4.2.1 Updating an existing Dashboard report module

Select the properties icon  in the chosen report module. This will open a window that looks as follows:



The Header presents the report title which can be edited by the user at any time.

The report module that has been selected for the Dashboard is displayed – and editable – in the following lines.

A specific height for the module can also be selected to fit the required size of the report module. Alternatively, by selecting 'Auto' from the list will automatically resize the height of the report to adjust to the height to the module content.

Refresh is for setting the interval by which the content of the report will automatically update the values. This is especially useful when near-real-time data are displayed.

In instances where the report is not able to fit within the screens available height or width, horizontal and vertical scroll bars will appear to assist the user in navigating the report.

More information about adding modules to the dashboard can be found in Section 5.3.

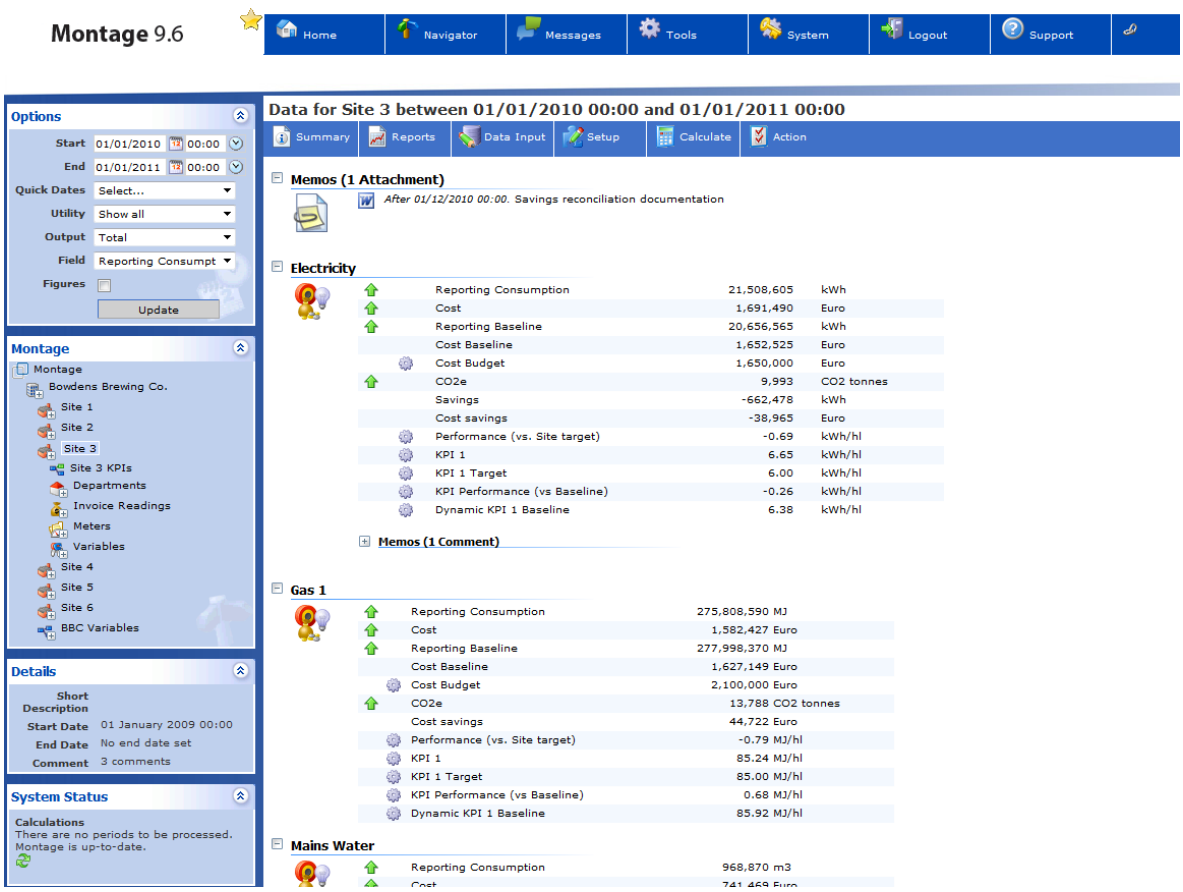
4.3 The Navigator

The Navigator screen is the focal point of the system. This area provides the ability for the user to drill-down through the organisation structure in order to view the consumption, cost, emissions and other outputs performance.

You can access the Navigator from any other part of Montage at any time by clicking on the Navigator button in the menu bar.

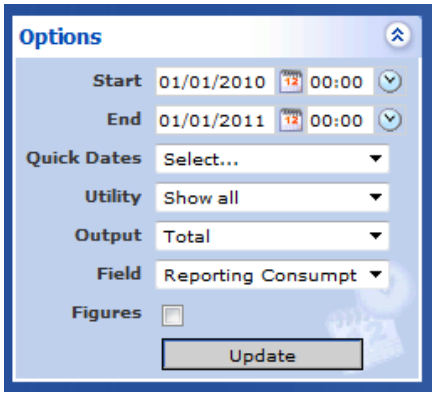
The Navigator presents all the output data you need, for all utilities, for different areas of the site. A hierarchical tree structure of nodes is displayed on the left hand side of the screen, which lets you navigate up and down the structure. Clicking on the chosen node, displays the output data on the right hand side of the screen, known as the Summary screen.

The Navigator and Summary screen are shown below:



4.3.1 Options Panel

The Options panel is located at the top left hand side of the Navigator. It operates as a mechanism for filtering to ensure that the data displayed in the Summary screen contains only the required information.

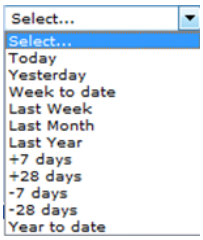


4.3.1.1 Setting the date range

Selecting the Start date/time and End date/time is done either by using the calendar selector, or simply by typing in the date and time in the boxes provided.

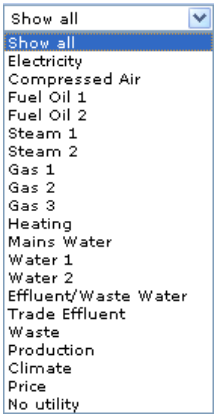
Alternatively, the 'Quick Dates' option offers you a number of pre-defined ranges, or to step backwards or forwards in time by one or four weeks. Selecting an option from the dropdown list and the Start and End dates will be set appropriately.

The standard list of options is presented below:



4.3.1.2 Selecting the utility

You can also select that you are only interested in one Utility, or you can leave it at the default "Show all" meaning that all utilities assigned to the selected node, will be included in the Summary screen or report.

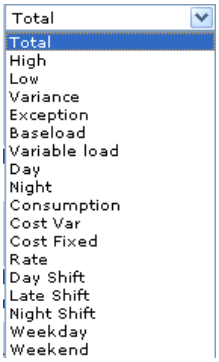


In some instances the contents of this list will reflect to what we typically do not refer to as 'Utilities'. Examples being Climate, Price and Production although they are included so that they can also be displayed on the Summary screen together with traditional utilities (Electricity, Gas, water etc.).

Additional utility types can also be added to the list if the standard list does not match your sites requirements.

4.3.1.3 Selecting the Output

You also have an option to select a specific Output value for the NodeFields to be displayed.



The default for this option is "Total" which means the total value for the selected node in the selected date. The alternatives to Total are …

- Segments of the periods such as Weekend, which is the value of the selection that has been related to the weekends within the data range, or Day Shift which is the value of the selection that has been related to the time of day/week which is called the Day Shift.
- Parts of the Total number, such as the Baseload which is the consumption which is considered to be independent of the production volume or the variable load which is assumed to be somehow proportional to the production volume.
- Exceptions, which is a means of "counting" unusual situations such as unexpected high or low consumption.

The output Total will always be available but most sites only make use of a limited number of the alternatives.

You can learn more about these options in section 6.4 where the Definitions for calculations of values are explained.

4.3.1.4 Displaying values in the Node tree

Finally, the Options panel also provides the option to display numbers directly on the nodes in the node tree.

When the Figures box is checked, the values for each node will appear directly in the node tree.

***Tip!** When using this option it is often necessary to select one utility, because it will only show one number and if the nodes have several utilities that use different units, these will not be displayed.*

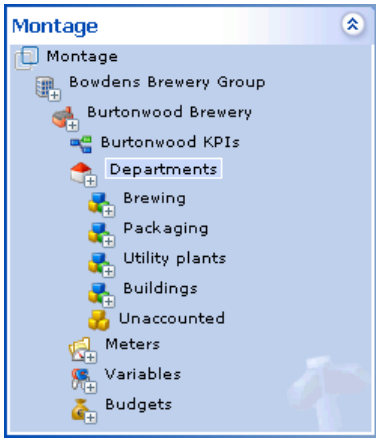
You will also mostly want to set which NodeField you are interested in. You can select any of the NodeFields that are implemented on your system, such as Consumption, Cost, Baseline etc.

In this example '**Cost**' has been selected. Cost is one of the NodeFields which typically work when no specific utility has been selected. It will then show the sum of the cost for the utilities on the nodes, that has cost calculated.

Tip! *Whenever you make a change to the settings in the options panel, you will need to press the Update button to apply the settings. The only case when pressing Update is not required is when selecting' Quick dates', as this selection will automatically trigger an update.*

4.3.2 Navigating the structure

Montage organises the structure of nodes in a hierarchical way. The further you "drill down" the structure; you will narrow your view of the site. At first you will see the overall picture of the site and at the lowest level you will find the individual meters. In between you will find regional offices, sites, departments and energy account centres.



You can say that any node is related to another node higher in the hierarchy, very much like a family tree, which is the reason that we refer to the relations between nodes as 'Parent Nodes' and 'Child Nodes'. Except for the very top and the very bottom level, all nodes are as well a child node to the node above and a parent node to the node(s) below.

There is no limit in Montage as to how many levels the structure can have or to which nodes can be related.

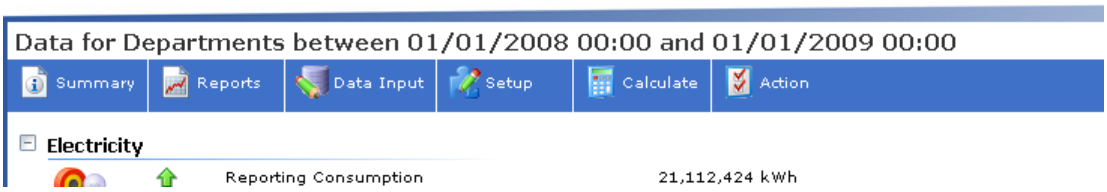
Nodes are displayed by their name and with an icon that helps identifying the type of information this node contains. When a Node has Child Node(s), the icon is automatically overlaid with a small ⊞ in the lower right corner to indicate it has Child Nodes.

You browse through the structure of nodes simply by clicking on a node.

Tip! *When you click the name of a node, the Summary screen will update to display the information for the selected node. By clicking not on the name but the icon itself, the user can navigate up and down the tree without the Summary screen being updated with every click. This is useful as it makes navigating the tree faster.*

At the very top part of the Summary screen you will see the name of the node you have selected and the date range that is currently being used to provide the data on the Summary screen. You may see that the date/time range isn't exactly what you set in

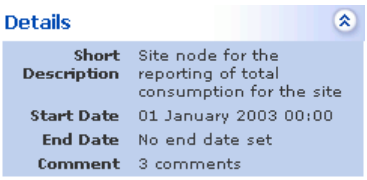
the Options panel. This is because the data on the Summary screen usually snap to full days. This is called the Montage base frequency and it may be set differently on some installations. If you want to view data at higher granularity than this, you can do that from the reports area.



Specifying the date range and other criteria for viewing the nodes output is defined in the Options panel.

4.3.3 Node details

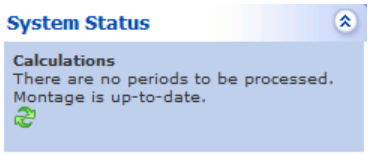
In the Node details box you find details for the selected node.



- The short description is typed in during configuration and can be changed from the Setup menu and selecting the option 'Attributes'.
- The Start Date is the first date from which this node will exist. The node will only be visible in the node tree if its Start Date is before the End Date set in the Options panel.
- The End Date is mostly not set, as in the example, but if you have meters in your system which have been uninstalled, departments that have disappeared during restructuring of your site, or even buildings that have been demolished, there will be an End Date set so these nodes will not influence calculations after they have ended. The node will only be visible in the node tree if its End Date is after the Start Date set in the options panel.
- Comment; is the number of comments on this node for the selected date range.

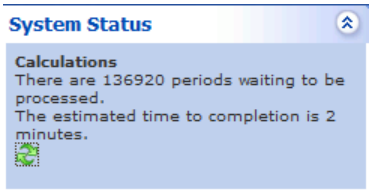
4.3.4 System Status

The system status is indicating whether there are any on-going calculations at this time.



If new data has come in or changes have been made to the configuration, Montage will automatically pre-calculate numbers for reporting. For a few minutes you may sometimes see the following system status information:

This means that Montage is evaluating what needs to be calculated. Once this evaluation is completed, usually within a few minutes or less, the system status will update to the following:



Montage estimates the time for completion of all calculations. This feature is especially valuable on large calculation jobs, whilst most of the smaller jobs are successfully completed even before the system has a chance to estimate a completion time.

Tip! *Whilst the calculations are processing, the user can press the refresh button located underneath the balloons to update the System Status box only. This is quicker than waiting for the screen to update from time-to-time and only updates the box contents and not the full screen.*

The number of periods which are reported to be waiting or outstanding is a measure of how many periods still remain to be calculated. The exact meaning of the numbers depends on a server setting which again depends on server resources. It is fair to say this is an estimate of time rather than an exact measure.

4.3.5 The Summary screen

The Summary screen, which is displayed in the right hand side of the Navigator page, shows the aggregate numbers for the selected node and as filtered in the Options panel.

If there have been added comments or attached files or links to the node, these will also be available from the Summary screen. See Memos section 4.4

Montage will automatically show all the assigned NodeFields for the node, which is why you see that there will be different information for the various nodes.

If "Show all" utilities is selected in the Options panel, you will see all the utilities which are assigned to the selected node, as shown in the example above where the node is using the utilities Electricity, Oil, Steam and Gas.

The numbers for each NodeField can be a calculated value defined in a formula (Definition), or it can be the sum of the values from child nodes to this node. You will see two icons related to these possibilities.

The green arrow indicates that the value will be "summed above" i.e. displayed on the parent node as part of the sum of the other nodes at the same level which has this option set.

The gear indicates that this value is the result of the calculation of an equation.

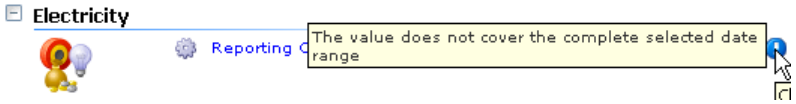
Note: *These options are set when the node is configured and explained later in section 6.3. They are only displayed on the Summary screen as information.*

4.3.5.1 Data integrity

Normally the numbers on the Summary screen will be **black**, which means that the data is complete. You will also see the numbers displayed in other colours from time to time:

- **Red** numbers are numbers which are currently being calculated, or waiting to be calculated. This will be seen after entering or importing new readings.
- **Blue** numbers are numbers that for some reason are incomplete. This can be because the date range includes periods for which there is no data, or it can be because the number is calculated from several numbers, of which one or more is incomplete. This will be seen quite often when data is to be entered manually, and acts as a reminder to get the readings entered.
- **Maroon** numbers are numbers that will never get updated and therefore indicates an error in the configuration. There is no data in the database at all for these numbers, or, if the numbers should be the result of child nodes Sum Above, there are no child nodes with this set.

When the numbers are displayed in another colour than black, you will see an icon to the right of the number. Click this icon to see a short description of the problem.



Tip ! If the End date is by default set to be the end of the current day, then the numbers on the Summary screen will appear blue, as the day has yet to be completed and therefore the system has not got a complete data set up until midnight that day.

4.3.6 Access to other functions

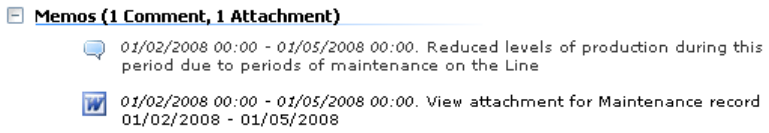
The Navigator also provides access to other functions, such as assigning Memos to nodes and producing reports using Navigator Reports. These options are explained in the following sections.

4.4 Montage Memos

A Memo is a mechanism by which the user can provide some inputs about special circumstances or to keep valuable information about certain utilities, all within Montage.

Memos are displayed on both the Summary screen within the Navigator and in Reports whenever the Report Type 'Memo' is selected. See Section 4.8.3.1.

On the Summary screen you will see an icon if the Memo is an attached document or a link, (see MS Word icon below), while comments are directly available to view.



Memos can be in the form of free text (comments), attachments (documents, photographs etc.) or links (e.g. URLs) to external sources.

Some good applications for using Memos could be:

i). To ensure that all users at all times have access to explanations of any irregularity,

ii). To input corrective or preventative actions to ensure the irregularity doesn't happen again,

iii). To keep details of a meter that is installed,

iv). To keep a copy of the invoice from your supplier, or

v). Link to your document management system so you always have access to drawings and descriptions.

Some general principles that apply to assigning Memos are,

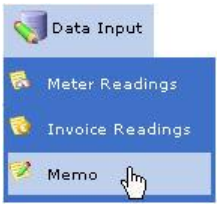
- Memos always link to a Node.
- The user can specify a Utility for the Memo, or the Memo may apply generally to the node.
- The user may set Start and End Dates for the Memo. If no dates are set, the Memo will always display when Memos for this node are displayed.
- All users can create Memos and modify and delete the Memos they have created.
- Administrators can edit and delete other user's Memos.

4.4.1 Adding or Editing a Memo

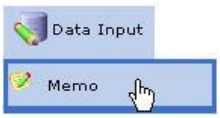
Select the Memo option from the 'Data Input menu. The Data Input menu is active when the user is in the Summary screen of the Navigator.

If the node that is highlighted in the Navigator tree is not a data point (e.g. a Department or Site node) then the Memo function is the only option in the list, whereas if the selected node is a data point then the Memo function will appear in a list together with meter readings and Invoice reading options.

When a **Data Point** is selected

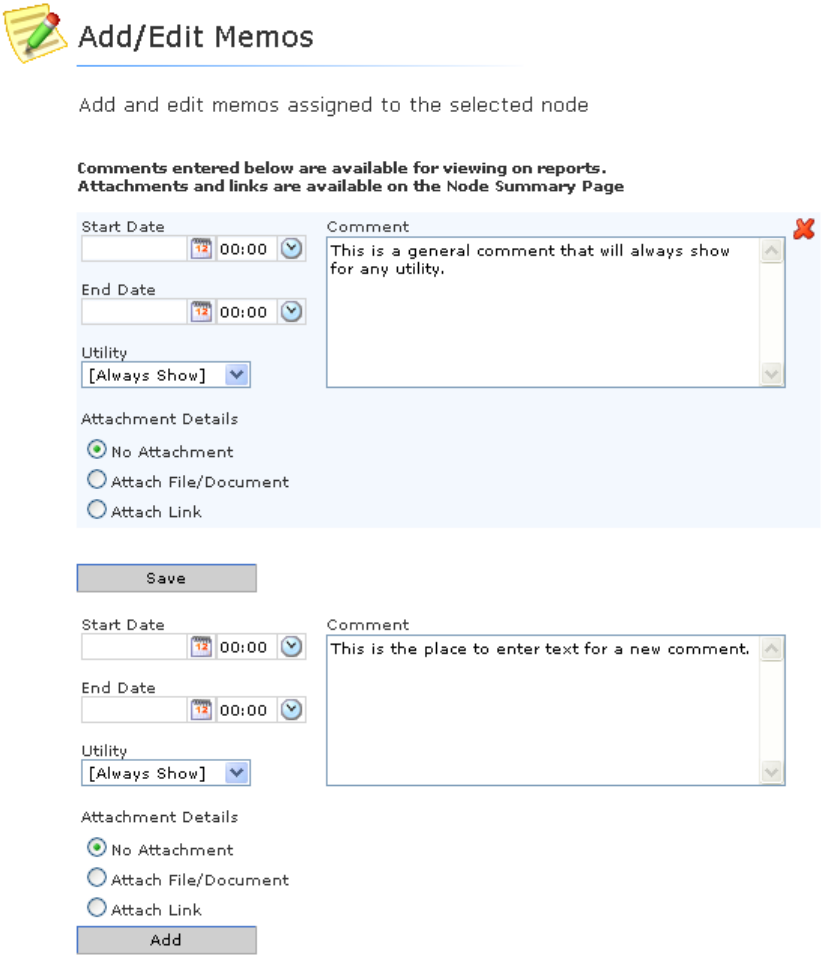


When any other **Node** is selected



Having selected Memo, the screen will show all existing Memos on the selected node and allow these to be edited. Make any changes you wish and press <Save>.

Below the existing Memos there is a blank entry where you can create a new memo. Fill in the required details and press <Add>.



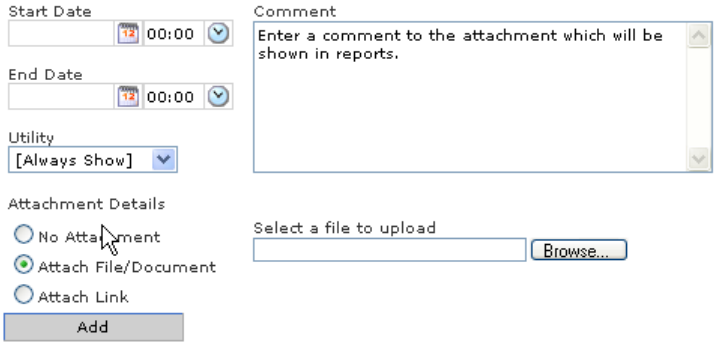
If you leave the Start and End Dates blank, the Memo will be available at all times. You may also choose to enter just a Start Date or an End Date.

You may relate the Memo to a specific utility or you may leave it as default and always show.

You select whether the Memo is a …

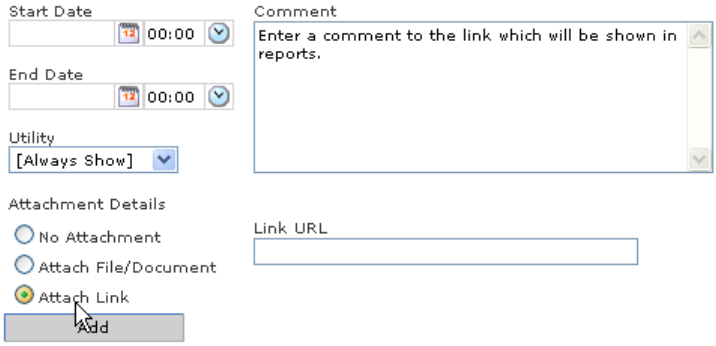
- **Comment**; in which case you leave the Attachment Details at 'No Attachment' and add free text into the Comment field.

- **Attached file/document**. When adding an attachment, select 'Browse' to navigate to the document you wish to attach and enter a comment for the attachment. This comment will be available on reports where Memos are shown while the attached documents are not.



- When you have finished the settings press <Add> to save the Memo.

- **Attach Link** to a document or a web page. Enter the URL (link address) to the document and enter a comment for the attachment.



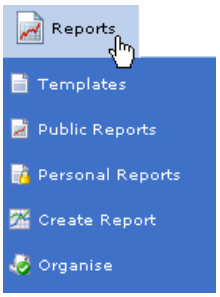
- When you have finished the settings press <Add> to save the memo.

Note! *Remember that links will only "work" if you have access to the server with the document/web page from the PC where you use Montage. This could limit the access to documents on a corporate document management system to be available only when you use Montage from within the corporate network, while Montage may be accessible from the Internet.*

4.5 Running Reports from the Navigator

We have described in the previous sections how the output data can be displayed on the Summary screen. Within Montage it is also possible to view this data in the form of graphs or reports whilst allowing the user to control the contents of the report by using the selections in the Options panel and the Navigator tree.

These reports are called Navigator Reports and can be accessed from the Navigators Summary screen when selecting the Reports menu.



Montage 9 is very flexible in terms of the content and type of reports that can be developed. However, in order to assist the first-time user of Montage, as part of the standard setup we have included a number of Standard Report Templates that can be used to assist in identifying the types of reports that may be of use in the future. These report templates can be found under the menu option Report Templates. The list of Templates is configurable and will be managed by the sites Report Administrator.

Previously in Montage, it was only possible to customise and save report modules that would be later accessed via Homepages. This limitation no longer exists in Montage 9, and now Personalised Navigator Reports can be saved to the Reports menu as well as access to other users Personal Reports are provided, managed by the owners of these Reports.

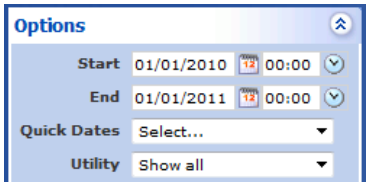
4.5.1 Overview of Navigator reports

Common to all Navigator reports are that general selections from the Options panel are used to define the report contents.

These selections are:

- **Start Date/ (Time) and End Date/ (Time)** specify the time frame for the data to be displayed. The oldest data used in the report are from the first period which starts at or after the Start Date and Time, and the latest data used are from the last period ending at or before the End Date and Time.
- **Utility:** Some of the reports also filter data by the utility selected in the Options panel.

Selections in the Options panel that impact Navigator Reports

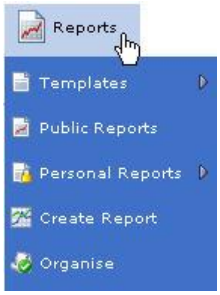


The data displayed in Navigator reports are specific to the Node selected in the Navigator tree

When selecting a Navigator report from the Reports menu, the report will be produced for the node which is selected in the node tree. Once you have selected a report, this will remain active in the right hand side of the screen, allowing you to select another node or make changes to the report contents by changing selections in the Options panel. The report will at all times display the numbers from the selected node and the settings in the Options panel.

4.5.2 Selecting a Navigator report

Select the 'Reports' button menu from the Navigator screen.



The first level of your menu options will then become available. This menu is new to Montage 9 and is categorised into;

- **Templates** – Are available as partly configured reports providing easier access to various different basic configurations. The default installation does not have any such templates included – they are configurable and added to the menu during the configuration of the site.
- **Public Reports** - reports that have been created by another user but shared with the current user.
- **Personal Reports** - reports that have been created by the current user and saved for repeated use.
- **Create Report** – the most basic report to be used as the basis for further configuration as required.
- **Organise** – opens the interface to arrange personal and public reports in a flexible and configurable menu structure. The option is described in more detail in section 5.5.

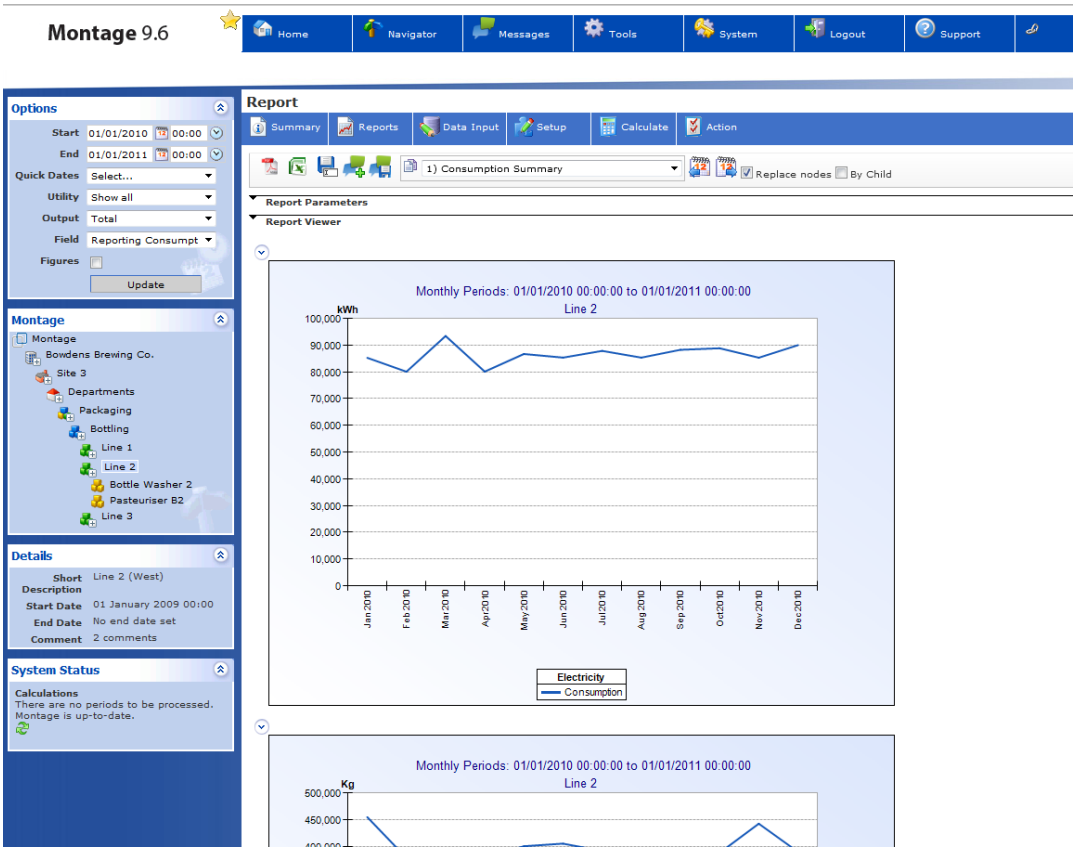
The menu structure from level 2 onwards can be configured by the users as required (See Section 5.5) to ensure the menu structure is logical for the user to quickly select the right report.

Report menu: Level 2 (Customisable)

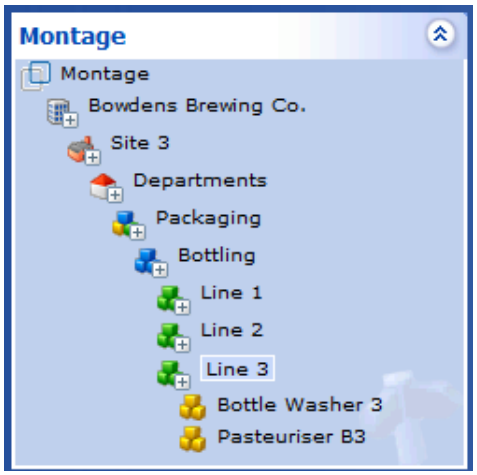
Report menu: Level 3 (Customisable)

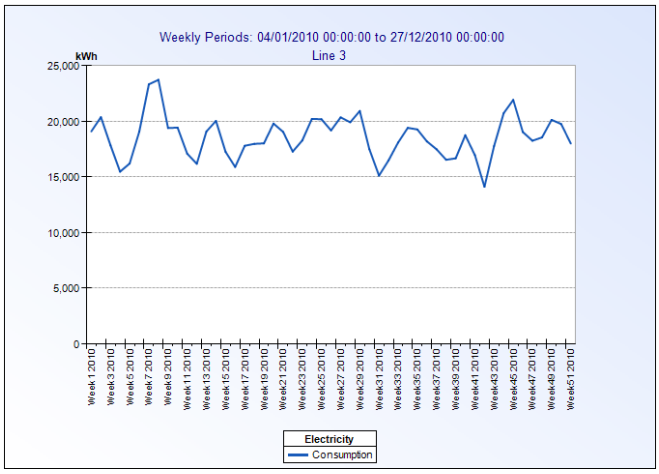
In this example, by drilling down Level 2 and selecting Time-Series followed by Consumption Trend, the report that had been previously configured for this purpose will be displayed on the Summary screen (See Section 5.1 for more information on the various report options).

An example of how the report is displayed within the Summary screen is displayed below:

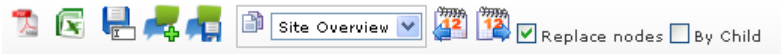


This report is specific to the settings in the Options panel and the selected node (Line 2). Changing the selected node to 'Line 3', and changing the frequency in the Report Parameters section to 'Weekly', will display the same graph, but specific to Line 3 with a Weekly rather than the Monthly frequency as seen in the previous report.





Above the report you will find a number of icons and settings you may use to control the report



Create a pdf file of the report which you can save as a static report, similar to a printed copy.

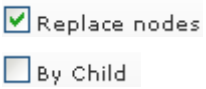
Download an Excel file with the data from the report.

Save the current report to your Personal Reports in the Report menu. Refer to section 5.4.1 for instructions.

Share your reports with other users. Refer to section 5.4.3 for instructions.

Save the current report as a Homepage Module on the selected Montage Homepage. Refer to section 5.4.2 for instructions.

Icons for easily shifting the report date range one period back or forward.



Options to control how nodes are selected for the report. This is explained below in section 4.5.3

4.5.3 Advanced selection of Nodes for Navigator Reports

As mentioned earlier, the report will use the Node selected in the Navigator dynamically such that the report will update when another Node is selected.

There are however also a few other features which are mentioned in the following sections.

4.5.3.1 Comparing multiple nodes

The check box; Replace Node, which is default checked, sets the operation to update the report and display the “new” Node instead of the previously selected Node.

Replace nodes

If this check box is unchecked, Montage will add the selected nodes to a list of Nodes and include them all in the report. If one Node is first selected, then another and then a third, it means that Montage will report for each of the three Nodes in the same report.

When the check box is checked again, selecting the next Node will remove all the previously selected Nodes and again only display from the selected Node.

4.5.3.2 Reporting from Child Nodes

The check box Child Nodes which is default unchecked sets the operation to display information from the selected Node.

By Child

When this check box is checked, it will cause Montage to display data for all the child nodes to the selected Node instead of from the Nodes themselves.

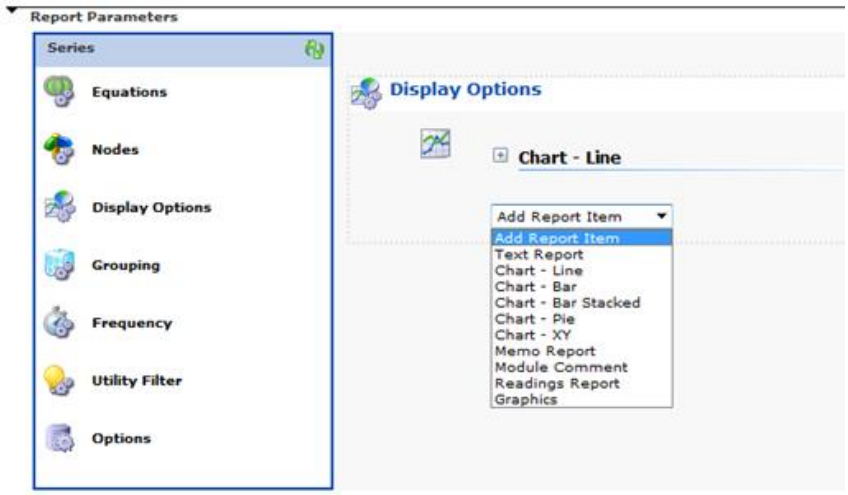
4.5.3.3 Reporting from Fixed Nodes

It is also possible that equations are set to refer to explicit Nodes and therefore won't change when another Node is selected in the Navigator. This will typically be references to production volumes or outside temperature, when these numbers are used in the report, often in combination with numbers that updates dynamically from the selection of Nodes in the Navigator.

For more information on manually creating equations for reporting please refer to section 5.1.2.1

4.5.4 Changing the Report type in Navigator Reports

The Report Type can be easily altered by accessing the 'Report Parameters', selecting 'Display Options' and specifying the type of report you wish to see.



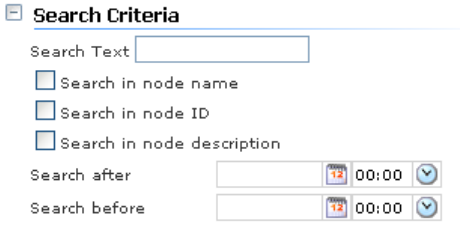
Numbers in reports are displayed either as Text, Line, Bar, Scatter (XY) or Pie charts or they are placed on graphics like flowcharts or photographs. It is also possible to include text descriptions of the report content or include Memos entered for the Nodes in the report. If more than one report type is selected the various forms are displayed after each other.

It is also possible to extend the reports by adding more NodeFields and/or calculations on the NodeFields from the node in question. Refer to the following section 5.1.2 where configuration of reports/homepage modules is explained further, and section 5.4 where you will find instruction on how to save Navigator reports to your personal Navigator report menu and to Homepages.

4.6 Searching for a specific node(s)

Montage offers a comprehensive search facility that lets you i) quickly locate a node within the Navigator hierarchy ii) create lists of Nodes for use in Homepage modules or Reading forms and iii) export lists of Nodes.

The feature is available from the Tools menu and allows for Search Text and/or Numeric values to be added together with a specific data range to limit the search.

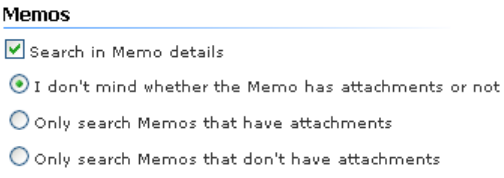


The search will look for Nodes where the entered text appear as part of the text string in either of the fields selected in the search criteria, as described below. The search looks in any part of the fields and assumes there are wildcards before and after the text (*<EnteredSearchText>*).

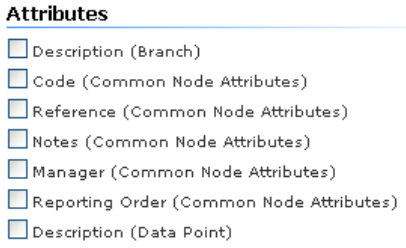
The default is to search in the Node name, the NodeID and the text description in Memo's. Alternatively you may enhance the search to include more text fields in the Nodes or exclude some of the default selected fields.

4.6.1 Narrowing the Search

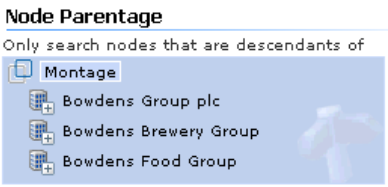
The user has the option to further narrow the search, by activating any combination of the following filters:



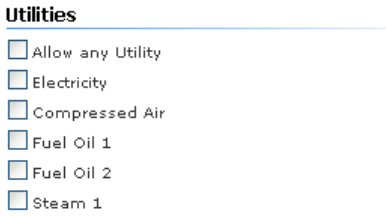
Includes Memo entries in the search.



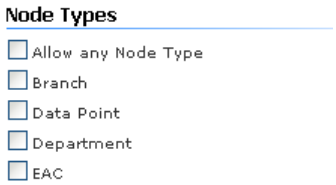
Searches the node attributes given to the node during setup.



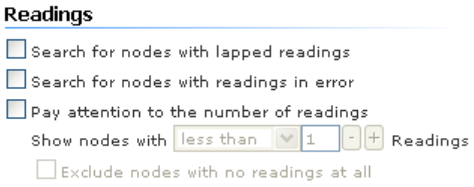
Only searches specific nodes and child nodes of the chosen parent node.



Default searches regardless of which Utilities are assigned to the Node. Alternatively you may search for Notes using one or more specific Utilities.

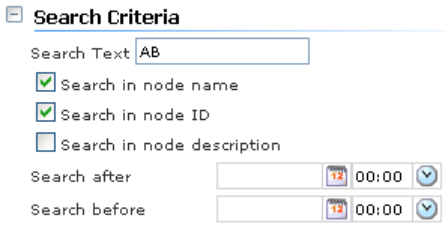


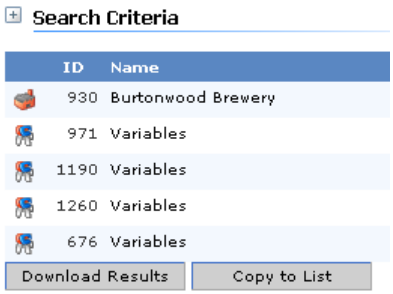
Default searches node of any type but may be limited to specific node types.



Allows searching for Nodes with possible issues in readings within the set search criteria's.

In the example whereby a user wants to find a specific node or nodes which in their Node name contains the letters 'AB', by entering these characters into the 'Search Text' field and selecting Search, would return the list that complies with these criteria as shown below.





4.6.2 Using the Search Results

You may use the search results in various ways.

4.6.2.1 Sorting the results

The results of the search can be sorted in various ways.

- **Node ID** - Sorts the results in sequential Node ID order
- **Node Name** – Sorts the list alphabetically by the Node Name.
- **Node Type** - Sorts the list alphabetically by the Node Type.
- **Short Description** - Sorts the list alphabetically based on the first letter of the description.
- **Reference** – Sorts the list alphabetically by the Reference.
- **Code** - Sorts the list alphabetically by the Code.
- **Last Reading date** - Sorts the result in chronological order of the dates for the last reading.

4.6.2.2 Select a Node found in the Search

The search result is a list of Nodes that match the criteria entered. By selecting the Node, Montage will take you to the Navigator screen with that Node selected.

4.6.2.3 Use the Search results for Reports, Reading Forms

By pressing the button 'Copy to List' below the search results you keep the list of nodes in memory for later use in creating Homepage modules, readings forms or for various other purposes.

If you are using search to make a list of nodes which cannot be found by one set of search criteria you may first use the 'Copy to List' feature to save the first results and then do another search and use the 'Append to List' button which will add the results of the second search to that of the first. You may continue this as many times as required.

4.6.2.4 Download the list of Nodes

By pressing the button 'Download Results' you will be downloading the search result as a text file or comma separated values (a csv file). On most PC's this file will open in Excel and allow you to process the list further for documentation or printing. For instance this is useful when printing barcode labels to be used with the Montage HDC meter readings PDA unit.

4.7 Homepages

This chapter describes the general use of Homepage reports and the tasks you are most likely to carry out on a daily or frequent basis. Creating new or editing existing homepages is described in Section 5.2.1 page 130.

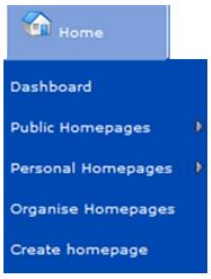
Homepages and the information they contain are unique to each individual user of Montage so you only see the information that is relevant to you. The information on these homepages is updated dynamically so assuming the base data has been entered into Montage, the information on the Homepages will be up-to-date every time you log on.

Homepages consist of Homepage modules, as explained in section 4.7.2. These modules will also be available for your Dashboard screen, which can be considered a special kind of Homepage.

4.7.1 Selecting an existing Homepage

Selecting the Home button will always take you to your start screen. Refer to section 4.9.2 to see how you set your start screen.

Home is also a menu from which you have access to your Dashboard, your predefined Homepages and also creating new Homepages and organising the structure of the menu.

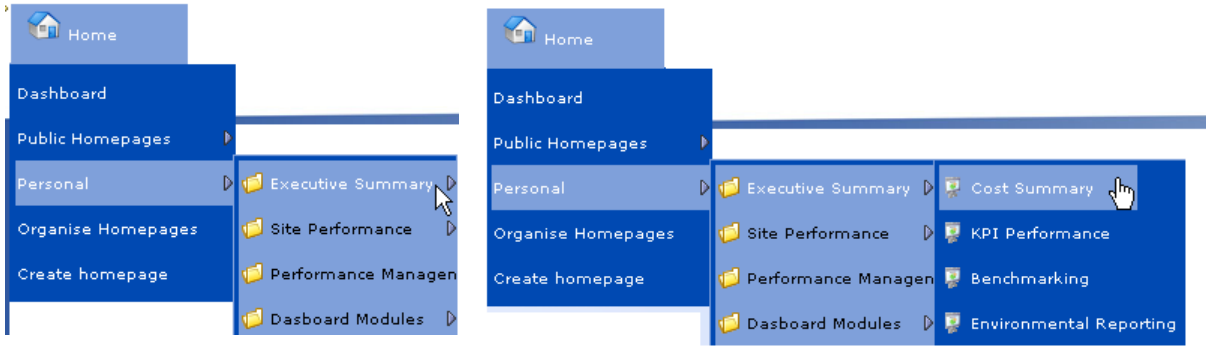


This menu is new to Montage 9 and is categorised into;

- **Dashboard** – Each user can have one or several Dashboards set to provide easy overview. Using the Dashboard is explained earlier in section 4.2
- **Public Homepages** - reports that have been made 'Public' by any user and are accessible to you.
- **Personal Homepages** – Reports that have been created by the current user for their own personal use.
- **Organise Homepages** - Opens the interface to arrange personal and public homepages in a flexible and configurable menu structure. The option is described in more detail in section 5.5.
- **Create Homepage** – Create an empty homepage that can be configured by the user as required.

The menu options Public Homepages and Personal Homepages open a structure of sub-menus which are configurable by the user. The example below illustrates how the next two levels could be organised.

Level 2 (Customisable) Level 3 (Customisable)



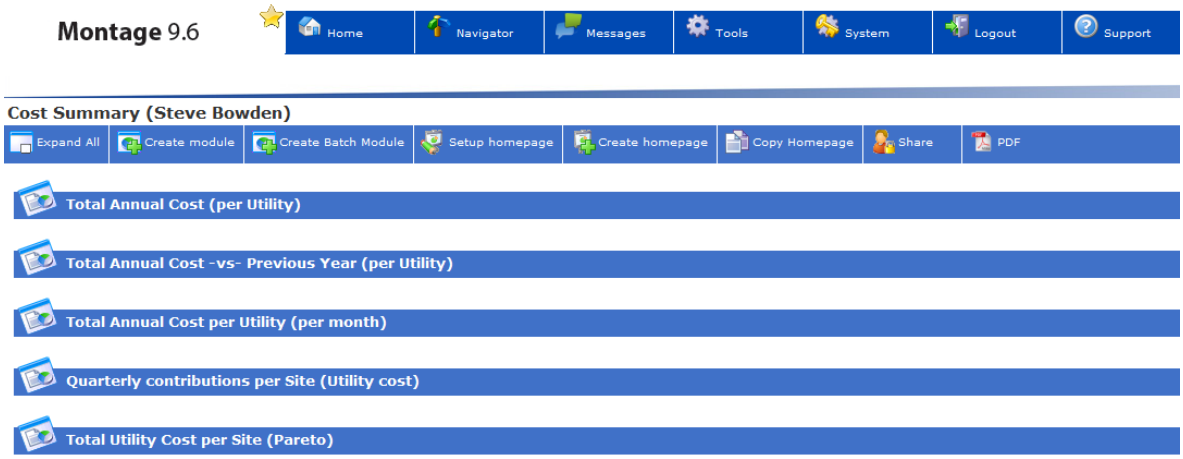
In this example, by selecting 'Executive Summary' followed by 'Cost Summary', the Cost Summary Homepage report will be displayed on the screen.

4.7.2 Homepage contents

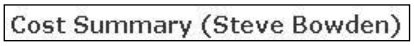
Information is added to Homepages in the form of reports and graphs. Each report or graph is referred to as a 'Module'.

Modules can be expanded or collapsed by single clicking on the module title, or they can be set to display as expanded or collapsed as part of the report creation process.

In the example below, all the report modules have been set to open in the collapsed mode.



The name of the owner of the Homepage will always display in the top left corner of the Homepage. This can be useful when viewing a Public Homepage.



The user can always return to the start page from any area of the system by clicking

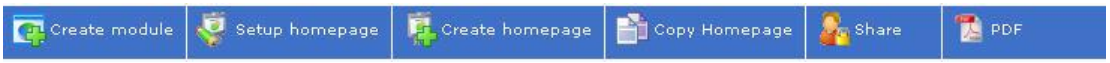
4.7.3 Homepage access levels

The Homepage owner, and other users to whom the owner has granted the rights, can make permanent changes to his Homepage report modules.

Users who only have the rights to view the Homepages can still modify any of the Homepage modules but the changes cannot be saved and will be lost once the user opens another Window.

When selecting a Homepage, for which you do not have edit rights, the menu options will look like this:

When selecting a Homepage created for your account or for which you do have edit rights, the menu options will look like this:



These options will be described in this section, except for ‘Creating a Module’ which will be explained in section 5.2.1.

4.7.4 Creating a Homepage

Any user has the rights to create Homepages, it is a simple task requiring few entries.

Simply click on the ‘Create Homepage’ button in the toolbar.

Once open, the screen will look as follows:

- Enter the ‘Title’ that best suits the purpose of the Homepage.
- You can specify if you want this module to be ‘Default collapsed’ when the homepage opens. This can be useful when there are many modules on one homepage.

Click ‘Save’ when you have created the Homepage.

The Homepage other than having a name will not contain any contents at this time. The Homepage will later contain report modules by way of creating modules (section 5.2.1) or by copying existing modules from other Homepages or from Navigator reports (see section 4.5.2).

4.7.5 Deleting a Homepage

If you want to delete an entire Homepage, simply select the Homepage you want to delete from the menu, and click on the Delete button.

To protect the user from accidentally deleting a Homepage, this operation requires a confirmation before actually deleting the Homepage. A deleted Homepage cannot be restored.

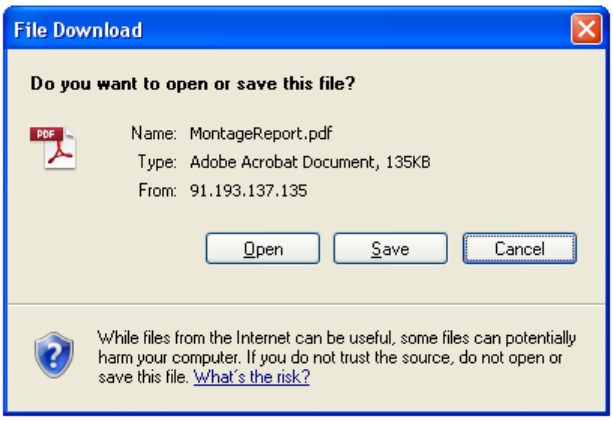
Homepages that are shared with other users cannot be deleted.

4.7.6 To export an entire Homepage to PDF

Click on the 'PDF' button in the Homepage toolbar.

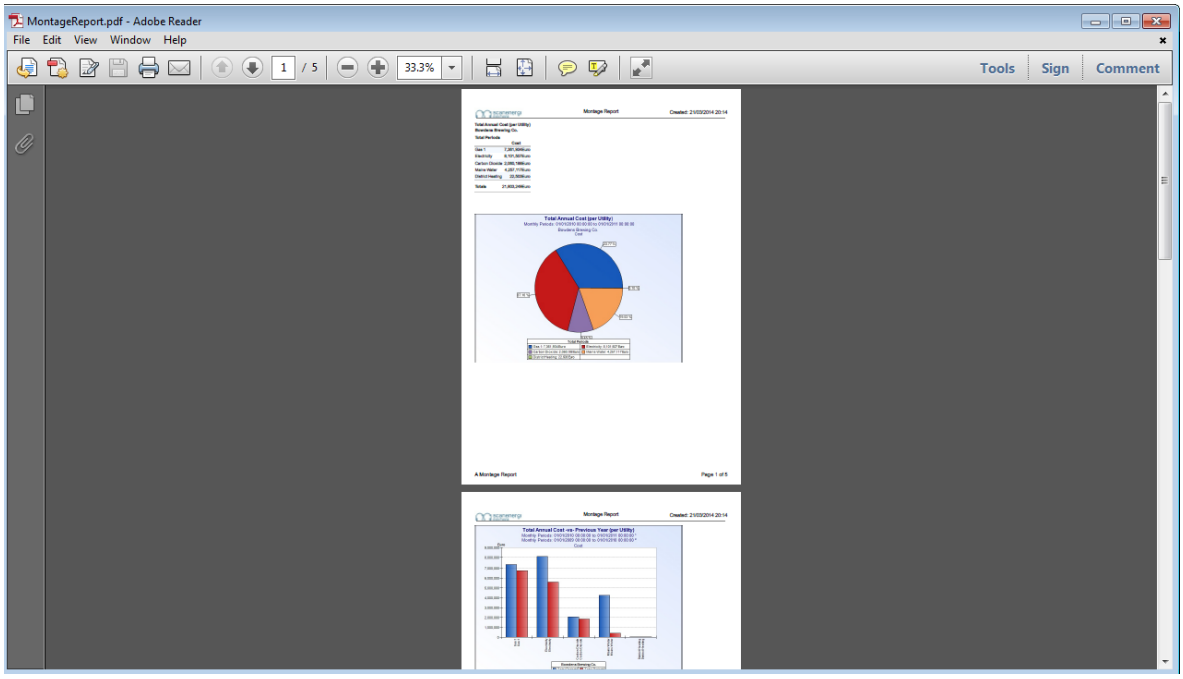
This will present two options, either 'Open PDF' or 'Send PDF'. To view the Homepage in PDF format select 'Open PDF'.

Assuming Adobe Acrobat® software is installed on the PC you will be presented with the following message:



Note: *Adobe Acrobat Reader® can be downloaded from http://www.adobe.com.*

Selecting 'Open' will display a PDF version of the Homepage complete with all modules expanded, whereas saving the file allows the user to store a copy of the file taken at that moment in time, as displayed below:



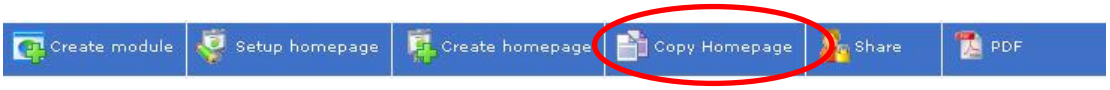
***Note**: If you chose to 'Save' the report, this instance of the report will remain as a separate file, very much similar to keeping a printed copy of a report. Homepage modules will automatically update when the data in Montage is updated, but the modules contained within the PDF files will never change.*

4.7.7 Copying a Homepage

You can copy any Homepage, as well the ones you have created as those you can use because another user has made them public.

Copying Homepages is an efficient way of creating several Homepages which are similar.

- If you, for example, want to create a Summary Homepage for each of 3 departments you will only do the entire configuration once, then copy it, change the name and modify the copy to include other nodes.



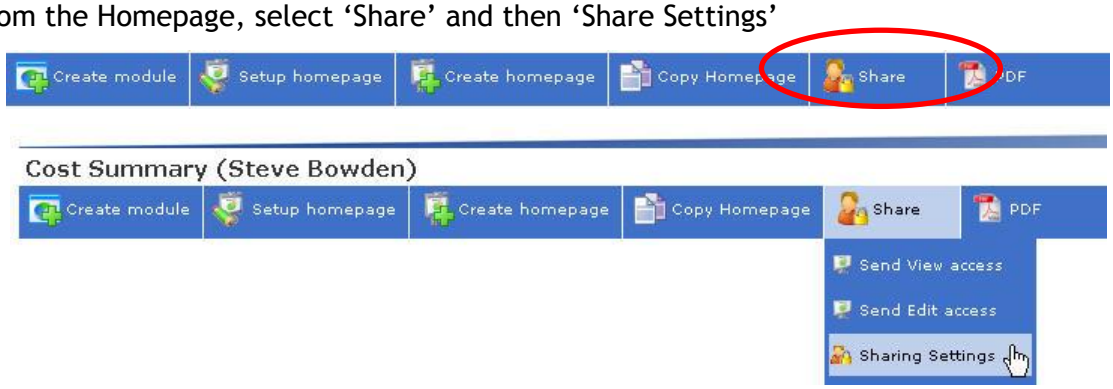
Simply click on the 'Copy Homepage' button and a new Homepage is created with the name: "Copy of … (the name of the Homepage you copied)".

The entire Homepage with all the modules will be copied.

4.7.8 Sharing a Homepage with other Users

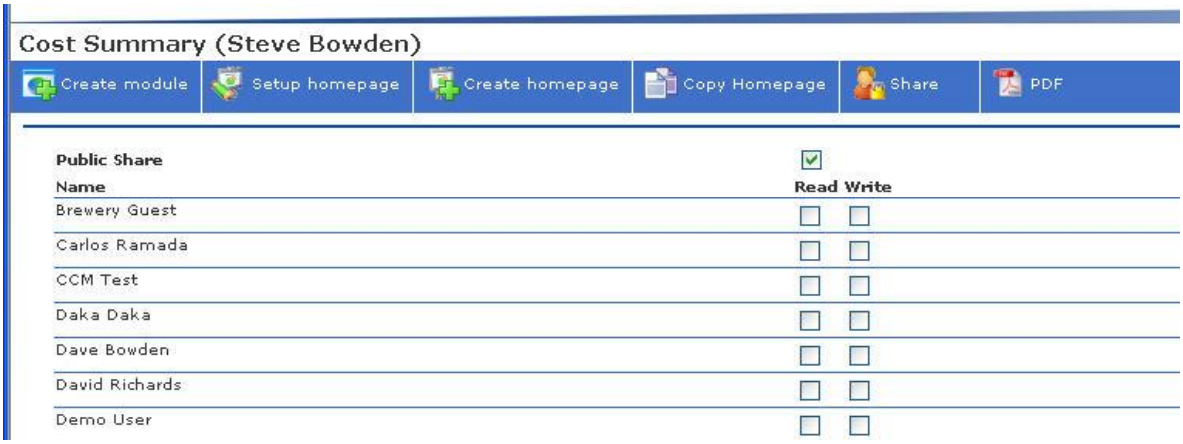
You can share the Homepages you have created with other users. You can make a Homepage Public so that everybody can see it or you can choose to share with selected users only. Selected users may be granted edit access so they are actually able to make changes to the homepage on your behalf.

From the Homepage, select 'Share' and then 'Share Settings'



The user can then select whether they wish to make this Homepage 'Public' by ticking the box.

Alternatively, clicking Add will present a list of Montage users from which the user can select who to grant 'Read' or 'Write' access to the Homepage.



Once you are done selecting your user(s) permissions click Save.

Your Homepage will now be available in the Home – Public Homepages menus for the other users. The users do not explicitly get notified when you grant them access in this way.

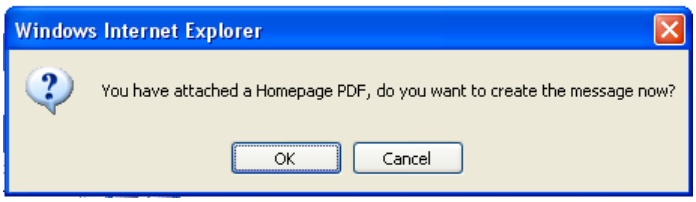
Granting either View access or Edit access to users can also be done by sending the Homepage as an attached report using Montage Messages. Selecting either option from the 'Share' menu will attach the Homepage to a Message allowing the user to send it directly to one (or more) recipients. The User rights that are granted this way may later be managed from the Sharing Settings.

The recipients of the Message will be able to access the Homepage report and edit it according to the permission level granted.

4.7.9 Sending an entire Homepage PDF file in a Message

Firstly, select the Homepage you wish to send. From the 'PDF' menu select the 'Send PDF' option.

This will display the following message:



Selecting 'OK' will take the user to the Montage Messages function allowing for supporting text and recipients to be selected before sending the message. (see Messages 4.10 for more details). Selecting 'Cancel' will return the user to the previous screen.

4.7.10 To export an entire Homepage to Microsoft Excel®

If the Homepage has been prepared for export to Excel® the <Export to Excel> option will appear in the Homepage toolbar.

Click this button to export the data of all the modules on the chosen Homepage to the Excel® sheet. Each module will be saved to a separate worksheet in the destination file.

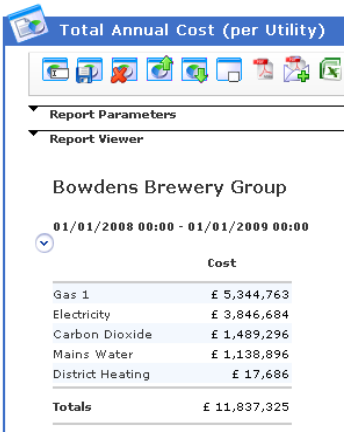
See section 5.2.4 to learn more about using Excel® for reporting.

4.8 Homepage Modules

The reports that appear on the Homepage are called 'Report modules'. This section describes the basic functions associated with report modules but DOES NOT cover the creation or editing of new and existing modules. These areas are covered in section 5.2.2.

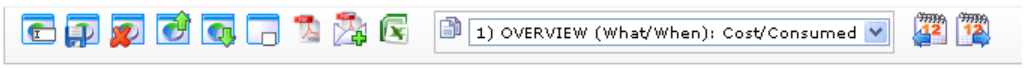
4.8.1 Opening a Homepage Module

To expand or collapse a module click anywhere in the module title bar and the module will expand (or collapse if already expanded).



4.8.2 Homepage module settings

Each report module is presented with its own available functions, presented as a toolbar of icons located directly underneath the module title, as shown below:



These functions are described below:

4.8.2.1 Show / Hide Title

Selecting this icon will display the title of the Homepage module, for editing and saving. Saving the new title will overwrite any previous label given to the module.

4.8.2.2 Save the module

Selecting this icon saves any changes made to the module.

If you don't save the settings any changes you make to the Homepage module are lost when you move away from the Homepage.

4.8.2.3 Delete a Homepage module

You can delete a Homepage module by selecting this button.

4.8.2.4 Changing the order of the modules on the Homepage

You can change the order of the modules on the Homepage.

Selecting one of these buttons to move the module "one-up" or "one-down" on the ordering of modules.

4.8.2.5 Set a module to be expanded or collapsed

Individual report modules can be set to either open expanded or collapsed when the Homepage is selected.

4.8.2.6 Export a single module to PDF

Additionally to exporting the entire Homepage to a PDF file, you may choose to export a single module to a PDF file. Simply open the required Homepage module and select the 'PDF' icon in the tool bar.

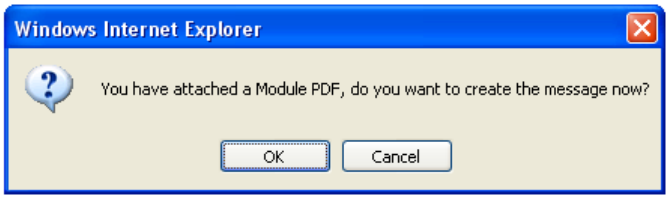
You may find that your PC is running a firewall preventing the download of the PDF file. You should accept the download of the file.

Once the PDF file has been downloaded (usually very quickly) you may choose to open the PDF file, or Save it to your local PC before opening it.

4.8.2.7 Sending a single module as a PDF attachment to a message

Select the Homepage followed by the module you wish to send. Click on the 'PDF Send' button from the module toolbar.

This will display the following message:



Selecting 'OK' will take the user to the Montage Messages function allowing for supporting text and recipients to be selected before sending the message. (See section 4.10 for more details). Selecting 'Cancel' will return the user to the previous screen.

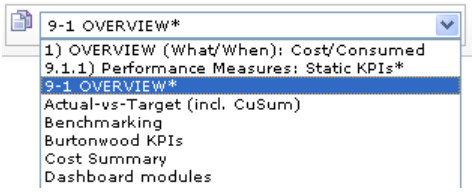
4.8.2.8 Exporting a single Homepage module to Excel®

By selecting the Excel icon you will export the data in the report to an Excel file. The content of the file will be comparable with the Text Report display.

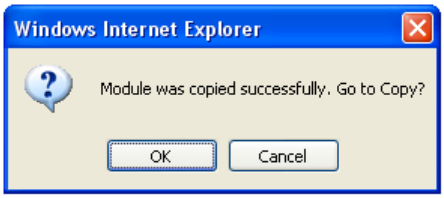
4.8.2.9 Copy a Homepage module.

You can create a copy of a Homepage module on the same Homepage, place a copy of the module on any other Homepage of yours, or copy the module and place it on a New Homepage.

Select the name of the Homepage from the drop-down list where you want the copy to be added and select the copy button.



The user will get the following message:



Selecting 'OK' will take the user to the 'Copy of' the original report module, whereas 'Cancel' returns the user to the active report module.

4.8.2.10 Period forward / back.

A useful feature when reviewing performance in a Time-series report or graph is the ability to quickly move the date range of the report forwards and backwards from the original Start and End Dates specified in the Report Parameters.

If the Frequency of the report is selected to be Daily, selecting the button will move the End Date one day forward. The opposite is true if selecting the period back icon.

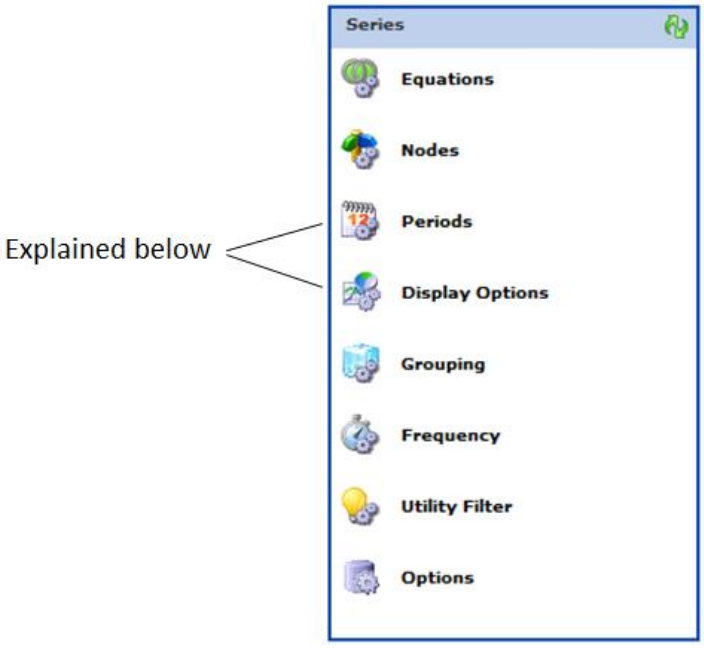
4.8.3 Homepage modules –Report Settings

All module reports are separated into two parts;

- The **Report viewer** which is the section that displays the report/graph (and is set by default to be expanded), and
- The **Report Parameters** which is used to display the settings for the report (which is set by default to be collapsed).

Click on the headline Report Parameters to display the parameters menu that allows the user to modify the content and formatting of the graph.

The report parameters list is displayed below:



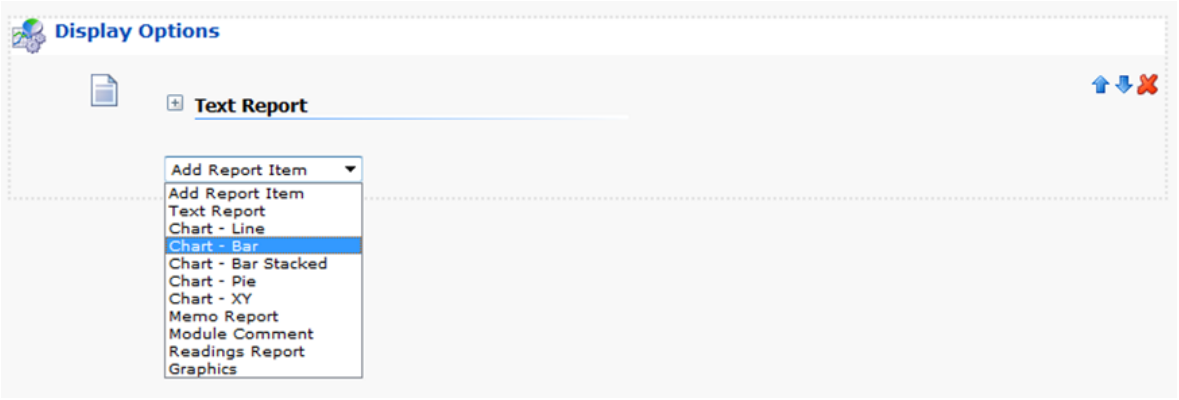
You can modify as well the data source for the report, as the date range and graphical appearance. Changing the date range of the report module as well as the report type is described below. The more advanced functions such as changing the reports contents and grouping the data series is described in section 5.1.2.

4.8.3.1 Selecting the Report Type.

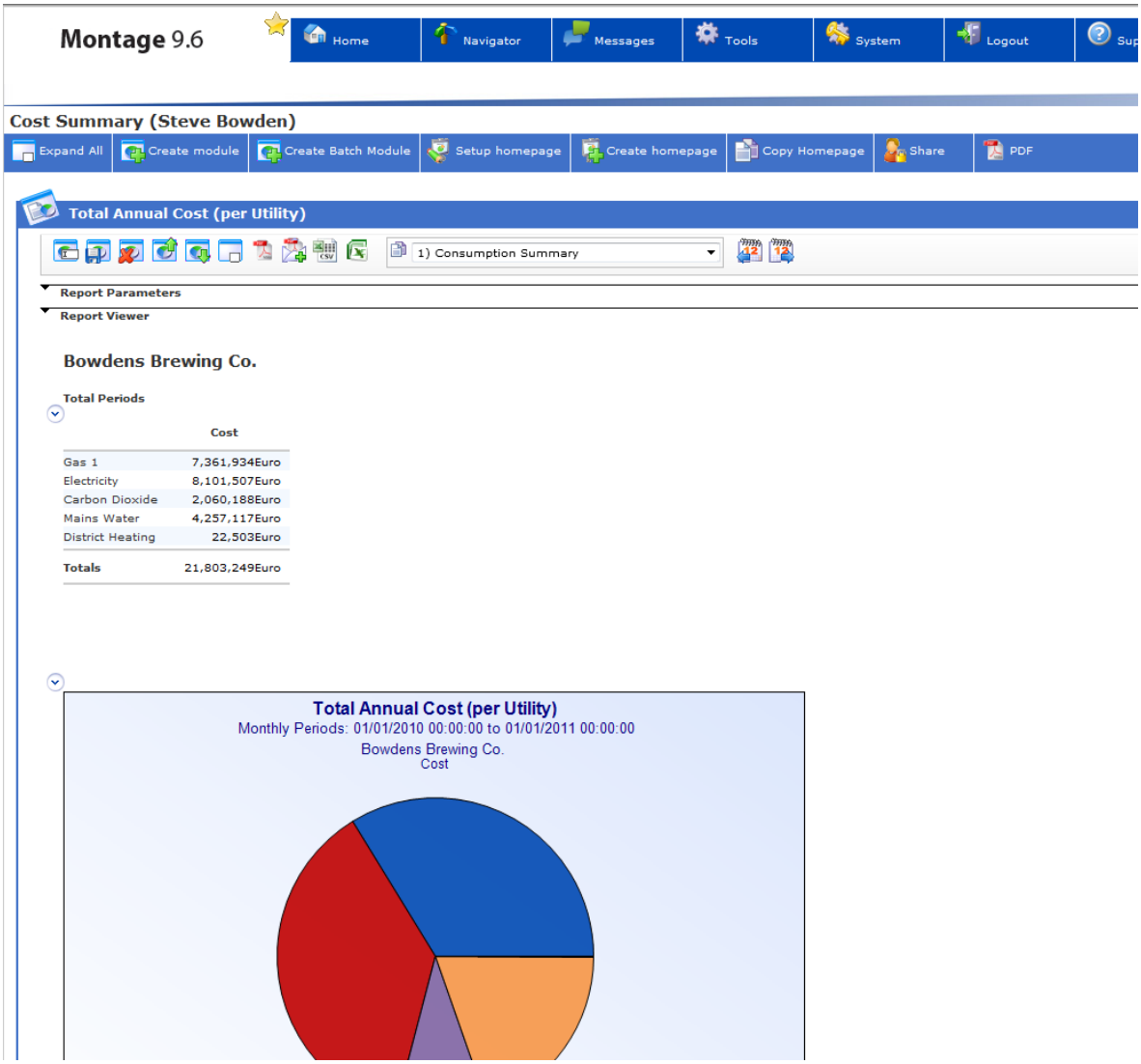
The modules can display in various graphical forms; Text, Bar, Line, Pie or X-Y Scatter graphs and you may also display any Memo's that have been related to any of the output data contained within the report.

Upon selecting Display Options from the menu, the screen will display as follows (showing the default report type if it is a new report):

To add another report type to the same module (so both Text and Bar can be displayed), select a second report type from the drop down box.



The Report Viewer section at the bottom of the screen will automatically update to show the two report types selected, as shown below:



Not all data is suited for display in all report types. Please refer to section 5.1.2.4 for a description of each report type.

It is also possible to further adjust the presentation of the data in the various report types by selecting the ⌄ located within the report module. Options contained within are specific to the chosen report type, but can include sorting, data filtering etc. The various options are explained further in section 5.1.2.6.

You may choose any number of the available report types, which will then be displayed after each other in the module. The ordering of the report types can be easily changed using the ⇅ options.

4.8.3.2 Defining the data range and frequency.

The data range is the period of time for which Montage will display data.

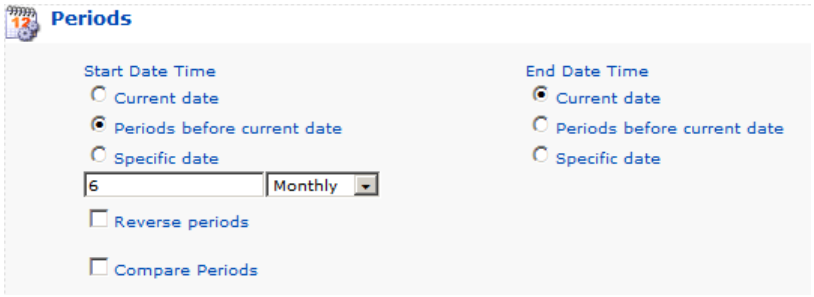
The data range is defined by a 'Start Date', 'End Date' and a 'Reporting Frequency'. The report will contain data for the periods that are completely after the Start and before the End dates.

***Example**: If you are looking at a weekly report from 1/1-2009 to 1-6-2009, the first weeks data in the report will be the first week starting after or at the Start date (and time), and the last week in the report will be the last week that has ended before or at the End date (and time).*

Typical frequencies on a site are Days, Weeks and Months etc., typically starting at midnight, but you may also find frequencies of different length and starting times. This all depends on the requirement for your site.

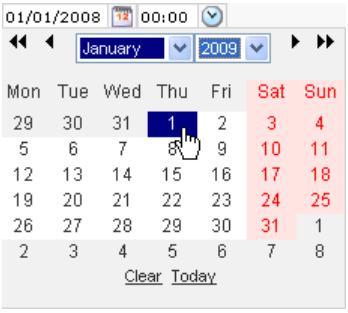
The concept of Frequencies is described in more detail in section **Error! Reference ource not found.**.

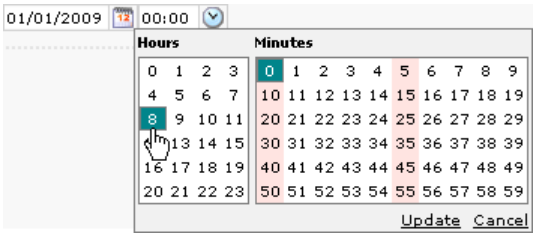
A typical setting of Start and End dates is illustrated below:



The above example will display the data for the past 6 months; the period will be dynamic and change as time passes. If you for instance enter “0 Yearly” this will always be 1/1 in the current year and useful for displaying information such as “Year-to-Date”.

You also have the option to specify a specific Start- and/or End date.





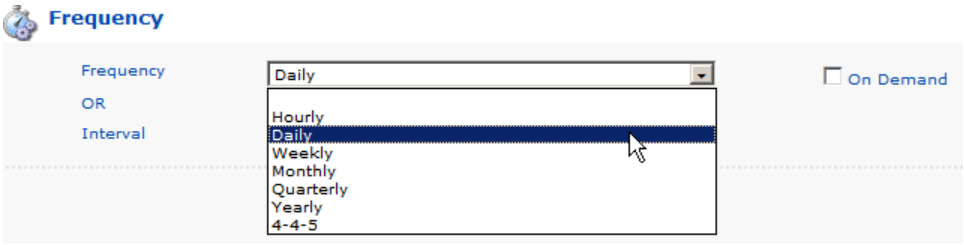
You can either type in the date and time into the text boxes, or you can select the date and time from the calendar modules by clicking the calendar or clock respectively.

***Note**: Montage is quite exact in the interpretation of the time - a day ends at the following day at 00:00 - not at the day itself at 23:59!*

To select the Frequency, select the  **Frequency** option from the report parameters list, and pick the required frequency.

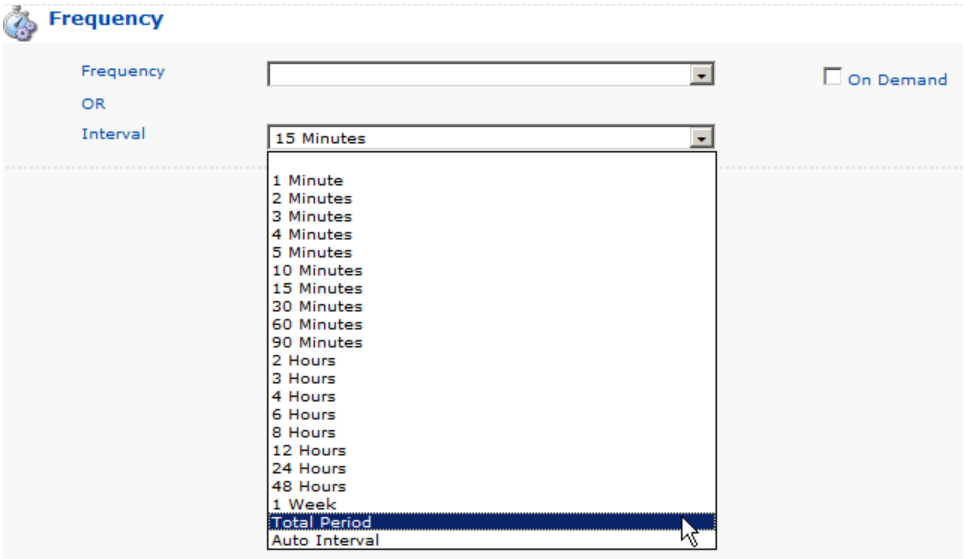
You have the option to either use the defined frequencies for reporting or you may specify an exact date/time range and interval.

Which frequencies are available depend on your configuration and will match the reporting periods you generally use in your company, as shown in the example below.



When reporting on a defined reporting frequency and the periods to be included in the report are those that fall entirely within the data range. Montage will by default use the pre-calculated values to produce the report faster.

If you need to report on shorter intervals you select the Interval from the list below.



The first interval will start exactly at the start time of the Periods and set the desired interval for the report. Please note that if you choose too long a period with too short intervals you will be requested to limit either the Period or increase the interval.
The two options at the end of the list provide you with the options to report the entire date/time range as one number(Total Period), or automatically set a reasonable interval for the selected date/time range (Auto Interval).

Selecting the 'Save' icon from time-to-time will prevent any changes made to the report module being lost.

4.8.4 Data status displayed in reports

As explained earlier in section 4.3.5.1 numbers may display in different colours to indicate the integrity – or validity – of the numbers.

4.8.4.1 Text reports

The same colour coding of numbers apply to text reports, where

- **Black** numbers are considered complete and reliable.
- **Blue** numbers are somehow incomplete, either in respect of the date range or the contributing meters.
- **Red** numbers are currently being calculated and therefore probably going to change when calculations are complete.

On reports it is also possible to use the forecasting feature (See section 5.1.2.10) and report on future (expected) numbers.

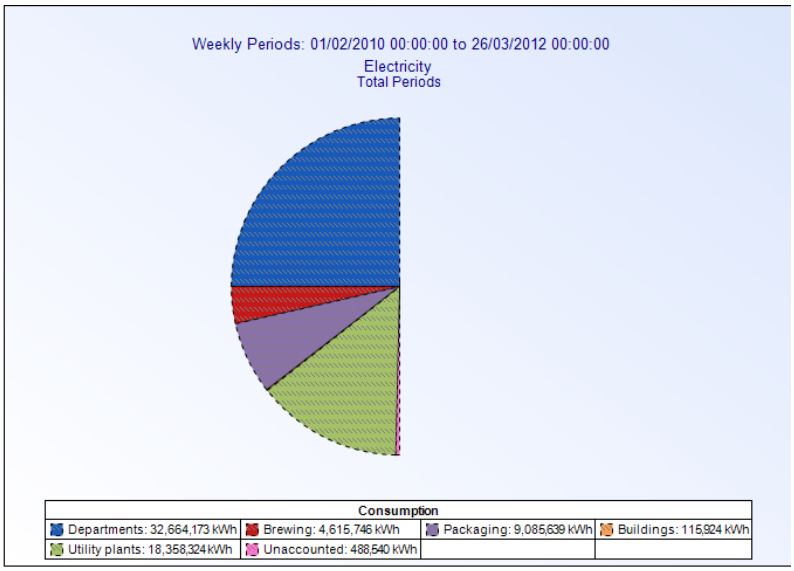
- **Green** numbers are forecasted numbers.

4.8.4.2 Line, bar and pie charts

Since the colours are used to differentiate each item, dashed lines indicate any non-confirmed numbers. Only good numbers will be displayed as full lines. On bars and pies it is the border of the bar or pie which is dashed.

4.8.4.3 Pie charts

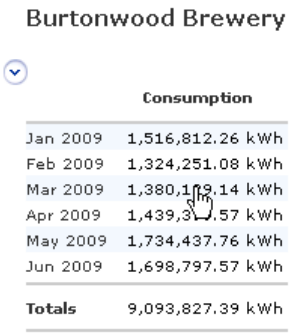
Pie charts normally form a full pie and the sizes of each piece of the pie indicate the share. When the data, making up one or more of the pie pieces are considered not-confirmed, the pieces will make up only a half pie, as shown in the figure below.



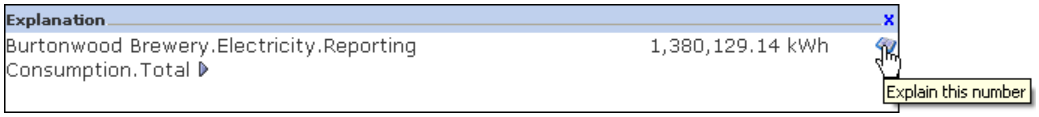
4.8.5 Investigating the root of a number

In many cases the numbers displayed in reports are made up from calculations of various sources. When such numbers are unusually large or small it is valuable to be able to drill down to each of the sources of data.

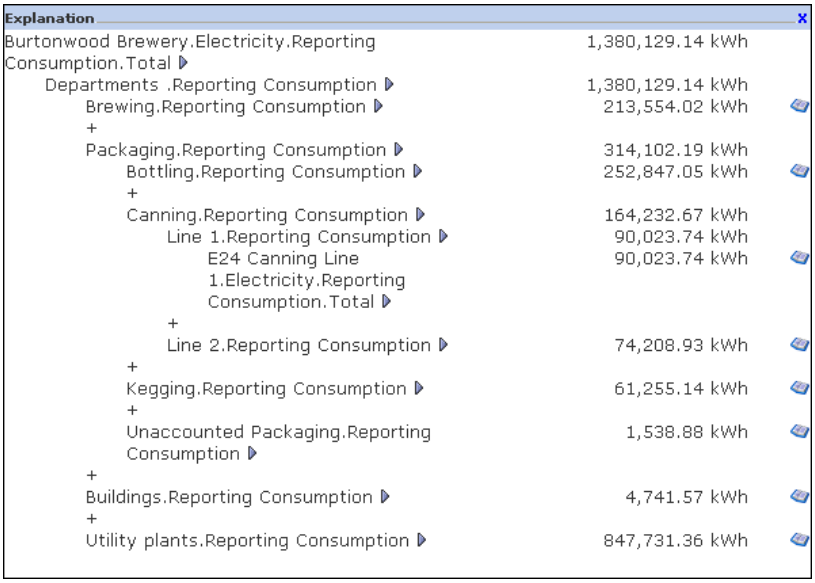
If the feature “Explain numbers” is set to ‘On’ in the text report, the mouse turns into a hand when placed over a number.



Simply click the number you want an explanation for, and the following window opens.

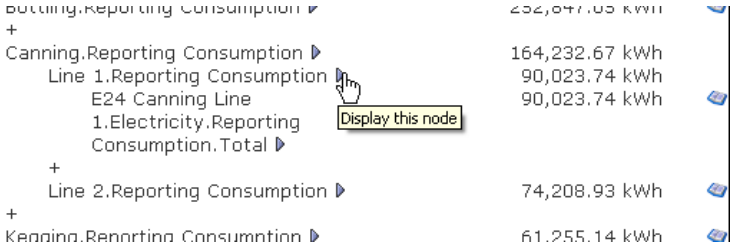


Click the "Explain" icon in the right hand side to drill down towards the actual sources of data. In the following example the drilling has been following the route of the meters making up the consumption for Canning Line 1.



Each if the icons in the right hand side provides access to drill down any of these sources.

The arrow icon after the Node.NodeField



… will take you to the navigator screen and select that node to assist with conducting further investigation.

The feature needs to be set to 'On' in the text report to be active. Please refer to section 5.1.2.5 where these settings are explained.

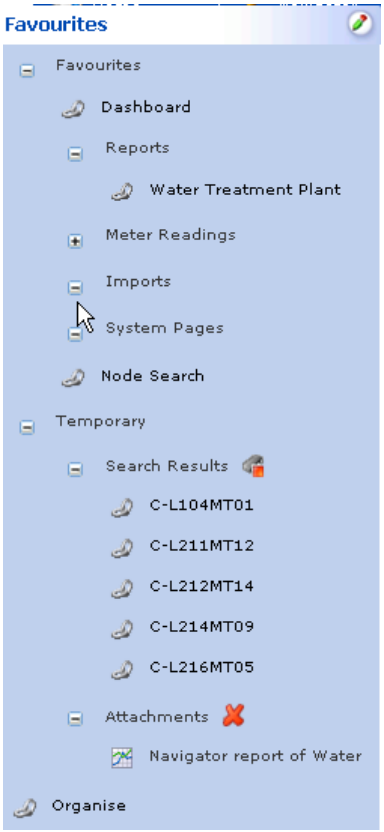
4.9 Favourites

New to Montage 9 is the ability for each user to build up a personal list of shortcuts that takes the user to specific areas of the system quickly. These shortcuts are referred to as Favourites.

4.9.1 Using Favourites

The Favourites menu appears when you click the ★ located within the logo box.

The Favourites menu has three main sections.



Favourites, is the actual favourites which is the personal structure of links to pages in Montage.

Temporary is automatically updated by the system and provides access to Nodes that have been found by the search feature and used as the latest attachments to messages.

Organise provides access to the tool to create folders in the favourites menu and move links around in the menu.

To open the folders in the Favourites menu simply click on the folder.

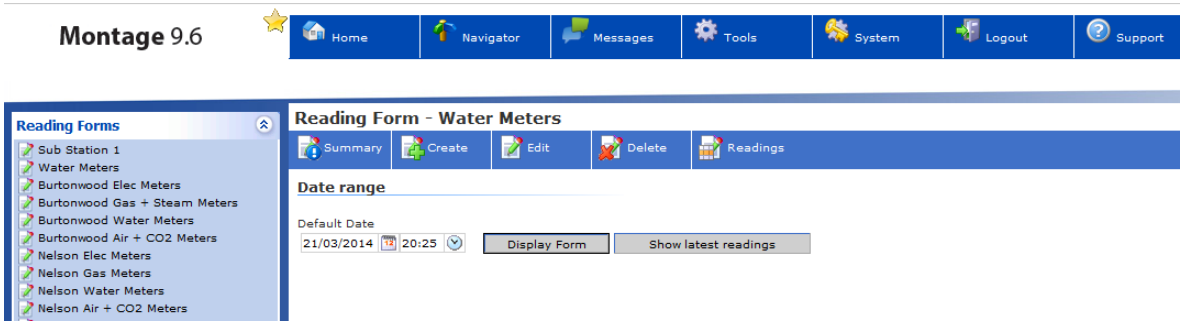
To go to a favourite simply click on it, and you will be taken to the selected screen.

The menu will disappear again when you move the mouse outside the menu.

4.9.2 Managing your favourites

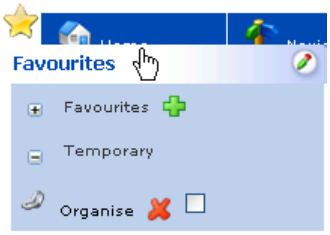
You can add any Montage screen to your favourites. If for example one of the pages you access regularly is to display meter readings for a particular period, one of the pre-defined Reading Forms could be set up as a favourite.

To do this, navigate to the screen you would like to assign as a Favourite. (In the example below it is the Reading Form for 'Water Meters that we want to make a Favourite').



Whilst on this screen, select the  located within the logo box.

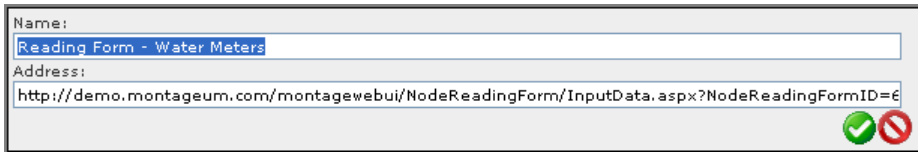
This will open the favourites menu as explained above. Then click in the title bar of the Favourites menu to take the Favourites menu to edit mode and start the configuration of the Favourites.



When you select "Favourites" from the menu, the menu will expand as in normal operation, and you will see that you now have the options

4.9.2.1 Add a new item to the menu

Click  to Add the current page as a Favourite. The next screen will allow you to enter a title for the item in the menu.



The default screen name will appear highlighted, although this can be changed by the user. Make any necessary changes to the 'Name' and accept the change by selecting the  icon. The shortcut to this page will now be included as a Favourite.

4.9.2.2 Delete an item from the menu

Click  to remove an item from the Favourites.

4.9.2.3 Set an item to be your Default start screen

Tick the checkbox ☑ to make this item your default start screen; the screen that Montage will display when you log on, and the screen you return to when selecting Home from the main menu

4.9.3 Organise your Favourites

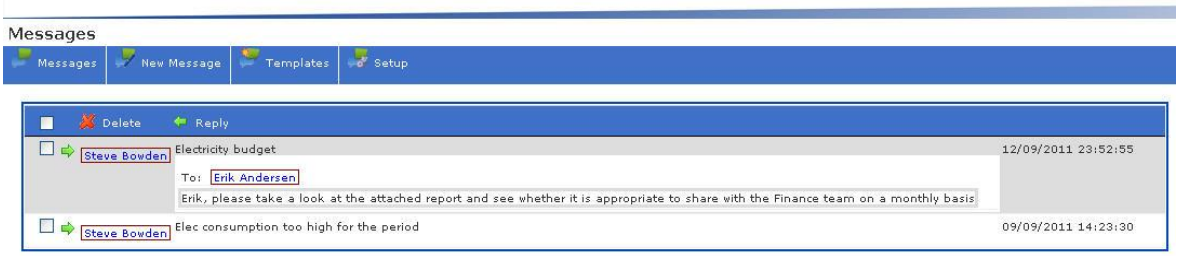
You may create sub menus in the Favourites menu in as many levels as you wish and you may move items from the menus up and down or between sub menus. Please refer to section 5.5 for more information about this.

4.10 Montage Messages

Another new function to Montage 9 is the ability to use Montage for i) communicating with other users, ii) sharing useful content such as reports, and iii) triggering either event or time-based alerts. These three activities are all handled through the Messages interface.

To access this function, select 'Messages' from the toolbar.

This will open up the Messages screen showing the audit trail of any previous messages as the default screen

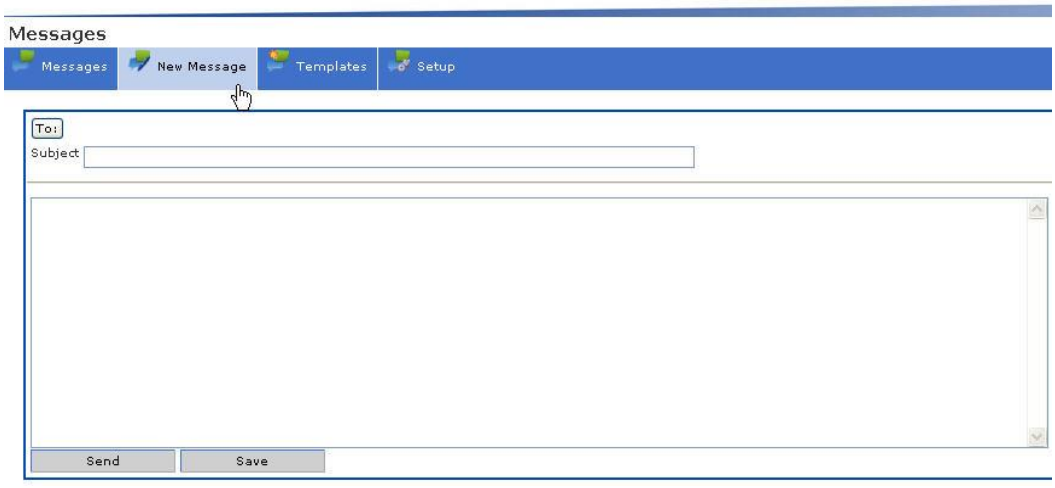


Although this area of the system shares some of the features consistent with an e-mail system (e.g. sending and receiving messages), it is not by design meant to have all the features expected from today's comprehensive e-mail tools (Microsoft® Outlook, Lotus Notes®). The purpose is simply to enable Montage users to send and receive messages (perhaps also with an attachment) to another Montage user about Montage/energy related issues.

The following sections explain the basic approach to using Messages.

4.10.1 Creating a message

Select 'New Message' from the toolbar to display a blank message, as shown below;

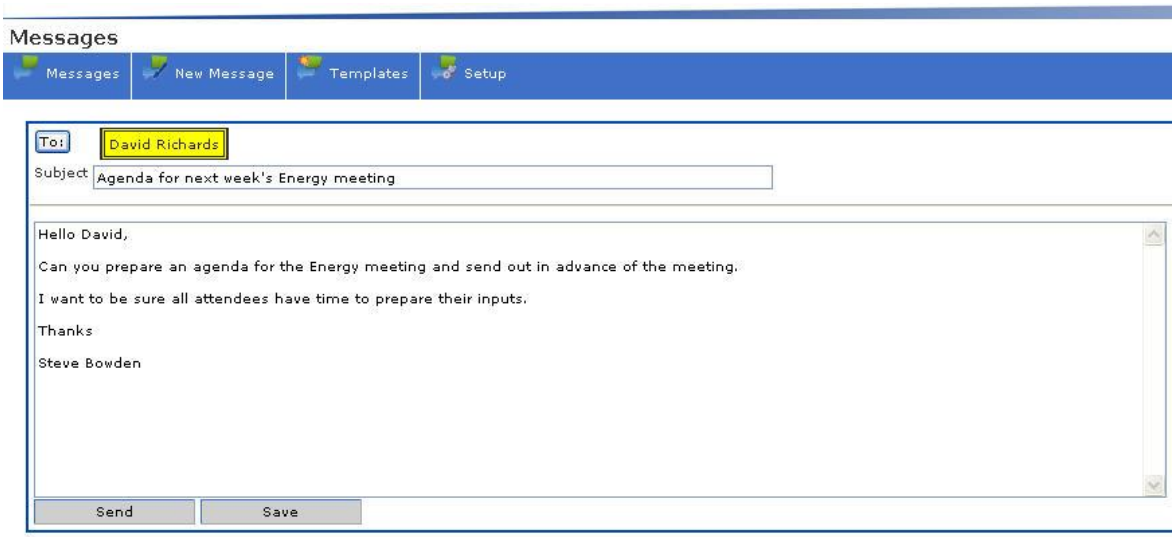


Selecting the To: button will display the list of Montage Users.

Select the recipient(s) from the list as required. Note that only users registered in Montage can receive Montage Messages.

The supporting text Subject and message text is entered as with other similar applications.

After entering the message text, the user can click 'Send' to send the message to the selected recipient.



Alternatively, rather than typing a specific message, the sender may prefer to send one of the predefined templates, as described below.

4.10.2 Creating a message template

Creating Message Templates is useful when sending the same information on a regular basis.

For example, if a Montage report is being sent on the first day of each month by the Site Energy Manager to the Management Team showing them the performance of the main

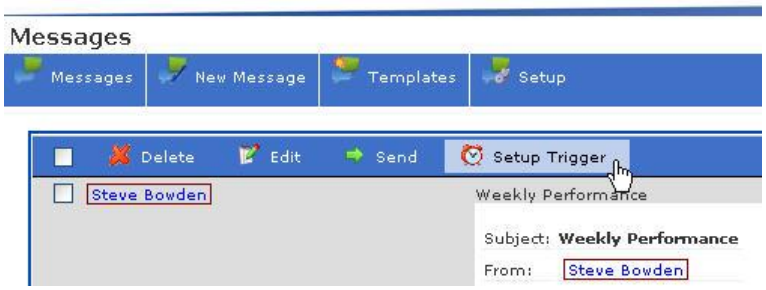
utilities compared to target, then a template could be used to contain standard text and recipient list, and be automatically scheduled to be sent once per month in time for the Monthly Management Team meeting. This would prevent the requirement for any human intervention in the distribution of this report once the template was created.

To create a new Template, select 'New Message'.

Create the message as required, remembering to select the recipients and the text to be displayed in the Subject line and message body. Press 'Save' once this has been completed.

Then, select 'Template' to display the list of active Templates, as shown in the example below.

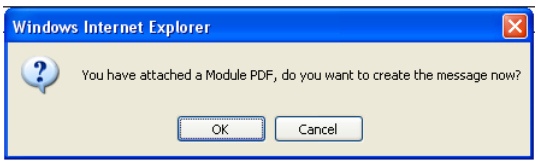
The template that you just created should appear in the list. The user can now access the template to customise it further, for example to specify the time or event-based triggers that will determine when the message gets sent.



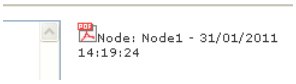
4.10.3 Adding Montage reports to Messages and Templates

Adding a Montage report to a Message cannot be done directly from the message. In order to attach a report, the user must first have accessed the report they want to send via Messages.

As an example, select a Homepage from the 'report' menu. Select the module that you wish to send and press the  icon. The following message will appear:



Selecting 'OK' will open a blank message which can be filled in as required. Over to the right hand side of the Message you will see the report attachment as a PDF file:



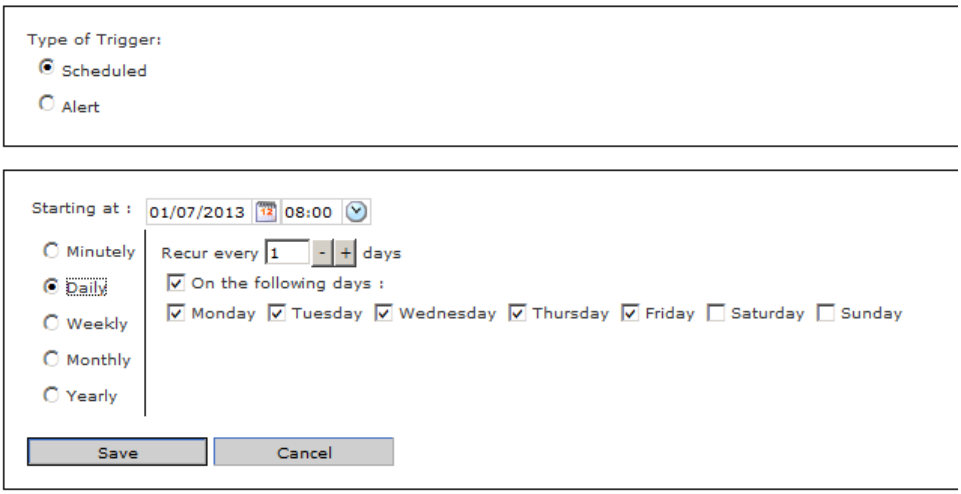
Once the message text is entered, the Message can either be sent directly from here by pressing 'Send' or pressing 'Save' will add the Message to the list of available Templates. This template can then be accessed as described above, with further conditions entered as described below.

4.10.4 Assigning a time-based trigger to a template

Select the Template you want to add a trigger to, and select the 

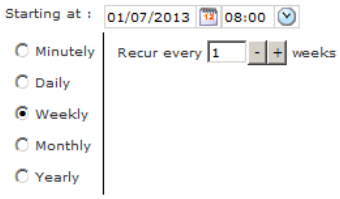
button from the toolbar. This will display by default the radio button for 'Scheduled' to be selected, and the screen below to allow the user to select the required settings that best suits the purpose of the message. In this example, the schedule is set up to be triggered for weekdays only, once per day.

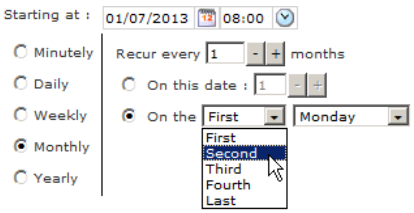
The user can also specify a starting date and time at which point triggers will become effective.

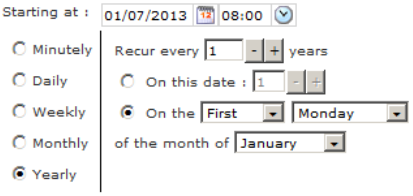


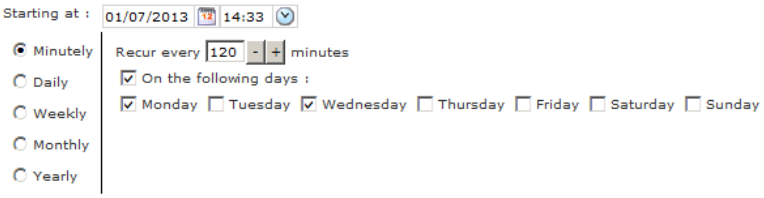
The example above shows the settings that will trigger the message to be sent each working day at 08:00 in the morning.

The alternative interval settings are shown below as self-explanatory.



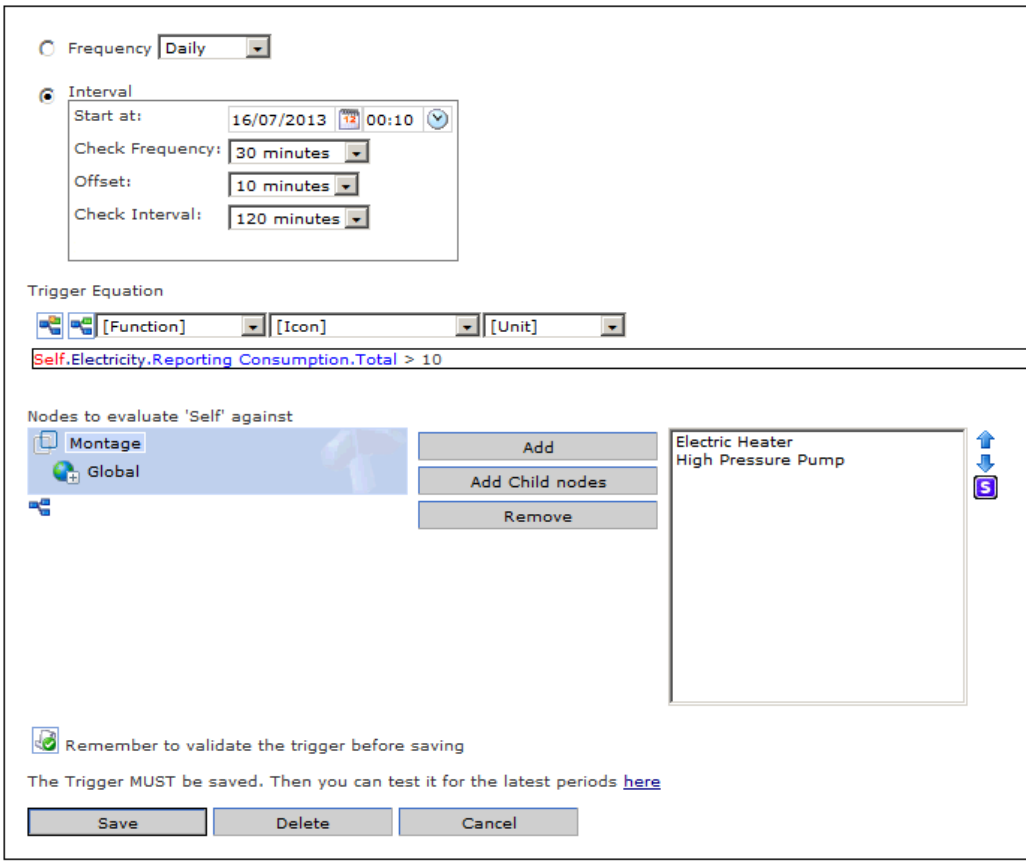






4.10.5 Assigning an event-based trigger to a template

Alerts are messages which are sent automatically when a configurable criteria is met, for instance if there are no readings in a specific period of time or if the consumption exceeds a certain fixed value or it exceeds the target by for instance 15 %.



4.10.5.1 Alert testing intervals

The interval at which the criteria are tested may be based on the defined ‘Frequencies’ or at shorter ’Intervals’.

When the alert is controlled by a frequency, the criteria will be tested at the end of each period of that selected frequency. For example, in the above example whereby the Frequency radio button was active and the option of ‘Daily’ was selected, an alert would be triggered upon completion of all the periods that make up the daily frequency, but only if the Electricity Reporting Consumption exceeded the value of ‘10’ on either of the selected Nodes (Electric Heater’ or High Pressure Pump).

When shorter intervals than those allowed within the list of frequencies is required, then the user can specify to use ‘Intervals’ which are defined as follows:

- Start at: the date and time to which the rule is first applied.
- Check Frequency: the amount of lapsed time between the data set being evaluated against the rule e.g. check the data against the rule every 30 minutes. This is the shortest possible time between alerts.

- Offset (Start time minus): the amount of time back in history from the Start time that will be excluded from the data range.
- Check interval: the amount of data to be evaluated.

In the example above, the data sample is comprised of 120 minutes of data and is evaluated at 30 minutes intervals, therefore at 10 and 40 minutes past each hour. The first 10 minutes worth of data between 00.00 and 00.10 is excluded from the data range, and therefore the Data range is comprised of data from 22.00 on the 15/07/2013 to – 00.00 on the 16/07/2013.

4.10.5.2 Alert criteria

The trigger Equation must be an equation resulting in either True or False. If the result of the equation is true, the message will be sent. The equation may refer to specific Nodes or refer to a list of Nodes in which case the equation will be evaluated for each Node on the list. If the result is true for at least one of the Nodes, the message will be sent.

Press the  icon to validate the equation before you save it.

The equation shown in the example above simply compares the value of any utility on each of the selected Nodes to the fixed value '10'. Normally the equations will be that simple. A few examples are shown below.

- Compare the consumption of each Node to the High Limit set on the Nodes Attributes Screen:
  Self. Elektricitet.Reporting Consumption.Total > Self.Data Point.High range value per day * DaysInPeriod()
- Compare the consumption to the Target set for each Node and trigger the alert if the consumption exceeds the Target by more than 10%:
  Self. Elektricitet.Reporting Consumption.Total > 1.1 * Self. Elektricitet.Reporting Target.Total
- Count the number of readings on the Node and trigger the alert if no readings have been entered during the period:
  Self.Meter Reading.Reading.Count < 1

Please refer to section 6.5 for details of creating expressions for equations.

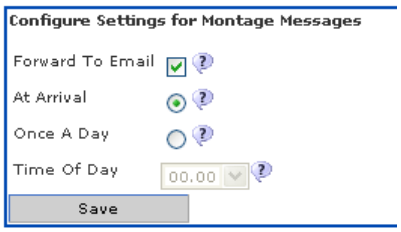
Once saved, the Message template will display a  symbol to indicate that a trigger has been assigned to the template.

4.10.6 Editing an existing template

Select the template by simply clicking on the message in the list of Templates. The selected template will expand and show details of the selected message. This will open the Template allowing the contents to be overwritten and the trigger settings changed as required.

4.10.7 Message Setup

The final step in the process requires the user to specify how he/she would prefer to receive Messages. The user can specify if they wish to receive their messages to their e-mail address, as listed in the user profile, as well as via Montage Messages.



The user can also specify when they want to receive Messages. Depending on the extent of use, receiving Messages too regularly may become a distraction and therefore to avoid getting overloaded with communications, the user can specify only 'Once per day' at a specified time. Only messages that have not previously been read in Montage will be e-mailed. Messages with event-based triggers however would make sense to receive them as they occur to prevent unnecessary energy waste.

4.11 Data entry

The User Manual so far has focused on the functions that enable the user to view output data, both in the area of the Navigator's Summary screen and in the various areas of reporting (Dashboard, Navigator reports and Homepages).

The predecessor to being able to view output data in Montage is naturally that you first have to get data into Montage!

There are two main ways of getting data into the system:

- Manually entering data, and
- Automatically importing data.

This section will provide instructions into the basic approaches to uploading data, with the more advanced approaches covered in section 4.12.

Firstly, it is important to note that only nodes of the type 'Data point' (see section 6.2 for descriptions of node types) can hold input data; numbers entered which are the roots of all calculations throughout the system.

The most common type of input data are meter readings, for Incremental, Consumption, Absolute or Tank meters. You can find more information about these types of meters in section 6.2.2.5

Another type of input data is invoice readings. These are used to record the actually invoiced consumption and cost which enables you to compare the recorded numbers from the meter readings with the invoiced consumption. You should not expect these numbers to be exactly the same, because of differences between meters and also the exact times of reading, but they should be close or you may have an issue.

You also have the option to enter comments or memos for a node, to keep track of any explanations of irregularities or documentation related to a node. This is described in section 4.4.1

4.11.1 Manual data entry

There are basically three ways of entering readings manually.

- **Single meter readings**. Provides access to the readings of one data point (meter) allowing the user to add, delete, modify or override individual readings. The interface, which is mostly used to investigate existing readings and less to actually enter new readings, also displays various information about the reading.
- **Multiple meters readings**. Manually entering readings for a group of data points (meters) in a Reading Form on one screen.
- **Montage HDC meter readings.** Using the Montage (Handheld Data Capture) PDA application to enter readings on a portable device while actually taking the meter readings. The readings are automatically transferred to the Montage server via available networks.

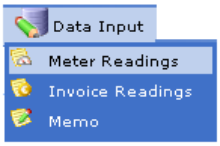
4.11.2 Single meter entry

The single meter entry screen is rarely used to enter new readings, but particularly useful when you want to view or change historical data for a meter due to analysis of spikes or blank data. These anomalies can be traced back to bad meter readings and so

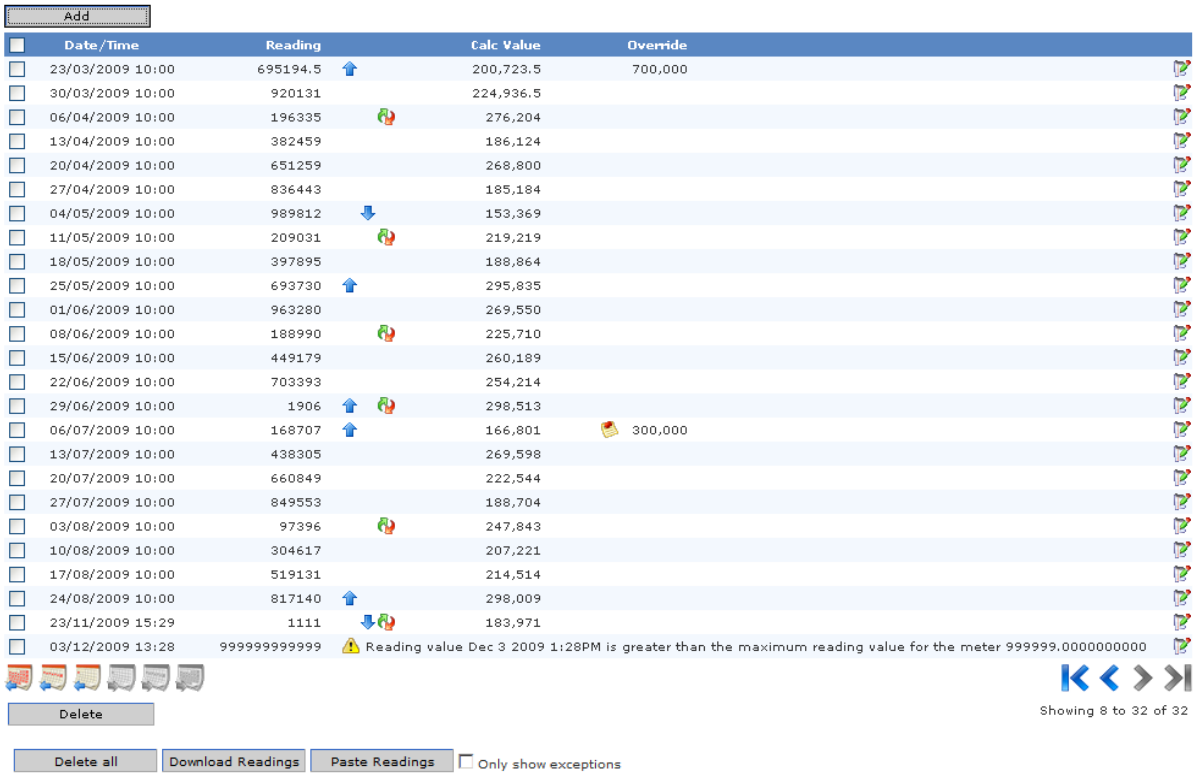
it is useful to have a quick and easy way to check and if necessary amend these readings.

From the Navigator options, set the date range of readings you want to view, and browse to the relevant meter.

Click on the 'Data Input' menu in the toolbar, and then select 'Meter Readings'.



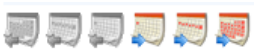
Selecting the Meter Readings option, displays the following screen. Any existing readings are displayed. If you have the relevant access rights, you can amend this data.



Readings are displayed on the screen with 25 readings on one page. Each reading is displayed in one line, containing the:

- **Date/Time** stamp,
- **Reading** value,
- **Calc Value** (the "consumption" since last reading) and,
- Any **Override** value. If an override value is entered this is the value used for calculation of consumption instead of the originally Calc Value.

You can browse backwards and forward in time by using the icons at the bottom of the screen:



From left to right:

- One month back,
- One week back,
- One day back,
- One day forward,
- One week forward,
- One month forward.

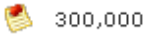
From left to right:

- First 25 readings,
- Previous page of 25 readings,
- Next page of 25 readings,
- Last page of 25 readings.

4.11.2.1 Only show readings with exceptions

Depending on the date range entered into the Options panel, and the input frequency of the meter readings, there could be many hundreds or thousands of meters readings. If you are only concerned about those readings which may be an exception to normal performance, you may use a filter called 'Only show exceptions'. Checking this box will update the screen and only show the list of meter readings that are considered to be exceptions.

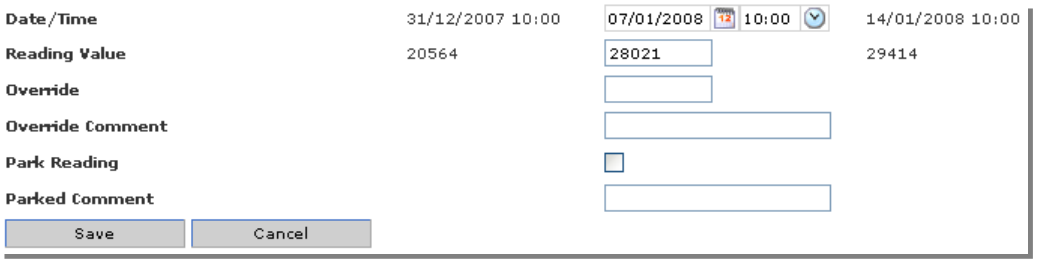
By default all exceptions will be included when you check the "Only show exceptions" box. You may then exclude selected types of exceptions by un-checking the relevant boxes.

- **Show errors** – will show readings that exceed the maximum reading as entered on the attributes of the node.
  
- **Show Lapped** – will show the readings were the reading of an incremental meter is less than the previous reading which forces the meter to calculate as if the meter has reached the maximum reading and count from zero again.
  
- **Show High Range and Low Range** – will show these readings where the High and Low expected daily consumption (as set on the Attributes page) has been exceeded. This is also the value used on the PDA to request the user to confirm the correct reading.
  
- **Show Overrides** – will show those readings were a user has entered a value to be used instead of the calculated consumption based on the readings. If the override has been commented, you will see an icon next to the override value.
  

- **Show Parked Readings** - will show those readings were a user has 'parked them', meaning they are not included in the consumption calculations as they are currently being investigated to ensure their validity.

4.11.2.2 Edit a reading

To edit a reading you select the edit icon .



The reading details will be displayed in text boxes where you can edit them. The previous and the following readings will be displayed as information. Make any change you may wish and press 'Save' to keep the changes.

In this screen you can…

- **Change the reading or the date/time** if required.
- **Override** the calculated value. This is useful when a meter is defect so you are able to use a qualified assumption of the consumption, or if the meter is replaced.
- '**Park**' the reading so it will not be used in the calculation of the consumption. This is useful as an alternative to deleting it when you need to investigate what the correct reading has been if that is possible. You should never change a reading unless you are certain what you do is correct. If you are unsure it is usually better to delete the reading, or, if you want to make an assumption you should make an override.

4.11.2.3 Export readings

You can export the readings to a csv file simply by pressing the 'Download Readings' button located at the bottom of each meter reading page. All readings within the date range set in the Options panel will be downloaded.

4.11.2.4 Delete readings

You may delete a selected reading by marking the check box at the beginning of the line and then press the 'Delete' button. You may mark as many readings as you wish for deletion and they will be deleted when you press 'Delete'.

You may delete all readings within the date range set in the Options panel in one operation by pressing the 'Delete All' button.

Note: *Deleted readings cannot be recovered!*

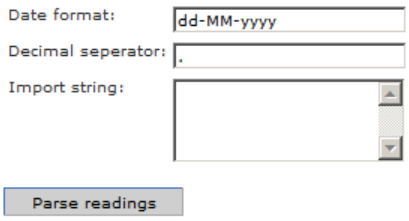
4.11.2.5 Adding a meter reading

To add a meter reading, press 'Add' and fill in the boxes. Then press 'Save' for the readings to be saved and output values calculated.

4.11.2.6 **Inserting multiple readings for the same meter from Excel**

This feature allows for insertion of many readings by copy/pasting them from an Excel spread sheet. In the spread sheet the data must be organised such that the time stamps are in one column and the readings in the next column.

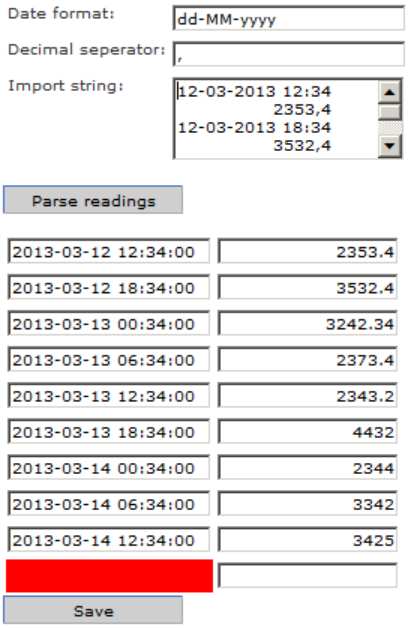
Press ‘Paste Readings’ to open the interface for inserting a bulk of readings.



Montage will automatically identify the timestamp from the inserted data, except for the order of date, month and year which cannot be safely identified automatically.

You may change the decimal separator, in some countries comma is used alternatively to the more commonly used point.

The data to be inserted are simply pasted into the text box ‘Import string’ and when the ‘Parse readings’ button is pressed the data is being validated for a preview as shown below.



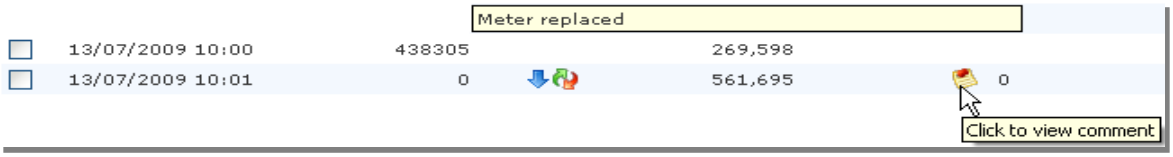
Each reading is now displayed and may be edited if you see mistakes. The date format in this pre-view is always yyyy-MM-dd.

You may enter as many readings in one operation as you wish, provided that your server is powerful enough. On typical server setups inserting 1000 readings should not be a problem. If you are inserting many readings you will find that the system seems to be unresponsive while it is processing the data, this is not an error and you just have to be patient.

It is highly recommended that you check the data carefully before pressing ‘Save’, which will insert the readings into the database.

4.11.2.7 Managing a data point when a Meter is replaced

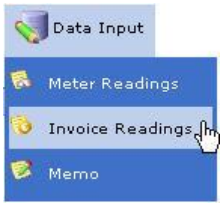
If the new meter uses the same attributes; number of digits and multiplication factor, as the existing meter, you should enter the last reading of the old meter at the time it was taken down, the initial value of the replacement meter on the time when the new meter is installed and then override the calculated value for this initial reading to zero or to an estimate of what the consumption has been while the meter was not in operation. An example of this is displayed below.



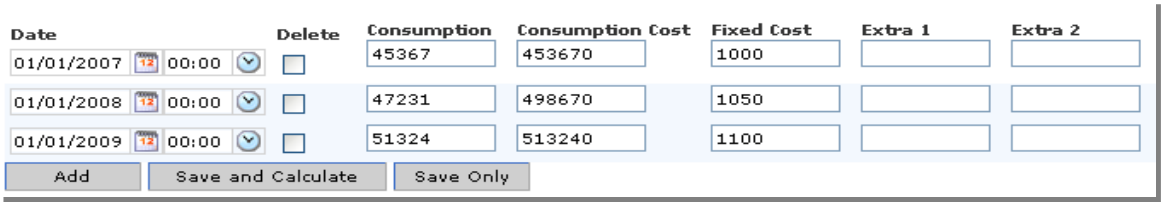
If the new meter has different attributes, you will need to end the old meter and create a new meter.

4.11.2.8 Invoice readings

Select the 'Invoice Readings' option from the data Input menu.



This will display the following screen:



Invoice readings are useful when you want to compare the invoiced consumption and cost and compare them to the recordings of the meters in Montage.

4.11.3 Meter Reading Forms

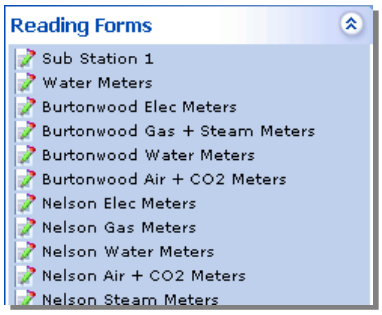
To make meter reading more manageable, Montage allows meters to be grouped together in to meter 'Reading Forms'.

Reading Forms are used for as well entering of data from the web interface as from the PDA application, known as 'Montage HDC'.

To access this area, select 'Reading Forms' from the Tools menu.

The user will be presented with a list of existing Reading Forms. Select the required 'Reading Form' from the list to open it.

The screenshot below shows an example of a list of eleven Reading Forms all containing different meter configurations across two sites.



The menu bar will show the following options:

Pressing 'Summary' will display the description of the Reading Form (as shown above).

Pressing 'Delete' will allow you to delete the Reading Form. Deleting a reading form does not affect the meters or their readings. A meter may be referred from multiple reading forms if required.

'Edit' and 'Create' are explained later in this section.

4.11.3.1 Entering data from the web user interface

Click on the 'Edit data' button in the menu bar.

Select the default date and time for the readings you are about to enter and press 'Display Form'.

The Reading Form will have set the default time stamp to the date and time you entered in the previous step. You may change the default time stamp on individual meters if you need to.

The Reading Form also shows the last reading of the meters in the form.

The user can then enter the meter reading in the Readings box for the corresponding meter. Pressing 'Save' upon completion will save the readings and trigger the calculation.

4.11.3.2 **Validating and editing the latest readings in the form**

When in the meter Reading Form, pressing the 'Show Latest Readings' button will return a list of the latest readings and their calculated values along with the status flags of any exceptions.

This screen will often return many different icons and messages, the most common ones being explained here:

- If the reading is less than the previous reading, the **Lapped** reading icon will appear.
- If the average daily consumption since last reading exceeds the value for expected high reading on the Node attributes, the **High Reading** icon will appear.
- If the average daily consumption since last reading is less than the value for expected low reading on the Node attributes, the **Low Reading** icon will appear.
- If the reading has been marked as parked the calculated value is not displayed, instead the **Parked Reading** icon will show. Parked reading is a new feature

that allows the user to manually exclude the reading from the calculation but leave it in the database for further investigation and later correction or deletion.

- If the reading has been manually over written this is shown to the left of the calculated value (which is not being used).
- If the numbers of digits are too high this is reported and no calculated value has been calculated.

To edit a reading press the edit icon at the right hand side and it will open the meters latest reading for editing.

It is also possible to export the readings to a comma separated file by pressing the 'Download Readings' button should that be required.

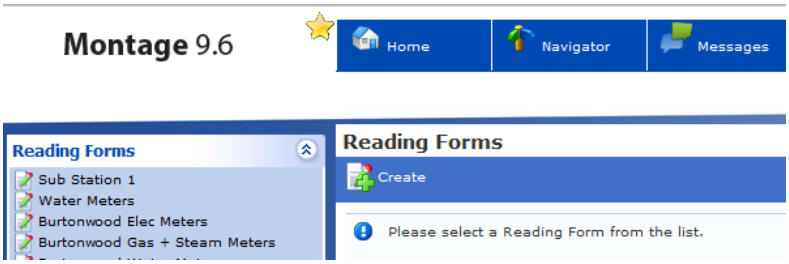
4.11.3.3 Entering readings using Montage HDC

The Montage HDC is a PDA tool that comes complete with a version of the Montage software installed. This tool assists in the capturing, validating and transferring the meter reading data from the source to the server, saving both time and ensuring data accuracy.

This tool is not provided as standard with Montage and therefore comes complete with its own User Manual. Please refer to the 'Montage HDC User Guide' for further information on its configuration and use.

4.11.3.4 Configuring the Reading Form

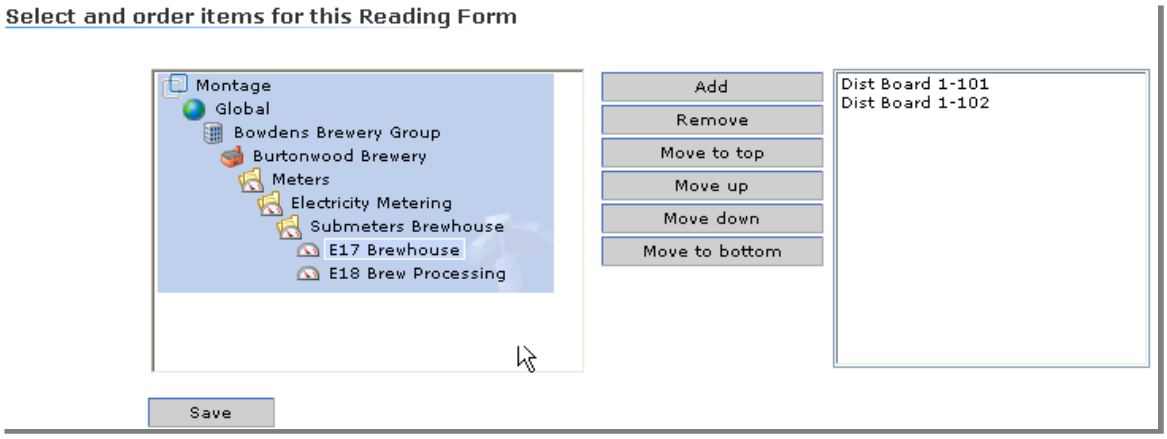
Select 'Create' to create a new Reading Form.



Adding a meter to a Reading Form

If you have previously been selecting meters by use of the Search feature (See section 4.6) and saved the search result to memory, the meters list in the reading form will already be populated by the search result.

To manually add another meter to the form, simply browse to the meter you want to add to the Reading Form, in the node tree in the left side of the screen. Select the meter and press 'Add' to add it to the Reading Form.



Remove a meter from the Reading Form

Select the meter in the meters list in the right side of the screen and press 'Remove'.

Change the order of the meters in a Reading Form

Select the meter you wish to move in the right side of the screen, and then press …

'**Move to top**' to make this the first meter in the list.

'**Move up**' to switch it with the meter immediately above.

'**Move down**' to switch it with the meter immediately below.

'**Move to bottom**' to make this the last meter in the list.

When the Reading Form is used with the PDA, the order of the meters is less important, as the selection of the meter is usually done by scanning a barcode attached to the meter.

4.12 Importing data

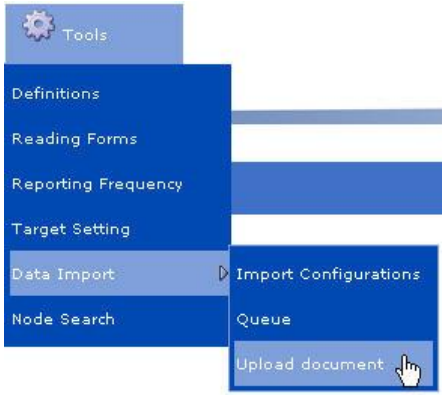
Montage also has the ability to import data that has been saved into files such as CSV and TXT files, Microsoft® Excel spreadsheets or MS Access database files.

To use this option manually, there needs to be an import configuration. Please refer to section 5.7.1 for further information on managing import configurations.

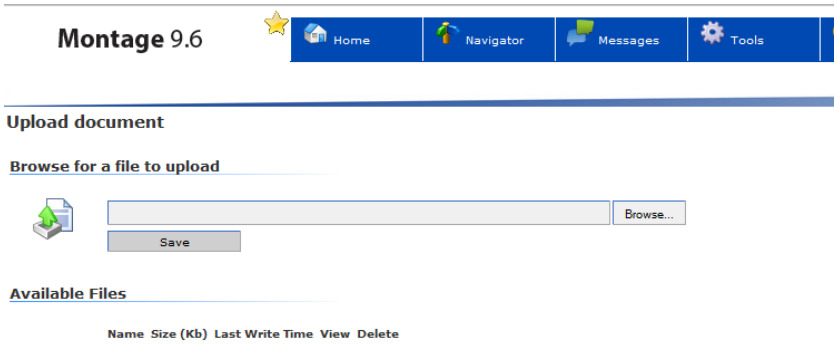
Before you can run an import configuration to import file data, the source file must be uploaded to the Montage web server. This may already have been done by an external system, or you may have to add the file yourself.

4.12.1 Uploading an import file

Select 'Tools', 'Data Import' and 'Upload document' from the menu.



The screen will show a list of the files which are available on the server for import. In many cases there will be none, because it is common to automatically archive the files after they have been imported.



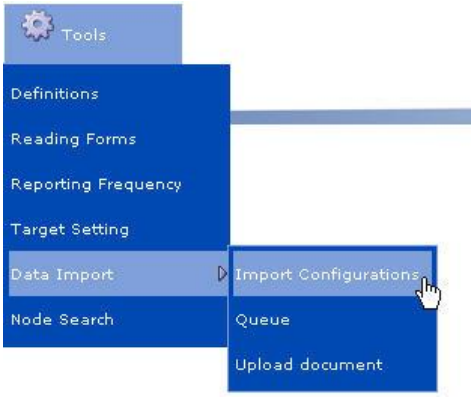
Select 'Browse' to select the file you want to upload from your PC and then press 'Save'.

Now that the file of meter readings is stored on the web server the data can be imported.

This is done by running an import configuration, which tells Montage which file(s) to import and how the data is formatted. Different import configurations can be set up to import different types of files, or to specify where the data is formatted differently within the files.

4.12.2 To import a data file manually

Select 'Tools', 'Data Import' and 'Import configurations' from the menu.



In the left-hand side of the screen you will see a list of the imports that have previously been configured to run.

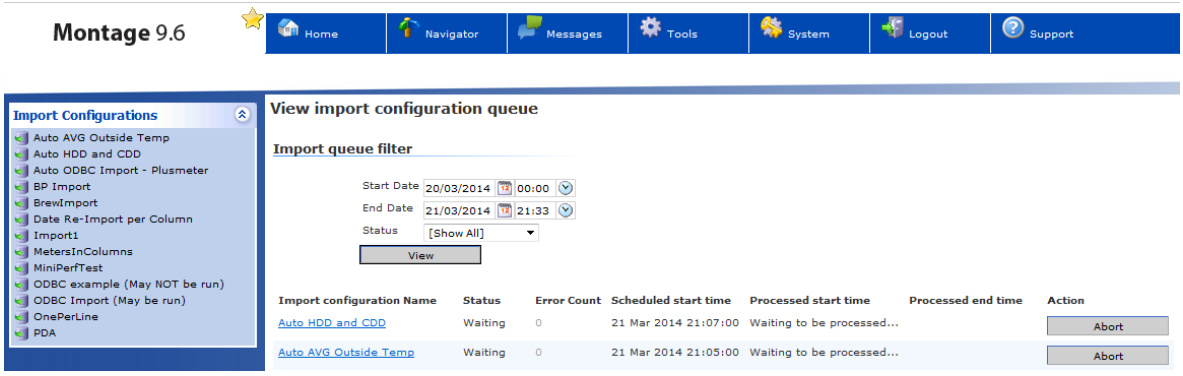
Select the Import Configuration that matches your data file from the list. You will find information about this import as a Summary.

Select the 'Run' option from the menu to import the file. This will place the import job in the queue of imports and display the following message:

Data imports can also be run automatically on a scheduled basis, assuming that files are copied to the upload folder by other means such as a SCADA system. In automatic mode, Montage can also import data from ODBC (Microsoft® Open Database Connectivity) databases. This is described in section 5.7.1.1.

4.12.3 The Import queue

You can access the Import queue from the menu, or click queue in the message you get after running an import configuration.



The Import Queue screen shows some useful information relating to the status of the import. Any errors that are found during the import process are counted and can be accessed easily for review. It is also useful to identify the start and end time of the import to review how long this import takes to complete, whilst also having the ability to 'Abort' the import at any time should the Error Count be rising higher than expected, or if it appears the import is not processing for whatever reason.

More information on importing data is available in section 5.7.

If you have been through this manual in chronological order, and have successfully followed the steps in your own version of Montage, the chances are you are now in a position to explore some of the basic features in more detail.

Descriptions of the more advanced features of Montage follow in the next chapter.

5 USING ADVANCED FUNCTIONS

This Chapter is intended for the user that has a basic understanding of the workings of Montage's standard functions, or is intended to be one of the 'Super-user's' or 'Administrators' for the system.

This section will focus extensively on describing the workings of the new approach to Reporting that comes with Montage 9. Specifically this Chapter will explain how to create report modules for use in Homepages, Navigator reports and available to view as part of the Dashboard.

Descriptions will also be given for the purposes of established equations that will provide the data displayed within these reports and the functions available to enable the user to display a report in the format required.

As well as focusing on reports, this Chapter will also describe the purpose for establishing baselines/targets using Montage's targeting tool, before concluding by detailing further the more advanced approaches to importing data.

This section starts with one of the core fundamentals of the system, the ability to create and use reports.

5.1 Report template and Report Parameters

One of the key design principles of Montage 9 has been to allow the user as much flexibility to configure Montage as possible, whilst ensuring ease-of-use isn't compromised.

Previous versions of the software have introduced flexibility to create Homepages and Report Modules, whilst having a predefined list of Report Templates and Navigator Reports from which the user can select.

The downside of this approach has proven to be that many of the reports when viewed from the Navigator appear to be incomplete. Although these are not software errors, they can appear so to the occasional user when they see blank columns in a text report or a series of dashes when they expected to see calculated values.

In Montage 9, we have focused extensively on providing flexibility to the user in order to control i) what they see, ii) how they see it, and iii) when they receive it.

The new approach to reporting provides clear examples of how increased flexibility has been introduced into the software. This has all been done using ONE underlying report template.

5.1.1 The Report template

All reports available in Montage 9 are based on one template. This template selects data based on a selection of ***Nodes***, the filtering of ***Utilities***, Settings of ***Date Range*** and creation of ***Equations***.

The selections of each of these four properties are explained below.

An additional setting called ***Grouping*** is available to specify how charts are grouped in Sections and Sub-sections to allow for multiple selections of each of the four properties. Since each chart can only display two sets of variables (X/Y axis on charts or rows/columns in text reports), that leads to 6 different charts which will automatically

be organized in sections and sub-sections depending of the Grouping setting which also offers the option to swap X<->Y axis on charts (Rows<->Columns in text reports).

Examples of the various combinations of reporting is shown in the table below, and explained in more detail later in this Chapter.

Charts / text report		Sections and Sub-sections
Equations by Period	Equation1 Equation2 Period1 value value Period2 value value or Period1 Period2 Equation1 value value Equation2 value value	Node and Utility
Equations by Node	Equation1 Equation2 Node1 value value Node2 value value or Node1 Node2 Equation1 value value Equation2 value value	Period and Utility
Equations by Utility	Equation1 Equation2 Utility1 value value Utility2 value value or Utility1 Utility2 Equation1 value value Equation2 value value	Node and Period
Nodes by Period	Node1 Node2 Period1 value value Period2 value value or Period1 Period2 Node1 value value Node2 value value	Equation and Utility
Nodes by Utility	Node1 Node2 Utility1 value value Utility2 value value or Utility1 Utility2 Node1 value value Node2 value value	Equation and Period
Utilities by Period	Utility1 Utility2 Period1 value value Period2 value value or Period1 Period2 Utility1 value value Utility2 value value	Equation and Node

In many cases there will only be one section of the report. This is when only one selection has been made in two of the properties; for instance only one Node and one Utility, one Node and Date Range totals or any other combination of two properties. This is explained in more detail in section 5.1.2.7 where the Grouping settings are described.

When used in Navigator Reports, the Node selected in the Navigator is automatically used in the Nodes list and the NodeField selected in the Options may be referred to by selecting ‘Self’ instead of an explicit NodeField in the equations.

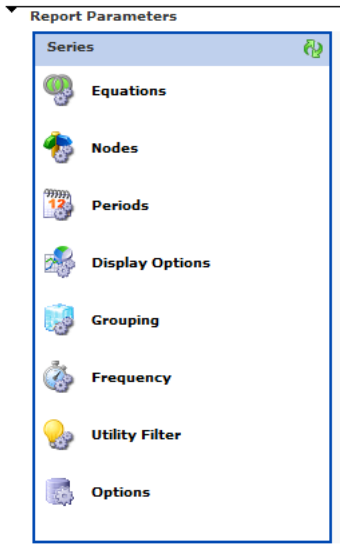
5.1.2 The Report Parameters

This section describes in detail the various ways that the report parameters can be used to ensure the right data is displayed and presented in the report, as well for Homepages as for Navigator Reports.

This version of Montage has more options for the user to select than previous versions of the software. These allow for greater flexibility in the amount of data that can be selected, how they are displayed, sorted and if required exported to other applications.

There are nine options to select, two of which (Periods and Display Options) have briefly been introduced in an earlier Chapter, but are included here with further description.

The ‘Report Parameters’ section of all reports are presented and described in turn below.



5.1.2.1 Equations

 **Equations**

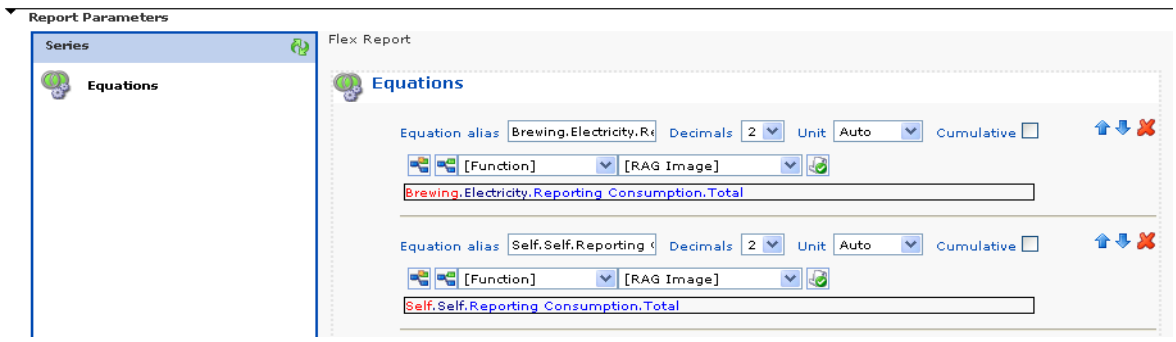
Each data item in a report is defined as an Equation. Typically, Equations simply select the required NodeField, but it may also combine Nodes together with mathematical operations.

Most Equations refer to NodeFields, and their references need to include a selection of a Node (displayed in Red in the Equation Editor), a Utility (**Black**) and a selection of the NodeField (Blue).

When creating equations, the Nodes, Utility types and NodeFields can either be explicit, in that they relate to a specific node (Packaging), a specific Utility type (Electricity) and a specific NodeField (Cost). In this example, the report would return the electricity cost for the packaging node. However, given the flexibility of the reporting template in Montage 9, the user can also opt to keep the equation as generic as possible, and therefore present in the report any calculated values irrespective of the Node, Utility or NodeField. In such instances, the user would make use of the 'Self' function, which is explained further in section **Error! Reference source not found.**

The example below shows as well an equation using explicit reference to Node.Utility.NodeField as an equation which refers to the Nodes list (Self) and the Utilities filter (Self). When these references are used for Nodes and/or Utilities the equation is executed for all combinations of Nodes and Utilities.

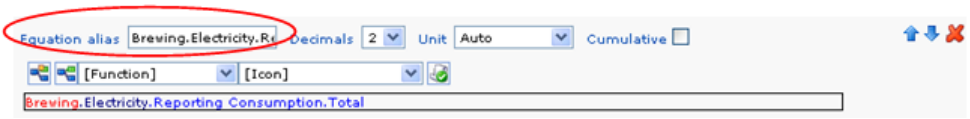
***Note**: For instance, if you use only one equation (the second in the example) referring to Nodes and Utilities in the list, you will be able to make a report of each instance and all the Energy Account Centres for all the utilities which are in use … with only this one Equation.*



You may combine explicit Equations with Equations referring to 'Self' in place of Nodes and/or utilities. When combined in this way, the explicit equations are repeated for each of the Nodes and/or Utilities in the lists so that values like production volume or degree days are displayed with each of the referenced Nodes.

After creating or editing the equation the user must press to validate the equation and apply the change to the report.

The Equation alias is the text used for the Legend in reports. If no text is entered when creating the equation, the whole equation is inserted automatically, as shown in the example below.

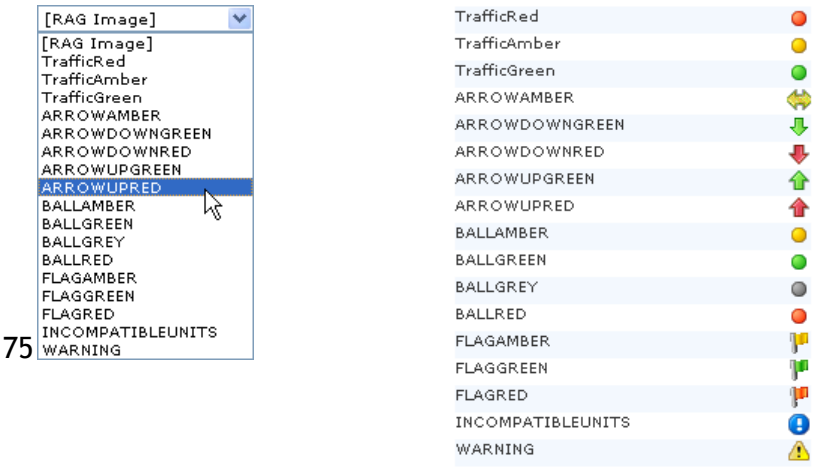


For each equation you have the following options:

- You may specify how many **Decimals** you want to display.
- You may choose any **Unit** from the drop-down list, or you may let Montage decide the unit based on the fields that form the equation.
- If you check the **Cumulative** box, the numbers for each period will be added to the sum of all previous periods.
- You may **delete** the equation by clicking .
- You may **move** the equation up or down in the list of equations by pressing or .

You will find a thorough explanation of the Equation Editor in section6.5.

There is however a special feature, only available for reports, which helps you make use of the icons to draw attention on certain fields in text reports.

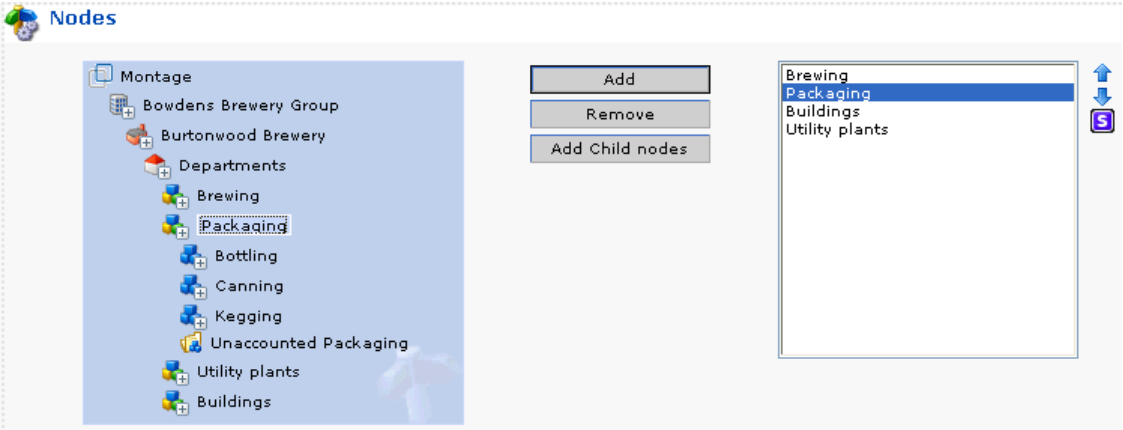


These icons are most often used along with an ‘’if’ statement, for instance as shown below.

In the instance where the reporting consumption for the chosen utility exceeds the target, the report would show the icon, whereas if the consumption was less than target the report would display the icon.

5.1.2.2 Nodes

When ‘Self’ is used in place of an explicit Node in the Equation, the equation will be evaluated for each Node in the list. Alternatively, on occasions the equation may be specific to a given Node(s) and therefore the user is required to identify which of the Nodes by selecting them from the Node tree.



The user can …

- **Add** any selected Node one by one.
- **Add all Child Nodes** to the selected Node in one operation.
- **Remove** individual Nodes from the list.
- **Insert** the list of Nodes that has been found from the Search feature (see section 4.6).
  Note! *This button only appears if a search has been performed and the search results saved to the list*

- **Sort the list manually** by moving the nodes up or down. The Nodes will appear on Reports in the order they are listed.
- **Sort the list alphabetically**.

***Note**: There is no limit to the number of Nodes that can be included in one report module. However it will be important to make use of the Grouping function if the list is extensive to ensure the report when viewed is meaningful and formatted in an appropriate way.*

5.1.2.3 Periods

Periods

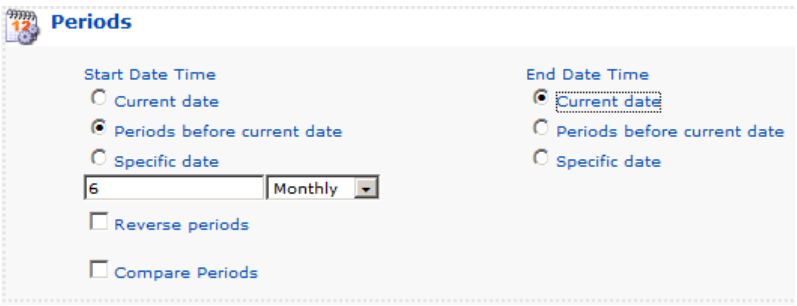
There are various options to define the date range for the report, either to be fixed dates or referring to current date.

Most reports cover one date range, but you also have the option to compare two date ranges, for instance the latest three months to the previous three months, or to the same three months previous year.

It is important to remember that Montage always refers to Date and Time. Montage is quite exact in the interpretation of the time – a day ends at the following day at 00:00 – not at the day itself at 23:59!

Reporting from one Date Range.

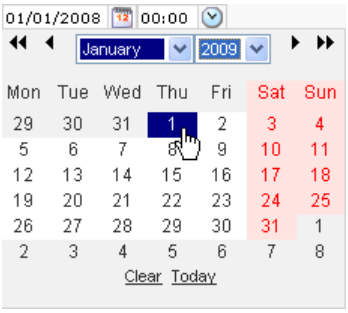
Selecting either 'Current date' or 'Periods before current date' allows you to specify a dynamic date range to always display current date. In the example below, the selections would include all the data for the last 6 months from the current date – although either the numeric value or the frequency can be changed by the user to suit the purpose.

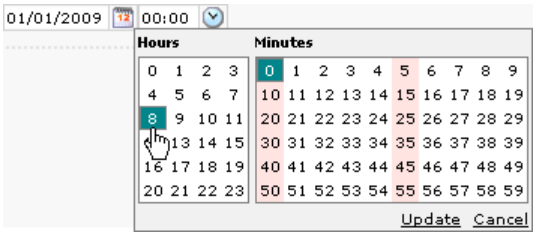


The options are defined as follows;

- **"Current date"** means the time and date when the module is to be displayed, or more accurate; it is the start time of the current period of the selected Frequency. If for example the Frequency is set to Daily it means the start of the day, or if the Frequency is set to Monthly it means the start of the Month. Please refer to section 5.1.2.8 regarding setting the frequency).

- **"Periods before current date"** means at the beginning of the specified number of the selected frequency before the date when the module is to be displayed. You can for example use 0 Years before current date to specify this year from 01 January in order to make a Year- To-Date report.
  You may also use a negative number of **"Periods before current date"** as End Date Time if you want the report to include future periods, use for instance -1 Year to make a report for the whole of current year.
- When you select **"Specific date"** you can type in the date or you can select the date and time from the calendar modules by clicking the calendar or the clock respectively.





When reports are used within the Navigator, the Period settings are automatically selected and edited from the Options panel.

Displaying the report in reverse chronological order

By checking the "Reverse Periods" box the report will be sorted in reverse chronological order with the latest values first.

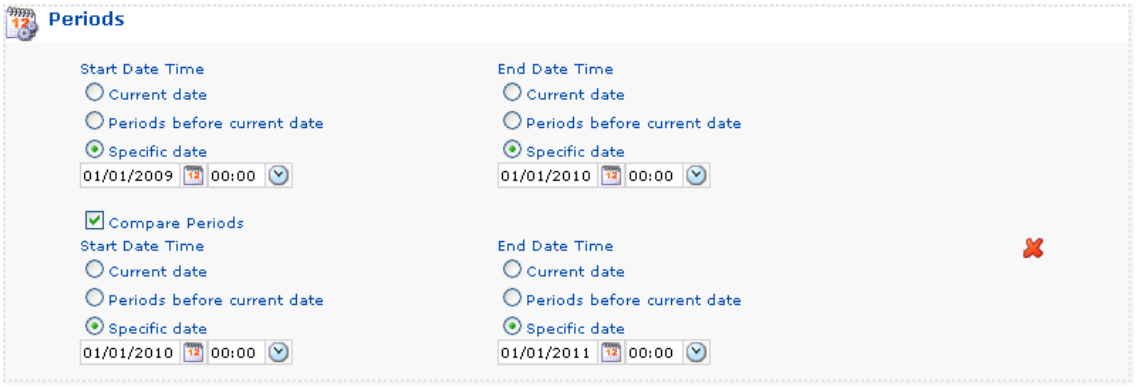
Comparing periods

When you check the **"Compare Periods"** box you get a second set of Date settings. Data from these two sets of periods are used in the same report and allows you to compare recent data against historical data.

Note: *The two sets of periods do not have to be the same size.*

For instance; when improvements have been made to the site, you are able to compare data from before and after the improvement and therefore document the savings achieved.

The example below when viewed as a Line graph, would display two lines, one for the period 01-01-2009 to 01-01-2010, and the second Line would show 01-01-2010 to 01-01-2011.



You can remove the second set of periods by clicking the in the right hand side of the screen.

5.1.2.4 Display Options

Display Options

Montage supports the presentation of data in many different ways. By selecting 'Display Options' from the Report Parameters menu, the user can experiment with viewing the output data in many different forms.. All the available Report Types are presented and described below:

Text

The text report is a table with columns of the data generated by the equations.

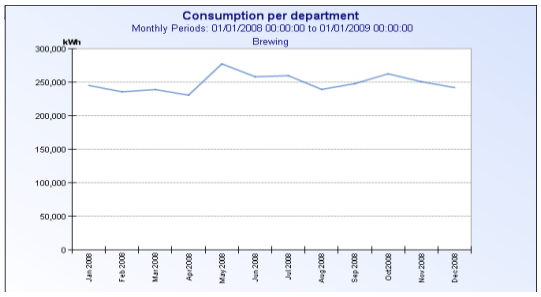
The units are default given by the units of the data in the equation or if that is not possible, there will be no units. It is however also possible to specify which unit to use, when the equation is defined.

By default all numbers are displayed using 2 decimals. This can be adjusted when the equation is defined.

Jan 2008	245,305.75 kWh
Feb 2008	235,685.73 kWh
Mar 2008	239,063.27 kWh
Apr 2008	230,793.33 kWh
May 2008	277,377.43 kWh
Jun 2008	258,228.40 kWh
Jul 2008	259,845.98 kWh
Aug 2008	239,352.48 kWh
Sep 2008	247,960.50 kWh
Oct 2008	262,585.14 kWh
Nov 2008	250,827.20 kWh
Dec 2008	241,933.98 kWh
Totals	2,988,959.19 kWh

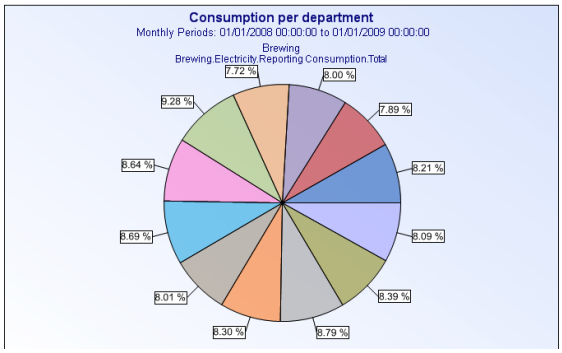
Line, Bar …

The Line and Bar chart displays the numbers lines, bars, stacked bars or combinations of these. The lines and bars can be scaled against one or two axis.



Pie

The Pie chart is useful to compare departments or cost share of utilities.

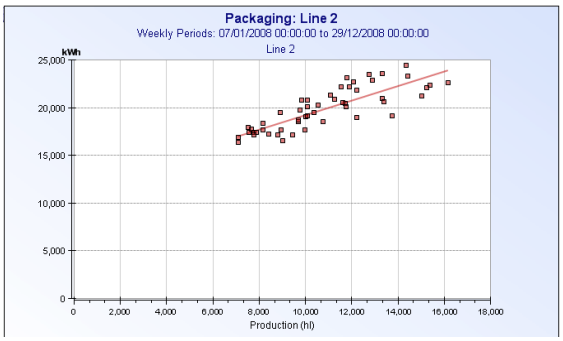


X-Y scatter

The X-Y scatter graph is often used to show the Consumption compared to Baseline or Target, against a variable such as the production volume or degree days.

The numbers are displayed as dots and the chart can also calculate …

- A "line of best fit" for the numbers displayed – useful if you are looking at consumption against production volume.
- A hyperbola of best fit – useful if you are looking at KPIs (ratios) against production volume.



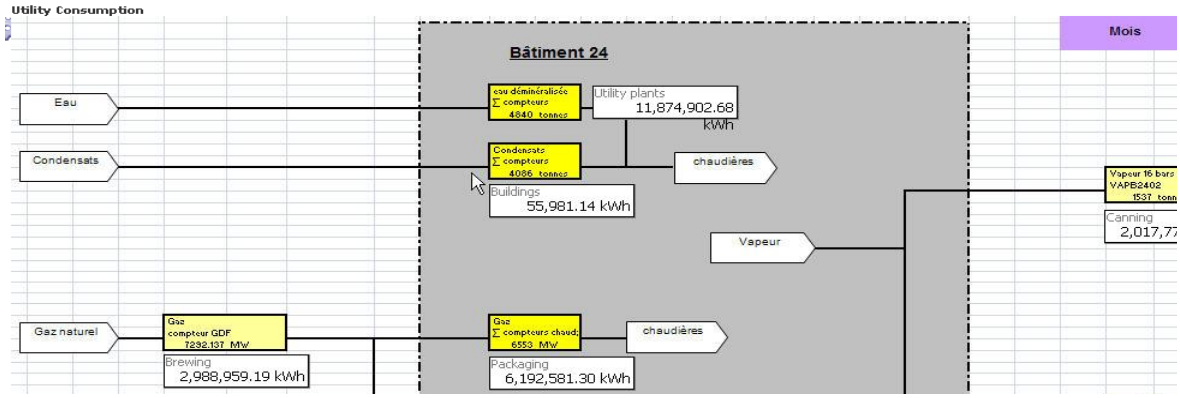
You may set a tolerance band e.g. +/- 15% above and below the regression line of these numbers so it is easier to see if any period's consumption falls outside the tolerance.

If you click a dot on the graph, you will see the details of the dot such as the period, the exact value of the Variable and of the Consumption.

Graphics

The graphics chart displays numbers overlaid on a graphics file, a diagram or a picture. Each number is displayed in a box; 120 pixels wide and 30 pixels high.

The use of such reports is to display the use of utilities in different geographical areas or to follow the distribution of a utility through the utility map of the site.



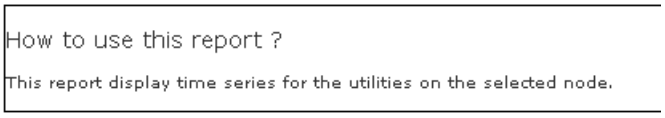
Memo

The Memo report lists the notes created to the nodes in the report within the date range. You may choose to see only notes created explicitly for this node or to also include notes from all child nodes (in all levels) to the nodes in the report.

Utility	Comment
) Electricity	Electricity tariff on fixed contract until 31/12/2008.
) Production	Reduced levels of production during this period due to periods of maintenance on
) Production	View attachment for Maintenance record 01/02/2008 - 01/05/2008
) Electricity	KOP table updated with corrective actions
[no specific utility]	Temporary meter readers recruited to cover Crafters holidays.

Module comment

The Module comment provides the option to enter a short description of the report. It may be used as many times as required on the same homepage and can be used to explain as well individual modules as the homepage in general.



***Note**: You cannot use this report type as the only module on the report It must be accompanied by at least one other report.*

Readings Report

Allows individual or a group of meters to be listed in the same report, and using the equation feature the user can specify which meter data to be displayed in the report. This is a useful report when identifying meter reading errors or meters that have not been read within a specified period.

Reading

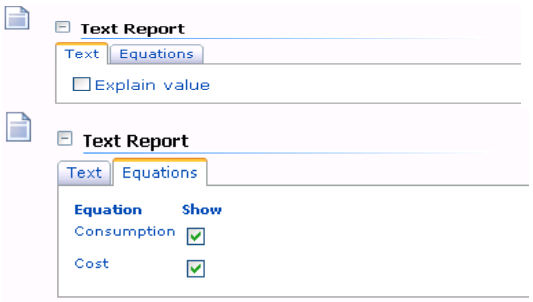
	Jan 2012	Feb 2012	Mar 2012	Apr 2012
Discharge	20,628.00	22,594.50	16,726.50	24,507.00
Imported Electricity	684,753.00	747,979.00	585,691.00	786,307.00
N2	1,795.60	2,485.80	1,366.10	2,812.20
Natural Gas	174,844.00	202,291.00	188,486.00	211,094.00
Purchased CO2	10,321.36	8,462.95	9,080.81	19,184.88
Total Water	22,920.00	25,105.00	18,585.00	27,230.00
Well Water	22,495.00	24,695.00	17,895.00	26,705.00

5.1.2.5 General Display options

The chart settings for Line, Bar and Stacked Bar are the same, the only difference is the default display type. Regardless which report type is selected, it will be possible to set any of the series to be displayed as either Line, Bar or Stacked Bar. There can be only one Stacked Bar in each chart.

The table below shows the basic settings for all the report types.

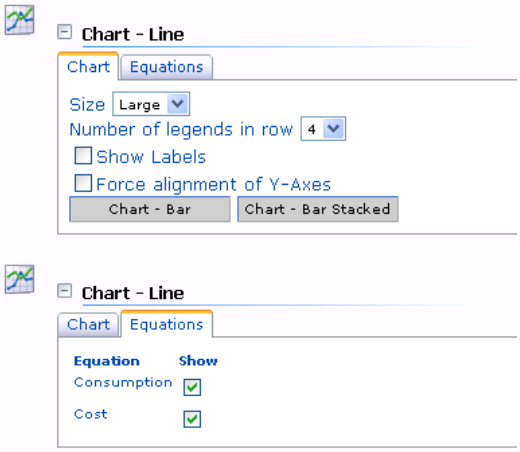
Text Report Settings



If **"Explain value"** is checked the numbers for each period in the text report becomes a link to an explanation of which sources and calculations have made up this number.

It is possible for each of the Equations to either be included or excluded from the report when displayed.

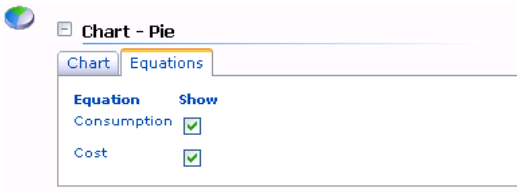
Chart (various) Settings



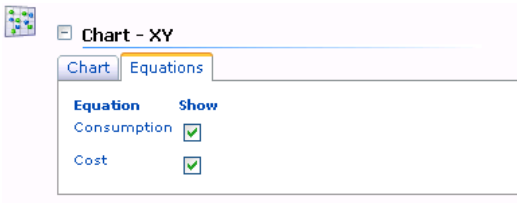
It is optional to choose a **Large** or a **Small** sized chart. The small sized chart will enable you to see two charts next to each other on a typical screen size.

The **"Number of legends'** can be used to provide better space for displaying long legend names by reducing the number.

"**Show labels**" will display number labels with each data point on the chart.

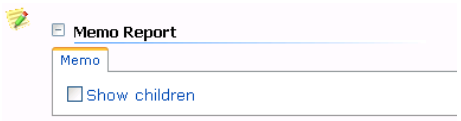


"**Force alignment of Y-axis**" will force the primary and secondary Y-axis to align the zero, also if the axes go negative.

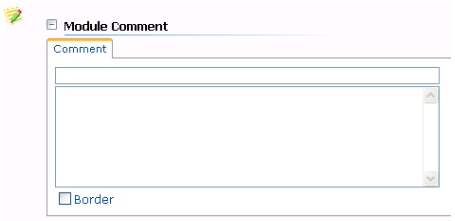


It is possible to **Show** for each of the Equations whether they are to be included or excluded from the graph when displayed.

Memo Report Settings



The Memo Report displays all Memos added to the Nodes in the report. By checking the box '**Show Children**' you will include Memos for all Nodes that are child nodes to one of the nodes in the report.



The Module comment may be used multiple times in the same report and be placed freely among chart modules so that the Module may use detailed descriptions of each Report type.

Note: *It is also possible to add a border around the Comment if required.*

5.1.2.6 In-Report Settings

When viewing the report or graph in the Report Viewer, to the left hand side of each report /chart you will find an icon which is used to open the settings of this particular chart.

It offers a number of settings such as for instance 'only display some of the data' in this chart and also to 'sort and/or filter' the data to create a league table (or chart).

***Note!** The options in these settings will differ depending of the settings in Grouping and they will be reset to default when Grouping is modified.*

The various 'In-Report Settings' are described and presented below:

In-Report settings: Text Report

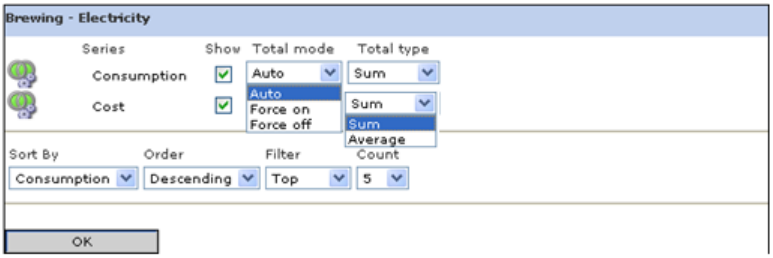
Shows that the report contains two **Series** (Consumption and Cost).

The user can specify whether they want to display both series in the report by checking the '**Show**' box.

The user can specify whether the data column should be totalled or not by selecting from the '**Total mode**' option list.

The user can specify whether the total should be displayed as the sum of the values or the average by selecting from the '**Total type**' list.

The user has options to **Sort** the columns in descending or ascending order, as well as adding a **Filter** to just show the top (or bottom) values. This is useful when producing league table or Pareto analysis reports.

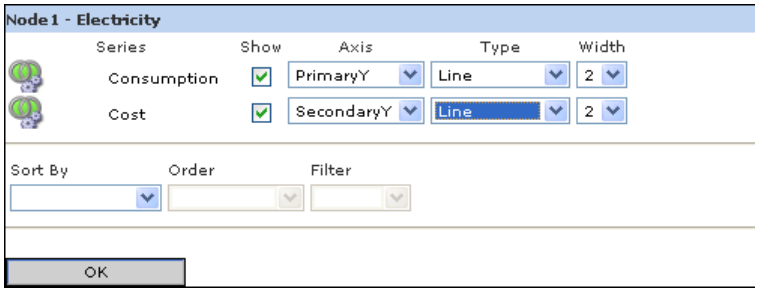


In-Report Settings: Line / Bar Report

With graphical reports, the user can specify which **Axis** is to be used to display which data series. A secondary Y axis option is also available and useful when graphing say consumption of multiple utilities, which typically will not share the same units. It could be therefore that kWh are graphed on the primary Y axis (displayed on the left hand side of the graph) with m3 graphed on the secondary Y axis (displayed on the right hand axis)

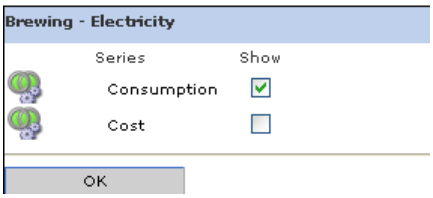
The **Type** of report could be either a Line, Bar or Stacked Bar

The **Width** of the line can be changed so that certain data series appear more (or less) prominently on the graph.



In-Report Settings: Pie Chart

The user can specify whether they want to display both series in the report by checking the '**Show**' box.



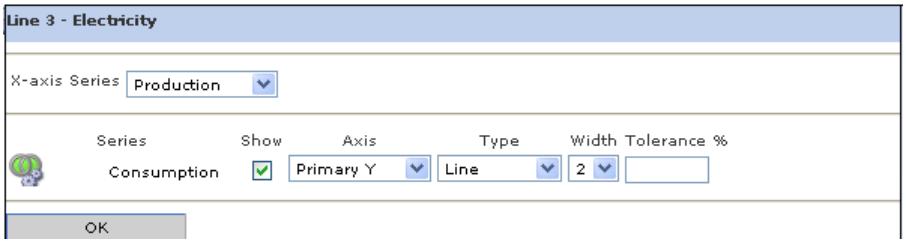
In-Report Settings: XY Scatter

The user can specify which of the data series will be displayed on the **X-axis**

Also, the **Type** of line that is most appropriate for the data set (Line or Hyperbola)

The **Width** of the line can be changed so that certain data series appear more (or less) prominently on the graph.

Also, the user can enter a numeric value to indicate the **Tolerance %**. For example, entering the number 5, will add two lines to the graph, 5% above and 5% below the line of best fit (straight line running through the points).



5.1.2.7 Grouping

 **Grouping**

Grouping offers total flexibility to the user on how the data series are displayed in the report. The relevance of Grouping the data varies depending on the Report Type selected.

There are two sections to Grouping, the first determines how the data series is to be displayed e.g. as rows or columns in a text report, or as separate Pie's in a Pie Chart.

The second section determines whether the data series will be displayed as one number e.g. the sum of all the numbers, or individually.

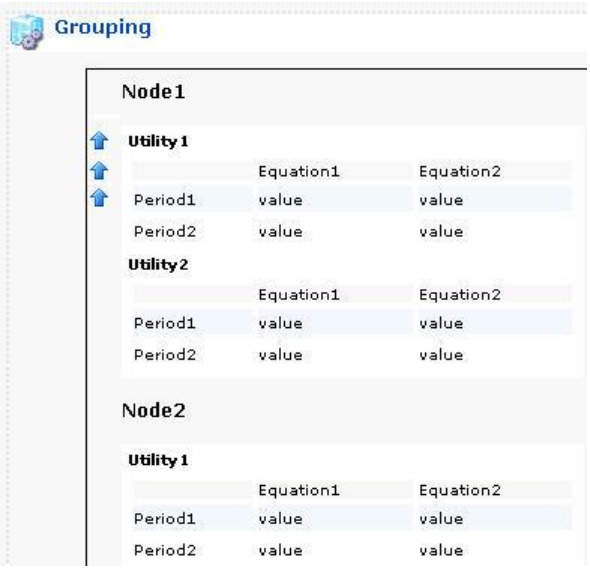
The best way to demonstrate how Groupings can impact your reports is to provide some examples. These examples are shown using the Text Report type, as not only is it easier to compare the configuration template to the output, but generally Text reports are

easier than Graphs to determine first the outcome the user is trying to achieve, before proceeding to select the Report Type that best suits the required impact.

Montage provides a Grouping Configuration Modeller that enables the user to simulate how they want the data to be displayed in the report. This Modeller displays the chosen Nodes, Utilities, Periods, Equations and Values in a combination of rows and columns to show a table (see the screenshot in Example 1 of the Modeller).

Example 1 (below), on the left hand side shows the default settings for the Groupings, the right hand side showing how the report looks with real data from Montage. The example shows **Node 1 (Brewing)** as the header, with **Utility 1 (Electricity)** as the section heading, with **Equation 1 (Consumption** as defined in the Equation Editor) and finally **Period 1 (Jan 2008** as defined as the first month in the Period setting)

Example #1: Grouping configuration template



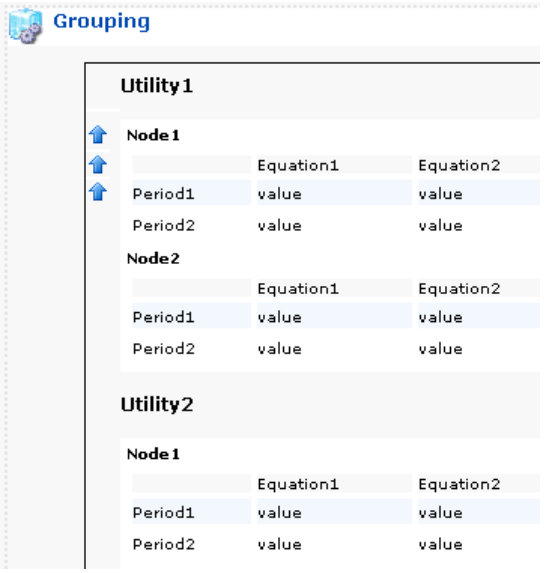
Example incorporating data from Montage

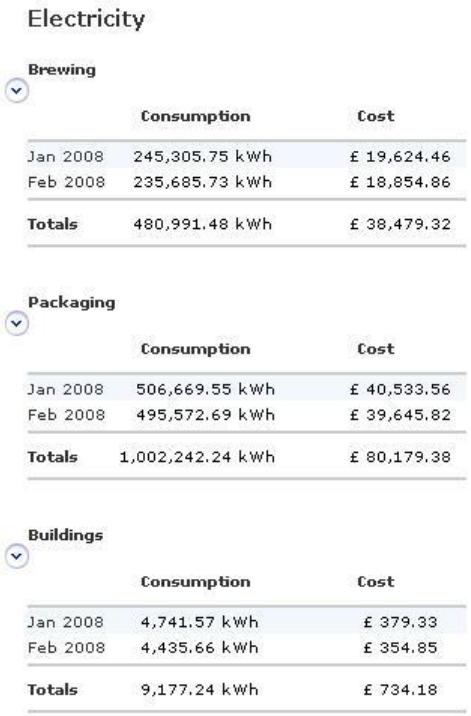
The settings to determine the behaviour of whether the columns/rows show totals are as follows:

The user can change the format of these Groupings by selecting the arrow located in the Modeller.

For example, clicking the to the left of **Utility 1** once would change the configuration by moving Utility 1 up one level, therefore replacing Node 1 as the header. The report would then be split into sections, with each Utility showing the Departments as its Children. The outcome is shown in **Example 2 (below)**.

Example #2: Moving 'Utility 1' one row up (which automatically switches replaces with Node 1)

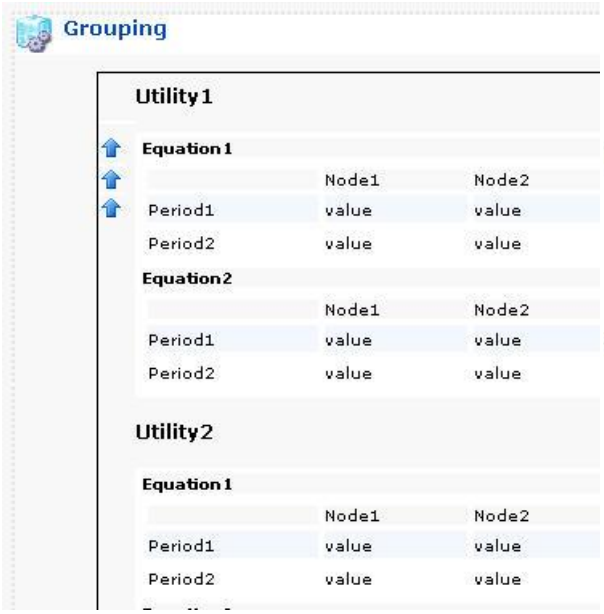




The settings to determine the behaviour of whether the columns/rows show totals are as Example 1:

Continuing with the same concept for **Example 3**, clicking the ⬆ to the left of Equation 1 would once again change the configuration by Equation 1 and Node 1 swapping places, resulting in the report now showing Node 1 being the columns of the report. ……..being split by Utility (Electricity) first, then by Department (a section for each of Brewing, Packaging etc) , with the Periods 1 and 2 remaining unchanged as with the two equations (representing Consumption and Cost) also unchanged.

Example #3: Moving Node 1 one row below (which makes each Node a separate column)

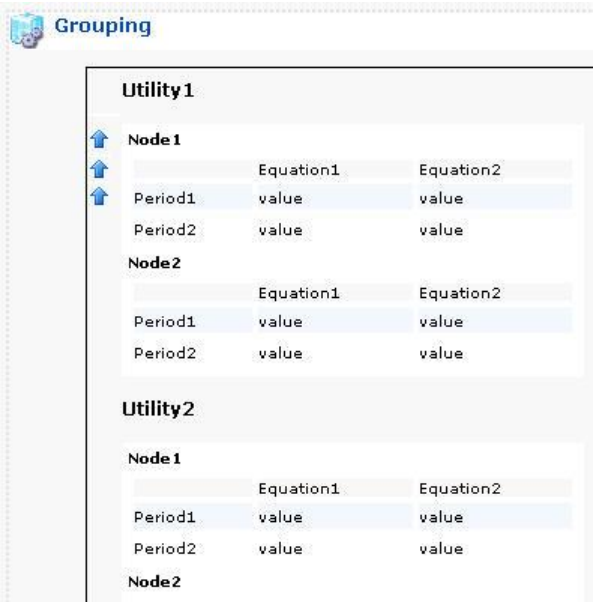


The settings to determine the behaviour of whether the columns/rows show totals remain as in Examples 1 and 2:

Finally, **Example 4** (below) keeps the positioning of the data in the Modeller the same is in Example 3, but makes a change to the 'Summing' options.

Simply by selecting the '**Nodes Total**' radio button, this results in summing all the Nodes together and displays it as one column, rather than in Example 3 when each Node (in this case Departments) where displayed each to their own column.

Example #4: Totally the Nodes sums all the separate Nodes and displays the results in one column)



There are many possibilities for Grouping data within reports, as each Node, Utility, Equation and Period can become either a row or a column. The above examples aim to provide an understanding of the concept of how the Grouping Configuration Modeller works and the impact it has on the output.

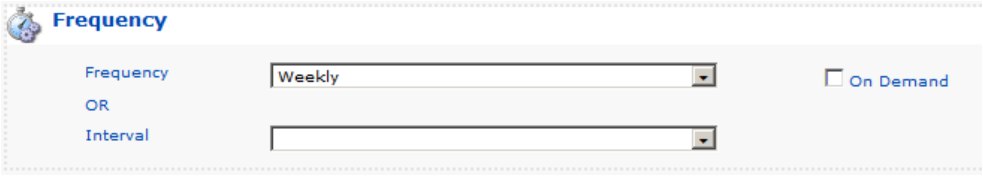
Our trials have shown that the best way to get familiar with this aspect of reporting is simply to play with the tool using your own data (so the labels show your node names, utilities names etc). This will make the process easier to visualise and within a short period of time you will become comfortable working within the tool.

***Tip!** Using the Text Report Type as the first report in the list makes it easier to get familiar with the tool, as the completed report looks comparable with that displayed in the Modeller. It is harder to follow if the Report Type is for example a Pie Chart as it shows no resemblance to what the Modeller is displaying.*

5.1.2.8 Selecting a Frequency

The Frequency is the size of the period(s), or you could think of it as the resolution over time, for time series of data, like lines in a text report, or in other words the intervals the reporting Period (See section 5.1.2.3) is split into.

The available pre-defined Frequencies in the system are available to the user in a drop-down list, or you may choose an interval from the drop-down list below.



The Frequency selections are used for longer intervals such as days, weeks, months etc. while the Interval selections are used for shorter intervals, also called high frequency reporting.

- Frequency reports are reporting on the pre-calculated data and will respond faster for longer periods of time especially for values which are calculations from many sources.
  Note: If you have sufficient privileges you will have the option to force the Frequency data to be calculated from the data source (On Demand), like Interval reports. This will be useful in situations where the pre-calculated data isn't ready.
- An interval report is calculating the data to report directly from the meter readings and is able to produce reports of intervals as short as one minute. Making reports of intervals significantly shorter than the readings interval will however be pointless.

Reporting by Frequency

By selecting a specific Frequency (e.g. Weekly), the values displayed in a report will be the total Consumption (Cost or other value) for the completed week's between the date range specified in the 'Periods' section of the report parameters.

The example below shows a time-series 'Text' report displaying Electricity Consumption and Cost data. The frequency selected in this case is 'Weekly', as each row of the report relates to a complete weeks' worth of consumption and cost.

Electricity

Brewing

	Consumption	Cost
Week 23 2009	75,013.51 kWh	£ 6,001.08
Week 24 2009	53,536.74 kWh	£ 4,282.94
Week 25 2009	56,187.45 kWh	£ 4,495.00
Week 26 2009	68,794.33 kWh	£ 5,503.55
Week 27 2009	59,653.98 kWh	£ 4,772.32
Week 28 2009	47,875.71 kWh	£ 3,830.06
Week 29 2009	52,400.93 kWh	£ 4,192.07
Week 30 2009	62,664.37 kWh	£ 5,013.15
Totals	476,127.02 kWh	£ 38,090.16

An example using the same date and time period but using the 'Monthly' frequency, would display the report showing only two rows of data, one representing June and one July, as shown below:

Electricity

Brewing

	Consumption	Cost
Jun 2009	271,024.58 kWh	£ 21,681.97
Jul 2009	242,382.56 kWh	£ 19,390.60
Totals	513,407.14 kWh	£ 41,072.57

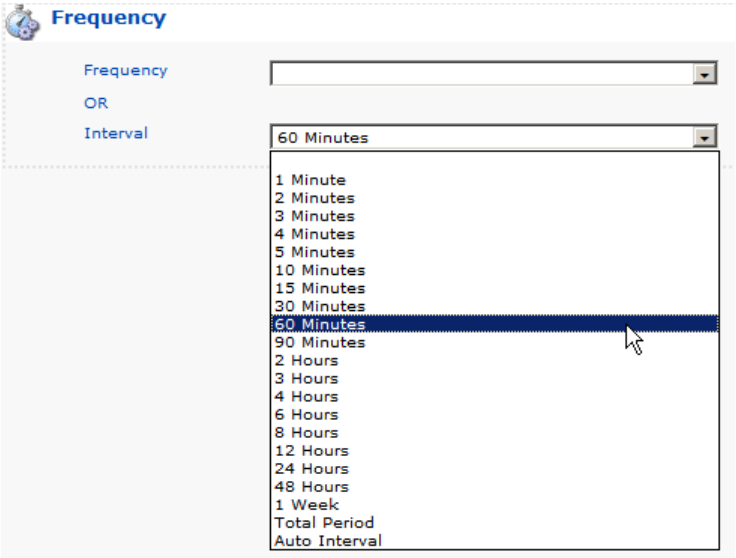
Note! *The total values for Consumption (513,407.14 kWh) and Cost (£ 41,072.57) in the Monthly example are different to those in the Weekly example. This is not an error, as the Monthly report only has two fully completed months (June and July) within the specified date range, whereas the Weekly report includes all weeks between the period, thus included more consumption and cost values.*

Custom frequencies can also be created to fit a specific period e.g. a 4-4-5 weekly reporting period is common in accounting practice, which would again provide a different result than a Montage report displaying Monthly frequencies for the same data range.

It is intentional that there is not a user interface allowing users to create their own frequencies (or amend existing ones) as making such changes has implications on all the calculations within the system. Therefore it should only be done by those who understand the implications and reasoning behind making such a change. To discuss whether this is something you need to do, contact support@montageum.com .

Reporting by Interval

When reporting by interval simply select the interval you wish to use.



In extreme cases the report may take a while to produce. Extreme cases are reports where you report from many meters in the same report, also if the meters are indirectly referenced because you report from an account centre, or if you report for a long period of time using short intervals.

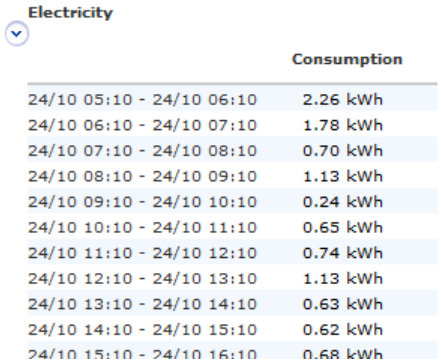
Note: How much data your Montage system is able to produce depend on the specification of the server(s) your system is installed on and a setting in the server configuration which sets limits to how many periods you are allowed to request data for, in order to produce an error message instead of having to wait for the server to time out if you happen to request too much data. As a general rule you should expect your system to be able to produce reports at intervals of 1 minute for about two weeks, similar to reports of hourly intervals of up to about two years.

At the bottom of the drop-down list you find two special options designed to help you choose.

- Auto Interval in the bottom of the list automatically selects a reasonably short interval to the Period you have selected to report on.
- Total Period displays the entire Period, often also referred to as Date Range, as one interval. This provides an option to produce reports of accurate consumption for any specific period of time.

If you request too short intervals to the Date Range you have selected you will

When reporting by interval the report will start at the specified Start Date Time and at the selected interval, as in the example below where which produce an interval report of 60 minutes starting 10 minutes past the hour.



Electricity

	Consumption
24/10 05:10 - 24/10 06:10	2.26 kWh
24/10 06:10 - 24/10 07:10	1.78 kWh
24/10 07:10 - 24/10 08:10	0.70 kWh
24/10 08:10 - 24/10 09:10	1.13 kWh
24/10 09:10 - 24/10 10:10	0.24 kWh
24/10 10:10 - 24/10 11:10	0.65 kWh
24/10 11:10 - 24/10 12:10	0.74 kWh
24/10 12:10 - 24/10 13:10	1.13 kWh
24/10 13:10 - 24/10 14:10	0.63 kWh
24/10 14:10 - 24/10 15:10	0.62 kWh
24/10 15:10 - 24/10 16:10	0.68 kWh

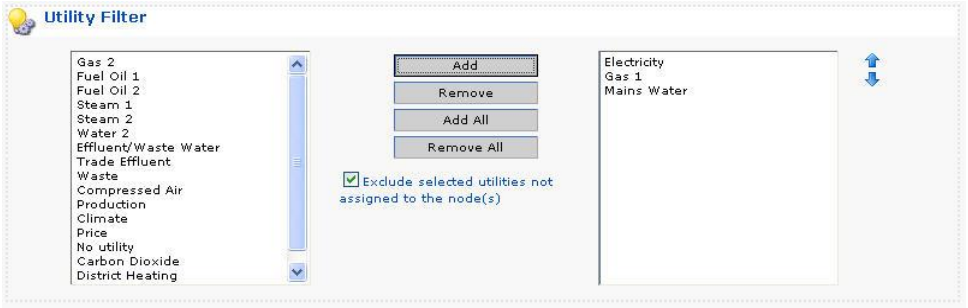
5.1.2.9 Utility filtering

Utility Filter

The purpose of the Utility Filter is to allow the user to specify which Utility Types to include in a report. Reports can either include all the utilities assigned to the node, or just the ones selected by the user.

In the example below, the report would be produced including all utilities that have been assigned to the Node(s) selected in the Node tree.

The user can select specific utilities and 'Add' them to the report. In instances whereby utilities have been included in a report yet the chosen Node(s) does not have that utility assigned, ticking the box entitled 'Exclude selected utilities not assigned to the node(s)' will remove them from the report. The example below would produce a report including only the utilities Electricity, Gas 1 and Mains Water.

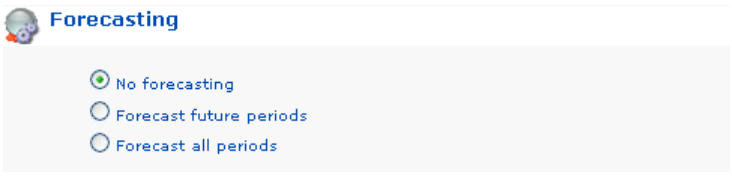


The ordering of these utilities in the report can be changed by using the ↑ and ↓ arrows.

5.1.2.10 Forecasting

Forecasting is a feature in Montage that calculates estimates of future periods or past periods without data. The forecast is calculated based on equations specified in the definition used on the Nodes. As default the forecast definition is to refer back 52 weeks to produce an estimate based on last year's value, possibly applying an annual increase or decrease. Forecast can however also be based on manually entered expectations for future production volumes or other means of estimation.

The options for calculation forecast are described on page 214. This only explains the setting for how to use forecasted values in the report.



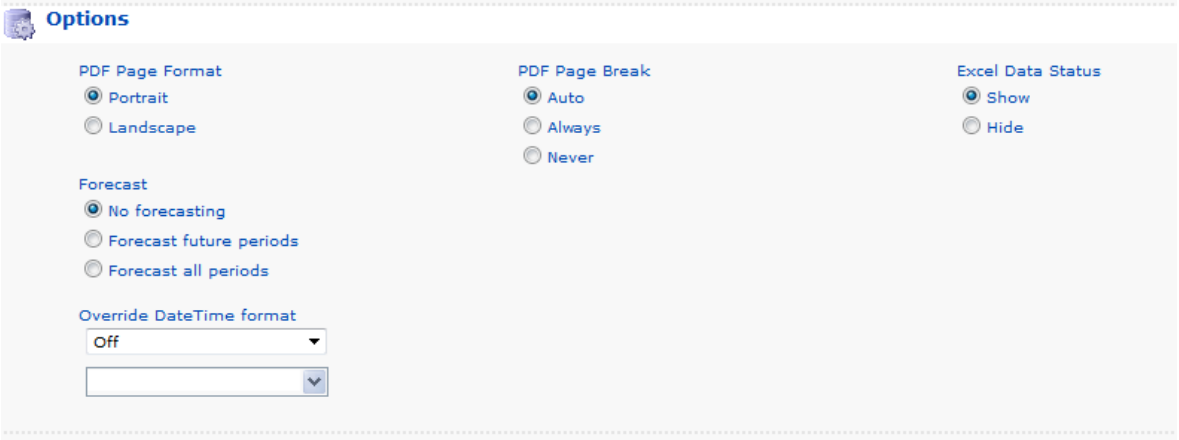
- No forecasting will make the report display only recorded past values. Operation as in Montage 8.3

- Forecast future periods will use the forecasted values for future periods only. Any past periods for which there could be numbers if the readings had been entered, will remain as dashes in text report and gaps in lines.
- Forecast all periods will use the forecasted value for any period that hasn't got a complete calculated value.

The use of forecasting is simply applied by setting the Date range in Periods to include future periods and is intended to e as recorded in the meter readings and the rest of the year is automatically estimated based on the definition.

5.1.2.11 Export Options

Montage now allows for a greater choice in how reports and data are exported out of Montage into third party tools. The options are selected using radio buttons and are as follows:



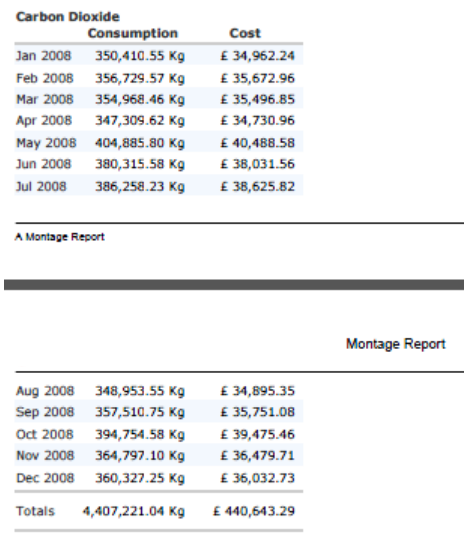
These options can be setup for each report module, and are defined as follows:

PDF Page Format

Portrait	Will display the report in Portrait size
Landscape	Will display the report in Landscape size

PDF Page Break

Auto	Adobe® Reader will determine the page breaks (which depending on the size of the report could result in splitting Text reports across two pages, as shown below)



Carbon Dioxide

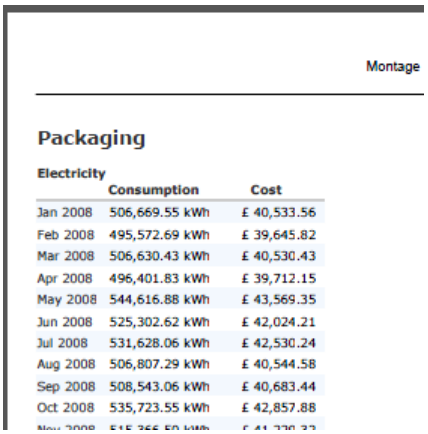
	Consumption	Cost
Jan 2008	350,410.55 Kg	£ 34,962.24
Feb 2008	356,729.57 Kg	£ 35,672.96
Mar 2008	354,968.46 Kg	£ 35,496.85
Apr 2008	347,309.62 Kg	£ 34,730.96
May 2008	404,885.80 Kg	£ 40,488.58
Jun 2008	380,315.58 Kg	£ 38,031.56
Jul 2008	386,258.23 Kg	£ 38,625.82

A Montage Report

Montage Report

Aug 2008	348,953.55 Kg	£ 34,895.35
Sep 2008	357,510.75 Kg	£ 35,751.08
Oct 2008	394,754.58 Kg	£ 39,475.46
Nov 2008	364,797.10 Kg	£ 36,479.71
Dec 2008	360,327.25 Kg	£ 36,032.73
Totals	4,407,221.04 Kg	£ 440,643.29

Always — Will always add a page break at the start of each new report section (e.g. each department will start on a new page)



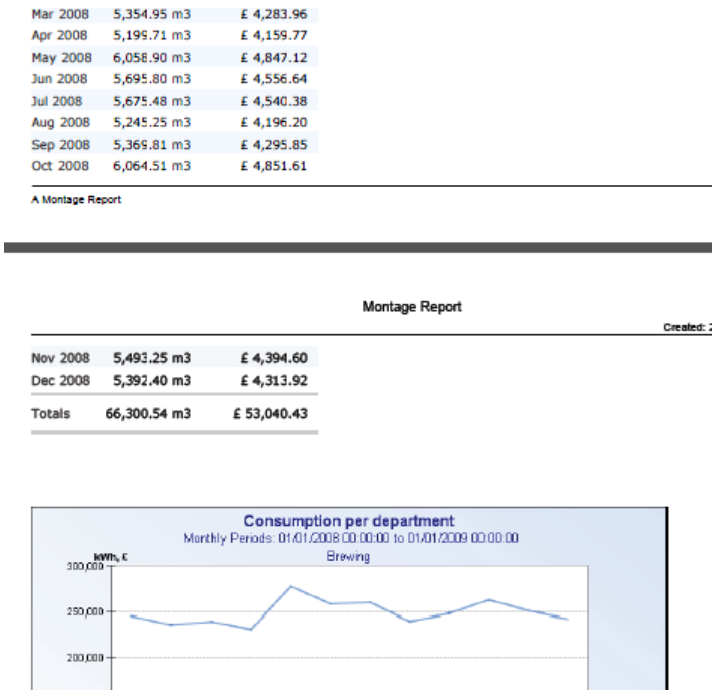
Montage

Packaging

Electricity

	Consumption	Cost
Jan 2008	506,669.55 kWh	£ 40,533.56
Feb 2008	495,572.69 kWh	£ 39,645.82
Mar 2008	506,630.43 kWh	£ 40,530.43
Apr 2008	496,401.83 kWh	£ 39,712.15
May 2008	544,616.88 kWh	£ 43,569.35
Jun 2008	525,302.62 kWh	£ 42,024.21
Jul 2008	531,628.06 kWh	£ 42,530.24
Aug 2008	506,807.29 kWh	£ 40,544.58
Sep 2008	508,543.06 kWh	£ 40,683.44
Oct 2008	535,723.55 kWh	£ 42,857.88

Never — Will allow the report to continue with the page breaks falling naturally.



Mar 2008	5,354.95 m3	£ 4,283.96
Apr 2008	5,199.71 m3	£ 4,159.77
May 2008	6,058.90 m3	£ 4,847.12
Jun 2008	5,695.80 m3	£ 4,556.64
Jul 2008	5,675.48 m3	£ 4,540.38
Aug 2008	5,245.25 m3	£ 4,196.20
Sep 2008	5,369.81 m3	£ 4,295.85
Oct 2008	6,064.51 m3	£ 4,851.61

A Montage Report

Montage Report

Created: 2

Nov 2008	5,493.25 m3	£ 4,394.60
Dec 2008	5,392.40 m3	£ 4,313.92
Totals	66,300.54 m3	£ 53,040.43

Excel data status

The entire dataset in the report - equivalent to the text report - can be exported to excel as explained in section 5.2.4. Since the use of colour coded numbers used on text reports, are not directly possible when the data is exported, it is possible to also export the data status behind the colours.

Show

Columns will be added to the table in Excel to indicate the validity status of the data similar to the information provided by the colour coding of the numbers:

- Black numbers are complete numbers meaning that all readings to calculate the values for the period have been entered. These are indicated as DS0.
- Green numbers are forecasted numbers calculated by the definition for automatic forecasting. These are indicated as DS1.
- Red numbers are numbers that are being calculated as the report was generated. These numbers are likely to change when the calculation is completed. These are indicated as DS2.
- Blue numbers are somehow incomplete for one (or both) of the two following possible reasons:
    - The data status will be set to DS4 if the number is made up of several numbers of which at least one is missing. For instance if some of the contributing meters have not been read.
    - The data status is set to DS8 if the value is incomplete for only part of the date range of periods. For instance if the total of periods include periods after the last reading of the meters.

Note: *You may see DS values different from the above listed. The DS*

values are binary numbers (0,1,2,4,8) you may find DS exported as any sum of more than one data status.

	A	B	C	D	E
1		Consumption	ds	Cost	ds
2	Jan-08	5363.583333	DS0	4290.867	DS0
3	Feb-08	5386.880952	DS0	4309.505	DS0
4	Mar-08	5354.952381	DS0	4283.962	DS0
5	Apr-08	5199.714286	DS0	4159.771	DS0
6	May-08	6058.904762	DS0	4847.124	DS0
7	Jun-08	5695.797619	DS0	4556.638	DS0
8	Jul-08	5675.47619	DS0	4540.381	DS0
9	Aug-08	5245.25	DS0	4196.2	DS0
10	Sep-08	5369.809524	DS0	4295.848	DS0
11	Oct-08	6064.511905	DS0	4851.61	DS0
12	Nov-08	5493.25	DS0	4394.6	DS0
13	Dec-08	5392.404762	DS0	4313.924	DS0

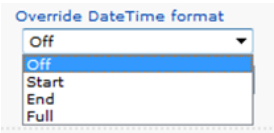
Hide — The columns indicating the validity status of the data will be excluded

	A	B	C
1		Consumption	Cost
2	Jan-08	5363.583333	4290.867
3	Feb-08	5386.880952	4309.505
4	Mar-08	5354.952381	4283.962
5	Apr-08	5199.714286	4159.771
6	May-08	6058.904762	4847.124
7	Jun-08	5695.797619	4556.638
8	Jul-08	5675.47619	4540.381
9	Aug-08	5245.25	4196.2
10	Sep-08	5369.809524	4295.848
11	Oct-08	6064.511905	4851.61
12	Nov-08	5493.25	4394.6
13	Dec-08	5392.404762	4313.924

Override date time format

Offers the user some individual preferences for how to display time and date settings.

Provides the user with the option to display either the start or end date of the period, or the full period which shows both start and end dates.



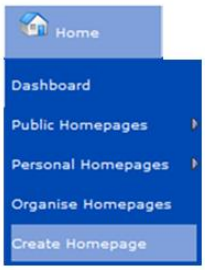
Options for how the date and time settings will be displayed.

5.2 Homepages and Report modules

This section builds on the details previously presented and explains how a Homepage and a Report Module are created from scratch.

5.2.1 Creating a New homepage

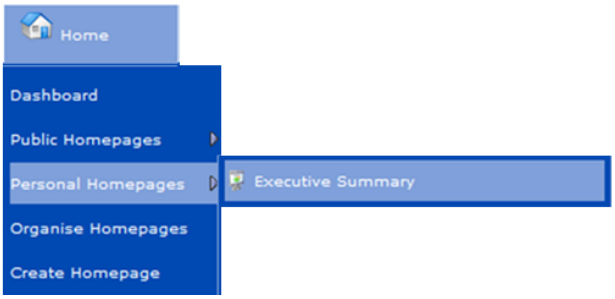
From the 'Home' menu, select t 'Create Homepage'.



The Setup Homepage screen will appear and in this example we will give it the title 'Executive Summary'. You will chose to make any modules created appear collapsed when accessing the Homepage, so these boxes will remain unchecked.

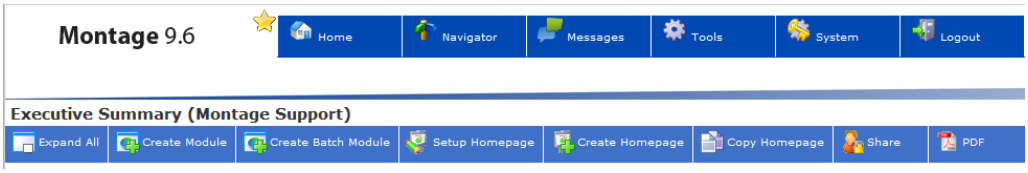
When pressing 'Save', the new Homepage will be created and the setup area will close.

To access the Homepage, navigate using the Home menu and the new Homepage will be located under the section entitled 'Personal'



Select the 'Executive Summary' Homepage and it will open.

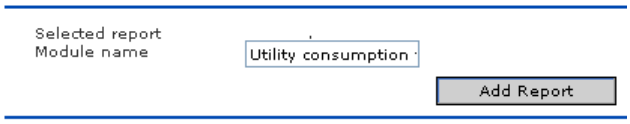
Note: *The Homepage will appear empty at this time, other than the name of the Homepage is displayed at the top left hand corner, together with the User Name of the person who created the Homepage.*



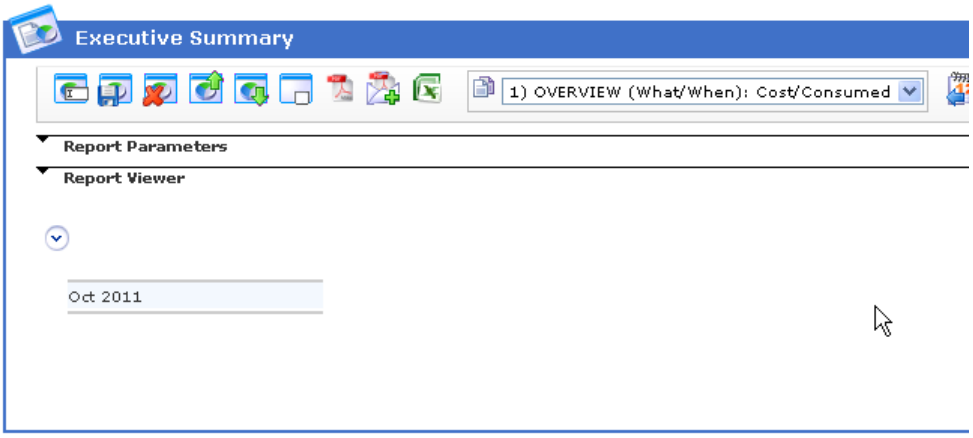
5.2.2 Creating a report module for the Homepage

Select 'Create Module' from the Homepage menu bar.

Give the report module a name, in this case 'Utility consumption time-series' and select 'Add Report'.



The module will be created and will appear expanded displaying the title and the icon appearing in the Report Viewer, as illustrated below.

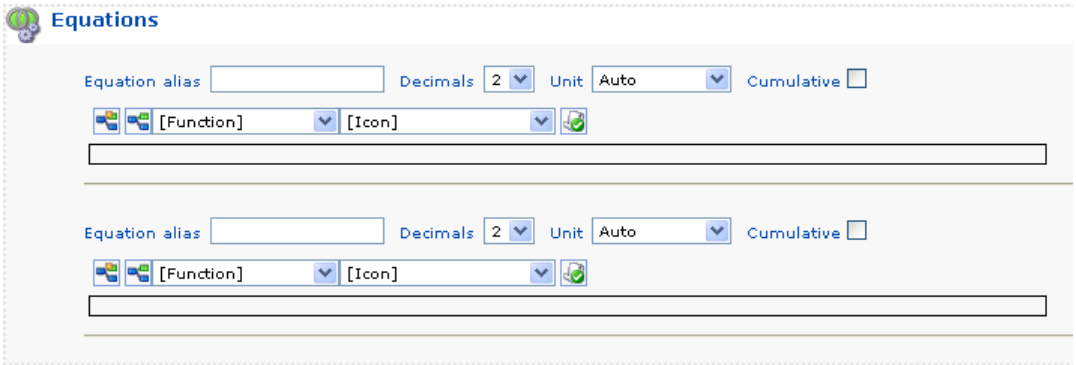


Unfold the 'Report Parameters' section by clicking it and fill in the various sections as required (see Section 5.1.2 for descriptions of each option)

In this example, the selections are driven by the data set available at the time of producing this User Guide; however they are sufficient to demonstrate how report modules are created.

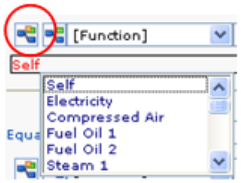
Equations

This section will default to be open, and will show an empty equation

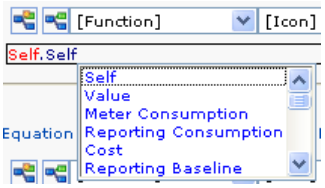


Step 1: First select the icon to the left-hand side entitled 'Self'. This will return Self as the first condition in the equation field. (This indicates that the node to be used in the equation is generic, rather than to one specific node. The node it

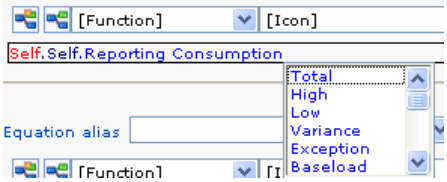
will reference will be identified in the Node section of the parameters)



Step 2: The next list displays the different 'Utility types' that are available. Again, in this example we will select Self to ensure the output data is not specific to just one utility when viewed in the report. The screen should now look as follows:

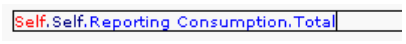


Step 3: In this report we are looking to display the Consumption for all utilities, and therefore we need to select 'Reporting Consumption' (select by double-clicking)

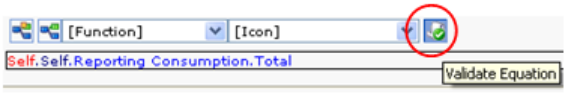


Step 4: We are looking for the Total Consumption for the given period, and so we should follow the same approach as previously and select 'Total'. You can then press 'Escape' to cancel the final list that appears.

Step 5: The equation line should now look as follows:

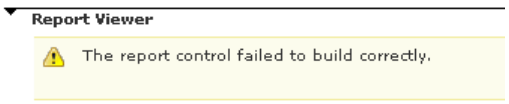


Step 6: Select the validate Equation icon to check that the equation is valid.



Additional equations can be added at this time as required. Add an equation alias (the column header that will appear in the report) or leave blank and allow Montage to assign the alias automatically based on the equation components.

At this time, the Report Viewer will display the following information:

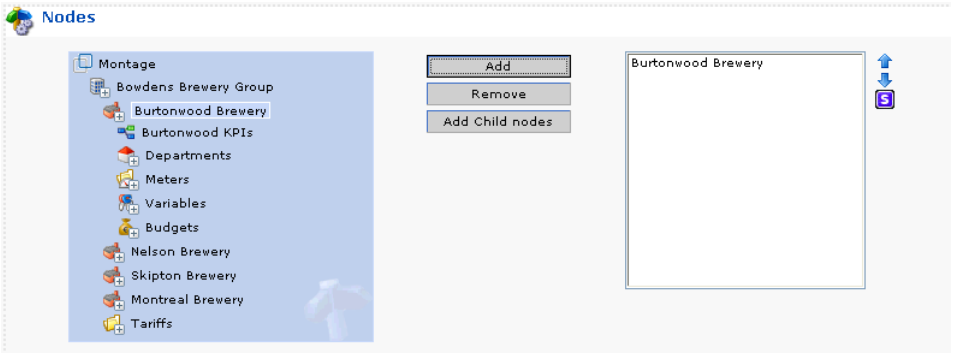


For now, we have finished defining our equation, so we can move on to selecting the required Nodes.

Nodes

Step 7: Select the **Node**s option, to display the Node Tree

Step 8: Navigate through the tree and select the nodes to be the subject of the report. In this case, we will select 'Burtonwood Brewery' and 'Add' it to the list.



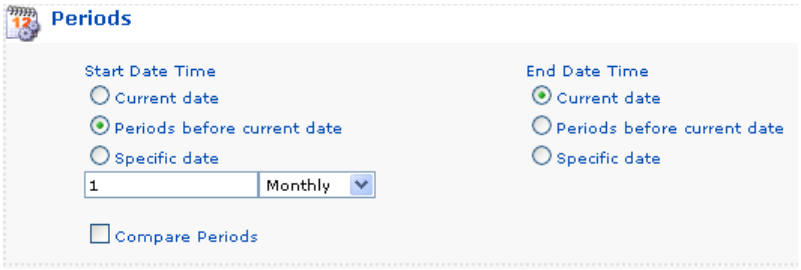
Step 9: By selecting from the Series box, the Report Viewer will then display the first insight into how this report currently looks.

For now, we have finished defining our nodes, so we can move on to Periods.

Periods

Step Select the **Periods** option to display the Period selection box. It displays the

10: following as default settings.



Step 11: Depending on the data available in your system, you can specify a 'Start Date/Time' and 'End Date/Time' settings that make the most sense. In this case, we will use a 'Specific date' to be 01.01.2008 and 01.01.2009 as follows:

Step 12: By selecting from the Series box, the Report Viewer will be refreshed and the report will start to take shape.

Burtonwood Brewery

Electricity

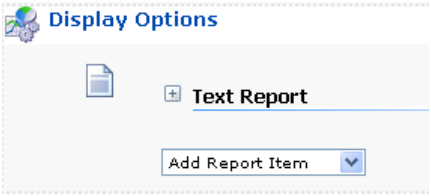
	Consumption
Jan 2008	1,708,266.85 kWh
Feb 2008	1,704,920.81 kWh
Mar 2008	1,703,894.65 kWh
Apr 2008	1,667,172.09 kWh
May 2008	1,914,420.94 kWh
Jun 2008	1,815,233.11 kWh
Jul 2008	1,831,807.25 kWh
Aug 2008	1,687,172.07 kWh
Sep 2008	1,727,323.70 kWh
Oct 2008	1,865,859.51 kWh
Nov 2008	1,749,972.97 kWh
Dec 2008	1,736,380.35 kWh
Totals	21,112,424.30 kWh

For now, we have finished defining our Periods, so we can move on to Display Options.

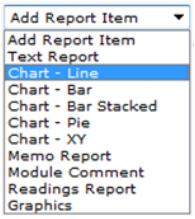
Display Options

Step 13: Select **Display Options** to open the default settings. The text report is always used as the default Report Type as it is the easiest way to ensure you are

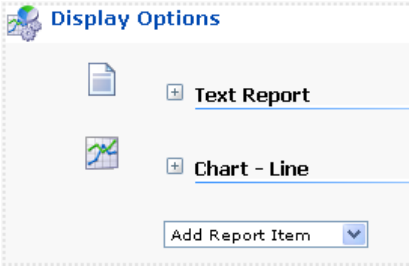
getting the required data sources in the report.



Step 14: Given it is a time-series report we are looking to define, it would make sense to view the data in the form of a Line graph. Select 'Add Report Item' and select 'Chart – Line'.



This will add the Line Chart below the Text Report in the Display Options section.

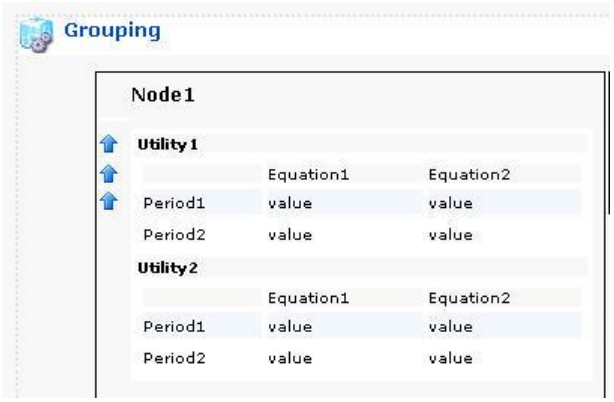


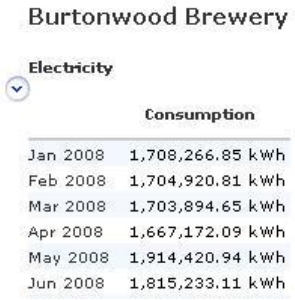
Step 15: Also, scroll down the Report Viewer to see that we have added Line graphs for the current data sets.

For now, we have finished defining our Display Options, so we can move on to Grouping.

Grouping

Step 16: Select **Grouping** to open the default settings. The Grouping Configuration Template is displayed, showing the layout of the current report.





Burtonwood Brewery

Electricity

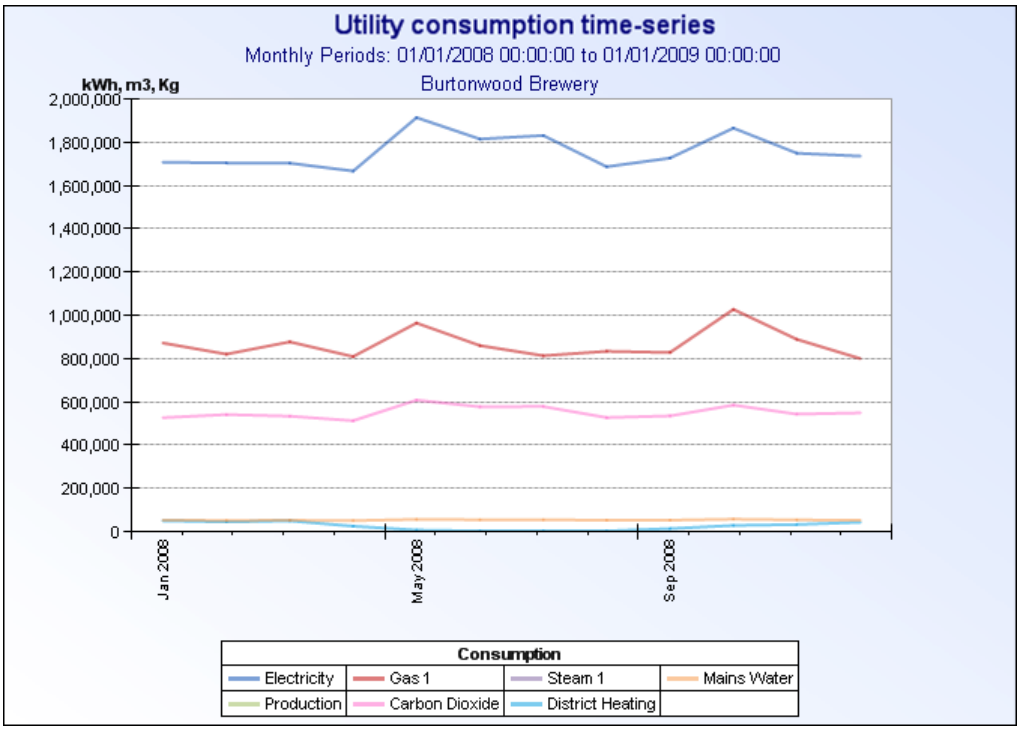
	Consumption
Jan 2008	1,708,266.85 kWh
Feb 2008	1,704,920.81 kWh
Mar 2008	1,703,894.65 kWh
Apr 2008	1,667,172.09 kWh
May 2008	1,914,420.94 kWh
Jun 2008	1,815,233.11 kWh

Step 17: In this report we would like to see the consumption for each utility as columns (like a table) and also the trend lines for each utility on the same graph. By clicking once on the upward arrow next to Equation1, this will replace Utility1 with Equation1 and therefore Utility1 and Utility 2 now reside as column headings in the text report, and as separate lines on a Line Graph.

Burtonwood Brewery

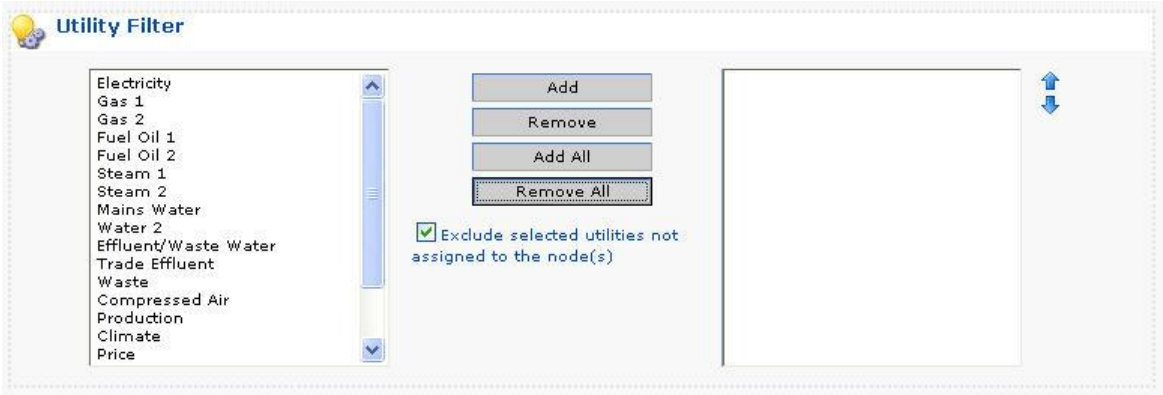
Consumption

	Electricity	Gas 1	Steam 1	Mains Water	Production
Jan 2008	1,708,266.85 kWh	872,130.47 m3	-	52,948.73 m3	-
Feb 2008	1,704,920.81 kWh	820,629.14 m3	-	51,646.44 m3	-
Mar 2008	1,703,894.65 kWh	877,673.31 m3	-	52,717.94 m3	-
Apr 2008	1,667,172.09 kWh	809,578.40 m3	-	51,066.83 m3	-
May 2008	1,914,420.94 kWh	964,552.97 m3	-	57,180.42 m3	-
Jun 2008	1,815,233.11 kWh	860,444.53 m3	-	55,472.20 m3	-
Jul 2008	1,831,807.25 kWh	813,534.83 m3	-	55,178.01 m3	-
Aug 2008	1,687,172.07 kWh	833,888.54 m3	-	52,845.19 m3	-
Sep 2008	1,727,323.70 kWh	828,488.07 m3	-	53,233.62 m3	-
Oct 2008	1,865,859.51 kWh	1,027,825.95 m3	-	57,786.53 m3	-
Nov 2008	1,749,972.97 kWh	889,362.76 m3	-	54,273.33 m3	-
Dec 2008	1,736,380.35 kWh	800,262.80 m3	-	52,750.96 m3	-



For now, we have finished defining our Groupings, and given we are okay with the data being shown Monthly, we don't need to change the Frequency of the data set so we can move on to applying Utility Filters.

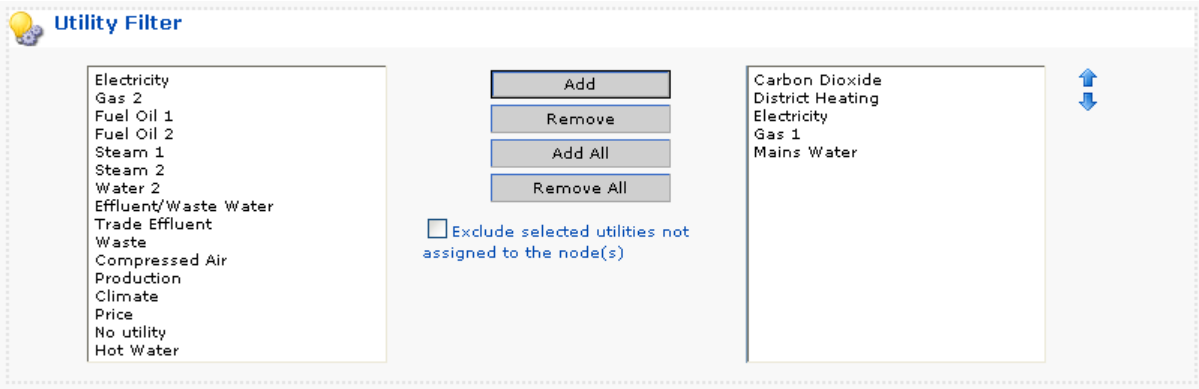
Step 18: Select **Utility Filter** to open the default settings. The box to the left hand side will display all the Utility Types configured in your system (these also include non-utilities such as Production, Price).



Step 19: When we viewed the current status of the text report in the Report Viewer, both Utility Types of Steam and Production displayed no data, as shown in Step 17. Using the Utility Filter would be a good way to remove columns from the report that have no data for the given node.

Step 20: The selected node (Burtonwood Brewery) shows that the utilities used on that node include Electricity, Gas, Carbon Dioxide, District Heating and Mains

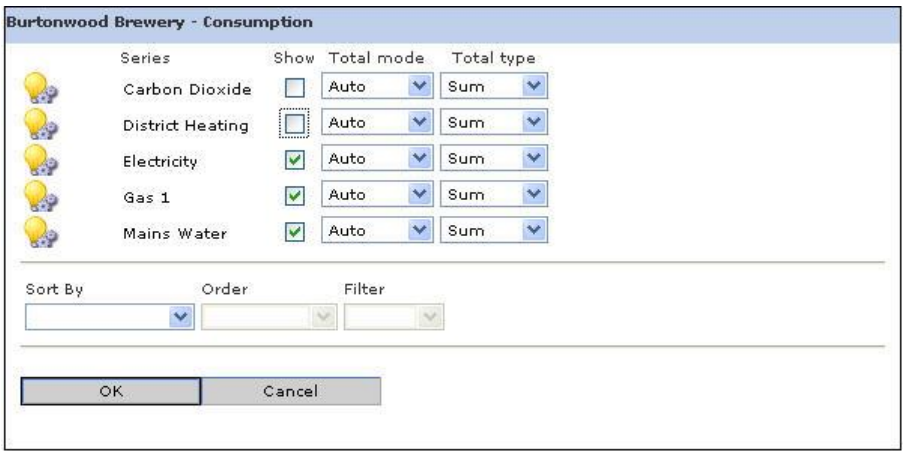
Water. The assigned utilities of Steam and Production show no data. To remove these from the report, select Electricity, Gas, Carbon Dioxide, District Heating and Mains Water and 'Add' them to the box on the right, as shown below.



Step 21: Also place a tick in the 'Exclude selected utilities...' box to ensure only the utilities assigned to the chosen nodes appear in the report. The report will update and display the columns in the order as displayed in the right hand box (alphabetically) as shown below. The ordering can be changed by re-arranging the utilities in the list, or by using the in-report sort feature as described below.

	Carbon Dioxide	District Heating	Electricity	Gas 1	Mains Water
Jan 2008	527,021.93 Kg	50,444.39 kWh	1,708,266.85 kWh	872,130.47 m3	52,948.73 m3
Feb 2008	541,315.86 Kg	45,519.26 kWh	1,704,920.81 kWh	820,629.14 m3	51,646.44 m3
Mar 2008	533,875.55 Kg	49,960.68 kWh	1,703,894.65 kWh	877,673.31 m3	52,717.94 m3
Apr 2008	513,010.26 Kg	25,306.37 kWh	1,667,172.09 kWh	809,578.40 m3	51,066.83 m3

Step 22: An alternative approach to removing columns in the report would be to use the in-report settings. Select the icon in the report to open the Settings.



Step By removing any of the tick marks in the Settings will remove the data series

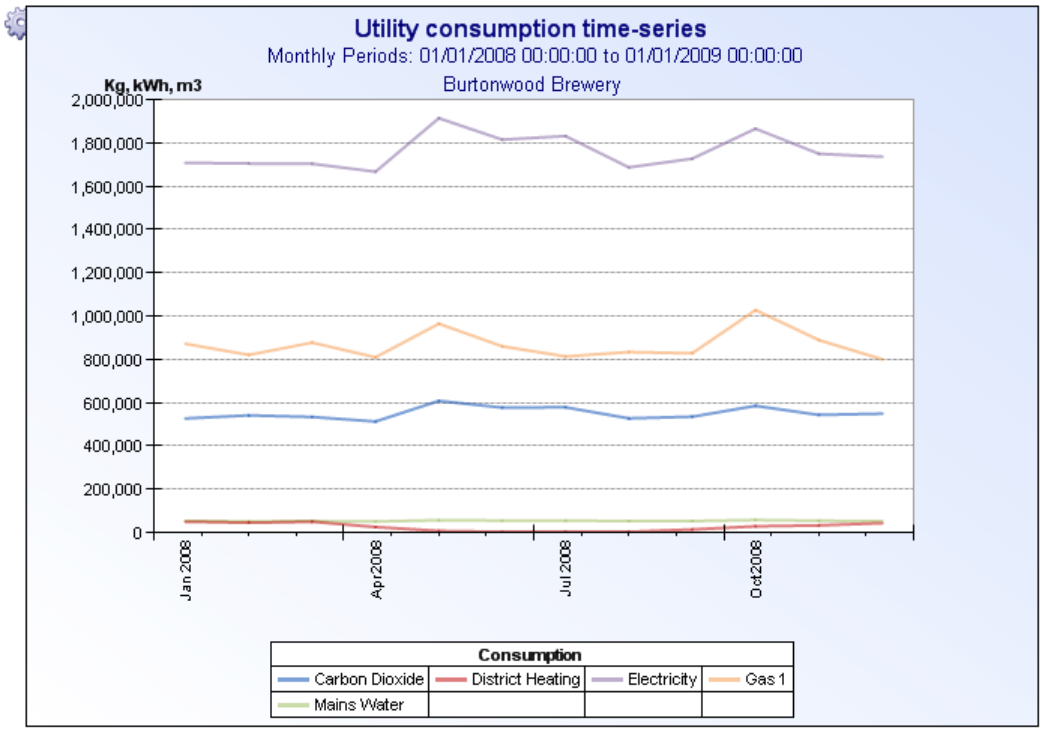
23: from the report. Other settings can also be placed on this report such as sorting one of the columns, displaying or removing totals and showing the totals as sums or averages. Removing the utilities of Carbon Dioxide and District Heating, whilst sorting Electricity would display the report as follows:

Burtonwood Brewery

Consumption

	Electricity	Gas 1	Mains Water
Jan 2008	1,708,266.85 kWh	872,130.47 m3	52,948.73 m3
Feb 2008	1,704,920.81 kWh	820,629.14 m3	51,646.44 m3
Mar 2008	1,703,894.65 kWh	877,673.31 m3	52,717.94 m3
Apr 2008	1,667,172.09 kWh	809,578.40 m3	51,066.83 m3
May 2008	1,914,420.94 kWh	964,552.97 m3	57,180.42 m3
Jun 2008	1,815,233.11 kWh	860,444.53 m3	55,472.20 m3
Jul 2008	1,831,807.25 kWh	813,534.83 m3	55,178.01 m3
Aug 2008	1,687,172.07 kWh	833,888.54 m3	52,845.19 m3
Sep 2008	1,727,323.70 kWh	828,488.07 m3	53,233.62 m3
Oct 2008	1,865,859.51 kWh	1,027,825.95 m3	57,786.53 m3
Nov 2008	1,749,972.97 kWh	889,362.76 m3	54,273.33 m3
Dec 2008	1,736,380.35 kWh	800,262.80 m3	52,750.96 m3

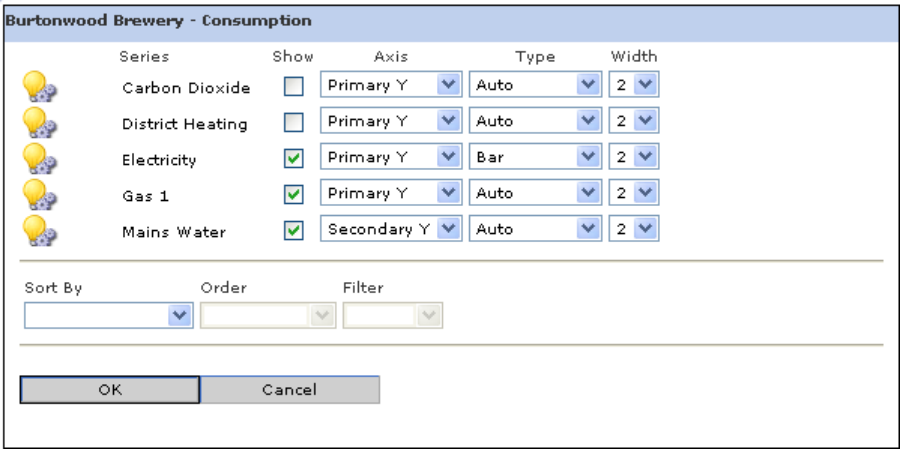
Note: *Any in-report settings are only specific to that chosen report, and so any changes made to the text report are not reflected in the Line graph that sits beneath, which currently looks as follows:*



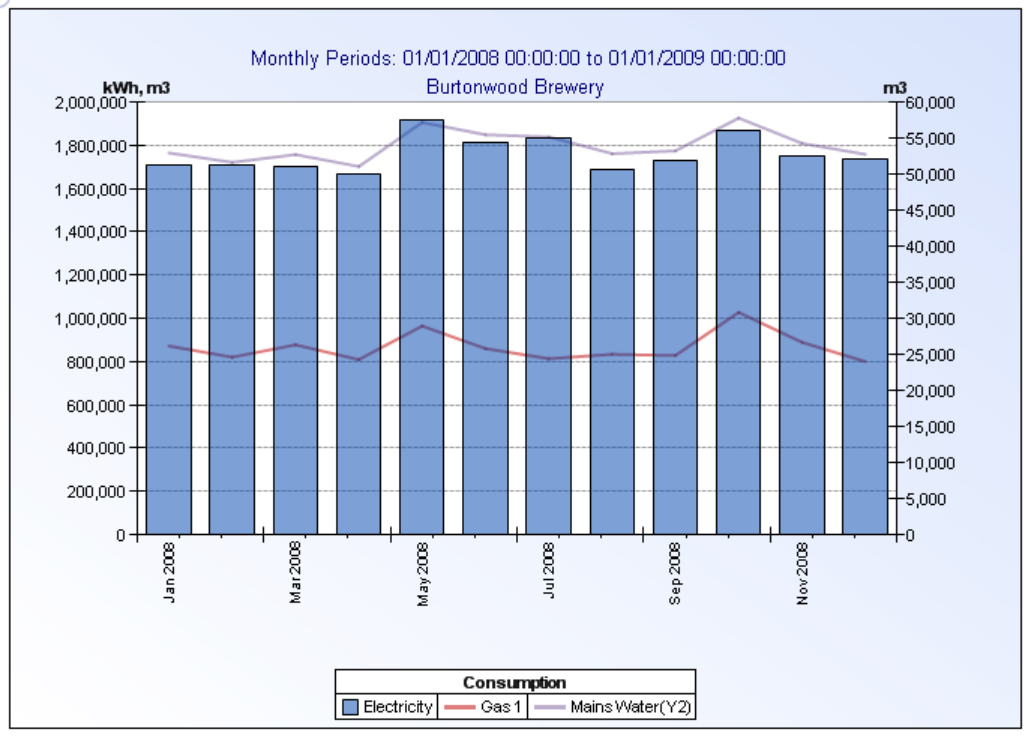
Step 24: To clean up this Line graph, select the icon to display the in-report settings.

Step By changing some of the settings and removing irrelevant data, the graph can

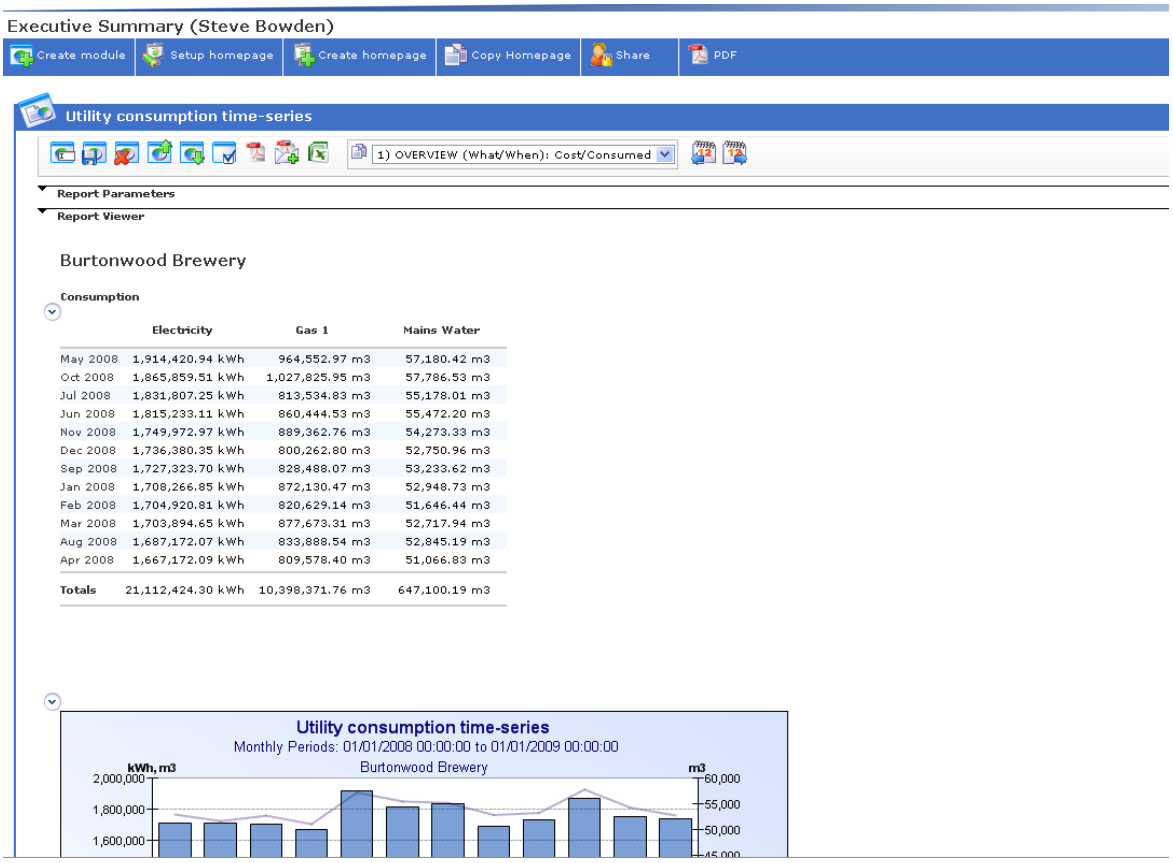
25: take a very different look and provide a more impactful message. Electricity is the highest consumer and therefore is presented as Bars, Mains Water is the lowest and to avoid losing impact by scaling, Mains Water is plotted against the Secondary Y axis (on the right hand side).



The above settings present the graph as follows:



That concludes the section on report development. Selecting  will ensure all the settings are saved and the new report module is available for viewing on the Homepage as shown below:



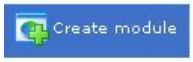
5.2.3 Creating a Graphics Report as a module

The 'Graphics' report is useful for displaying calculated values from Montage and having them displayed overlaid on an image. Typical examples of the use of such report would be when simulating the flow of a utilities consumption around the site, or in the situation whereby the user is a Landlord with many Tenants occupying different buildings around the site, a graphical representation of the site in the form of an aerial photograph or site map would allow the site consumption to be broken down and displayed on the respective Tenant buildings.

In order to make use of this Report Type, first the chosen graphic needs to be available and uploaded onto the Montage server. There is no user interface within Montage for designing the graphics, as these will tend to be designed in the source application e.g. Visio, Digital Image, Photoshop or Excel. Graphics of types GIF, PNG, BMP and JPG are supported. Each reported value will be displayed in a box of a fixed size; 120 pixels wide and 30 pixels high. The prepared graphic files must be sized accordingly.

The instructions for uploading graphics are explained in Section 7.4. The description below assumes that the graphic has previously been uploaded onto the Montage server.

From the Homepage from which you want to add the module showing the Graphics report, select 'Create module'



Firstly, create a 'Text Report' showing the contents of the report that you would like to later see displayed on the uploaded graphic.

In the example below, we have created a simple Text report showing the Electricity Cost for 'Burtonwood Brewery' over a 12-month period. The Text report is shown below:

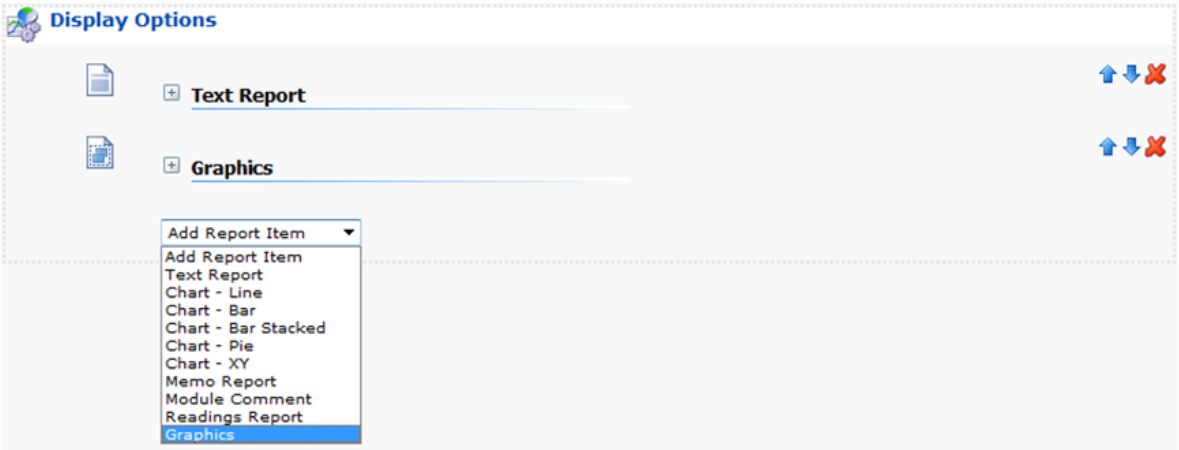
Electricity

Total Cost

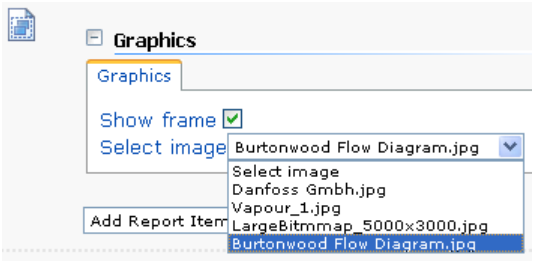
	Burtonwood Brewery	Departments	Brewing	Packaging	Utility plants	Buildings
Jan 2008	£ 136,661	£ 136,661	£ 19,624	£ 40,534	£ 76,124	£ 379
Feb 2008	£ 136,394	£ 136,394	£ 18,855	£ 39,646	£ 77,538	£ 355
Mar 2008	£ 136,312	£ 136,312	£ 19,125	£ 40,530	£ 76,277	£ 379
Apr 2008	£ 133,374	£ 133,374	£ 18,463	£ 39,712	£ 74,831	£ 367
May 2008	£ 153,154	£ 153,154	£ 22,190	£ 43,569	£ 87,015	£ 379
Jun 2008	£ 145,219	£ 145,219	£ 20,658	£ 42,024	£ 82,169	£ 367
Jul 2008	£ 146,545	£ 146,545	£ 20,788	£ 42,530	£ 82,847	£ 379
Aug 2008	£ 134,974	£ 134,974	£ 19,148	£ 40,545	£ 74,902	£ 379
Sep 2008	£ 138,186	£ 138,186	£ 19,837	£ 40,683	£ 77,299	£ 367
Oct 2008	£ 149,269	£ 149,269	£ 21,007	£ 42,858	£ 85,025	£ 379
Nov 2008	£ 139,998	£ 139,998	£ 20,066	£ 41,229	£ 78,335	£ 367
Dec 2008	£ 138,910	£ 138,910	£ 19,355	£ 41,546	£ 77,631	£ 379
Totals	£ 1,688,994	£ 1,688,994	£ 239,117	£ 495,407	£ 949,992	£ 4,478

As well as seeing this information as a Text report, we would also like to insert some of the key values (Totals) onto a Cost Flow Diagram I have previously created using Excel. The image has been uploaded as a .JPG file and is ready for use within a Graphics report.

To add the Graphics report to the existing module, select Display Options from the Report Parameters option, and under the Text report add the Report Type called 'Graphics. This will now add the Graphics report underneath the Text report as shown below:



In order to select the graphic to be used within this report, select the ⊞ to the left of 'Graphics'. The user will now be able to see a list of all the images that have been uploaded to the Montage server.



In this case, the required image is the *'Burtonwood Flow Diagram.JPG'* . Once selected, the image will appear within the Report Viewer underneath the Text report, as shown below:

Report Viewer

Electricity

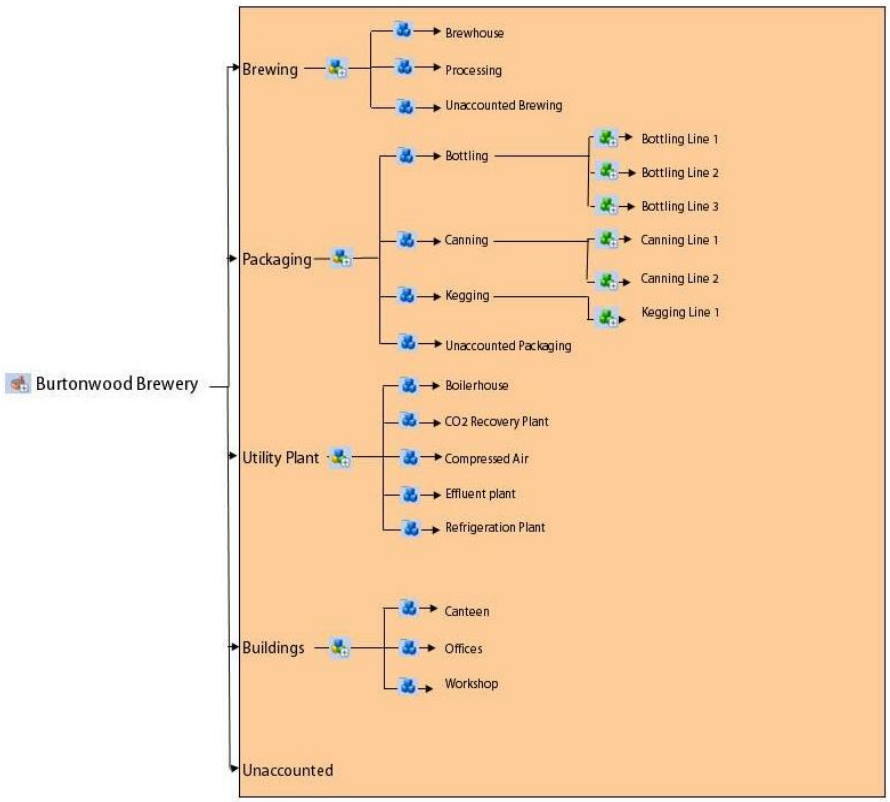
Total Cost

	Burtonwood Brewery	Departments	Brewing	Packaging	Utility plants	Buildings
Jan 2008	£ 136,661	£ 136,661	£ 19,624	£ 40,534	£ 76,124	£ 379
Feb 2008	£ 136,394	£ 136,394	£ 18,855	£ 39,646	£ 77,538	£ 355
Mar 2008	£ 136,312	£ 136,312	£ 19,125	£ 40,530	£ 76,277	£ 379
Apr 2008	£ 133,374	£ 133,374	£ 18,463	£ 39,712	£ 74,831	£ 367
May 2008	£ 153,154	£ 153,154	£ 22,190	£ 43,569	£ 87,015	£ 379
Jun 2008	£ 145,219	£ 145,219	£ 20,658	£ 42,024	£ 82,169	£ 367
Jul 2008	£ 146,545	£ 146,545	£ 20,788	£ 42,530	£ 82,847	£ 379
Aug 2008	£ 134,974	£ 134,974	£ 19,148	£ 40,545	£ 74,902	£ 379
Sep 2008	£ 138,186	£ 138,186	£ 19,837	£ 40,683	£ 77,299	£ 367
Oct 2008	£ 149,269	£ 149,269	£ 21,007	£ 42,858	£ 85,025	£ 379
Nov 2008	£ 139,998	£ 139,998	£ 20,066	£ 41,229	£ 78,335	£ 367
Dec 2008	£ 138,910	£ 138,910	£ 19,355	£ 41,546	£ 77,631	£ 379
Totals	£ 1,688,994	£ 1,688,994	£ 239,117	£ 495,407	£ 949,992	£ 4,478

Report Messages
Unaccounted does not have Electricity

Electricity

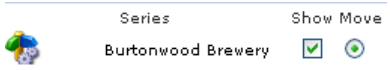
Total Cost



The next step is to add some details on top of the image. The data that is available to include in a Graphics report depends on the calculated values resulting from the Equations that defined the report.

In order to add some values on top of the graphic, select the icon that appears to the left of the Graphics report, to open the in-report options. For this particular report, they appear as follows:

The in-report options display the data series that was used to create the Text Report, in this case a list of departments. To include any of the calculated values for any department and have it displayed on the Graphic, select the appropriate 'Move' radio button as shown below.



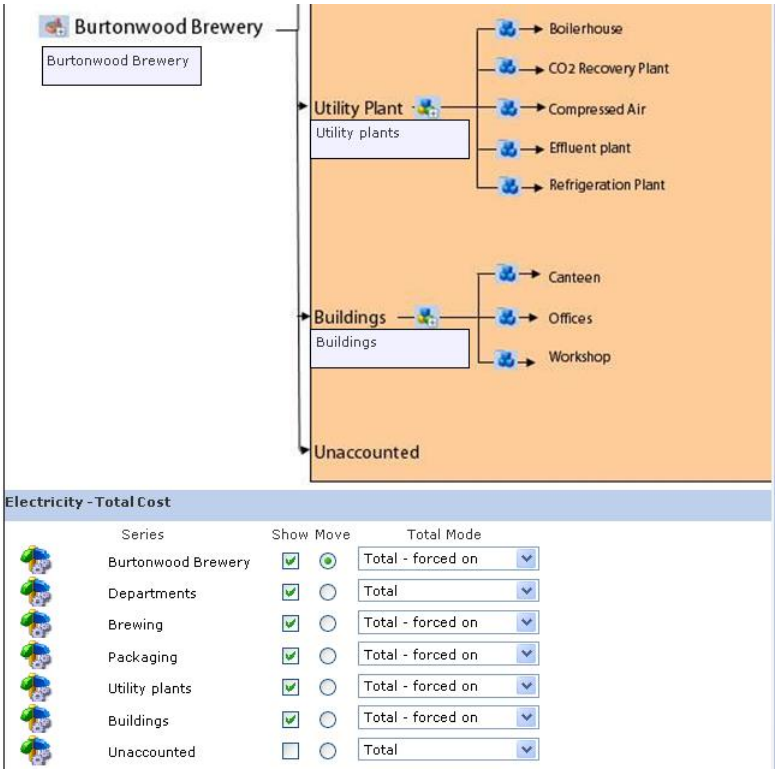
This selection notifies the system that the value to be added to the graphic represents that of Burtonwood Brewery.

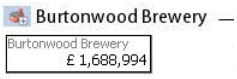
The next step is to select where on the graphic this value is to be placed. This is done by moving the mouse curser over the graphic (the cursor will change from an arrow, to a Link Select (or pointed finger) .

Navigate the finger pointer to the position you want the text box to appear on the graphic and select it by clicking the left hand mouse button.

***NOTE**: The finger pointer will always indicate the top left hand corner of the text box.*

In this example we want the box to appear under the Node name on the graphic, as follows:

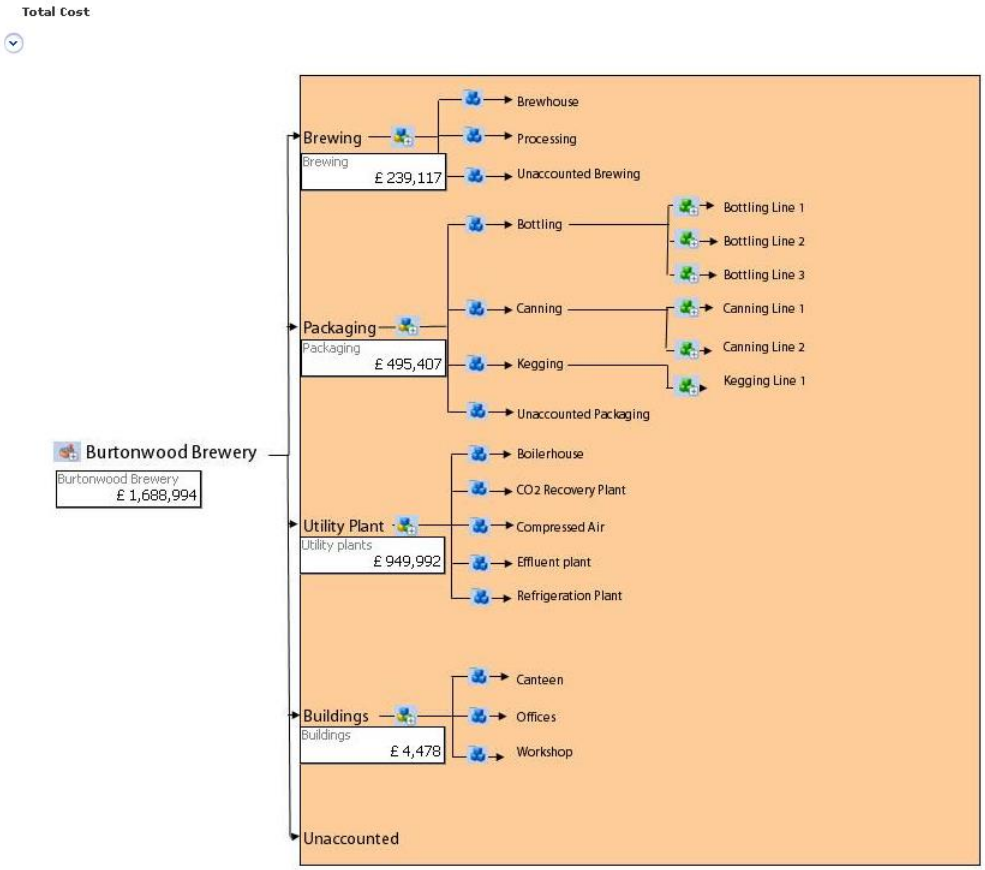




The value that is displayed in the text box will depend on which 'Total Mode' was selected from the list. Selecting either the 'Total - Forced On' or 'Average – Forced On' will place the result in the text box.

Continue with this process until the graphic includes the relevant values. Remember, Montage can provide any series of NodeField output values to be included in Graphic reports.

In this example, the final report looks as follows:



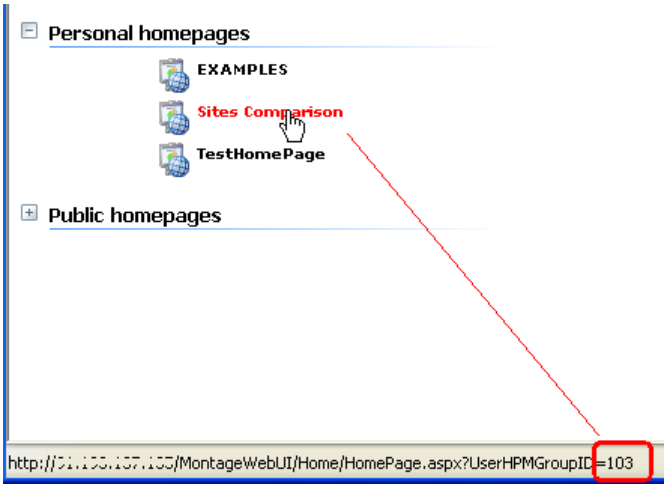
5.2.4 Export the entire Homepage to Microsoft® Excel

If you need to design a report that you cannot make within the Montage Reporting tools, there is an option that all modules on a Homepage can be exported to an Excel sheet. Each of the modules on the Homepage will be exported to a sheet, and you will be able to create other sheets in the Excel document, referring to the exported data.

If there is an Excel file available for the Homepage, you will find the 'Export to Excel' button in the Homepage menu bar.

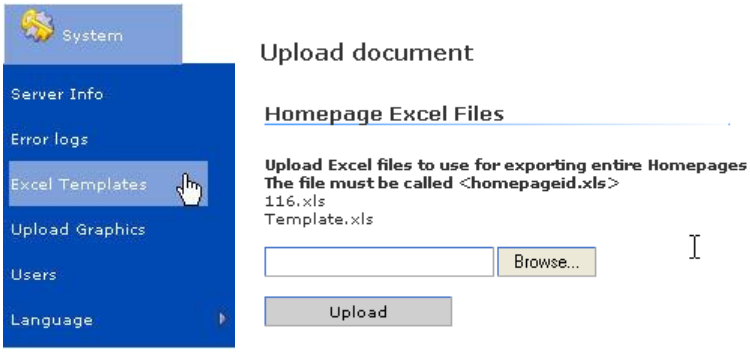
5.2.4.1 Preparing the Excel destination sheet

There will be an Excel file for each Homepage you want to use with this feature. The Excel file name must be the 'HomepageID' which you will find in the status line (located in the bottom left in the browser window), as illustrated below.



The Excel file to be used for this Homepage should have the name '103.xls' and be uploaded.

The upload feature for Excel files is available from the System Menu (if you have appropriate permissions).



Browse to find the file you wish to upload, select it and press the upload button. The file should be available for you right away.

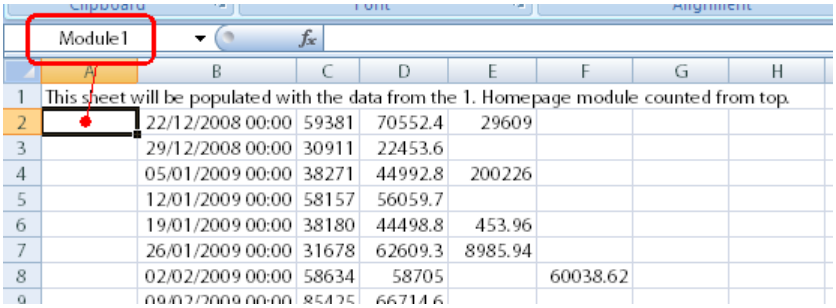
***NOTE**: To delete a file you will need access to the folder on the Montage server, either via a traditional file manager on the server or via an ftp connection.*

***NOTE!** The Excel file must be in the format of Excel 2003.*

In the Excel file there must be a sheet prepared for each module to export to. The names of the sheets are not important. Any number of homepage modules may be inserted into the same sheet, and/or modules may be inserted into a sheet for each module. For each module to export, a named cell with the name "module<number>" should be created on a sheet in the file. This named cell will be the top-right cell in the range that data from the modules will be inserted into. If multiple modules are inserted into the same sheet please ensure that there is sufficient space to hold the data.

If no cells have been named as explained, Montage will automatically create new sheets, one for each module in the homepage.

In the example below, the cell A2 is named "Module1" and data will be inserted to the right and down from the cell B2.


Module1
A
B
C
D
E
F
G
H
1 This sheet will be populated with the data from the 1. Homepage module counted from top.
2 22/12/2008 00:00 59381 70552.4 29609
3 29/12/2008 00:00 30911 22453.6
4 05/01/2009 00:00 38271 44992.8 200226
5 12/01/2009 00:00 58157 56059.7
6 19/01/2009 00:00 38180 44498.8 453.96
7 26/01/2009 00:00 31678 62609.3 8985.94
8 02/02/2009 00:00 58634 58705 60038.62

5.3 Dashboard Reports

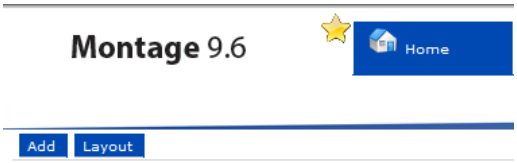
Once report modules have been created, as well as accessing them via their specific Homepage(s), the user also has the option to make them available in the form of a dashboard.

A dashboard is a method by which the user can select pre-defined reports and have them displayed (either as default upon login or their Homepage accessible whenever selecting the 'Home' button).

This is a useful function when the user is only interested in a specific area of the site, or just wanting a snapshot of the status of energy performance without having to drill-down through many Homepages and report modules to find the required answers.

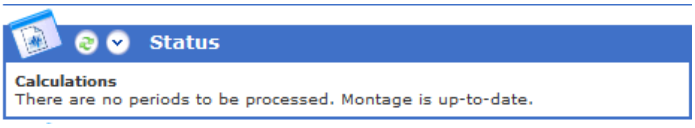
In order to access the dashboard, select 'Dashboard' from the 'Home' menu. Your current Dashboard will display and you may change modify the content and layout.

The following screen will be displayed.



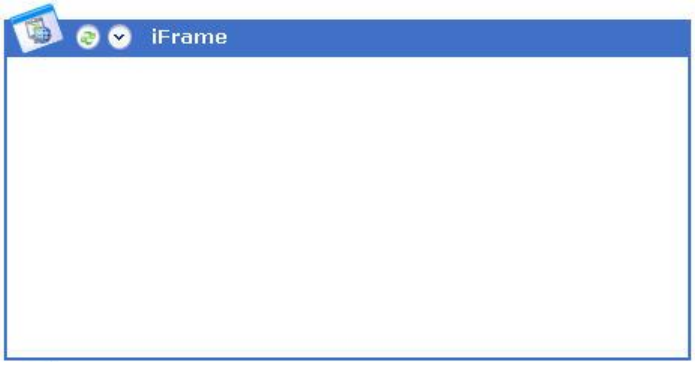
Selecting the 'Add' option allows the user to specify the type of report content they want to include in the dashboard, such as:

Status	Adds the Calculation Status box, which also is available on the Navigator screen as a dashboard module
ReportModule	Adds a section from which the user can then specify the report module that will be displayed



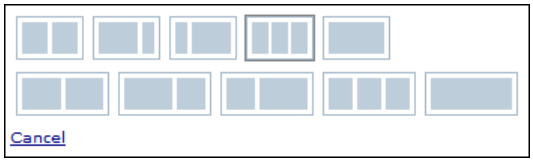
The module will not be able to display any information until it has been configured, which is explained below.

iframe — Adds a section that allows the user to specify a URL to enable intranet/internet pages to be displayed, or links to other sources.



Selecting the 'Layout' option allows the user to specify the layout of the dashboard. This layout determines the number of columns the user wants to display from left to right on their screen, and the sizing of these reports.

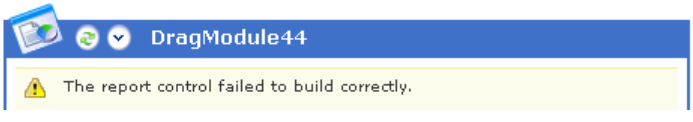
The user makes the selection from a simple options box, as shown below:



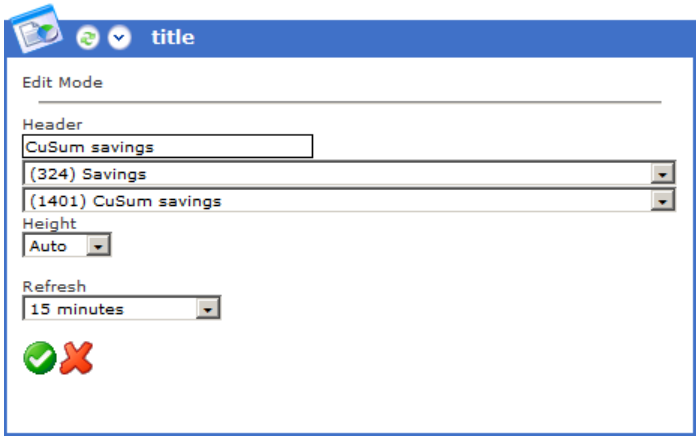
5.3.1 Creating a Dashboard

When creating a dashboard for the first time, it is recommended that the user first selects the Layout. In this example, we will select a standard two-column layout as highlighted above. The layout can be changed at any time.

Then we will add a ReportModule which at this time will appear empty with the default title of 'DragModule (and the Module #), as shown below. The title of the report and the module content are editable as explained in the following steps.



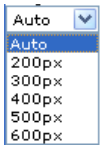
Select the option to the right of the module to edit. The module will open (as shown below) to display the Header as a blank field, together with two drop-down lists from which the user can specify the chosen report module (previously created and displayed on a Homepage) as well as specifying the height of the report and setting the update interval.



Selecting the drop down list will display all of the modules currently created and accessible to the user.

In this case, the selected module is entitled 'CuSum Savings' and it displays the module "CuSum savings" from the Homepage report "Savings". The numbers that appears in brackets (324) and (1401) are the unique ID numbers that Montage assigned to this homepage and the module upon creation. What gets displayed as the dashboard module title is the text that appears in the Header field.

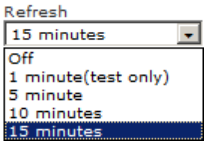
The Height drop down list presents the user with some options for sizing of the module.



The 'Auto' option will automatically resize the height of the module to fit the content of selected module.

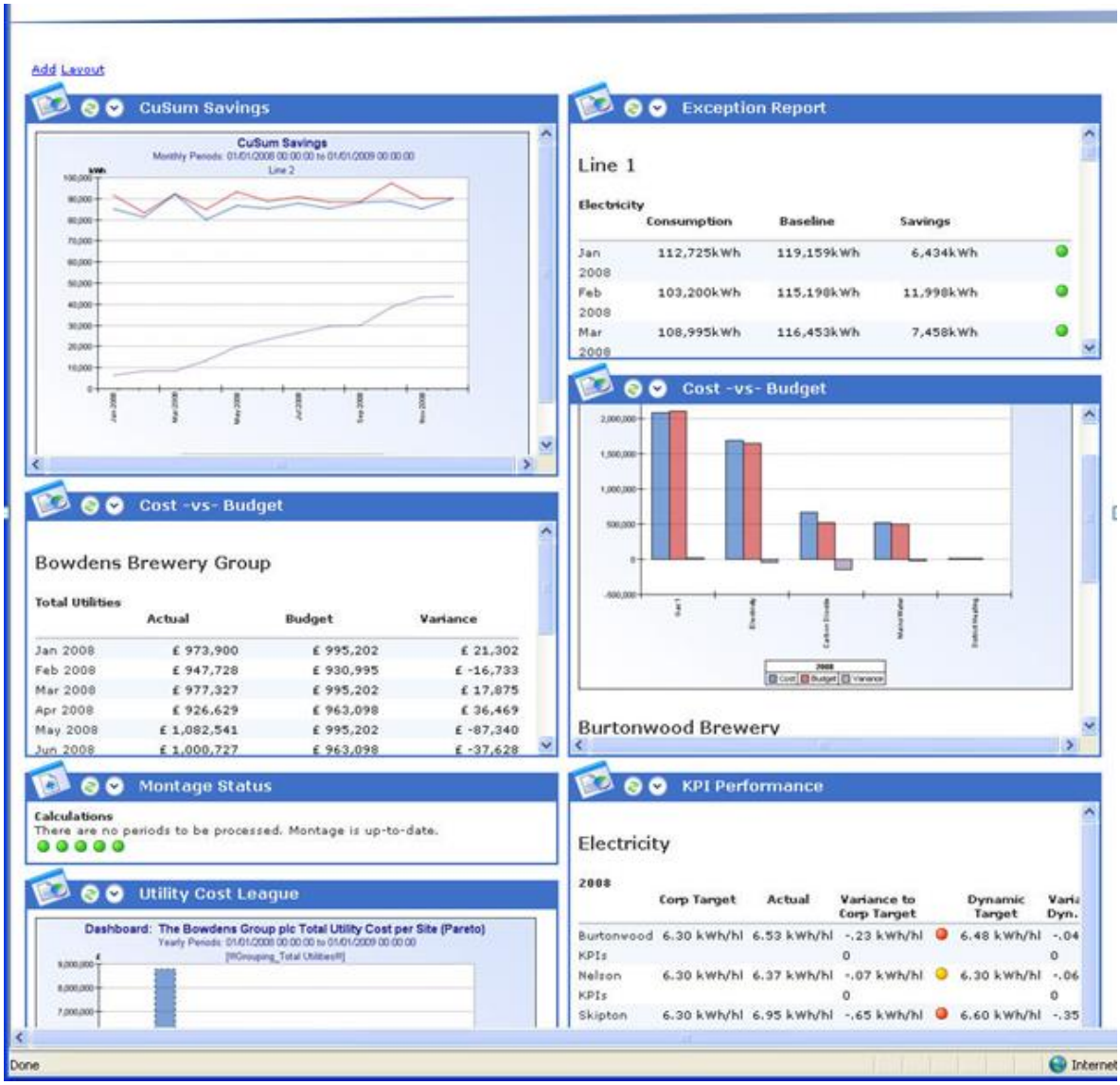
NOTE! *When the report doesn't fit in the frame, horizontal and vertical scroll bars will appear in the report window requiring the user to scroll to reposition the report, as shown below.*

The Refresh dropdown list presents the optional auto update intervals at which the contents of the dashboard module will be automatically refreshed. This feature is specifically valuable when looking at near-real-time data.



The user is free to continue to select different report modules and to create a dashboard that displays the required information.

An example of a dashboard showing multiple modules is shown below.



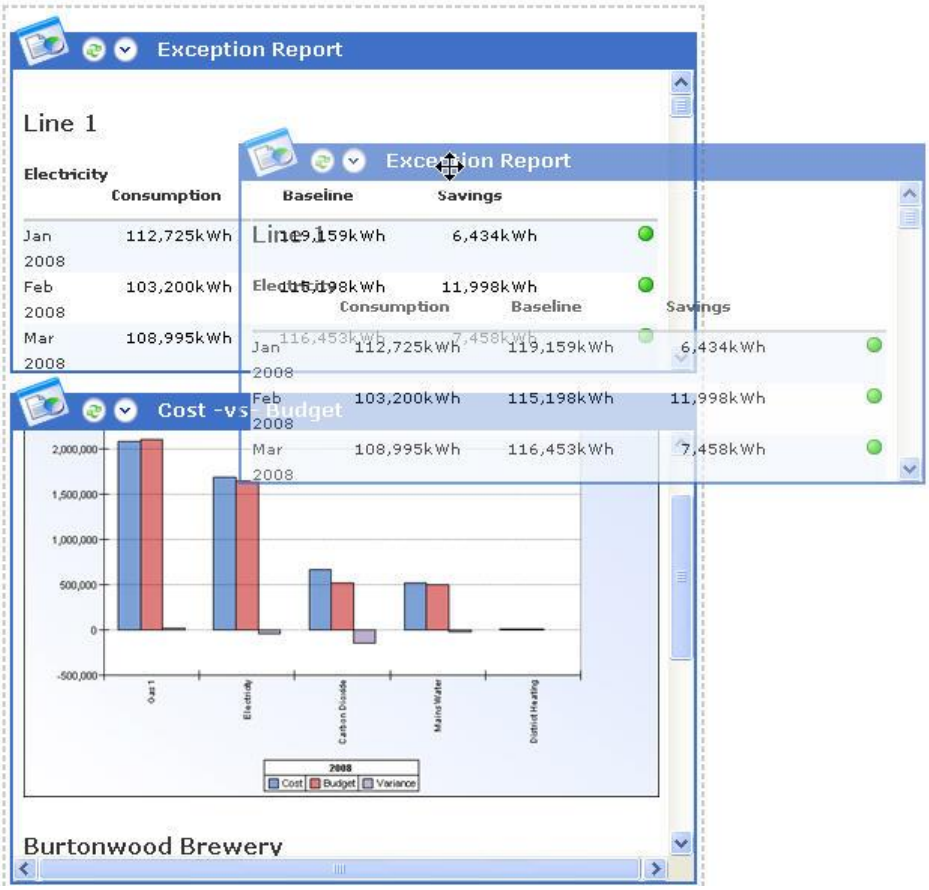
There is no limit to the amount of dashboard modules that a user can assign to a dashboard. The limit is more in the practical sense given the intention of a dashboard is to provide a 'quick snapshot of the energy performance of the business at any one time'. Having too many modules or modules with too much detail may prove to be counterproductive.

5.3.2 Changing the position of Dashboard modules

Once a dashboard has been created, the user has the freedom to change the position of the modules until they appear in the most logical and impactful position.

To move modules, move the mouse pointer over the module title on the module you wish to move. The mouse pointer will then change from being a link select icon, to a move icon.

By pressing and holding the left mouse button, the user can then drag the module and drop it into the new location on the dashboard.

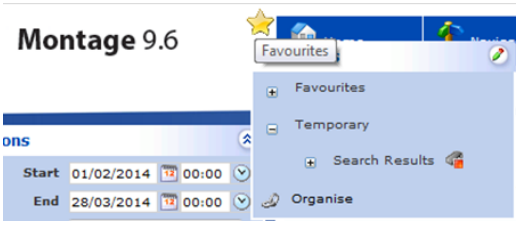


5.3.3 Making the Dashboard your default page

Having arranged the modules in a way that works best, it can make sense to assign this to be your default page. This will then be displayed immediately upon login.

To do this, click on the  located in the logo box. A new box entitled 'Favourites' will appear.

Click with the mouse in the title bar (where the mouse points, in the example below) to change the Favourites menu to edit mode.



Select the  icon next to Favourites. This will then prompt the user to give the dashboard a name and will display the URL Address where the dashboard page can be accessed directly.

The name can be anything you want, but it is recommended that it is relevant to the content for ease of use later on bearing in mind that the Favourites are personal to each user.

Accept the title and then the dashboard will be added to the list of Favourite reports for future use.

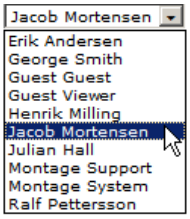
In order to make this dashboard the default, select the list of Favourite reports again by selecting the ☆ and next to the required dashboard, tick the box. This will then ensure that every time the user login the dashboard will be displayed as their opening screen.

5.3.4 Managing other users dashboard

Generally the dashboard is personal to each user and each user is always able to manage their own dashboard.

It is however also possible for users of a certain privilege level to manage other users dashboards in order to support users with limited use of Montage and help making the most relevant information available to them.

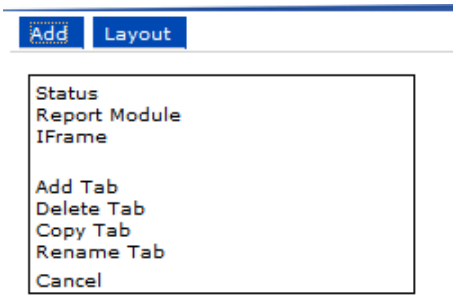
If you are such a user, you will see a dropdown list of users at the right-hand side of the dashboard screen.



By selecting any of these you will be viewing this users dashboard and be able to manage it.

5.3.5 Adding and Editing the Dashboard

It is now possible for users to have more than one dashboard. The purpose of this could be to collect all report modules of a certain type (e.g. cost) on one dashboard, whilst all the consumption performance reports are displayed on a second dashboard. Adding an additional dashboard can be done by selecting 'Add Tab' from the menu, and then following the usual steps for adding the desired report modules. The standard functions of copying, renaming and deleting dashboards have also been added to the dashboard menu.


Add
Layout
Status
Report Module
IFrame
Add Tab
Delete Tab
Copy Tab
Rename Tab
Cancel

5.4 Personal Navigator Reports

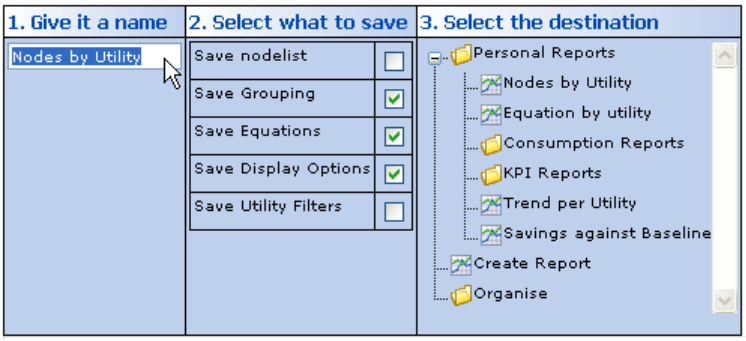
As explained earlier in section 4.5 you can create Ad Hoc reports by selecting Node(s) and using the settings in the options panel. Generally such reports will be lost when you navigate away from them to other areas of Montage but there are various ways of keeping the settings from reports you want to use again and again.

5.4.1 Saving a Navigator Report to the Reports menu

You may save a Report to your Personal Reports in the Reports menu and you may further organise these saved reports in folders and sub folders as explained below in section 5.5.

To save the Report you are currently viewing by selection the <Save To Menu> options from the Tool bar.

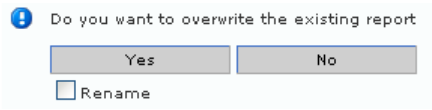
The saving of a report is a three step process.



1. Type a name for the Report.
2. Select how many of the selections you want to save.
    - Save node list
      Set this check box to also save the currently selected Node(s) with the Report settings. This is unusual since you normally use the Navigator reports with the Node selected in the Navigator tree at any time.
    - Save Grouping
      Leave this check box set if you want to save the layout of the report, as explained in section 5.1.2.7. If you uncheck the box the report will revert to the default grouping setting when opened.
    - Save Equations
      Leave this checkbox checked to save the equations. It will be very unusual not to save the equations.
    - Save Display Options
      Leave this checkbox checked to save the selections of report types (graphs, text reports etc.)
    - Save utility Filters
      Set this checkbox to also save the settings in the Utility filter. This is not a usual setting since the reports you may choose to report from in the future are likely to have different utilities assigned. Sometimes, however, you may want to make specific reports for certain utilities.
3. Select where to place it in the Personal Reports section of you Reports menu.

If you select the Personal reports folder directly, or any other folder in you structure, the report is saved and placed in that folder.

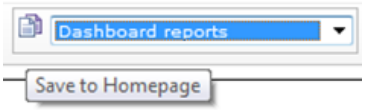
If you select an existing report you are prompted if you want to replace that saved report with the one you are now saving and whether or not you want to keep the original name or use the new name you just typed.



You may save as many reports as you wish to your Personal Reports and organise them in the structure you want.

5.4.2 Saving a Navigator report to a Homepage

You may save the current report to be a module on an existing Homepage by selecting the <Save To Homepage> icon from the toolbar.



Choose any existing homepage from the dropdown list and the report will be saved to the selected homepage. The settings in the Options panel and all the selections are saved. You may wish to edit the module on the homepage, for instance change the name and set the date range selection to by dynamic.

5.4.3 Sharing a Personal Navigator Report with other users

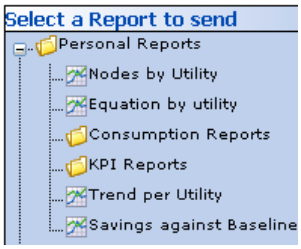
You can share your Personal reports with another user by sending a Montage message with a link to the report.

5.4.3.1 Sharing a saved report from your Personal Reports menu

To share a saved report means to grant another user access to this report in your Personal Reports menu. If you later modify the report, other users who have access to the report will also see the new modified report.

To share the report you open the report and select the <Send Saved Report> icon in the toolbar.

You will now get the option to select one or more of your saved Personal Reports from your menu to be sent.

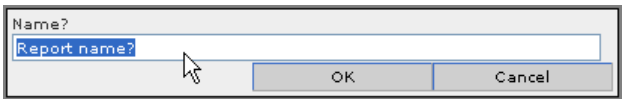


Each report you select will be added as an attachment to a message. Now go the Montage Messages, which are explained in section 4.10, and create a new message. You will see the report selected has been assigned automatically.

5.4.3.2 Sharing the report you are currently working on

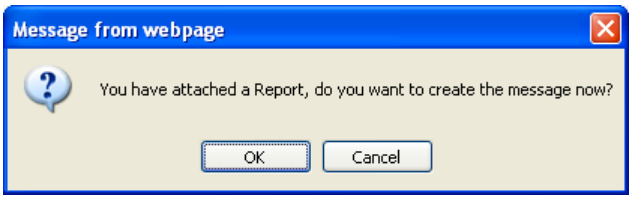
To share the report you are currently working on with another user you select the <Send Current Report> icon from the toolbar.

This option attaches all the selections you have made in the report to a message. You are prompted to name the report, but the report is not saved as a personal report.



You can then send the configuration to any other user who will then be able to open a report with the same settings as yours.

After naming the report you are prompted whether you want to now go to create the message.



If you select Cancel, you may add more attachments to the message, when you are done with all attachments, go to Messages and you will find that the reports has been attached.

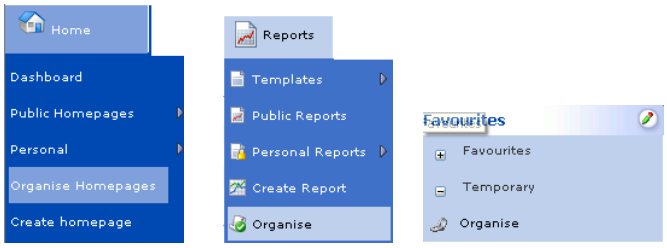
Note that the reports send in this way are not saved as Personal Reports, neither for the sender nor the recipient(s). If recipients want to keep it they will be able to save it as a Personal Report.

5.5 Organising the Report Menu Structure

One of the key design principles of Montage 9 has been to allow the user as much flexibility to configure Montage as possible, whilst ensuring ease-of-use isn't compromised.

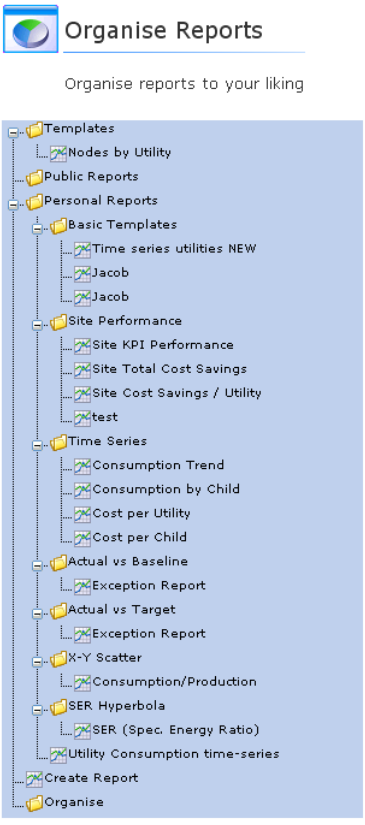
An example of this is presented here, by providing the ability for users to be able to design their own menu structures, from which they will hang their specific reports.

Report menus of various kinds appear in Montage in three distinct locations, Homepages, the Navigator and Favourites. In each case the user can determine the number of sections, section names and report position within these three menu structures.



In each case the functionality works the same, and so we will use Navigator reports as the example in this section.

Select 'Organise' from the Navigator 'Reports' menu. A screen will appear displaying the current structure for these reports, as shown below.

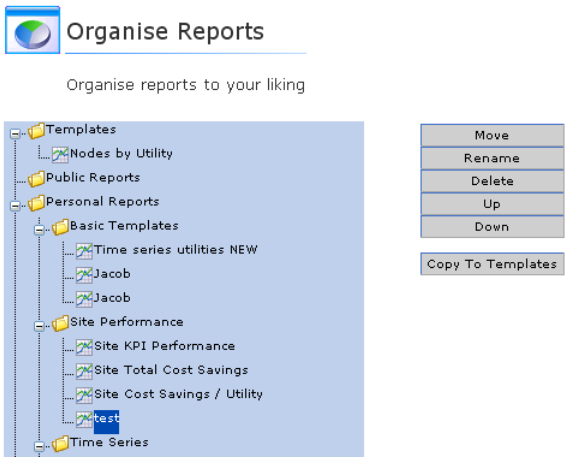


The menu shows a series of yellow folders, with the three standard Level 1 categories ‘Templates’, ‘Public Reports’ and ‘Personal Reports’ being listed at the top. These are the only folders that can’t be edited, neither deleted, renamed nor repositioned. Anything created by the user or System Administrator on Level 2 onwards can be edited.

In the above example, the user has created an additional seven folders on Level 2, with level 3 containing either reports that the user has previously configured or generic templates that can be used in the same way as Navigator reports in Montage version 8.X.

To make any changes to this structure, the user can highlight the item to edit, and depending on the changes permitted, an options box will appear.

In the example below, the user has highlighted the report named ‘test’ and now has the following options to edit the report as required.



This area of the system works in a similar way to the File Manager in Windows® Explorer and therefore should be intuitive for most new users.

5.6 Baselines and Targeting

One of the critical capabilities of Montage is its ability to establish accurate performance measurement indicators in the form of baselines and targets.

In order to establish the most accurate measurements, the user should try and incorporate all factors that will influence the level of energy consumption. In many cases there will be one dominant influencing factor, such as Production Volume in a manufacturing environment or Heating Degree Days (temperature) in a building.

However, this is not always the case, and therefore the ability for Montage within its toolkit to be able to incorporate both one and many influencing factors, ensures Montage provides the most accurate modelling of actual versus baseline/target performance possible.

In statistical terms, the modelling used within Montage is referred to as Regression analysis. Montage's ability to handle single as well as multiple variables are termed Single Regression and Multi-variable Regression. We will look at using Montage to establish both forms of targets within this section.

The subject of using Regression analysis for establishing effective targets is one of many statistical approaches that could be applied. However, this subject is not for debate here, given that Montage is developed using Regression analysis, and therefore it is this approach that will be included in the examples described in this section.

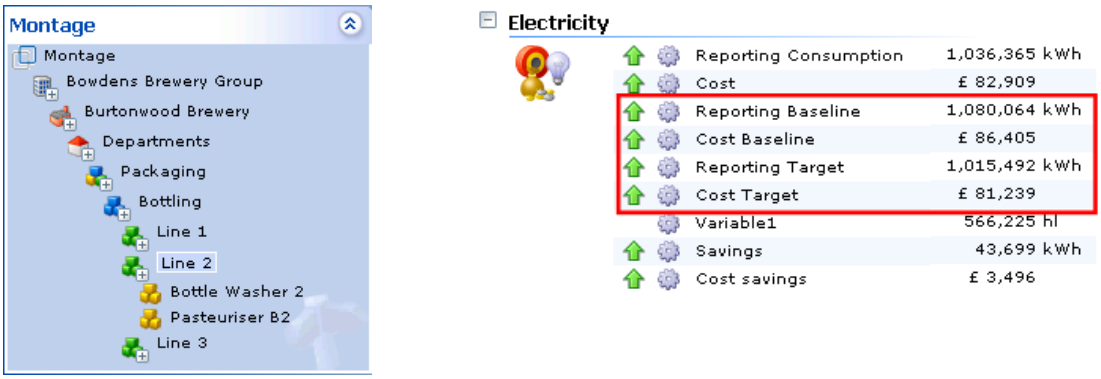
Scanenergi Solutions is constantly working in this area and has documented our learning's and those of external Associates experienced in the field of statistics. This work has valuable input into the future development of Montage as a targeting tool and ensures the software continues to be a leading product in this area.

Additional information on the statistical approaches to targeting is available from Scanenergi Solutions by request via Montage Support.

5.6.1 Displaying Baselines and Targets

On the Navigator screen, calculated baselines and target values are displayed as NodeFields for the selected node. Any node within Montage can be assigned a baseline, a target or both.

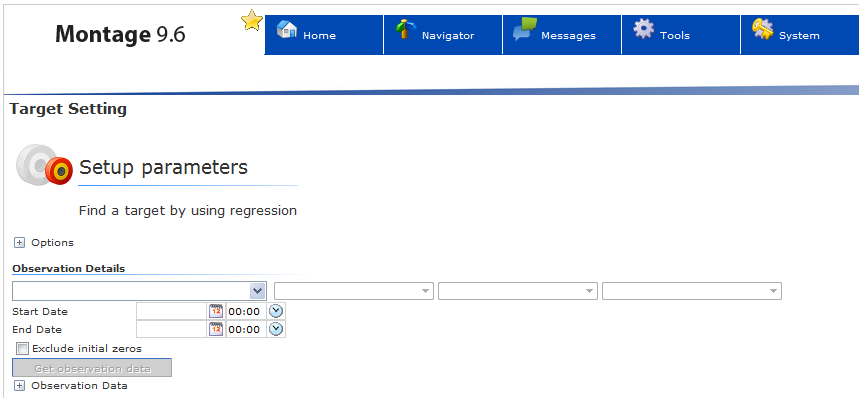
As shown below, the selected node (**Line 2**) for the utility of **Electricity** has both a baseline and a target assigned. You will also note that baselines and targets can be established to monitor different units, as in the example below that measures both **consumption (kWh)** and **cost (GBP).**



5.6.2 Creating baselines/targets using the Targeting function

From the Tools menu, select Target Setting.

The Target Setting screen will appear, initially appearing rather blank.



At the top of the screen under the 'Options' heading, you will you will see two tick boxes.

- The 'Auto-run regression' feature allows for regression calculations to be run automatically as any changes are made to the settings on this screen. This is default un-ticked.
- The 'Auto apply scatter clicks' option relates to the situation whereby the regression has been calculated and the results displayed in the form of a scatter graph. The user can, by selecting points on the graph, remove the corresponding data point from the graph, and in the instance whereby the 'Auto apply scatter

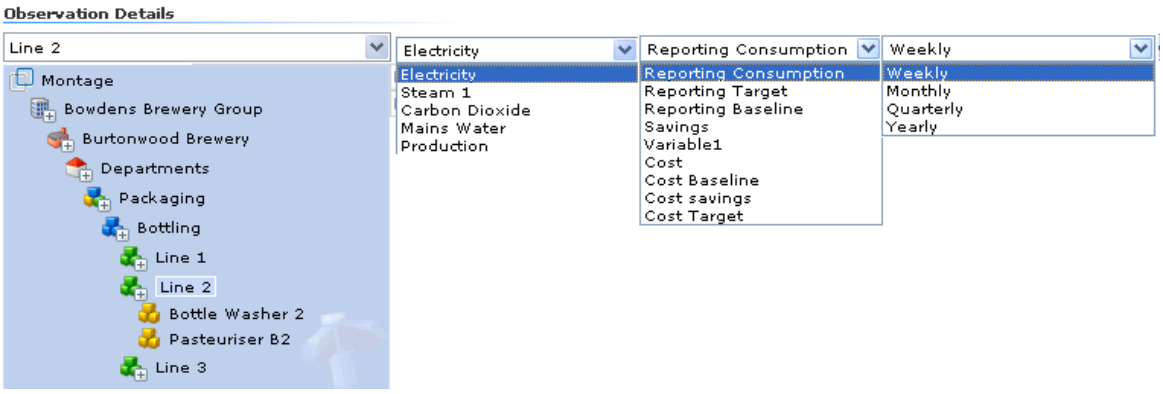
clicks' is ticked, the equation will be recalculated to exclude the points removed from the graph.

Observation details

The first point in the target setting process is for the user to select which Node, Utility, NodeField type and finally the Frequency to be used.

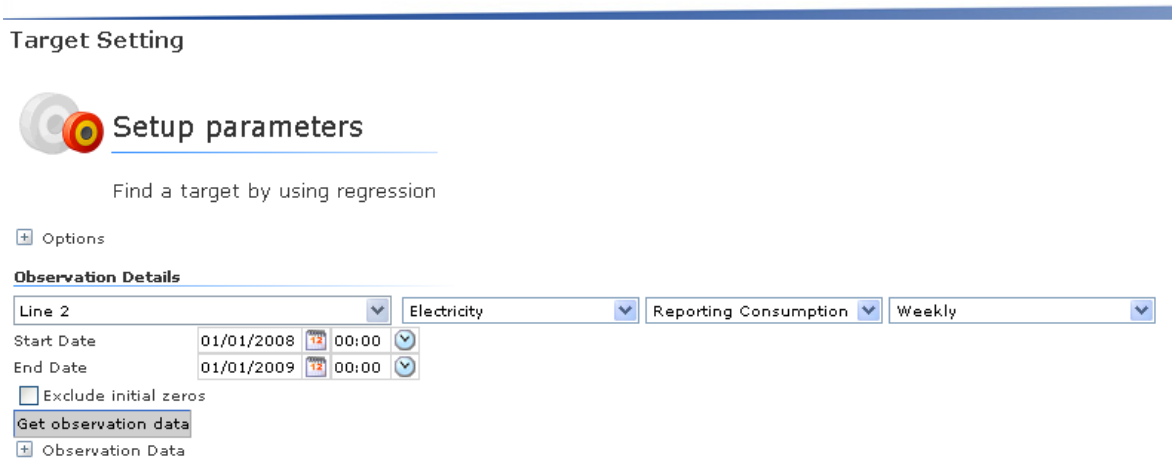
The first step requires the user to select the specific node from the node tree. Once a node has been selected, the remaining options in the drop-down boxes will be specific to the selected node and therefore will only contain relevant options.

***NOTE**: The system will always default to the first selections in the list although the user can overwrite these selections as required.*



Having made the required selections the user needs to define the time period that will define the data sample. This is done by entering a 'Start Date/Time' and 'End Date/Time' using the calendar functions.

The start Date/Time default to the start date of the selected Node. In some cases the actual capturing of data has been started sometime after the start date of the node. In these cases the box: Exclude initial zero's can be checked to avoid using all the zero consumption data that would be in the beginning of the date range and which would appear as noise in the regression analyses.



At this point the user needs to get the data from the regression analyses, and does this by selecting the Get observation data button. The screen will refresh and the option to observe the data becomes available ⊞ Observation Data .

Select the expansion button to view the data table containing the consumption data for the specified period, as shown below:

Period Ending	Observation Value	Exclude
14/01/2008 00:00	17,111	☐
21/01/2008 00:00	20,387	☐
28/01/2008 00:00	18,528	☐
04/02/2008 00:00	20,704	☐

Data can at this point be excluded (and subsequently included) in the data range by ticking (and un-ticking) the relevant boxes in the 'Exclude' column, and then selecting one of the following functions:

Apply Changes | Undo Changes

You will find similar tables of data for each predictor you choose and also on these lists you can exclude datasets. Since the whole data set will be excluded if it is excluded from either of the predictor variables or from the observation data, you will sometimes see the Exclude check boxed with a wide grey border which mean that this data set has been excluded from one of the other lists. When you place the mouse over the grey bordered box, you will see the information about from where it has been excluded.

⊟ Observation Data

Period Ending	Observation Value	Montage\Burtonwood Brewery\Departments \Packaging\Bottling\Line 1.Electricity.Variable1	Exclude
08/01/2007 00:00	25,938	14,818	☐
15/01/2007 00:00	24,808	14,758	☐
22/01/2007 00:00	26,940	16,267	☐
29/01/2007 00:00	22,659		
05/02/2007 00:00	30,858		

Predictors Excluded:
Montage\Global\Bowdens Brewery Group\Burtonwood Brewery\Departments \Packaging\Bottling\Line 1.Electricity.Variable1

Having selected the Observation data for the targeting process, the next step requires the user to specify the Predictor (or influencing variable(s). The process is the same whereby the user selects the required Node first, then the Utility then the NodeField.

Predictor Selection

Bottled Beer Line 2 | Production | Value | Add Predictor

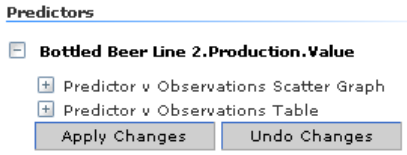
Once all selections are made, select the 'Add Predictor' and the new predictor will be applied.

Predictors

⊞ **Bottled Beer Line 2.Production.Value** ☐ Exclude Remove

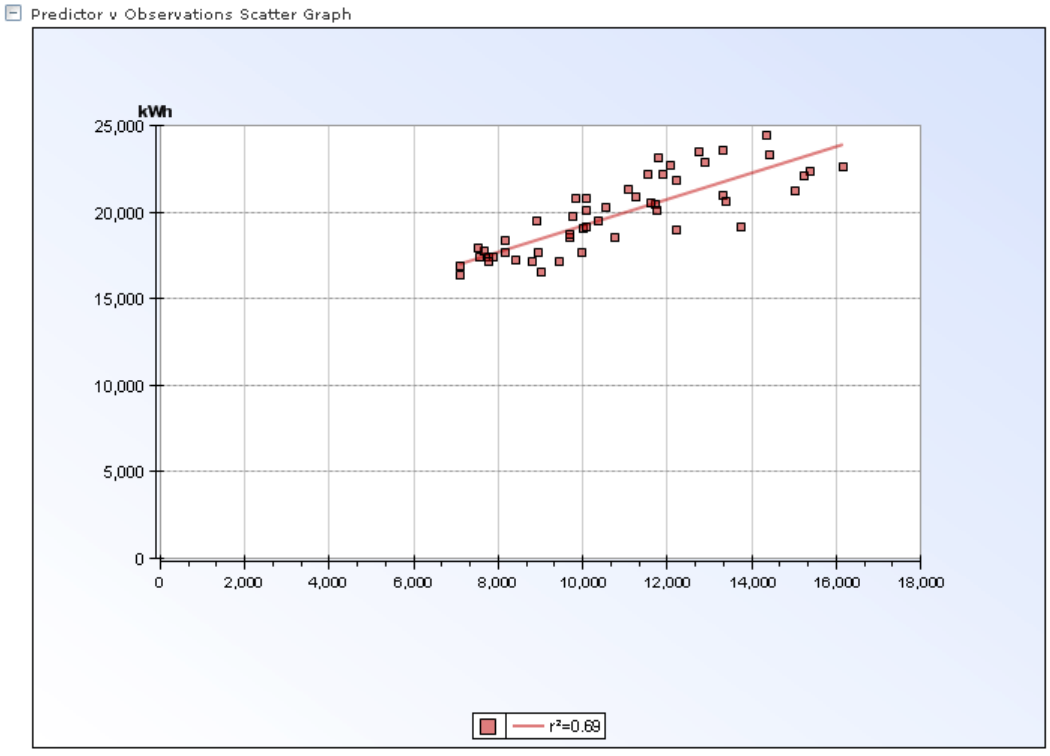
In cases where many predictors are selected (e.g. Multiple Regression) the individual predictors will be listed can therefore be excluded and removed from the calculations as required.

As with the Observational data, when expanding the chosen predictor(s) presents the user with options to view the resulting Scatter Graph and/or the Observations table. Since the scatter graph will display the observation data on the second axis where this predictor variable is the first axis. If this is a predictor variable with relatively little influence, compared to other in a multiple regression, it may seem less obvious that the correlation is good.



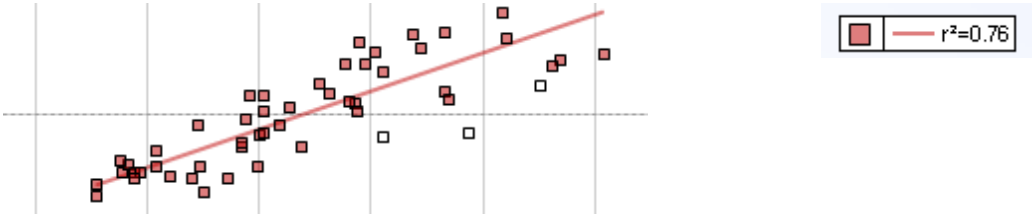
The example of the Scatter graph for the above selections is displayed below, showing the **Line 2 production** on the X axis and the **consumption (kWh)** on the Y axis. Each of the points on the graph represents one week's worth of data (as the frequency selected earlier in the process was 'Weekly') for consumption and production volume.

The legend label underneath the graph indicates an R^2 (squared) value of 0.69, which is an indicator for the level of control of the selected variable to consumption. A perfect correlation whereby all the points would sit on the line of best fit would have an R^2 value equal to one.



In statistical terms, a correlation of 0.69 is not deemed to be sufficiently reliable to form the basis of any credible assumptions. It may be that looking at the scatter pattern on the above graph that the user decides to eliminate some points that may be misleading the data sample. Typically, these could be periods of unusually low production, shut-downs for maintenance etc.

Montage allows this level of modelling by enabling the user to select points on the graph and removing them from the calculation. In this example, the user has selected three points and subsequently removed them from the calculation. As a result, the R^2 value has now increased to 0.76. You should however be careful not to remove "dots" simply because they seem to be exceptions. You are doing this regression to investigate to what extend the observation data can be explained by the selected predictor variable and you may be fooling yourself if you just keep those that show what you expected.



Montage itself will also assist the user by indicating the quality of the correlation between the selected variables, by presenting a series of 'stars'. In this case Montage is highlighting two gold stars which indicates that the correlation appear to be reliable, based on the statistical results.

After having deselected some of the weekly points the Apply Changes / Undo Changes come into play.

Depending on the settings for "Auto apply changes" and "Auto run regression" you may have to manually ensure that changes are applied and the regression is rerun.

The option to force "intercept to zero" will force baseload (the intercept with the second axis) to be zero which is rarely the case. If however you have reason to believe that the actual result of the reression should be a line through origo, you may set this.

The grading of the regression uses the notation of 0, 1 or 2 stars.

- 0 gold stars (2 gray stars) indicate that there is very little statistical indication of a usefull correlation. You should probably not use this variable as a predictor.
- 1 gold star indicates that there is statistical indication of a possibly useful correlation. You should consider the use of this variable as a predictor; possibly combine it with more variables.
- 2 gold stars indicate that the statistical information support the use of this variable as a predictor.

Whenever the correlation is deemed to be satisfactory (includes one or more gold stars), Montage will present more information to the user specific to the correlation. By expanding the section called 'Regression Rating', an ANOVA (ANalysis Of VAriances) table displays the relevant statistics of the equation.

Some of the most important numbers are explained briefly below. Some of the values require better understanding of statistical methods and will not be explained here, please refer to the document: "*Univariate Multiple Linear Regression MODELS AND METHODS*" which can be obtained from Montage support, for a more thorough description of the statistical methods used.

Regression Statistics	
Multiple R	0.871
R Square	0.759
Adjusted R Square	0.754
Standard Error	1,118.040
Observations	48

	Degrees of Freedom	Sum of Squares	Mean of Squares	F Statistic	Significance F
Regression	1	181,076,542.051	181,076,542.051	144.860	7.772E-16
Residual	46	57,500,635.686	1,250,013.819		
Total	47	238,577,177.737			

This part of the information covers the entire regression.

- **Multiple R**
  Is also called the "*coefficient of multiple correlation*" and it is the positive square root of the R Squared.
- **R Square**
  Is also called the "*coefficient of multiple determination*". The R Squared value indicates how well the variable(s) explain the observed value. The R Squared value will in practical cases be less than 1. 1 is the perfect correlation that only appears when "all the dots are on the line". The higher the R Squared value the better fit, often an R Squared value above 0.75 is considered good.
  With more observations the R Squared value will normally decrease slightly and a lower R Squared value may be acceptable. As a special case you will see that if you have only two observations the R Squared value will be 1 since the best fit line will be the line through the points. It should however be obvious that this is not a valid proof of anything. Normally you should have at least 12 samples (sets of observation data) for a regression analysis, and these samples should cover all normal conditions; periods with as well high and low production throughput and also all seasons. There are three numbers for the R Squared value:
- **Adjusted R Square**
  Is also called the "*adjusted coefficient of multiple determination*". This number is especially important when using multiple predictor variables. Due to the mathematical method, the value of R Squared will normally increase when adding more variables but maybe it does not increase sufficiently to prove that the improvement is significant. If you see the Adjusted R Squared decrease when adding another predictor variable, you should probably not use it even though you may see the R Squared increase.
- **Observations**
  Simply tell how many samples have been used in the regression.

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Factor	Product	Percent
Intercept	10,905.118	758.587	14.376	0.000	9,378.162	12,432.075	48.000	523,445.678	55.0%
Line 2.Production.Value	0.841	0.070	12.036	0.000	0.701	0.982	508,990.488	428,217.275	45.0%

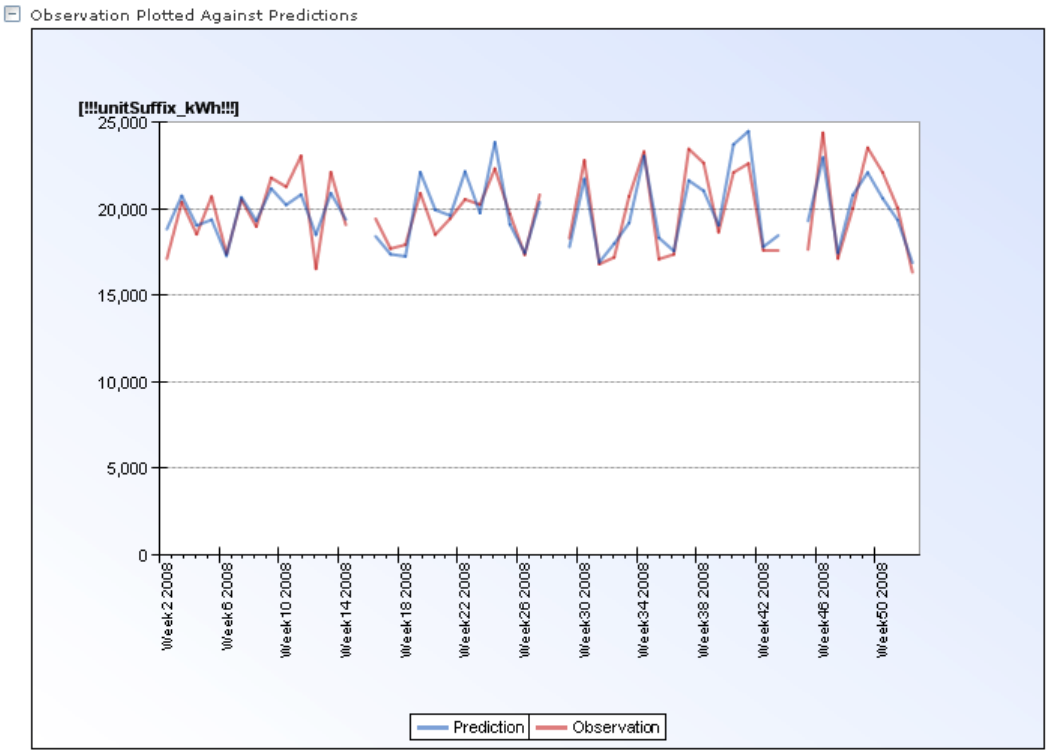
This part of the information has one line for each predictor variable, and one for the intercept (baseload)

- **Coefficient** is the consumption per unit of the predictor variable. The first line in the table, the intercept, is the baseload. These numbers will be the ones used in the target equation when it is saved.
- **p-value** is the most important number in this table. It can be said that the p-value is the statistical probability that the apparent correlation could be by simple chance. If this value is above 0.05 (equal to 5% probability) the result is generally not considered to be valid. You will often see values of 0.00; really these numbers are not exactly zero but very small so Montage rounds then to make the table easier readable.

- **Lower 95%** and **Upper 95%** expresses an interval in which the real coefficient is with 95% probability. In the example above, the coefficient for the production volume is found to be 0.841 and the it may be expected, with 95% probability that the real value is between 0.701 and 0.982.
- **Percent** is the percentage of the total investigated consumption that can be said to be explained by each predictor variable. The sum of the numbers in this column will add up to 100.

Plotting the Observation against Predictions

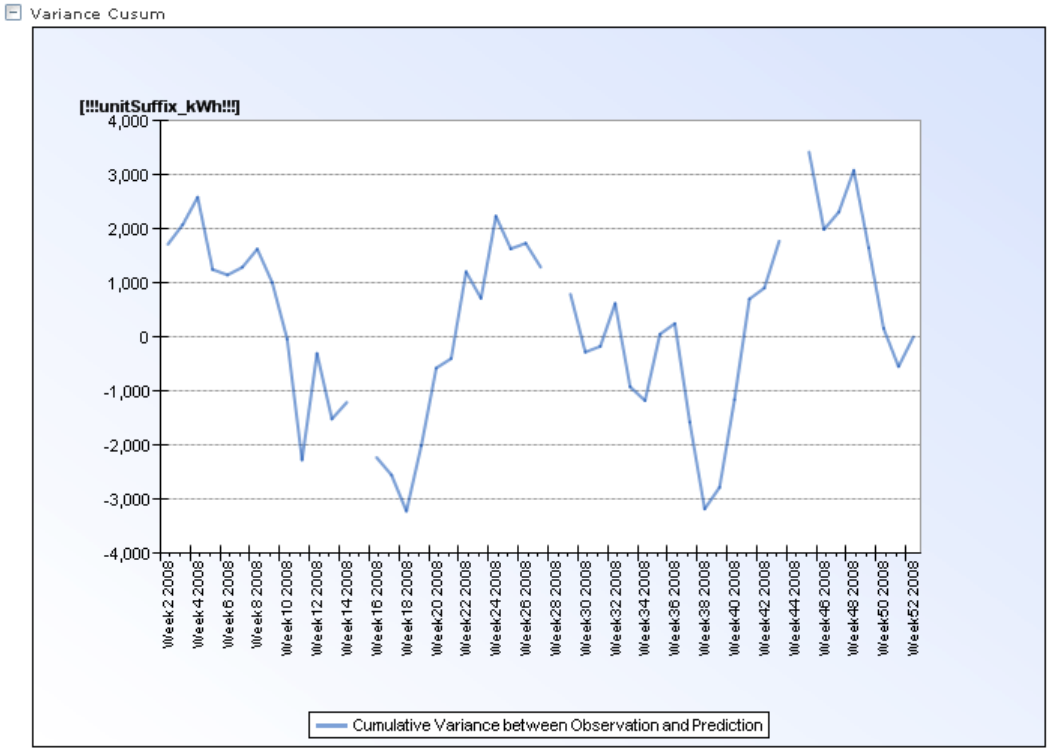
Another useful visualisation is to compare the actual consumption to the calculated regression line.



The graph above also highlights the three areas where the points on the graph where excluded from the analysis. Enabling these points and re-running the regression would replace these points.

Variance Cusum graph

It is often easier to get an interpretation of how closely these variables correlate to one another over time by adding the variances (differences between the Observation and Prediction points for the same period) and plotting the results on the time line, as shown below:

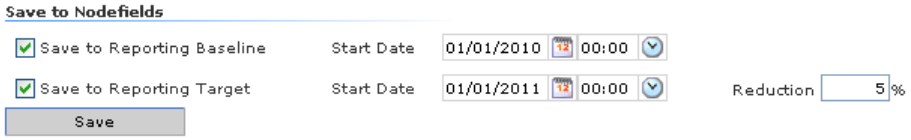


Ideally the Cusum graph should vary randomly and close to zero, if the variance is big (in relation to the value of the examined observation data) and there seem to be a pattern in the variance, it is like that there is at least one predictor variable that hasn't been considered.

Save the results to the required NodeField

Once the equation has been finalised, the final step in establishing the target is to assign the equation to a corresponding NodeField. This can either be a Reporting baseline and/or a Reporting Target, starting at a period of time to be specified by the user.

In this example, the equation has been used to establish the Reporting Baseline starting from 1/1/2010, with the same equation (but with a 5% reduction) as the Reporting Target from the period 1/01/2011 and continuing until the Reporting Target is replaced by a second target.

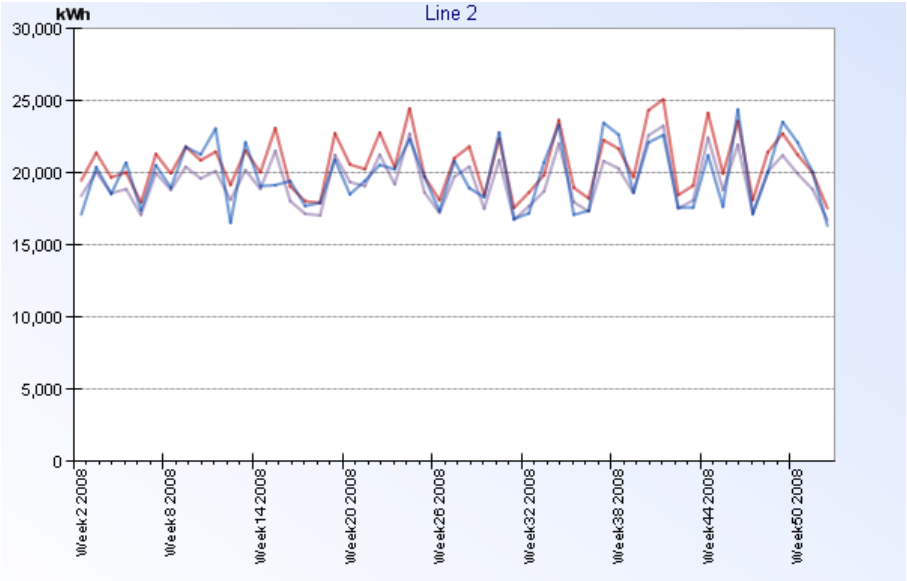


Selecting 'Save' will assign the equations to the NodeField(s) and trigger a calculation before displaying the correct output on the Navigator screen.

Using Baselines and Targets in practice

Having established and applied a baseline/target to its respective NodeField, this data can be used within Montage reports as an effective measure of performance.

In the example below, the graph shows the trend of Actual Consumption of Electricity (blue line) against baseline (Red) and target (purple) on **Line 2**.

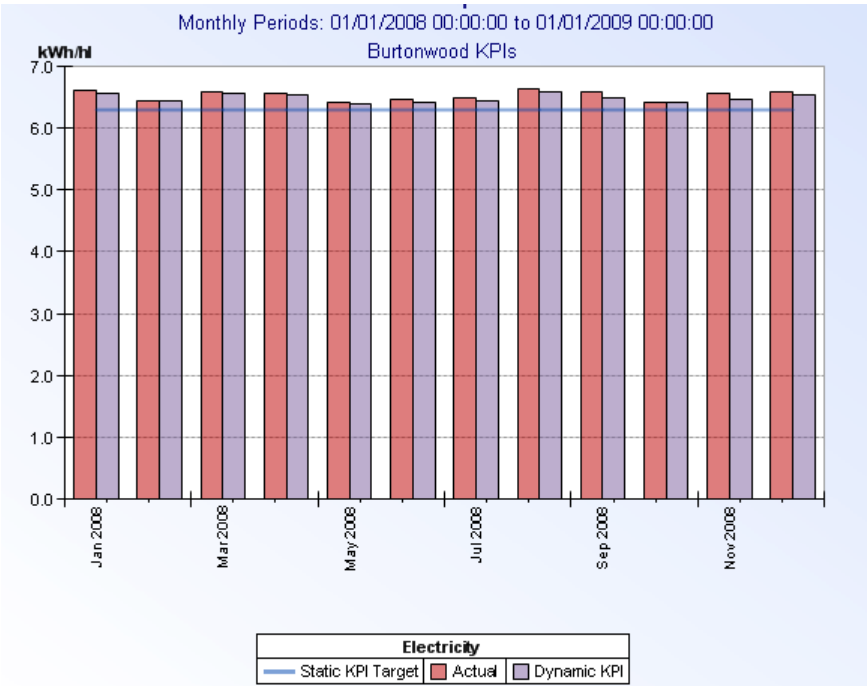


Another way to use these performance measures is a ratio of another variable. For example, using the ratio between Electricity (kWh)/Production (hectolitres) (hl) to give a KPI (key performance indicator) to monitor how much Electricity it takes to produce one unit of production output.

By using the Target Setting tool within Montage, the historical performance of this KPI could be analysed in order to establish a realistic KPI target that accounts for the unique influences of the site (e.g. outside temperature, product mix, efficiency of equipment etc).

Establishing such KPIs that are based on real historical data and account for changing levels of production are called Dynamic KPIs. These provide a more realistic measure of performance than say comparing against a fixed target that has been set based on a set reduction figure (5%) from the previous period.

The example below shows the KPI performance of a site, as compared to a Fixed (Static) target and also a Dynamic target. The Static target (blue line) is set at an expected level of 6.30 kWh/hl whereas the actual performance (Red bars) shows that for every month for the specified period the consumption was above target. It could be that the target set was in fact unrealistic, and so when including the Dynamic target (Purple bar) which is based using the target setting tool with real historical data, shows that based on the varying levels of production (and other variables) the site got close to target in about 3 (May, June and October) of the 12 monthly periods. It would appear therefore that the Static target is unrealistic for this site assuming status quo on process and equipment.



The subject of establishing baselines and targets is far more comprehensive than is able to be covered here. This section provided an introduction to the steps necessary to establish a baseline/target and also some statistical definitions associated with identifying whether the resulting equation is a valid source for setting performance measures.

It is important however to note that in order to make the best use of Montage and to increase the chances of utilising the tool to make savings, wherever possible in the node structure we would encourage baselines and targets to be established.

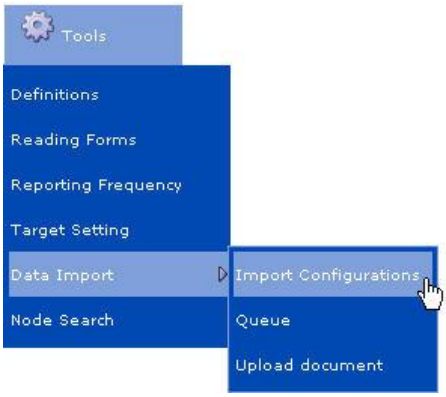
Without these, Montage becomes a utility monitoring tool rather than a performance management tool.

5.7 Import configuration and file management

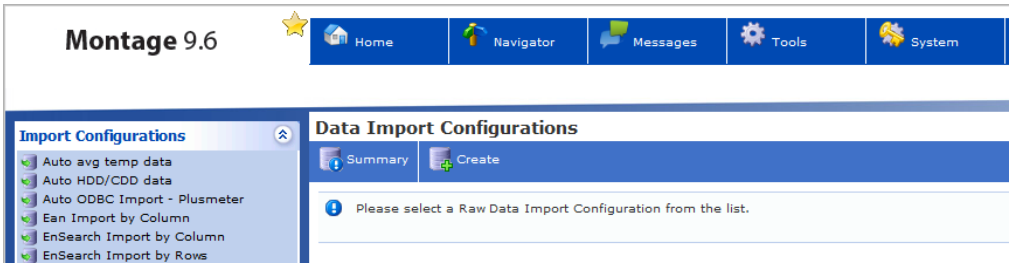
Import configurations specify where data can be found, how it is formatted and where it should be saved in the Montage database.

Each Import configuration reads one source of data. You can create as many import configurations as you like.

To access Import Configurations, from the Tools menu, select ‘Data Import’ and ‘Import Configurations’.



This will open the Import Configurations screen, and will display the list of import configurations previously created in the box to the left hand side of the screen as shown below. When using the system for the first time, this list will be empty.



The screen opens as default on the Summary page, with the instruction to select an existing import configuration from the list. This is useful for when wanting either to access, edit or copy an existing configuration. Else, selecting ‘Create’ will enable the user to create a new import configuration.

Selecting a configuration from the left-hand side opens the chosen configuration, and the menu bar will be updated with additional options, which in turn are described below:

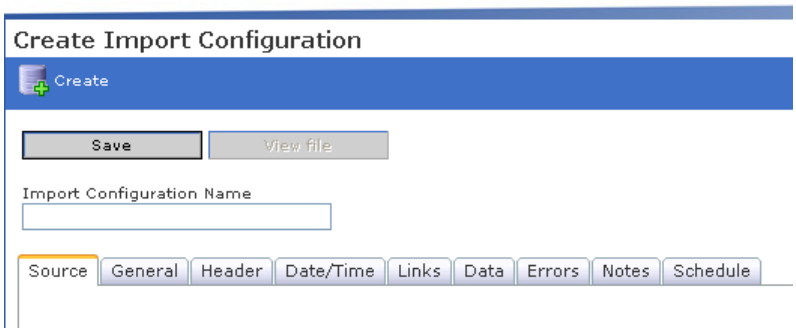
	Returns the user to the opening screen of the import configuration.
	Will run the import configuration based on the parameters selected.
	Takes the user to the various configuration tabs which define the import.
	Allows the user to test the import based on a small data sample to see if there are any configuration errors before running the full import. ***NOTE!*** *Recommended to be used before running all imports.*
	Creates a new (blank) import configuration
	Allows the selected import configuration to be copied to make a duplicate for editing. ***NOTE!*** *A useful time-saving feature when requiring to create a similar import configuration to one previously configured.*
	Deletes the selected import configuration.

5.7.1 Creating (or Editing) an import configuration

This section explains the options you have during configuring an import. Whether you are requiring editing an existing configuration or creating a new one, the configuration screens are the same. Due to the extreme amount of combinations it is not possible to describe them all. Instead the approach is to explain each of the settings individually.

The many settings in the configuration are displayed on a number of configuration tabs. These can be accessed by either selecting ‘Setup’ (having already selected an import configuration) or ’Create’ if creating a new one.

The screen when creating a new configuration is displaying below, and identifies the individual tabs that will detail the characteristics of the import.

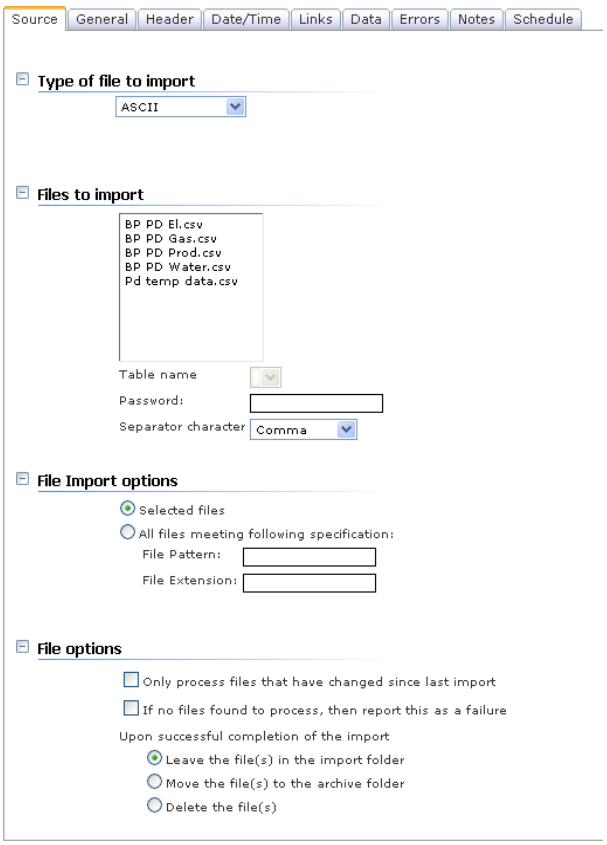


Each of these tabs is described in the following sections. Some of the tabs vary slightly depending on settings on other tabs but all the major properties are explained below.

5.7.1.1 Import configuration – Source

The Source tab defines where Montage should find the data to import.

File Import



Type of file to import

ASCII Text files with a fixed structure. This is the most simple file type which should be preferred if possible.

Excel Spreadsheet files of Microsoft® Excel (97-2003) format. Data must be on one sheet. When importing from Excel, Montage reads the formatting of date time

as well and you must be careful to make the configuration corresponds to that and users must not change the formatting of the files that are uploaded for import.

Access — Database files in Microsoft® Access format. Only data from one table can be imported.

Files to import

For Excel and Access files you must specify the table/sheet name and provide a password if required in the file.

For ASCII files you must specify the field separator: Comma, Semi-colon or Tab.

File Import options

There are three options:

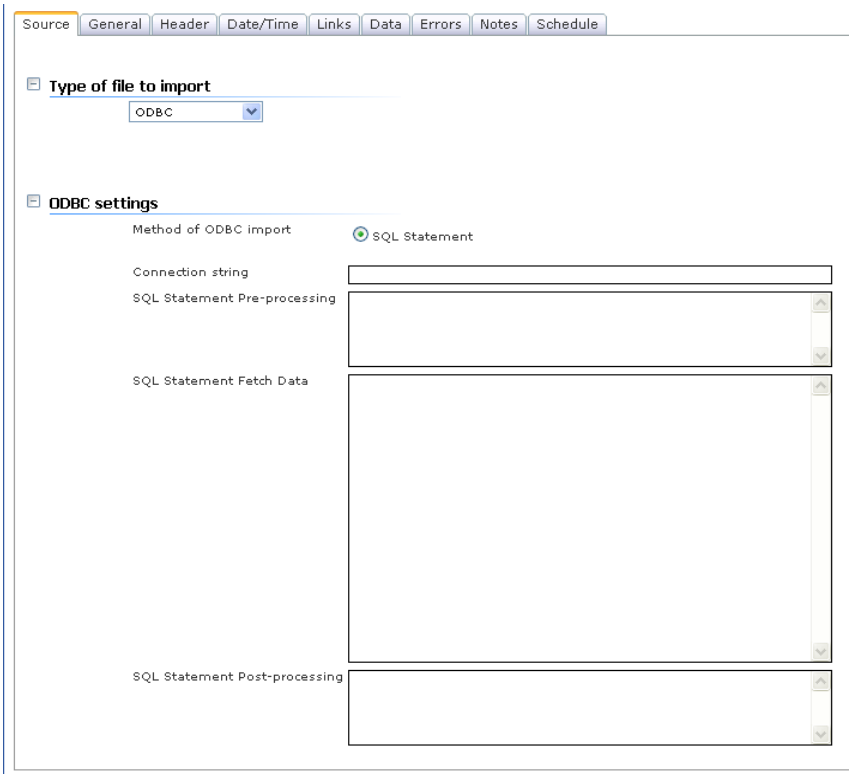
- Selected files … is used to select one or more files from the list to be imported.
  - Click on a file to select it and deselect other files.
  - Hold the shift key down and click on another file to select all files between the selected files.
  - Hold the Ctrl key down to select another individual file.

  This option is mostly used when manually importing historic readings once.
- All files meeting following specification … is used to create a filter and import all files that match this mask. It is the common method for importing automatically generated files from e.g. SCADA systems. These files will often include a time stamp in the file name.
- Prompt with file list … is used when the file can change name from time to time. This is an option for manually importing files from time to time and cannot be used for scheduled (automatic) operation.

File options

- Only process files that have changed since last import. When checking this box Montage will only import the same file once. Alternatively, a better approach can be to move the file once imported, which is one of the options described below.
- If no files found to process, then report this as a failure. This will produce an error in the calculation queue if the associated system, e.g. a SCADA system or the Montage HDC application, has not produced the expected file.
- Upon successful completion of the import …
  - Leave the file(s) in the import folder. The file will appear in the files list of Montage and may as such be imported again if requested. Generally this is not a good idea, except for during the testing phase when you might want to re-run the same import several times.
  - Move the file(s) to the archive folder. The file will disappear from the files list of Montage. It will not be deleted but moved to an archive which is not accessible from the Montage user interface but the Administrator will be able to reproduce the file for investigation at any time.
  - Delete the file(s). The files will be permanently deleted.

ODBC Import



To use the ODBC (Open DataBase Connectivity) import option you must enter the connection string which identifies the database to connect to, the user Montage operates as and the password for this user.

The configuration of the import itself consists of three pieces of SQL script:

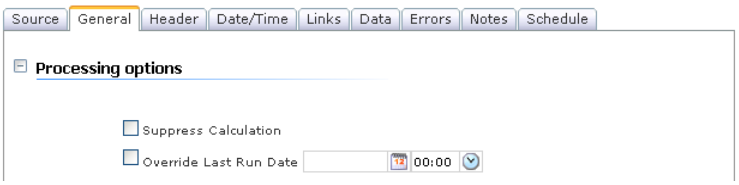
- The pre-processing statement can be used to prepare the source database data for import. This could for instance be flagging the data that are going to be imported. One import should be limited to no more than about 8000 rows of data, depending on the hardware Montage is running on.
- The Fetch Data statement extracts and formats the data from the source database into a temporary table in memory before it is saved in the Montage database.
- The Post-processing statement can be used to mark these data that has now been imported into Montage. By using such techniques, it is possible to make sure that all data is read only once.

Dealing with this type of import requires some level of SQL skills, and should only be undertaken by individuals qualified to do so, which is also why it is intentionally not described in more detail here.

If more guidance is required you should seek assistance and not just experiment. You must understand that you are actually able to modify any record in the Montage database and possibly also in the source database, and as such permanently harm the system. This is also in breach of the terms outlined in the End User licence Agreement (EULA).

If you require assistance you should contact the Montage helpdesk (support@montageum.com) and/or your local database administrator.

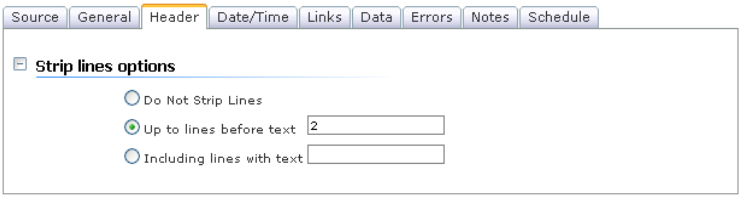
5.7.1.2 Import configuration – General



- Suppress Calculations.
  Check this box to import the data into readings in Montage, but don't run calculations on output data.
  ***NOTE**: This may be used during the testing of the import, but should never be left in a configuration as it will not produce output data.*
- Override Last Run date.
  This will force the last run date to be different from the current time.
  NOTE: *It may be used when testing ODBC imports but should never be left in a configuration.*

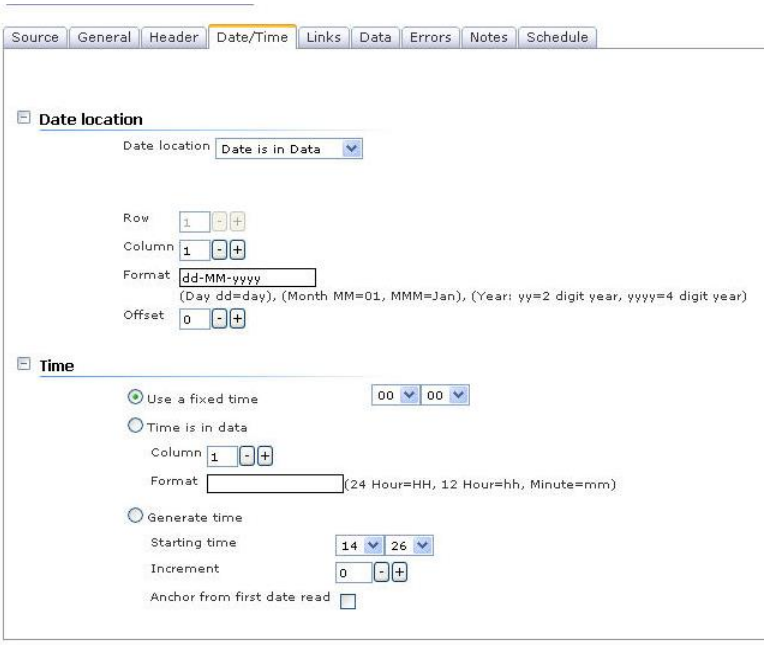
5.7.1.3 Import configuration – Header

This is the Tab where you may specify which lines in the file you wish to exclude from the import (e.g. if the file contains headers or titles that would result in errors on import)



- Do Not Strip Lines – Imports from all lines in the data set.
  Up to lines before text – Skips the first lines of the data set.
  Include lines with text - Skip's lines from the data set if they start with the entered text.

5.7.1.4 Import configuration - Date/Time



Date

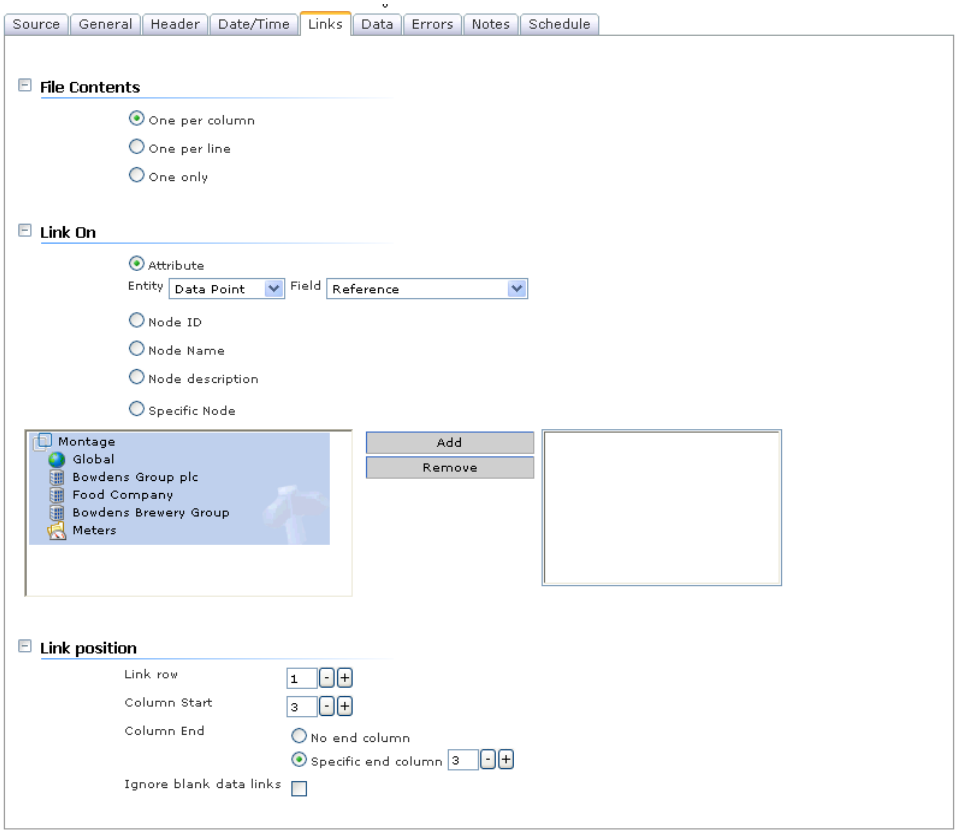
- Date Location
  Date is in data … Specifies that the dates are to be found in the data section of the file (See Header tab). This is the most typical setting.
  Date is in header … Specifies that the dates are to be found in the header section of the file.
- Row
  Specifies in which row to find the date (Only when 'Date is in header')
- Column
  Specifies in which column to find the date.
- Format
  Specifies how to extract the date from the text in the file.
- Offset
  Shifts the date a number of days compared to the time stamp in the file. Use this for instance if the reading is the consumption for a day, in which case the correct time stamp in Montage is the following day at 00:00.

Time

- Use a fixed time
  This option will time stamp the readings in the file with the same time stamp. This is the most commonly used option for importing historical data when first implementing Montage. Set the time to be in the middle of the interval where it is most likely that the readings have been taken.
- Time is in data
  Use this option if each reading has a time stamp in the file.
- Column
  Specifies where to find the time
- Format
  Specifies how to extract the time from the text in the file.
  Note: *If Date and Time is found in the same cell (row/column) the entire format for the date/time must be included.*
- Generate time.
  This option will generate a time stamp for each reading, starting at the specified

time for the first reading in the file and incrementing for each reading. Use this estimate option if you know the order in which the meters were read and the time the reading started. It is likely to be more accurate than using a fixed time, but it is still an estimate.

5.7.1.5 Import configuration - Links



File Contents

- One per column.
  Is used when a number of readings are sharing a time stamp. Each line will have a shared time stamp and then there will be data in one column for each meter which are in the file. This is the most commonly used format for importing historical data.
- One per line.
  This option is used when each line in the file contains one reading. Typically the lines will have four fields: Date, time, reference and reading. This is the most commonly used format for importing automatic readings, as it allows for any number of readings for any number of data points.
- One only.
  This is rarely used but applies if there will always be a new file for each reading.

Link On
Specifies which attribute on the Montage nodes, the linking reference should be compared, to decide which node the data belongs to.

- Attribute.
  This option allows you to link the data to any attribute on the data point. For instance the automatic import from the Montage HDC PDA data capture option

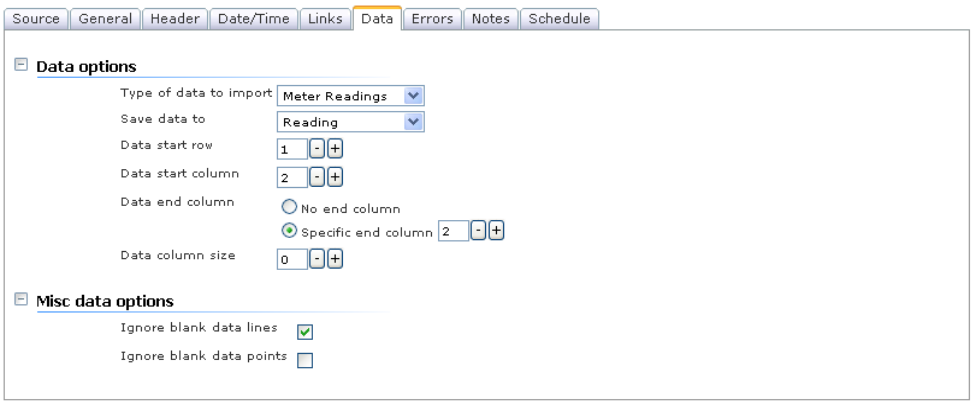
uses the Reference attribute (attached to the meter as a barcode) for linking the data to the nodes.

- Node ID.
  This option stores the readings on the node with this Node ID as found in the data file.
- Node Name.
  This option stores the readings on the node with this Node Name as found in the data file.
- Node description.
  This option allows you to link the data to the description entered on the data point. Be careful when using this option because the description of the node is a property which is relatively likely to be edited in which case the data import will fail.
- Specific node
  This option allows you to select a specific node to import the data to. This is not used very often.

Link Position
Specifies where in the file to find the reference to the node in Montage – referring to the setting of which property on the node to link on, as specified above.

- Link row specifies in which row to look for the reference (applicable depending on the File Contents as set above).
- Column Start specifies in which column the first link is to be found and End specifies whether Montage shall continue in the next column until there are no more, or if it should only look in a specific range.
- By checking the box 'Ignore blank data links', you prevent Montage from counting errors in situations where a link cell is blank. Please refer to section 5.7.1.7 for explanation about the error count.

5.7.1.6 Import configuration – Data



Data Options

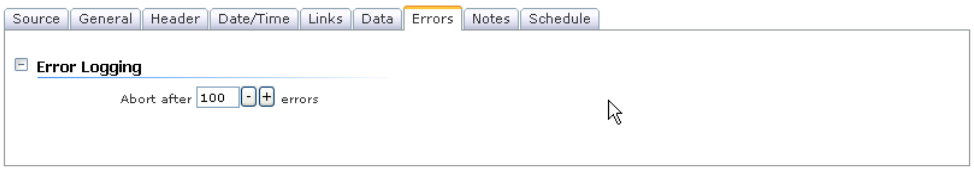
- Type of data to import.
  Choose whether it is 'Meter Readings' or 'Invoice Readings' that are to be imported.

- Save data to.
  You can save the imported data to any of the fields that also appear on the Meter Readings or Invoice Readings pages. Several of the options you find for Meter Readings are only to be used in very specific cases. The normal fields to save the data to will be Reading or Meter Delivery.
- Data start row; specifies in which row to look for the first data in the file (applicable depending of the File Contents as set above).
- Data Start Column; specifies in which column the first data is to be found.
- Data End Column; specifies whether Montage shall continue in the next column until there are no more, or if it should only look in a specific range.
- Data columns size

Misc data options

- Ignore blank data lines.
  By checking the box 'Ignore blank data lines', you prevent Montage from counting errors in situations where a line is blank. Please refer to section 5.7.1.7 for explanation about the error count.
- Ignore blank data points.
  By checking the box 'Ignore blank data cells', you prevent Montage from counting errors in situations where a data cell is blank. Please refer to section 5.7.1.7 for explanation about the error count.

5.7.1.7 Import configuration – Errors

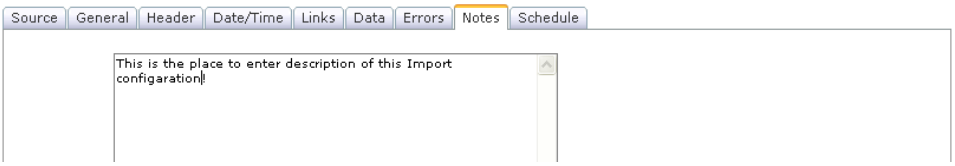


When an import is running, it will first investigate whether the data file corresponds to the settings in the import configuration. If the various lines and fields in the file complies with the settings and contain understandable data, the import is carried out.

Each time there is a mismatch between what Montage finds in the file and the settings for that particular line or field, this is considered an error. As long as the error count in the entire file does not exceed the number specified on this tab, the import of all the understandable data is carried out and the problem data are simply rejected. If the number of errors exceeds this number, the entire import is cancelled. It is likely that there from time to time will be such errors in the data files, and the typical setting of this threshold is between 10 and 100, but you may set it very low if you think that the data file should at all times be perfect or very high > 1000, which is often the case when importing historical data.

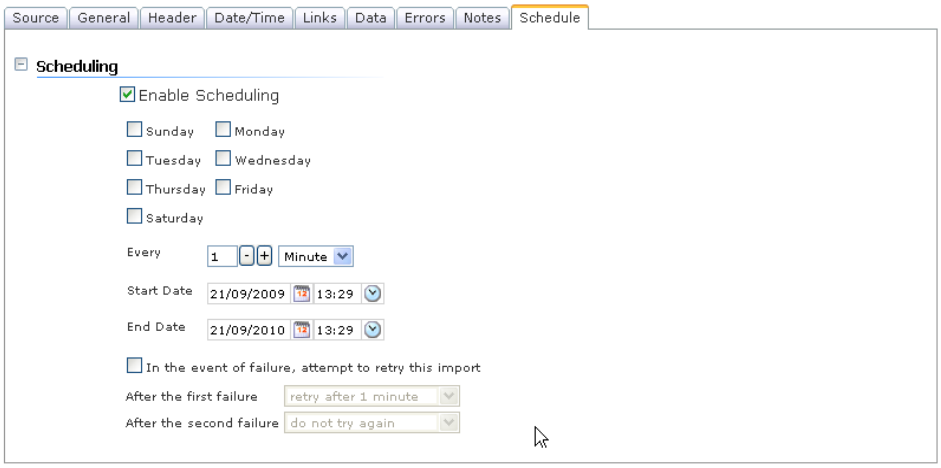
Usually it will be better to import all the understandable data from a file, than to reject the entire file. The errors are logged and can be investigated at a later time, when actions can be taken to solve the problem.

5.7.1.8 Import configuration – Notes



On this tab you have the option to make notes and explain about the import configuration. It may be helpful when you at a later stage revisit the import configuration, or if there are more users working at this level in Montage.

5.7.1.9 Import configuration – Schedule



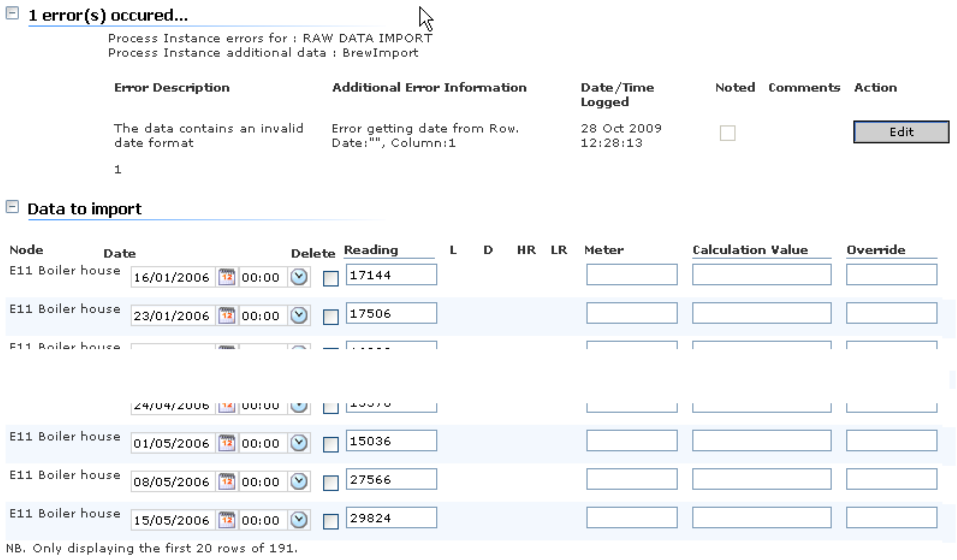
It is possible to schedule an import to run at specific intervals on selected days of the week. It is very important, when applying scheduled imports that you make sure the data file is either archived (recommended) or delete after import. If the file is left in the import folder you will keep importing the same data and load the server unnecessarily.

- Once you check the 'Enable Scheduling' box, you must specify which days of the week you want the import to run automatically.
- Although you can set it to run very frequently, the most typical setting is between 1 hour and 1 day. If the import is run at times where there are no files to import, the process will be very fast and not cause any load on the server.
- The schedule will only apply to a specific date range but it is common to set the end date to be a day far out in the future.
- You may set the import to retry if it fails for any reason. Sometimes this may be a good idea, typically when importing via ODBC, because there may be a problem on the network that periodically prevents Montage from accessing the source database. The option is to set these retries in two levels and it is recommended that the first retry is after a short period while the second should wait considerably longer. If there is a problem that still exists after one or a few minutes, it is likely that it may take longer before it will have been fixed.

5.7.2 Test an import configuration

Once you have created a file import configuration you should test it before running it. Simply save the configuration and select 'Test' from the menu bar.

The import will run, but only display the first 20 lines on the screen and not save anything to the database. More importantly, it will also display the error messages from the import, so they can be corrected.



An example of a test import is displayed above, where you can also see an example of an error message. There are many different error messages and these are not all covered by this manual. They may not always seem obvious at first sight, but they are helpful when it comes to troubleshooting the import configuration or the data file.

***NOTE**: It has been seen that the web-interface times out when testing the import of very large files. This is not a fault in Montage and provided the import configuration and the data file are OK, the actual import will work fine. You should 'Test' the configuration on a sub-set of the data, so you can confirm that the structure of the data complies with the configuration. Please also remember that you should never try to import more than 8000 data items in one operation.*

5.7.3 Automatic data upload

Files to import are placed in the MontageDataUpload folder on the Montage web application server. In the default Montage installation the MontageDataUpload folder will be:

C:\Program Files\...\Montage\DataImportUploadFiles

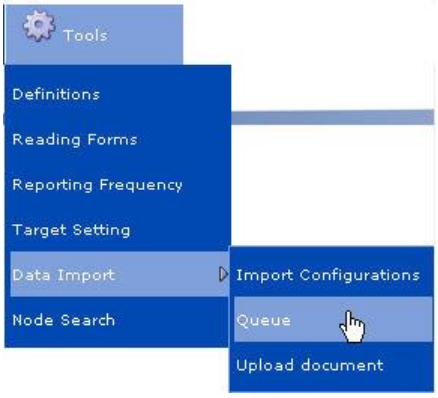
Files that are uploaded through the Montage user interface are placed there but files can be copied to this folder by other means, either by simple folder sharing within a Windows network or via ftp.

Sharing and access to this folder and possible ftp support must be configured by the computer administrator of the network and is not a Montage task.

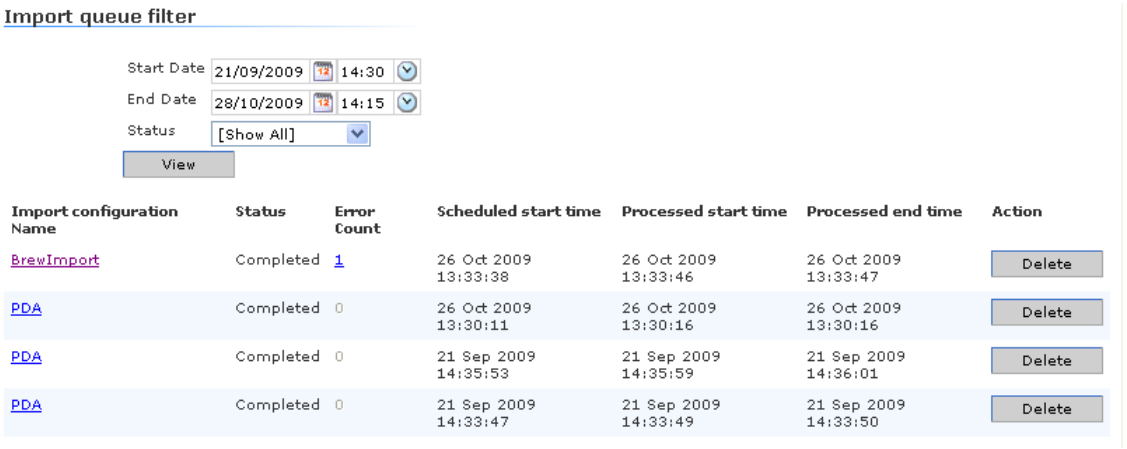
5.7.4 The Import queue.

Whenever an import configuration file has been run either manually or automatically using the scheduler, the task is placed into a queue. This queue system is a method of controlling multiple imports.

To view which imports have been placed in the queue, click on 'Tools', point to 'Data Import', and then select 'Queue'.



You can filter the queued import by date and by status, for example Waiting, Processing or Completed.



You can go to the Set-up screen of the import configuration by clicking the name in the list and you can investigate the errors, if there are any errors, by clicking the number of errors.

6 CONFIGURING MONTAGE

This section focuses on the different elements associated with the configuration of the structure of Montage.

Typically, this will have done initially together with Scanenergi Solutions' Consultants or a Certified Services Delivery Partner and so it is unlikely that you will be required to create a structure from the start. However, whether starting again or editing an existing structure, it is useful for the user to be familiar with all the required elements of configuring Montage.

6.1 Node management

When creating a new Montage structure, say for a new site or amending an existing site to incorporate new meters or departments, it is important that the Super-user is familiar with the different types of nodes, their purpose and how best to use them.

A 'node' is defined as any point on the Navigator tree identified by a name and node type.

A node can appear in only one place in the node tree.

In the above example, there are eleven specific nodes in the tree, of various node types. For each node type, you can choose among various icons to assist with ease of use.

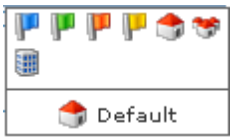
The node types and their available icons are described below:

Site

The Site node should indicate a new address. For instance, as in the example above, there are three brewery sites; Burtonwood, Nelson and Skipton.

The Montage Licence Manager tool and the corresponding EULA makes use of this information to govern the use and commercial arrangements for the Licence.

Department



The Department node should be used when splitting the site into operational units, such as various parts of the production process, technical installations and buildings.

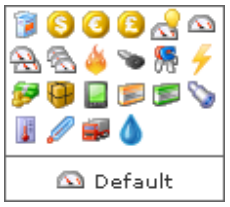
Branch

The Branch node is very much equivalent to the Department Node. It is intended to be used for any segmentation in the structure.

EAC

The 'Energy Account Centre' node is the node type which is used for identifying the units for which you want to be able to track performance. Like the Data Point nodes, the EAC nodes also have attributes for high and low limits.

Data Point



The Data Point Nodes are used for meters, but also for production variables, "constants" like calorific values, climate recordings, tariffs and everything that requires input of data.

The Data Point is the "bottom" of the hierarchy and they are the source of all calculations. They are also referred to as 'Input Nodes' while all other nodes are 'Calculated Nodes'.

Virtual Meter

The Virtual Meter shares the properties of the Department and the Branch. The reason that it is a Node Type of its own is that logically it has another role to play. The Virtual Meter is used for derived calculations of other Data Points.

NOTE: *Virtual Meters are not counted as data points in the licensing of the software.*

Opportunity

The Opportunity Node is different from any other Node type. It is normally not part of the calculations or the reporting you will find on most sites.

However these nodes can be very useful as a means of recording ideas that any user have for achieving savings. Each Opportunity Node has a lot of fields where you can register the idea, and as investigations of the idea progresses you can add this new information and eventually decide whether or not to

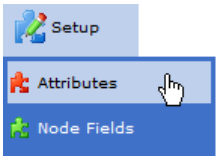
get on with implementing the suggested idea.

6.2 Node Attributes

All node types have most of the Attributes in common but there are differences, as you will see in the following sections.

The Attributes associated with a node can be accessed from the Setup menu.

***NOTE**: This menu only appears when a node in the node tree is selected.*

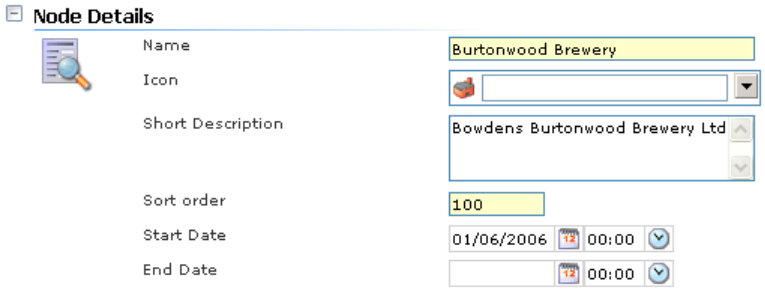


6.2.1 Shared Node attributes for all node types

All node types, whether they are Site, Department, Data Points etc, all share some common attributes. These common attributes are important not only for providing the node with a unique identify but also allows for node history to be tracked from the 'Start date' to the 'End date' of the node.

6.2.1.1 Node details

The common attributes for each node type are displayed under 'Node details' located in the 'Attributes' memu and described below. The example shows the fictional site of 'Burtonwood Brewery':



Name: The Name (a mandatory field) given to the node as it will appear in the node tree and everywhere the node is referenced. You can use all letters and all numbers (**but not only numbers**), but you cannot use characters like brackets in any form ( ) [ ] { } and not mathematical operators * / - + &.

Icon: Select the icon to display along with the node in the node tree.

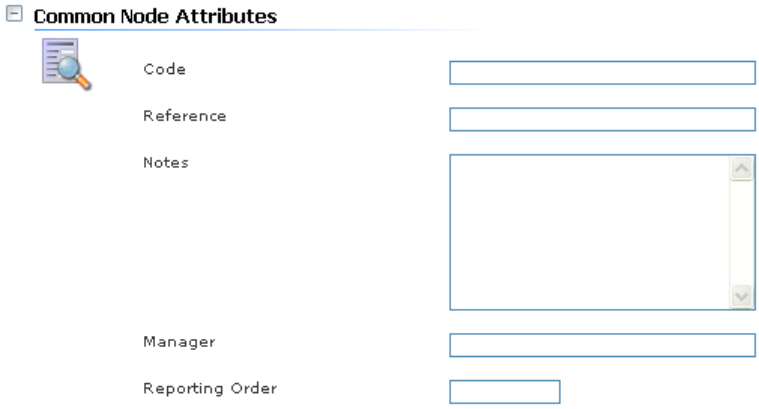
Sort Order: This field specifies the order in which the nodes are sorted in the node tree. By default the seven node types have the values 100, 200

… to 700 which mean that the nodes will be primarily sorted by type. The second sort criterion is alphabetical. You may change the sort order as you wish and can control exactly how you want the nodes to appear in the tree.

Start Date: The node will only be available to view in the node tree when the End Date in the options panel is after this date.

End Date: The node will only be available to view in the node tree when the Start Date in the options panel is before this date.

6.2.1.2 Common node attributes



Code: Is available to enter a relationship with other systems. Basically this is just a text/number field. The value is often used on Data Point nodes, to link this node to for instance a SCADA system so that automatically imported data are correctly placed at the right node. It can also be used in relation to site documentation. The value will be available in reporting.

Reference: Very much the same as the use of the Code field described above.

Notes: Here you may enter any notes you may want to keep. The value will be available in reporting.

Manager: This field is for recording who is the responsible manager for this node.

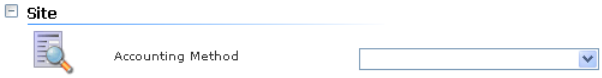
Reporting Order: This field is kept for legacy reasons to earlier versions of Montage. Not in use in version 9.

6.2.2 Node type specific attributes

Each of the node types has a set of specific attributes.

6.2.2.1 Site

Accounting method: This field is kept for legacy to earlier versions of Montage. Not in use in version 9



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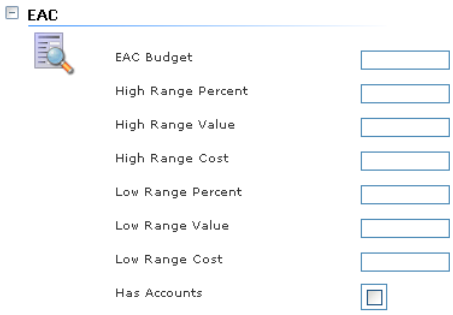
6.2.2.2 Department

Description: Enter any description you want for the node.

6.2.2.3 Branch

Description: Enter any description you want for the node.

6.2.2.4 EAC



EAC Budget: You may enter a budget value for the EAC and refer to it in equations and reports. This field is kept for legacy to earlier versions of Montage. Our advice in Montage 9 is to use a Data Point for entering budget values and use the Budget NodeField for reporting it.

High Range Percent Enter a high percent limit for an exception. **High Range Value**: Enter a high range value limit for an exception.

High Range Cost: Enter a high range limit for an exception.

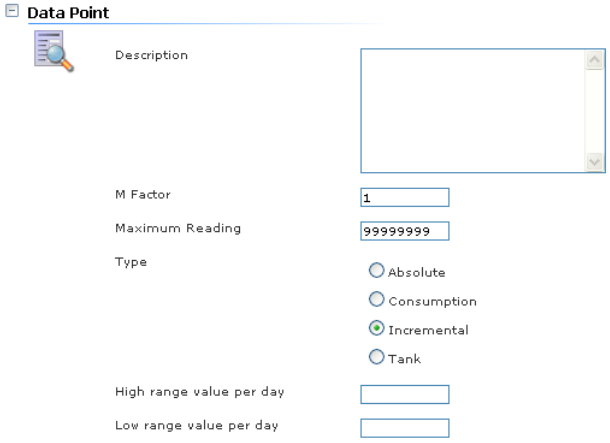
Low Range Percent: Enter a low percent limit for an exception.

Low Range Value: Enter a low range value limit for an exception.

Low Range Cost: Enter a low range cost limit for an exception.

Has Accounts: This field is kept for legacy to earlier versions of Montage. Not in use in version 9.

6.2.2.5 Data Point



Description: Enter any description you want for the node.

M Factor: Enter the 'Meter Multiplication Factor' here. When using the appropriate definition, this factor is multiplied on the calculation value of the readings to calculate the consumption. You should for instance enter 10 as a multiplication factor, if your water meter is reading m3 and you want to report in hl.

Maximum reading: This is the highest number your meter can display. If you are reading the meter with decimals you may enter the decimals as well. The value is used to calculate the value when the meter laps.

Type: There are four types of meters that differentiate in the way consumption is calculated from the readings:

- **Absolute** – this type will use the entered value for all future periods regardless of their length. Use this to record numbers like calorific values, tariffs etc. that are constant for some time and then changes. When a new value is entered during a period, the value for that period will be the weighted average of the numbers entered.
- **Consumption** – This type uses the entered number to calculate the consumption since the last reading. The consumption is spread proportionally across the periods since last reading.
- **Incremental** – This type uses the difference between this reading and the previous to calculate the consumption since the last reading. If the new entry is less than the previous, the meter is assumed to be lapped. The consumption is spread proportionally across the periods since last reading.
- **Tank** – This type of meter has two readings; 'Reading' and 'Delivery'. The Reading is the content in the tank and as such it will be a decrementing number when there has been no delivery. The Delivery is the delivery, normally from a tank truck. The consumption is calculated as the difference between the previous reading and the current reading plus the deliveries that

are recorded since the previous reading. The Reading and the Delivery must be entered in the same unit. The consumption is calculated at the time of Readings, but Readings and Deliveries can be recorded separately. The consumption is spread proportionally across the periods since last reading.

High range value per day:

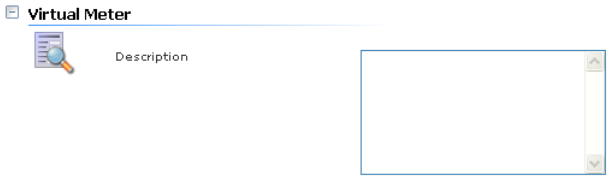
This number is used to evaluate the consumption in the Reading Form and on the PDA. If consumption between readings exceeds this average daily value, the reading will be marked as a high reading and the PDA will require the user to confirm the reading before it is saved.

Low range value per day:

This number is used to evaluate the consumption in the Reading Form and on the PDA. If consumption between readings exceeds this average daily value, the reading will be marked as a low reading and the PDA will require the user to confirm the reading before it is saved.

6.2.2.6 Virtual Meter

Description: Enter any description you want for the node



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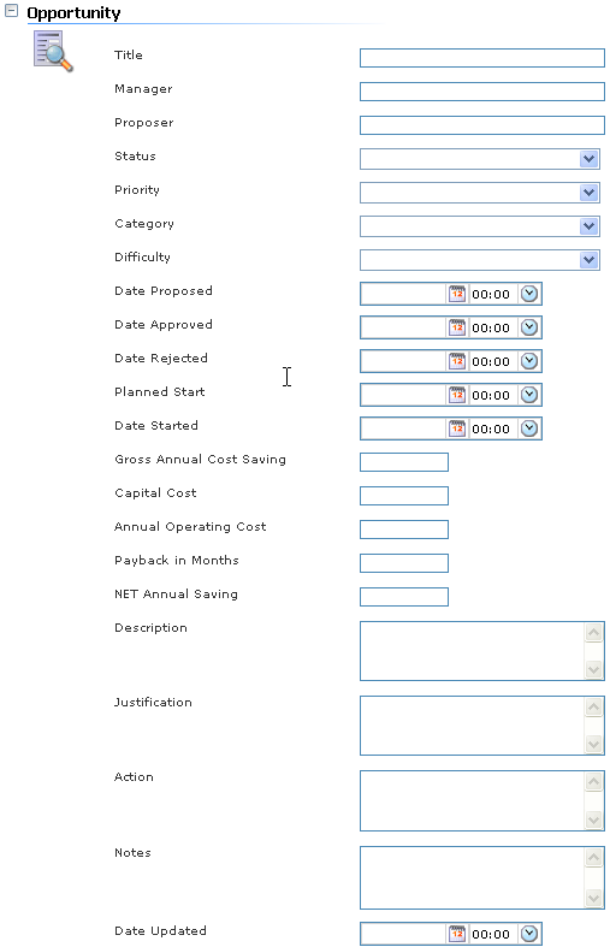
6.2.2.7 Opportunity

The opportunity node can be used to record ideas of potential savings initiatives. The numbers in this node does not automatically refer to any of the calculations of the system, unless you create special definitions.

There are a variety of fields and you can use them as you prefer.



6.2.3 Create a new node

To create a new node select Create from the Actions menu.

Select the node type you wish to create and fill in the details as explained above. When you press 'Save', the node will be created as a child node to the node you pointed to when you selected 'Create'.

6.2.4 Move a node

To move a node select 'Move' from the Actions menu.

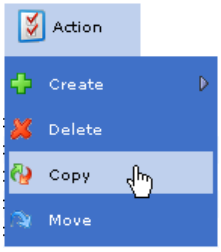
You browse to the new position for the node in the mini navigator.

Press ‘Move’, and the node is moved to become a child node to the node you selected. All child nodes are moved with the node.

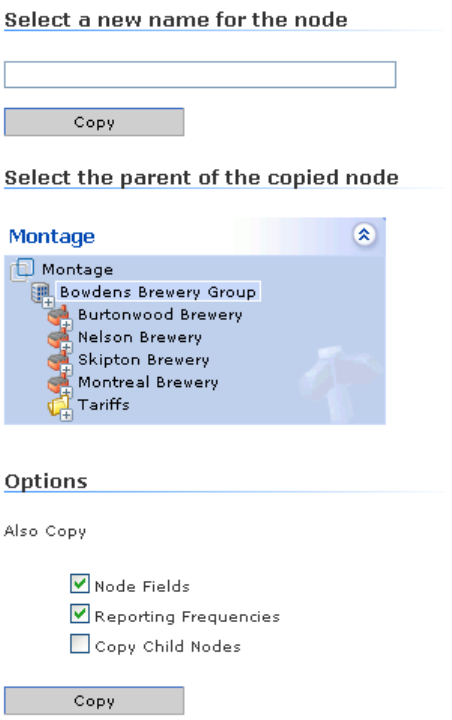
6.2.5 Copy a node

You may copy a node and place the copy anywhere in the structure. It is often the most efficient way to create new nodes.

To copy a node select ‘Copy’ from the Actions menu.



You then browse to the position for the copy, in the mini navigator.



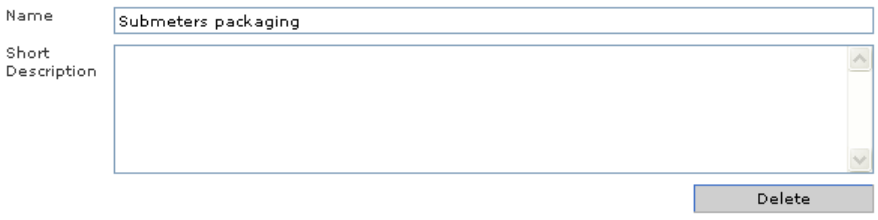
The copy will be created as a child node to the node you select. You may choose to also copy the assigned Node Fields, Reporting Frequencies and also the Child Nodes. Data will never be copied.

***NOTE**: You may make as many copies of the selected node as you wish by simply typing in new names and/or move to another position in the mini navigator.*

6.2.6 To Delete a node

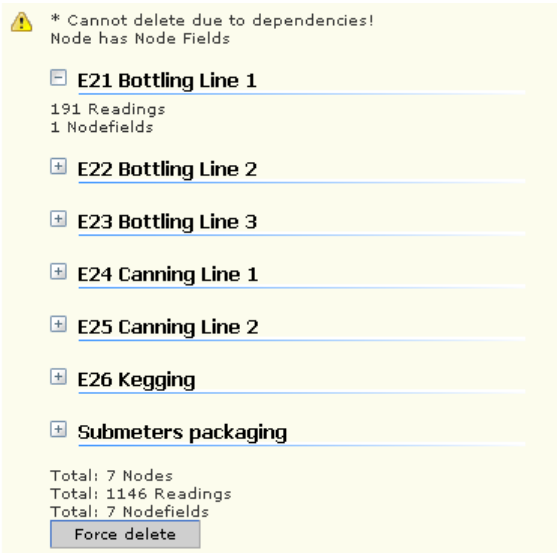
To delete a node select 'Delete' from the Actions menu.

After pressing Delete you will be prompted to confirm that you want to delete the node.



When you want to delete a node that has Node Fields assigned or has Child Nodes, you will be prompted with a list of the Nodes and the number of Readings and Node Fields included (as shown below).

When you press' Force Delete', the nodes and all related data will be deleted.



Users who have access only to the deleted Nodes will also be deleted.

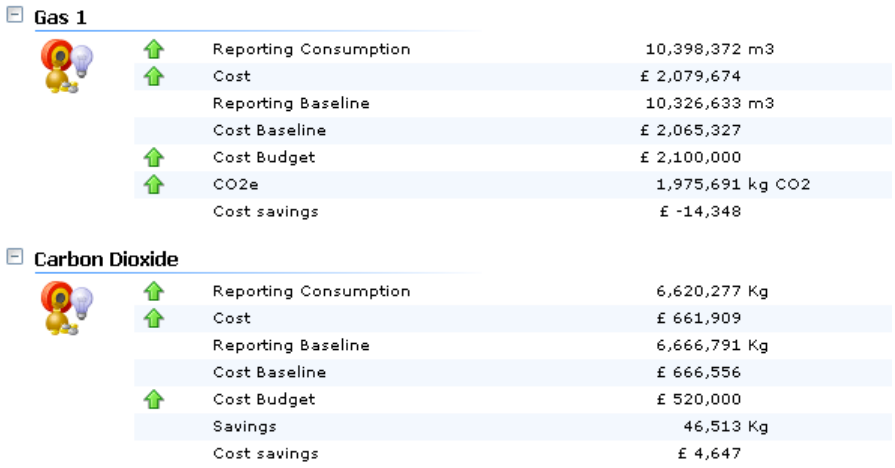
***NOTE**: Please think twice before deleting - there is no undo option!*

***NOTE**: There is a limit to how many nodes can be deleted at one time. This limit is set to: 10,000 Readings, 100 Node Fields, 50 Nodes and 1,000 Users.*

6.3 NodeFields

Any field that requires a calculation is set up as a 'NodeField'. NodeFields are used to calculate for instance the following: Reporting Consumptions, Cost, Targets and Baselines, Savings and KPIs.

The NodeFields are displayed as one line for each of the utilities on the Summary screen (see below). A node may have any number of the available utilities and each utility may make use of any number of the available NodeFields.



All nodes have the same set of NodeFields but not all of them will be used for each node. For example, a meter node will have NodeFields for calculating targets but these will not be required as it is of little benefit to set a target for a meter reading.

When NodeFields aren't used they do not display on the Navigator Summary.

6.3.1 Standard NodeField types

Montage comes with a standard set of NodeFields that you may choose to use by simply assigning them to the Node by using a Definition (see section 6.4). Although Definitions can determine the output of any NodeField, it is recommended that you follow the use of the NodeFields as explained below, to make your configuration comply with the features in Montage.

You may have other specific NodeFields created by request, or change the names of existing NodeFields using the Translation tool (see section 7.6), but those presented below are considered to be the standard NodeFields within Montage:

Value	The Value NodeField is intended to be used for keeping numbers which are not consumptions. Such values will be; Production numbers, tariffs for utility cost, calorific values, climate data such as outside temperature and degree days.
Meter Consumption	The Meter Consumption NodeField is intended to be used for recording the consumption in a different unit from the unit you want to use for reporting. Typically this can be if a water meter reads in cubic feet while the reporting is done in cubic meters.

Reporting Consumption	The Reporting Consumption NodeField is probably the mot commonly used NodeField of all. This is where you will find the consumption of any Utility - for the period of time you choose. Typically there will be only one unit for Report Consumption for each Utility in one system, but you may use various if you find it right for your application. You can create various structures of Nodes that report the same consumption using different units – however, this should only be done when really needed as there is a risk of causing confusion.
Cost	The Cost NodeField is intended to be used for the calculated cost of a utility. Typically this will be calculated by multiplying the consumption with the tariff as entered in a tariff node, and as such it will only include the variable cost. It is also possible to include fixed cost, based on time, such as a monthly fee for the connection to the utility, but that is less common. Cost may be calculated differently from the same consumption by using different tariff definitions. You can for instance have branches of the structure: • A branch where you use the “real” cost, changing the tariff when it actually does potentially several times a day. • A branch of calculating the cost based on a corporately decided standard cost, which then makes sites comparable in cost terms although they may operate under different conditions. • A branch calculating the cost at a fixed tariff, to provide information about the actual cost savings coming from the utility savings, unaffected by the changing utility prices.

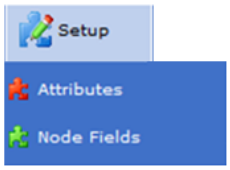
Reporting Baseline	The Reporting Baseline NodeField, (Baseline) is a calculated expected consumption given the actual conditions. The baseline approach is taken to become able to actually document savings, so the objective is, based on experience and historical data, to offer a calculation of the consumption you would have had, if you had not been improving your efficiency. The approach usually is to decide which variable you know – and can record – which will impact the consumption. Typically the main variables will be the production volume and also often climate conditions like temperature, but there could also be other, such as mix of various production types or changing quality of the raw material. The most common approach is to decide on one or a few such variables and then mathematically analyse these data using linear regression. The result will be an equation that allows you to calculate the Reporting Baseline from the actual values of the variables you choose to include. The savings you will have achieved will then be the Reporting Baseline less the Reporting Consumption.
Cost Baseline	The Cost Baseline is the calculated cost of the Reporting Consumption. The purpose is to make the savings available in cost as well as in engineering units, as this will often provide a better understanding, to the broad range of users, of the value of the whole energy management exercise, and thus contribute to the motivation of everybody involved.
Reporting Target	The Reporting Target NodeField is intended to work very much like the Reporting Baseline. To put it short, the main difference is that where the baseline refers to previous performance, the target refers to a new “ideal” performance that you are aiming at. The progress of the Reporting Consumption compared to the Reporting Target will be a guideline as to how well you are on track.
Cost Target	The Cost Target is very much similar to the Cost Baseline, except it uses the Reporting Target to calculate the cost. Please refer to the explanation of the Cost Baseline above.
Reporting Budget	The Reporting Budget NodeField is intended for holding an absolute value, a Budget so to speak, for the expected consumption. As this type of “estimates” are more common for cost estimates, the NodeField is not very commonly used.
Cost Budget	The Cost Budget NodeField is intended to hold the budget figure you, as a utilities manager, has been given by the financial department. The Cost Budget figure is typically entered once a year and allow you to be aware how the utility usage progresses, regardless of your production volumes etc.

CO2e	The CO2e NodeField is intended to calculate the CO2 equivalent emissions of your utility usage. The default Montage installation already has typical values for some fuels, but it is likely that you can get more accurate values from your supplier of fuels or electricity.
CO2e Baseline	The CO2e Baseline NodeField are used to calculate the CO2e from the Baseline Consumption (see above) to help you track your success in reducing the CO2 equivalent emissions.
CO2e Target	The CO2e Target is very much similar to the CO2e Baseline, except it uses the Reporting Target to calculate the emissions. Please refer to the explanation of the CO2e Baseline above.
Extra1	The Extra NodeFields are included to provide a means of calculating values outside the list of more typically used NodeFields.
Extra2	
Extra3	
CO2e Budget	The CO2e Budget NodeField is intended for holding an absolute value, a Budget so to speak, for the expected emissions.
Invoice Cost	The Invoice Cost NodeField is used to record the actually invoiced cost of the utility. The intention is that this number should be entered for every invoice you get. It will only apply on the site level, or the level where you account for incoming utilities, and it can help you compare your calculated cost to the cost actually paid. These will never quite match exactly, because you typically only count variable cost in Montage and because it is often a different meter you are invoiced by, compared to the one you read yourself, and there may be various other reasons that these will not be exactly the same. However, it should only be a little different and it will help you validate as well your invoices as your meter readings. You may also use this number to compare actual unit cost values between sites.
Invoice Consumption	The Invoice Consumption NodeField is used to record the actually invoiced consumption of the utility. It may/will probably not correspond exactly to the consumption you have recorded yourself, as explained above for the Invoice Cost.
Variable1	The Variable NodeFields are intended to “copy” the recorded values of the variables which affect the Node. Typically Variable1 will be used for production volumes while Variable2 will be used for climate variables. Variable3 is rarely used in most Montage implementations.
Variable2	
Variable3	

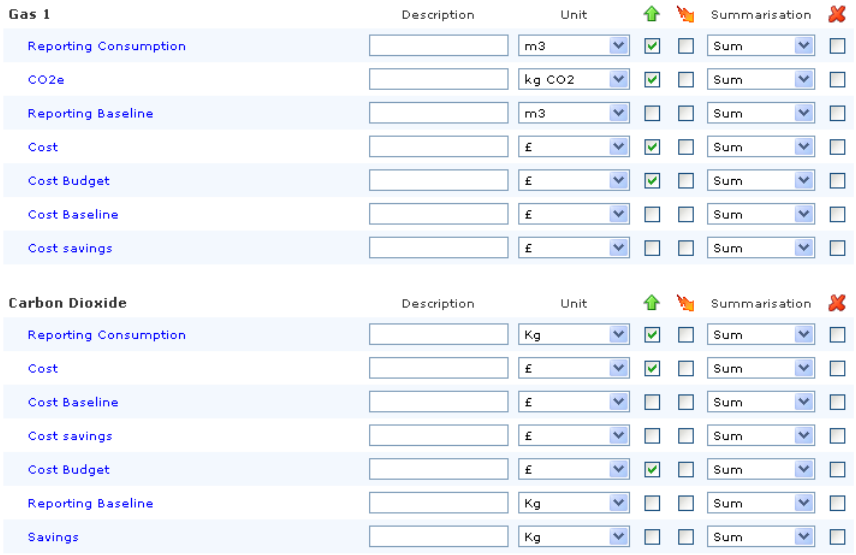
Savings	The Savings NodeField will most commonly be used to calculate the Reporting Baseline minus the Reporting Consumption. Savings are generally expected to be positive numbers while negative numbers are overspend. You may also choose to calculate the savings else wise as the definition is a freely configurable equations like all other definitions.
Cost Savings	The Cost Saving NodeField is similar to the Savings NodeField, except it operates on the cost figures.
Performance	The Performance NodeField will most commonly be used to calculate the Reporting Target minus the Reporting Consumption. Performance better than the target is expected to be positive numbers while negative numbers are gaps to fill. You may also choose to calculate the performance else wise as the definition is a freely configurable equations like all other definitions.
Cost Performance	The Cost Performance NodeField is similar to the Performance NodeField, except it operates on the cost figures.
KPI1 **KPI2** **KPI3**	The KPI NodeFields are intended to be used for calculated Key Performance Indicators. KPI's are generally accepted as means of measure for efficiency, although they generally suffer from being independent from production volume. The KPI 1 to 3 are normally calculated as Reporting Consumption divided by Variable 1 to 3 respectively. It is very rare, that they could all be applied on the same node.
KPI1 Target **KPI2 Target** **KPI3 Target**	The KPI Target NodeFields are intended to be used for keeping the targets for the KPI as they are set by the corporate business. Generally you will have no, or at least less, trouble meeting this KPI Target when the production volume is high while it is much more difficult, or impossible, when the volume decreases.

6.3.2 Node Fields setup screen

Select 'Node Fields' from the 'Setup' menu.



The main screen for managing utilities and NodeFields on a node is displayed below.



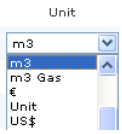
The screen will display all the assigned utilities (e.g. Gas 1 and Carbon Dioxide) together with the NodeFields (Reporting Consumption, CO2e, Cost, Savings etc) that have been assigned to the utility.

A description of the various field types available on this page is described below:

The name of the utility assigned to the node. The utility name always appears in **bold** text.

The name of the NodeField assigned to the utility. The utility name always appears as **blue** text as it also acts as a hyperlink to the definition that's assigned to the node field.

The Description field allows for a short description to be entered relating to either the NodeField itself or its Definition. The description then appears on the Navigator Summary screen next to the NodeField name.



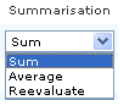
The Unit field allows the user to assign a unit to the output value displayed on the Navigator Summary screen. These units also appear in reports. Various types of units are available for selection from a drop down list. Additional units can be added to the system but not directly through the user interface, but via request to support@montageum.com.

If you check this box the value of this NodeField will SumAbove to the parent node (i.e. the value will be added to the value on the parent node.
***NOTE**: If the parent node has a definition assigned, that definition will decide the value of the parent node.*

If you check this box, the value of this NodeField will be calculated at the end of every period, regardless whether or not there have been new readings entered during the period or

any other dependencies. It may be used on rare occasions, for instance to always get the value of the last known reading.

NOTE: *Usually this option will be left unchecked.*



The user can specify how they wish the calculated value to be displayed on the Navigator Summary screen, either as the:

Sum – will add all the values in the given period and present the Total on the Summary screen.
Average - will take the average of the values in the given period and present the Total on the Summary screen.
Re-evaluate – is used when the values for each period is a ratio such as a KPI. It will re-evaluate the calculation of these values by summing up the numerators and dividing the sum with the sum of the denominators.

If you check this box it will mark this NodeField for deletion. Many nodes can be marked for deletion, and are then deleted when the editing of the NodeFields are completed.

In some instances, the NodeField may indicate that it contains a 'Local Definition'. This informs the user that this NodeField has a unique definition used only on that specific node, and therefore changes made to the definition will impact the calculated value on that node only and will not impact any other node within the system.

Clicking on the NodeField name will take the user to the Definition screen for the chosen node, as shown below:

The Definition screen will then show one of three options for the NodeField:

Use Local Definition – the definition (or equation) is unique to that NodeField. The definition is then edited directly within the node setup..

Use Universal Definition – uses a definition commonly used throughout the system. The definition is then selected from the list of universal definitions and not editable from within the node setup.

No Definition – no definition is in use on this NodeField, instead it inherits its value from its child node(s) that has SumAbove set.

More details on Definitions can be found in (see section 6.4)

6.3.3 Assigning Utilities and NodeFields to a node

You may assign any number of utilities to any node such that you will see all utilities for an account centre on the same node.

To assign an unassigned NodeField, you select the required Utility, NodeField.

You may choose to set properties, Description, Units and Summation settings from the options in the bottom of the screen before you press 'Add', or you can edit that later (as explained below) and you can add more NodeFields to the utility.

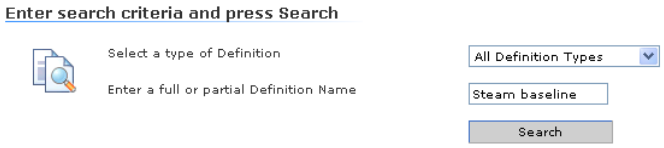
6.3.4 Bulk assigning definitions

If you want to assign a NodeField definition to multiple nodes you can do it in bulk rather than making lots of individual changes.

Select 'Definitions' from the 'Tools' menu.

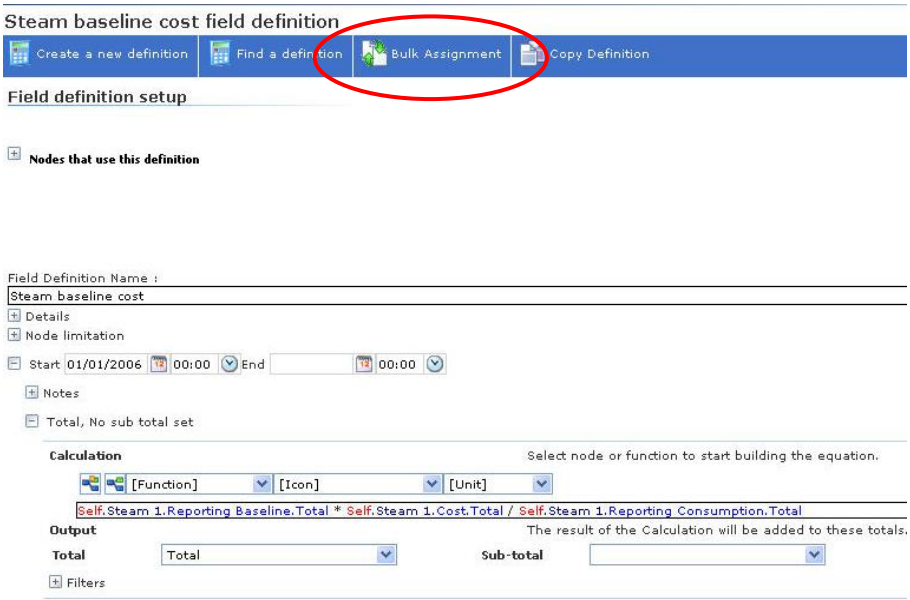
Select the type of Definition you are looking for (e.g. what type of NodeField do you want to assign the definition?) and press 'Search'.

Alternatively, you may enter a part of the name of the Definition if you wish to shorten the list of available Definitions that appear in the left hand side of the screen.



Pressing 'Search' in this example returns one Definition (Steam baseline cost) containing the text string for 'Steam baseline'

If this is the Definition that is to be bulk assigned to many nodes within the system, select the Definition and click on the 'Bulk Assignment' button in the toolbar.



The Bulk Assignment lets you drill down the structure and select any number of nodes you wish to assign the Definition to.

Browse to the nodes you wish to assign the Definition to, press 'Add' and continue browsing to the next node. You may add as many nodes as you wish.

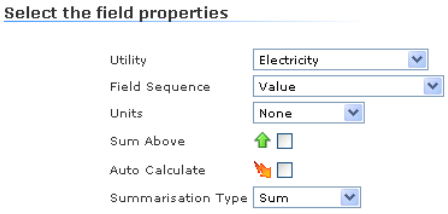
You can also use the Search facilities as described in section 4.6 to select the nodes. If you use the 'Save to memory' feature, the search result will be available in the list once you select the bulk assign feature.

Press this icon to save the current list of nodes to memory.

Press this icon to clear the saved list of nodes.

Having selected the nodes you want to assign the Definition to, you then need to specify the field properties that ensures once the Definition is assigned, it has all the correct properties.

***NOTE**: it is much quicker to select the properties prior to bulk assigning, otherwise the user has to navigate to each instance of the definition after bulk assignment and individually assign the properties.*



Select the Utility to which you want to assign the Definition, and set the unit to be used for all these NodeFields and if you want the SumAbove set.

If you check "Calculate data automatically", calculations will be kicked off when you press Assign.

You may also use the feature to unassign Definitions from specific NodeFields on a utility.

6.4 Definitions

Definitions are the ‘glue’ that connects the whole system together and allows for meter readings to be calculated to consumption and displayed at any point within the system.

Any number required in Montage is calculated by a Definition (directly or via SumAbove as explained earlier in section 6.3.2) and Definitions consist of one or more Equations. Equations can be set up by the user, rather than being hard-coded into the system.

Definitions calculate such numbers as:

- Consumptions
- Costs
- Targets and Baselines
- Exceptions
- Key Performance Indicators
- ...

A Definition defines how Meter Readings (Input) are calculated into Output data, other Definitions define how consumptions are calculated into Cost, or any other required transformation of the numbers.

Definitions are calculation rules with one or more equations and include all components/factors defined by the answer to the 5 questions:

- For which date range should this equation be applied?
- When does the equation apply? (day/time)
- How is the equation applied, what under what condition, for example when the consumption is greater than > x, or when less than < y?
- What is the time period of the consumption?
- Is this the complete equation to calculate the consumption or only part of it, i.e. does this require more than one calc item?

Definitions can be created as Local Definitions and used solely at one node, or they can be set up as a Universal Definition and be assigned to one or more nodes. Any calculated field relating to a node is termed a "NodeField".

All nodes have the same NodeFields available but not all of the NodeFields are used on all Nodes, for example, a meter node will have NodeFields for calculating targets but these will be left blank, whereas an EAC node would utilise these fields.

The same Definition may be used on multiple nodes and it is common that a Montage installation will have a set of generic definitions offering the frequently used calculations. In Montage we call these ‘Universal Definitions’.

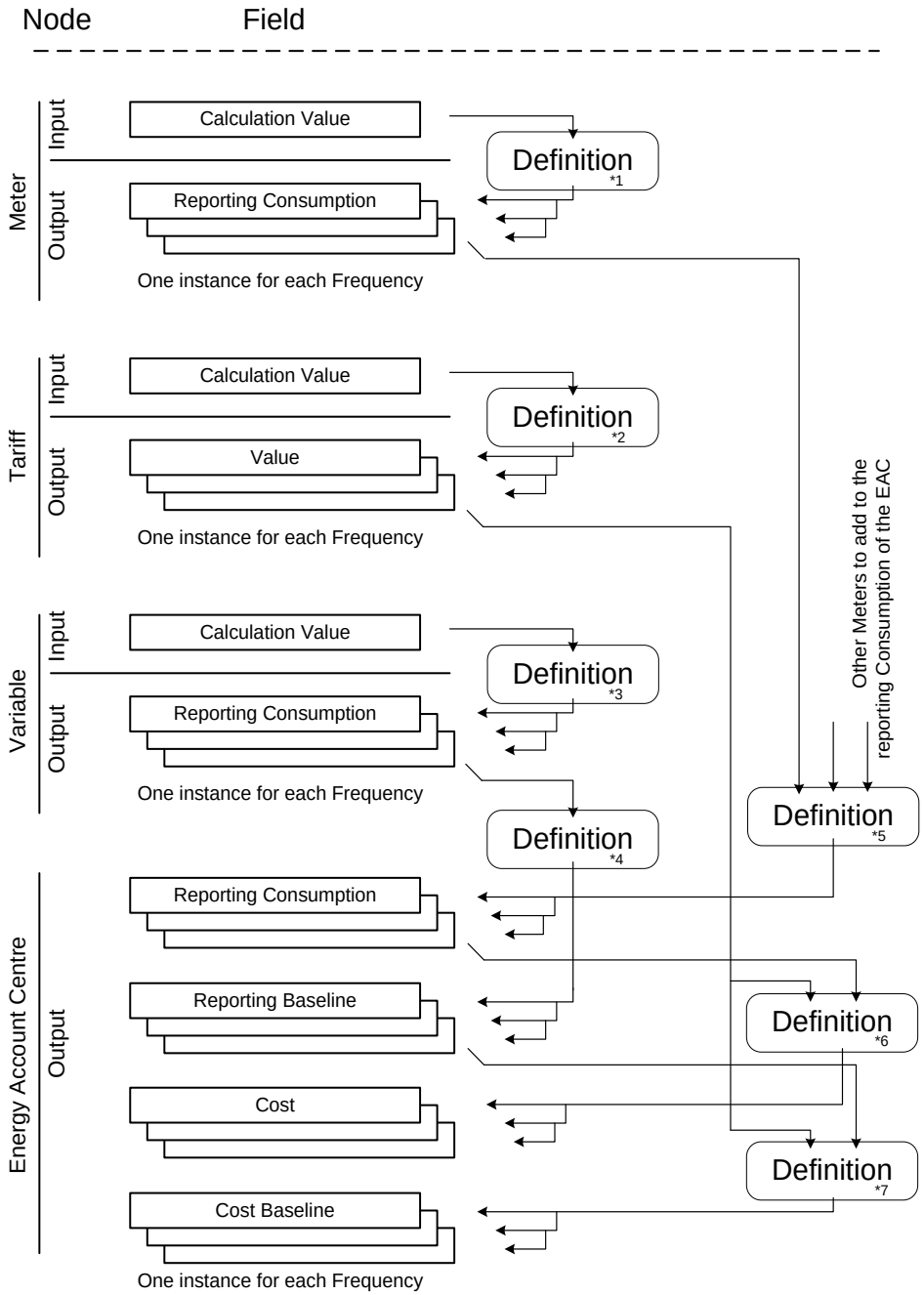
The drawing below illustrates some examples of applied definitions but there are usually many other applications of Definitions in Montage configurations.

There are four Nodes covered by the example.

1. An energy meter with a definition that calculates consumption from the readings of the meter.
2. A Tariff node in which the tariff is entered like a reading when a new tariff applies, with a definition that sets this tariff to be used until a (future) next date when the tariff change. The tariff node is referred to when the cost of the consumption is calculated.

3. A predictor variable node to keep records of production for instance volume or degree days. These numbers are to be used for calculating the Baseline.
4. An account centre where the consumption, cost and the calculated baseline consumption is presented.

The definitions in the drawing are all found in the definitions examples.



Please refer to the following sections for examples of the definitions above:

*1) 6.4.3.1 Meter readings
*2) 6.4.3.1 Meter readings
*3) 6.4.3.1 Meter readings
*4) 6.4.3.3 Calculating Baseline (or Target)
*5) 6.4.3.2 Calculating Energy Account centres

*6) 6.4.3.4 Applying cost

*7) 6.4.3.5 Calculating the Baseline Cost.

6.4.1 Managing Definitions

Any Definition can be edited at any stage of setup or even after it has been and assigned to one or more NodeFields in which a change to the Definition will kick off a calculation of all NodeFields using the Definition.

There are two types of Definitions; Local Definitions and Universal Definitions. These two types are absolutely identical in all respects except that

Local Definitions are only used by one Node and therefore created directly on the Node Setup. Universal Definitions are assigned to the Node also on the Node Setup and hence also available from the Node Setup screen. Please refer to section 6.3.2 for details of the Node Setup screen.

Universal Definitions are available to be assigned to any NodeField on any Node. Universal Definitions are also available for editing via the Setup Node screen and also from the Tools menu.

The toolbar options found at the top of the screen provide the following purposes:

To make a new Definition you need to enter i) the name of the Definition, ii) the type of NodeField it applies to and iii) you have the option to also enter a short description.

Creates a new calc group.

Saves the Definition and initiates the calculation of all nodes that use this Definition.

Deletes the Definition

Search for Definitions being assigned to a specific NodeField type. You will also have the option to enter (part of) a name when searching which can be useful when there are many Definitions in the entire list.

You can enter any part of the name e.g. simply entering “fin” will display the list of all the definitions where the letters ‘fin’ appear, for instance Definition.

***NOTE**: The list of Definitions is sorted alphabetically so you might*

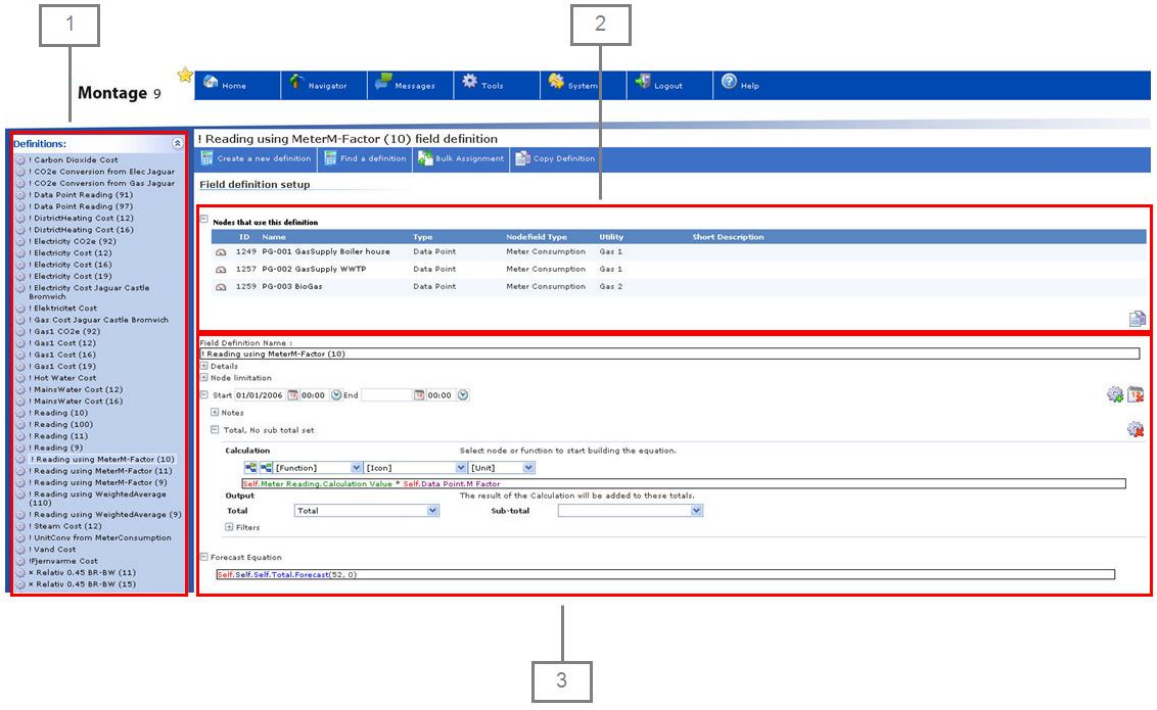
want to consider a naming convention so you can easily find your Definitions. The generic Definitions in the initial installation of a new Montage set-up, all start with the character '!' to make them always appear in the top of the list.

You can choose to assign the selected Definition many nodes in one operation by this feature.

You can copy a Definition, which is selected from the list. In many situations this is much faster than creating a new Definition. The 'Copy of the Definition' can be edited and the name changed.
NB: You can also copy the whole definition configuration using the Definitions clipboard which is explained in 3b in the section below.

6.4.1.1 The Definition screen

The Definition screen itself comprises three distinct areas, which are shown and described below.

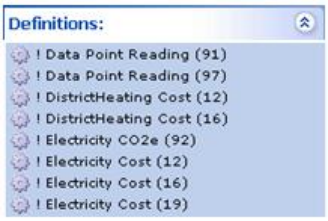


1 **Definition list.**

Presents the list of all available Definitions in the system. This list will either show all Definitions or just the ones that meet the specified search criteria.

Definitions that start with an exclamation mark "!" are System Definitions and they cannot be edited by the user.

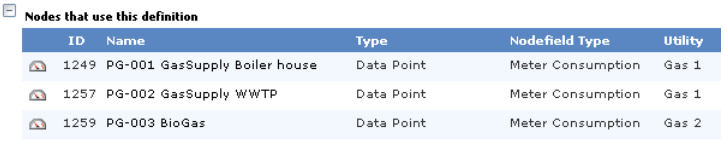
Other definitions are available to amend by the current user with assumed rights.



2

Node List

Displays the list of nodes that have the selected Definition assigned. This is very useful to prevent making changes to Definitions without knowing the impact it will have on the output value on other nodes.

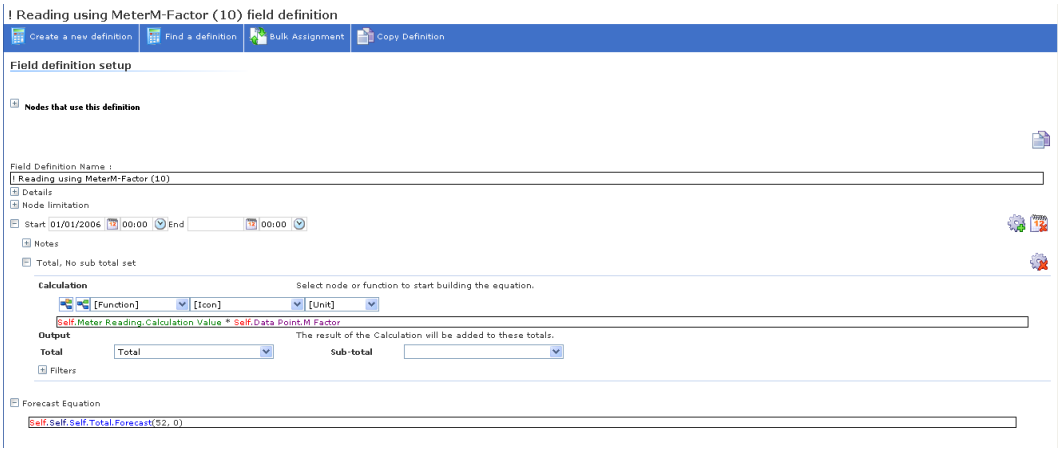


3

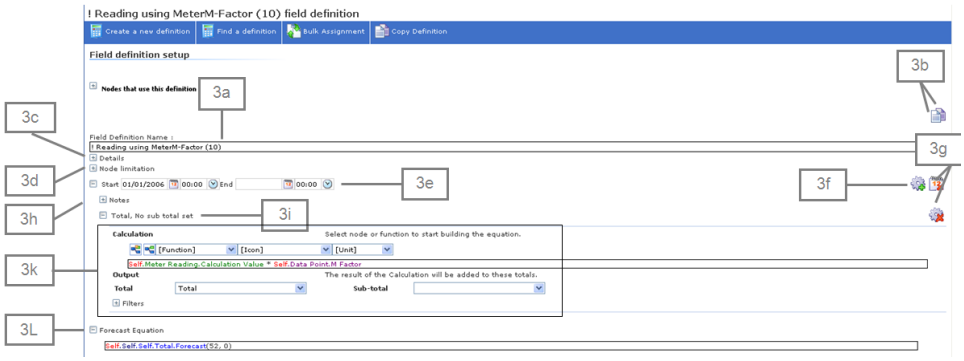
The Definition

Displays the Definition name, characteristics and the equations in the calculation sets that calculate the output data and the forecast equation.

Every Definition is set up through one or more calc groups, where a calc group is ‘a set of equations all running for the same date range’. Each calc group consist of one of more calc items. A calc item contains one equation.



The Definition itself has many integral functions, all of which are described below:



3a

Definition name.

The name the user gives to the Definition

3b

Copy and Paste

Copy's the entire Definition and allows the user to paste the contents to form a new Definition. This is also the way to copy a Local Definition to a Universal Definition or vice versa.

3c

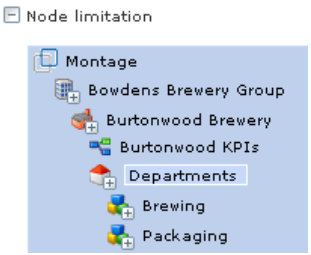
Node details

Allows for a free text box to appear allowing the user to provide some descriptive text relating to the purpose/content of the Definition.

3d

Node Limitation

New to this version of Montage, the node limitation feature allows for Definitions to only appear in the list to those users with access rights to view the selected node. This is useful in a multi-site system, which prevents users from one site from being able to view and edit Definitions that are in use only on other sites.



Only users who have access to the selected Node will be able to see and use the Definition. The Definition will be available for use on this Node and all child nodes to the Node.

3e

Date / Time

The period of time that the Definition will apply.

3f

Add Rule

Allows the user to add additional calculation rule(s) to the Definition.

3g

Delete Group / Rule

Having created one of many calculation rules, these can later be deleted either individually (Delete Rule) or collectively (Delete Group).

3h

Notes

Allows the user to add free text to further describe the purpose of the calculation rule.

3i

Calculation Rule

The expandable/collapsible section that contains the calculation rule.

3j

Move / Down

Allows the specific calculation rule to move-up or down the calculation rule order within the Definition.

3k

Equation Editor

The equation that determines the output value (refer to section 6.5 for further details)

3L

Forecast Equation

The forecast equation is used to predict future performance, or more accurately, to be able to make a guestimate when a number requested in a report doesn't exist. To use forecasting in reports, simply set a future end date for the report and turn on forecasting in the Reports parameters (See section 5.1.2.10).

Forecasting works when data are retrieved from the database; when the equations are evaluated, and it is automatically applied if the requested number doesn't exist pre-calculated. It is possible to suppress the forecasted values for past periods; periods for which there could have been values if readings had been taken.

How to calculate the forecast value is implemented as a new section of the definition. Filtering into sub-totals is not supported. A new method: .Forecast(n,i) is introduced and it is applied as default to all definitions. This new method is described in section 0.

The default is Forecast(52,0) meaning that it will basically use the same value as last year, more explicitly on the same weekday 52 weeks back.

Any equation can be entered in the Forecast Definition and Montage will work its way back through the required number of steps until it is able to generate a number or it hits a dead end.

As an example it is possible to use a forecast definition for the consumption to use the Reporting Target NodeField as the forecasted value.

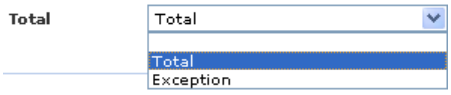
The target NodeField will calculate the estimated consumption based on production volumes, climate data etc. according to the equation that is typically created from the Target setting wizard. However the variables such as production volumes and degree days do not exist for the future periods so Montage will then evaluate the forecast equations for these before it is able to calculate the Reporting Target. If the user enters expected future production volumes, and expected future climate conditions, these can be used for forecasting production volumes and climate loads and by this the forecast of the consumption will be the target for the expected production volume.

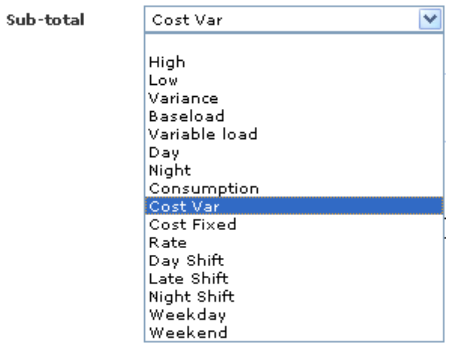
Forecasted values are not saved to the database and when the period has ended the number won't exist anymore. Forecasting is often used as one of the tools in budgeting but there should be no automatic link – the user should decide on the budget values.

6.4.2 Calculation Output

The **Total** and **Sub-total** outputs provide the option to create two results from one calc group; One Total and one Sub-total. If more calculation rules apply to the same Total and/or Sub-total, these will add up and for instance the final Total value will be the sum of calculations applying to Total.

The options that appear in the drop-down lists are shown below:





Each of the options are explained in section 6.5.2.1

This is useful for instance when you want the consumption during a period to be split into parts of the period. You may want to identify consumption that belongs to Night and Day separately and still contribute both Night and Day to provide the overall consumption of the period.

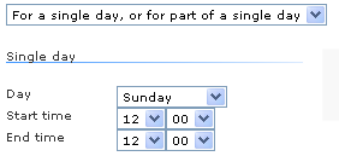
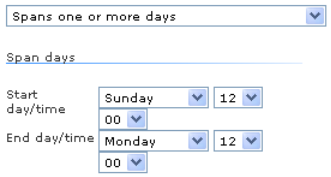
To define when the calc item adds to which Total or Sub-total, filters are applied. Filters are most often controlled by time but may also be depending on the value of other nodes.

If the Total or Sub-total field is left blank, the specific calc item will not add to any of the Totals, respectively Sub-totals. A calc item where both outputs are left blank will be meaningless.

These outputs can be referred to on the Navigator's Options panel and from Homepage modules and used to present for example the total consumption for the entire week along with the consumption that has been on weekdays respectively weekends.

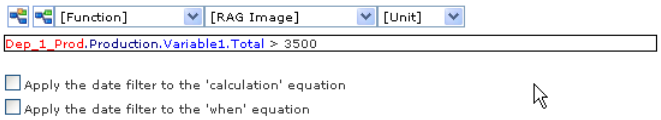
6.4.2.1 Filtering on time

Within the calc group any calc item can be set to run on specific day or set of days, very much like a scheduler. There are four options for this setting

	This is the default and there is not filtering on time or day.
	The calculation rule only applies to a specific time range on a single weekday. The calculation will not be run outside this time.
	The calculation rule only applies to a specific time range on one or more days. The calculation will not be run outside this time.
	The calculation rule only applies to a specific time range starting on one day and ending on another. The calculation will not be run outside this time.

6.4.2.2 Filtering on condition

There is also a second filter for condition. This would be the equivalent to a '@IF' statement, for example **IF** the meter is (less than) < 100, then apply the equation.



There is also an option to apply the date filter to this conditional filter, for example, if the date filter was set to Weekdays only, then the condition of the meter being (less than) < 100 only applies for weekdays. The equation would be applied on any weekday where the meter is (less than) < 100 and every weekend regardless of whether node meter is less than or more than 100.

If the date filter was only applied to the equation and not to the condition, then the equation would be applied Monday to Friday only where node meter is (less than) < 100. No value would be applied at weekends even if node meter was (less than) < 100.

The same date filter can be added to both the condition and the equation; however a different date filter cannot be added to the condition if it is not added to the equation. So, for example, the condition cannot have a date filter for "weekdays only" and the equation have a date filter for "all days".

6.4.2.3 Filtering on a Frequency

Filters can also be applied to either all frequencies assigned to the node, or a specific frequency.

If the **Frequency** field is left blank, the equation will be calculated for all the reporting frequencies assigned to the node. Similarly, the frequency chosen must already be set up as a reporting frequency assigned to the node.

For example, if a node had five reporting frequencies, Daily, Weekly, Monthly, Quarterly and Yearly, the frequency for any of its NodeField calc items must have at least one of these frequencies assigned, or left blank in which case numbers for all five frequencies will be calculated.

Any node used in the actual equation must also have a reporting frequency set up for the frequency chosen for the equation. For example, a target equation has a frequency of weekly and the target is based upon a production node, so the production node must also have a reporting frequency of weekly.

NOTE:
Sometimes an equation includes a fixed number, such as the baseload in a target. To make such a number applicable for all frequencies you can use the function DaysInPeriod()(section 6.6.25) *and calculate the baseload as an average daily consumption.*

6.4.3 Examples of definitions

This section provides some examples of definitions and their meaning and further explanation of how

6.4.3.1 Meter readings

There are various types of meters and you must use the correct Definition to make the calculation work. For more information of how the different types of meters work please refer to section 6.7.

Incremental, Consumption and Tank meters

Self.Meter Reading.Calculation Value * Self.Data Point.M Factor

This definition will take the Calculation value (the consumption since previous reading) and calculate the consumption for the periods of the assigned frequencies. This definition makes use of the node attribute: 'Meter multiplication factor' and can be used for meters with different multiplication factors.

If there is no need for a multiplication factor you can use the slightly simpler definition below.

Self.Meter Reading.Calculation Value

Absolute meters

To make the correct calculation for Absolute meters, which are used for tariffs, average temperature, calorific values etc. you must use the definition:

Self.Meter Reading.Calculation Value.WeightedAverage

6.4.3.2 Calculating Energy Account centres

It is very common to calculate consumption for account centres (or departments) by adding and possibly sharing physical meters consumption. The example below adds one quarter of the sum of the two meters E014 and E015 to the consumption of the meter E026.

E026 Sub06.Electricity.Reporting Consumption.Total + ((E014 Trafo04 part1.Electricity.Reporting Consumption.Total + E015 Trafo04 part2.Electricity.Reporting Consumption.Total) * 0.25)

Another common example is that meters can read in different units, which needs to be dealt with when adding meters. Use the function Convert to convert between units. The example shows as well the option to refer to the unit used on a node (PB001DV) and the option to enter a unit directly in the equation (by selecting it from the drop down list).

The definition adds the consumption of P014 (assumed to be in kWh) to the value, in kWh, of the meter PB001DV (which unit we actually don't need to know). Please note that Montage can only convert between units in the Montage database. Please refer to section 8 for a list of unit conversion factors in the standard Montage installation.

P014 Balloon Warehouse.Propane.Reporting Consumption.Total + (Convert(PB001DV Main Meter Uncorrected.Propane.Reporting Consumption.Total, PB001DV Main Meter Uncorrected.Propane.Reporting Consumption.Unit, kWh))

6.4.3.3 Calculating Baseline (or Target)

The Baseline (Target) equation is in general terms an equation that calculates the expected consumption from a set of predictor variables that has been found to be in control of the consumption. Most often the equations are found using the Montage target setting tool, based on the statistical model of linear regression.

An example could be as follows

1897.9 * (DaysInPeriod()) * 1.1 + 0.889 * Line 1.Electricity.Variable1.Total

Where the baseload (the demand independent consumption) has been found to be 1897.9 per day and the variable consumption depending on the volume on line 1 has been found to be 0.889 per unit of production.

6.4.3.4 Applying cost

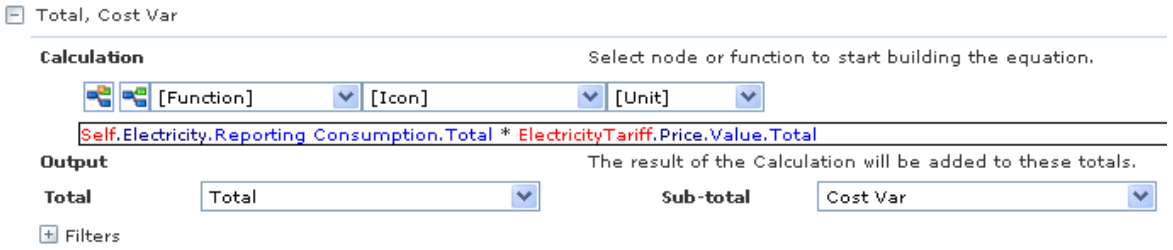
The easiest way to calculate the cost of a utility, at least if the cost changes from time to time, is to use an absolute meter to record the tariff.

Self.Electricity.Reporting Consumption.Total * Electricity.Cost.Value.Total

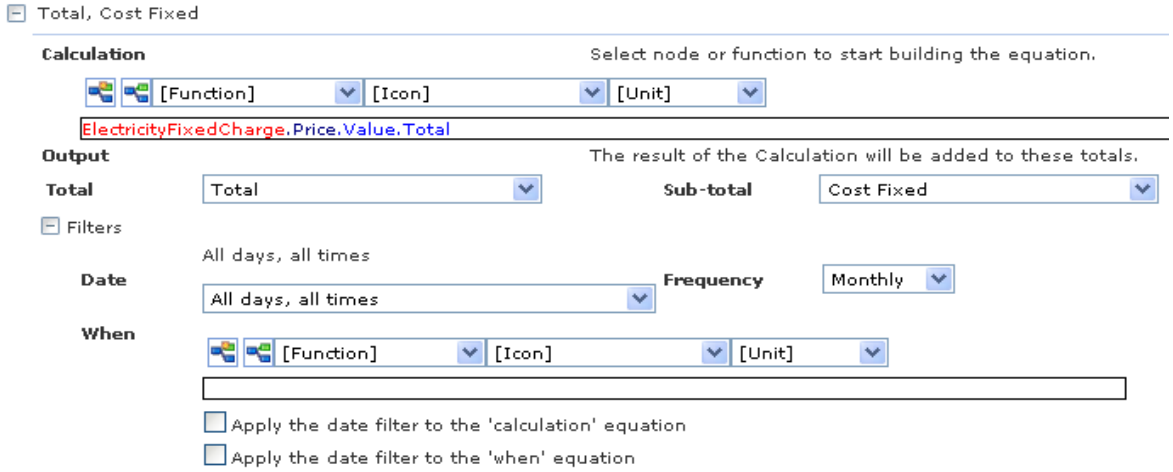
By using the reference 'Self' for the node, it becomes possible to use this definition on all nodes that have Electricity assigned.

In most cases it is advisable to only report on the variable cost since only the variable cost is influenced by changes in consumption. It is however also possible to include the fixed cost, like a monthly fee or such. If you want to also include the fixed cost you may extend the definition as illustrated below:

The first section of this definition calculates the Variable portion of the cost (related to consumption). The variable part of the cost in the section called 'Output' is added to the **Total** and the **Sub-total** "Cost Var." for all frequencies.



The second part of the definition, calculates the Fixed portion of the cost (related to the standard monthly fee):



For the **Frequency** 'Monthly', the fixed charge is also added to the **Total** and to the **Sub-total** "Cost Fixed".

6.4.3.5 Calculating the Baseline Cost

You may calculate the cost of the baseline consumption quite similar to how you calculate the cost of the consumption:

Self.Electricity.Reporting Baseline.Total * Electricity.Cost.Value.Total

Another way to universally calculate cost for any utility on any NodeField (typically Reporting Baseline and Reporting Target) with just one definition is illustrated in this example:

(Self.Self.Cost.Total/Self.Self.Reporting Consumption.Total)*Self.Self.Self.Total

By using 'Self.Self.Self' in this way and referring to the cost of the Reporting consumption, this definition applies to any NodeField on any Utility on any node. Note that it will use the average cost per unit, not necessarily the tariff!

6.4.3.6 Calculating exceptions

If you want to be able to report on the number of periods within the data range where the consumption has been exceptionally high, you can create calc items that will evaluate the consumption and add a 1 to the Total Exception. The number of exceptions

will display on the summary screen and sum up the tree if you set it to do so, and it will be available on reports.

Compare to target

This first equation will be valid for all utilities on a node, by comparing the target to the consumption and set the Exception to 1 if the utility consumption is more than the percentage set on the attributes page higher than the target. The same perceptual limit will apply to all utilities that are assigned this definition.

```
If(Self.Self.Reporting Consumption.Total * 100 / Self.Self.Reporting Target.Total >
(Self.EAC.High Range Percent + 100), 1, 0)
```

Compare to defined limits

If you want to compare the consumption on a utility meter with a fixed average daily consumption, the following equation will count an exception when the consumption is above the average daily consumption.

```
If(Self.Self. Reporting Consumption.Total > (Self.EAC.High Range Value *
DaysInPeriod()), 1, 0)
```

Compare to average

If you cannot really set the limit, you are also able to compare the consumption to the average of the latest 3 periods (or another number) by applying the following equation.

```
If(Self.Self.Reporting Consumption.Total > Self.Self.Reporting
Consumption.Total.Average(3), 1, 0)
```

6.5 The Equation Editor

The Montage Equation Editor is a very powerful tool and is used in any instance where a calculated item is required. The most common applications are for creating Definitions and when creating custom reports.

When you are creating a Definition, an equation can be set up in the calculation field of a calc item. The Equation Editor can be used to include nodes, functions, special icons and any arithmetic functions.

A node can have more than one utility, several NodeFields and any NodeField can have different destinations, total, exceptions, variances, and so on. So, when adding a node to the equation you also need to select which of the parameters of the node the equation should use.

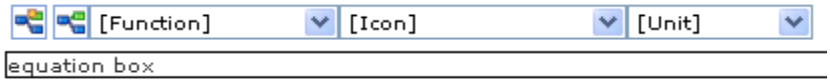
The node parameters are always given in the same order and appear colour coded in the equation editor to assist the user in differentiating between terms.

Node.Utility.NodeField.Output

- The **Node** that the equation relates to appears first in all equations, and appears in red.
- The **Utility** to which appears in black
- The the **NodeField**
- Finally the **Output** – possibly followed by methods to further specify the calculation.

Each parameter in the equation appears as text and are separated using a point. You cannot edit the equations by typing the names – you must select the options either by using the mouse or the arrow keys and space to select.

Immediately above the equation box are several buttons and drop-down lists that allow you to add further information to the equation.



6.5.1 Creating an Equation

During the creation of an equation, the Equation Editor helps the user to make these selections by prompting for the next required piece of information.

Besides the Red for Nodes, the **Black** for Utilities and the Blue for NodeFields, you will also find

- **Green** to identify Meter reading inputs
- **Purple** to refer to values entered in the Attributes pages
- Yellow for functions

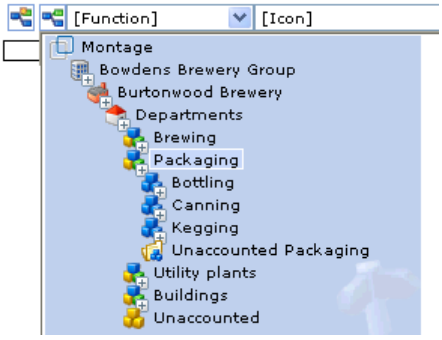
These other possibilities are also explained below where relevant.

6.5.1.1 Selecting the Node

The first button  enters the term Self into the equation. The concept of using Self is explained below in section **Error! Reference source not found.**.

Most often you will use the second button and select a specific node that will not change regardless of which Node you assign the Definition to.

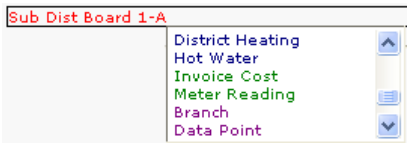
Upon selecting the the user will be presented with the node tree which can then be drilled down to find the required node.



When you have found the Node you wish to refer to, you must click that Node a second time to select it. The first click only opens the Node and display possible Child Nodes to the Node.

6.5.1.2 Selecting the Utility / Node Attributes

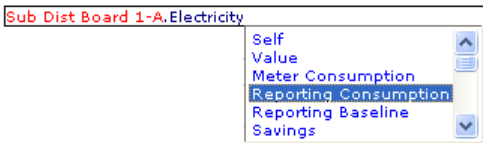
After having selected the Node, the equation editor will automatically produce a dropdown list of your available choices. The top of the list will be the available Utilities (in dark blue) followed by the references to the readings (in green) and last on the list the references to the node attributes (in purple).



The following three sections (Sections 6.5.3 and 6.5.4) explain the options you have when you choose a Utility, a reference to readings or a reference to Node Attributes.

6.5.2 Options following a Utility

After having selected a Utility, the equation editor will automatically produce a dropdown list of your available NodeFields.

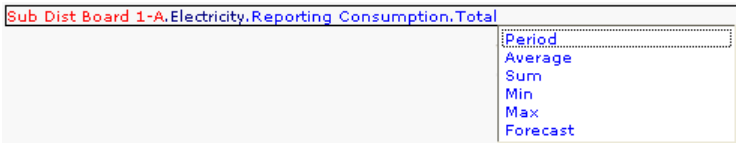


6.5.2.1 Selecting the Output

The available options for this choice differs depending on where the equation editor is used and some of the options may not be available at all times.

Unit	Refers to the unit configured for the NodeField. This option is used when converting numbers between units. Please refer to section 6.6.22 for a description of the function.
Total Exception	Refer to the optional choices for the output Total as explained in section 6.5.2.1.
High Low Variance Baseload Variable Load Day Night Consumption Cost Var Cost Fixed Rate Day Shift Late Shift Night Shift Weekday Weekend	Refer to the optional choices for the output Sub-total as explained in section 6.5.2.1. What the result of each option is defined in the Definitions and not necessarily the same on all sites. The options listed are those in the default Montage database and they are generally self-explanatory. These options may be different between sites as this can be modified in the database at the initial setup of Montage.

6.5.2.2 Using a method in the equation



After selecting the Output you will usually press Esc to end the equation, but you also have various options to make further calculations on the numbers.

Period

The Period() method will shift the period such that it will return the number from an earlier period instead. The example below will return the value for 12 periods earlier which would be the same month last year if monthly frequency is used.

ElecMeter1.Electricity.Reporting Consumption.Total.Period(12)

Average

The Average() method will calculate the average of a number of periods and return that number. The example below will return the average of the 12 recent periods.

ElecMeter1.Electricity.Reporting Consumption.Total.Average(12)

Sum

The Sum() method will calculate the sum of a number of periods and return that number. The example below will return the sum of the 12 recent periods.

ElecMeter1.Electricity.Reporting Consumption.Total.Sum(12)

Min

The Min() method will find the smallest number within a range of periods and return that number. The example below will return the smallest number from the 12 recent periods.

ElecMeter1.Electricity.Reporting Consumption.Total.Min(12)

Max

The Max() method will find the largest number within a range of periods and return that number. The example below will return the largest number from the 12 recent periods.

ElecMeter1.Electricity.Reporting Consumption.Total.Max(12)

Forecast

The Forecast (n,i) method is used to allow a definition to provide a guestimate of a number if no number exist. The main use of this is for forecasting; ie. Being able to report future periods and thus be able to produce a complete report of for instance "current year" even before the year end.

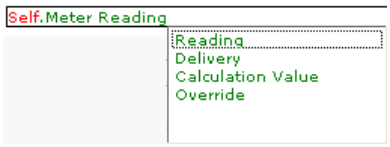
Self.Self.Self.Total.Forecast(n , i) works such that it looks for data in a past period if there is no data available for the requested period.

- n represents a number of weeks to go back
- i represents the annual growth in percent

The default is Forecast(52,0) meaning that it will basically use the same value as last year.

6.5.3 Options following a Readings reference

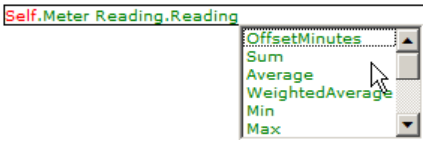
If you selected a reference to readings you will be prompted with the available options from the readings corresponding to the available fields on the Meter Readings screen (section 4.11.2)



Reading	The Reading refers to the entered deliveries in a Tank Meter data point. It is normally followed by a method as explained below in section
Delivery	The Delivery refers to the entered deliveries in a Tank Meter data point. It is normally followed by a method as explained below in section
Calculation Value	The Calculation Value represents the consumption since last reading. If no further method follows this option, which is the most common, the result of the equation will be the aggregated calculation value in

	the period.
Override	The Override refers to manual overrides which have been entered to readings.

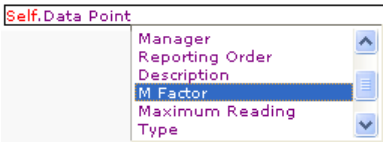
6.5.3.1 Methods on Readings references



OffsetMinutes()	The OffsetMinutes(mmm) shifts the time of the reading time stamp before calculating the value. The number of minutes in the brackets is the number of minutes shift. Self.Meter Reading.Calculation Value.OffsetMinutes(420) shifts 7 hours such that a reading at 7 is calculated to be midnight. The method is used when comparing consumption between plants that has different business days / operating hours. The result of the shifted calculation is normally assigned to a SubTotal which is then used when sites are compared. **Note**: OffsetMinutes() **ONLY influences the pre-calculated data.** Interval reports and other OnDemand calculations are not affected by the method.
Sum	Sum adds the values within the current period.
Average	Average calculates the mean value of the values within the current period.
WeightedAverage	WeightedAverage calculates the time-averaged value of the values within the current period such that values that has active for a longer period of time weights more.
Min	Min simply returns the lowest value from within the period.
Max	Min simply returns the highest value from within the period.
Count	Count returns the number of values in the period. This may be used to report on how often a meter has been read.
First or FirstToDate	First or FirstToDate both returns the first value for the entire lifetime of the meter.
FirstInPeriod	FirstInPeriod returns the first reading in the period – or in the interval of an interval report.
Last	Last returns the last (very latest) value for the entire lifetime of the meter.
LastToDate or LastInPeriod	LastToDate or LastInPeriod returns the last reading in the period – or in the interval of an interval report.

6.5.4 Options following a Node Attribute

If you selected a reference to Node attributes you will be prompted with the available options from the meter attributes. Each of the available fields the equation can refer to is explained in section 6.2.2 where the different Node Types are explained.



6.5.5 Using "Self" in the equation

To make equations universally applicable you have the option to use a the option 'Self' in the place of as well the Node (Self will be in red), the Utility (Self will be in black) and/or the NodeField (Self will be in blue).

Self are used in Definitions and in reports where they apply slightly differently.

In **Definitions** 'Self' refers to the

- Node to which the Definition is assigned.
- Utility to which the Definition is assigned.
- NodeField to which the Definition is assigned.

In **Reports** 'Self' refers to the

- Nodes in the nodes list
- Utilities available on the Node (and the Utilities Filter)
- NodeField selected in the Options panel (Only for Navigator reports).

To explain the operation we will show a few examples:

Self.Electricity.Reporting Consumption.Total * ElecTariff.Price.Value.Total

Can be used in a definition on any nodes where the calculation of electricity cost is required. Actually you could also refer to the electricity consumption by Self.Self.Reporting Consumption.Total but the risk of doing so is that if it is assigned to for instance GAS it will calculate the cost of the Gas by multiplication by the electricity tariff. By setting the utility to Electricity specifically ensures that it will not return a cost if applied to any other utilities while still being able to be used on all Nodes where the electricity cost is required.

The equation can also be used in reports where it will then refer to the Nodes in the nodes list.

Department 1.Self.Self.Total + Department 2.Self.Self.Total

Can be used to calculate the sum for any NodeField on any Utility to be the sum of the corresponding NodeFields from the two nodes Department 1 and Department 2.

Self.Self.Reporting Baseline.Total - Self.Self.Reporting Consumption.Total

Can be used in a Definition to calculate the savings as a NodeField.

It can also be used directly in reports.

Self.Self.Cost.Total

Can be used as an equation in a report where it will then display the cost for each node in the nodes list and for all utilities assigned to these nodes (or as filtered in the Utilities filter).

The equation can be used in a slightly modified form to calculate the cost in a different currency to another NodeField. If for instance, it is requested to diaplsy the cost in as well UK£ (the Cost NodeField) as well as in € (On a customised NodeField) this could be dealt with by applying the following Definition the all the Nodes where the conversion is required.

Self.Self.Cost.Total * 1.2

This is assuming a conversion rate of 1.2.

6.5.6 Using Functions

The first drop-down list is called '[Function]' and allows you to select and use functions such as 'IF' or 'LARGER' and many other functions. These functions are explained in detail in section 6.6.

6.5.7 The Icons dropdown list

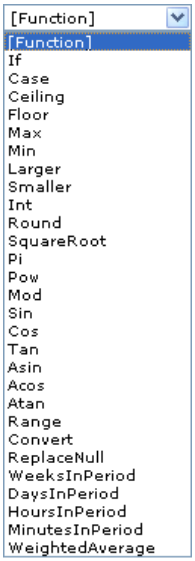
The icons dropdown list appears with the equation editor as well for reports as for definitions. It is however only useful with reports, since the purpose is to be able to select icons to draw attention in certain cases. The options in this list are described in section 5.1.2.1.

6.5.8 The Units dropdown list

The 'unit' dropdown only appear in the equation editor for Definitions and it is only used with the Convert function, as explained below in section 6.6.22.

6.6 Functions

This section will provide a summary of the available functions and how they can be applied in Montage.



When the functions work on numbers from the database, such as consumption figures, these are referred to by selecting them in the equation editor. In the examples below simple numbers have been entered to illustrate the function.

6.6.1 If

Returns one value if a condition you specify evaluates to TRUE and another value if it evaluates to FALSE.

Syntax:

If(logical_test,value_if_true,value_if_false)

Logical_test is any value or expression that can be evaluated to TRUE or FALSE. For example, ElecMeter1 > 1.800.000 is a logical expression; if the value of ElecMeter1 is greater than 1.800.000, the expression evaluates to TRUE and it will display the Icon . Otherwise, the expression evaluates to FALSE and it display the text entered in the quotes< “OK”.

```
If(ElecMeter1.Electricity.Reporting Consumption.Total > 1800000,
ARROWUPRED(), "OK")
```

The *Value_if_true* and *Value_if_false* may be

- An equation referring to NodeFields or other values in the database or simply a fixed number.
- An icon (see section 5.1.2.1)
- A Fixed text entered in quotes.

If one of the alternative results is an equation, both alternative results must be equations but you may mix icons with fixed text in quotes.

If you are evaluating more than two possible outcomes of the equation you may use nested IF() statements as illustrated below.

```
If(ElecMeter1.Electricity.Reporting Consumption.Total > 1800000,
ARROWUPRED(),If(ElecMeter1.Electricity.Reporting Consumption.Total <
1600000, ARROWDOWNGREEN(), "Normal"))
```

6.6.2 Case

Case is an alternative way of doing similar functions as IF. The main difference is that you can have multiple tests mixed with alternative results.

Syntax>

Case(logical_test1, value_if_true1, logical_test 2, value_if_true2, logical_test 3, value_if_true3, logical_test 4, value_if_true4, value_if_none_is_true)

Case is show easier to use if compared to IF() when you require more alternative outcomes. The example below is a CASE configuration of the same solution as the last example shown in the in IF section.

```
Case(ElecMeter1.Electricity.Reporting Consumption.Total > 1800000,
ARROWUPRED(), ElecMeter1.Electricity.Reporting Consumption.Total < 1600000,
ARROWDOWNGREEN(), “Normal”)
```

Case share the same options and limitations as the IF() statement. *Value_if_true* and *Value_if_none_is_true* may be

- An equation referring to NodeFields or other values in the database or simply a fixed number.
- An icon (see section 5.1.2.1)
- A Fixed text entered in quotes.

If one of the alternative results is an equation, both alternative results must be equations but you may mix icons with fixed text in quotes.

6.6.3 Ceiling

Returns number up, away from zero, to the nearest integer. For example, if you want to avoid using pennies and cents in your prices and your product is priced at £4.42, use the formula =Ceiling(4.42,0.05) to round prices up to the nearest £4.45.

```
Ceiling(2.55) = 3
Ceiling(-3.56) = -3
```

6.6.4 Floor

Rounds number down, toward zero, to the nearest integer.

```
Floor(2.55) = 2
Floor(-3.56) = -4
```

6.6.5 Max

Returns the highest value of the numbers referenced in the brackets separated by commas.

```
Max(12, 44, 15) = 44
Max(-33, 11, 23) = 23
```

The function supports an unlimited number of referenced numbers

6.6.6 Min

Returns the lowest value of the numbers referenced in the brackets separated by commas.

Max(12, 44, 15) = 12

Min(-23, 12, 2) = -23

The function supports an unlimited number of referenced numbers

6.6.7 Larger

Returns the highest value of two numbers referenced in the brackets separated by commas.

Larger(12, 15) = 15

Larger(-56, 2) = 2

The function is very similar to Max() except it supports only two referenced numbers.

6.6.8 Smaller

Returns the lowest value of two numbers referenced in the brackets separated by commas.

Smaller(12, 15) = 12

Smaller(-4, 3) = -4

The function is very similar to Max() except it supports only two referenced numbers.

6.6.9 Int

Find the Integer part of a number.

Int(2.85) = 2

Int(-34.8) = 34

Somewhat equivalent to Round but it always rounds towards zero – by simply skipping the decimals.

6.6.10 Round

Rounds a number to a specified number of digits.

Round(<Number>, <Digits>)

<Number> is the number you want to round.

<Digits> specifies the number of digits to which you want to round number.

Round(2.67, 1) = 2.7

Round(2.64, 1) = 2.6

Round(14.352461234, 4) = 14.3524

6.6.11 SquareRoot

Returns a positive square root.

SquareRoot(400) = 20

6.6.12 Pi

Returns the mathematical constant pi, accurate to 15 digits.

Pi() = 3.14159265358979

6.6.13 Pow

Returns the result of a number raised to a power.

Pow(<Number>, <Power>)

<Number> is the base number. It can be any real number.

<Power> is the exponent to which the base number is raised.

Pow(2, 3) = 8

6.6.14 Mod

Returns the remainder after number is divided by divisor. The result has the same sign as divisor.

Mod(<Number>, <Divisor>)

<Number> is the number for which you want to find the remainder.

<Divisor> is the number by which you want to divide number.

The sign of the result is the same as the sign of <Number>.

Mod(13.65, 4) = 1.65

Mod(-13.65, 4) = -1.65

Mod(13.65, -4) = 1.65

6.6.15 Sin

Returns the sine of the given angle measured in radians.

Sin(Pi() / 6) = 0.5

The number in the bracket is the angle in radians for which you want the sine.

The example below illustrates how to calculate the sine of a 30 degree angle.

Sin((Pi() / 180) * 30) = 0.5

6.6.16 Cos

Returns the cosine of the given angle measured in radians.

Cos(Pi() / 3) = 0.5

The number in the bracket is the angle in radians for which you want the cosine.

The example below illustrates how to calculate the cosine of a 60 degree angle.

Cos((Pi() / 180) * 60) = 0.5

6.6.17 Tan

Returns the tangent of the given angle measured in radians.

Tan(Pi() / 4) = 1

The number in the bracket is the angle in radians for which you want the sine.

The example below illustrates how to calculate the tangent of a 45 degree angle.

Tan((Pi() / 180) * 45) = 1

6.6.18 Asin

Returns the arcsine - inverse sine - of a number. The arcsine is the angle whose sine is <Number>. The returned angle is given in radians in the range -pi/2 to pi/2.

Asin(<Number>)

<Number> is the sine of the angle you want and must be from -1 to 1.

Asin(1) = Pi/2

If you want to know the angle in degrees you multiply by (180 / Pi()).

6.6.19 Acos

Returns the arccosine - inverse cosine - of a number. The arccosine is the angle whose cosine is <Number>. The returned angle is given in radians in the range 0 (zero) to Pi.

Acos(<Number>)

<Number> is the cosine of the angle you want and must be from -1 to 1.

Acos(-1)

If you want to know the angle in degrees you multiply by (180 / Pi()).

6.6.20 Atan

Returns the arctangent - inverse tangent - of a number. The arctangent is the angle whose tangent is <Number>. The returned angle is given in radians in the range -Pi/2 to Pi/2.

Atan(<Number>)

<Number> is the tangent of the angle you want.

Atan(1) = Pi/4

If you want to know the angle in degrees you multiply by (180 / Pi()).

6.6.21 Range

The function scales a number within min and max limits.

When the number is equal to or less than minimum, Range returns zero.

When the number is equal to or higher than maximum, Range returns the difference between max and min.

Range(<Number>, <Min>, <Max>)

<Number is the number which is tested.

<Min> and <Max> specifies the range you are interested in.

The result is "<number> - <Max>" but limited to always be between zero and "<Max> - <Min>".

Range(1, 3, 9) = 0

Range(3, 3, 9) = 0

Range(5.85, 3, 9) = 2.85

Range(8.12, 3, 9) = 5.12

Range(9, 3, 9) = 6

Range(11, 3, 9) = 6

6.6.22 Convert

Converts a number from one measurement system to another.

Convert(<Number>, <From_Unit>, <To_Unit>)

<Number> is the value to convert.

<From_Unit> is the units for number.

<To_Unit> is the units for the result.

<From_Unit> and <To_Unit> may either be references to Units used on NodeFields, as in the example below, or they may be selected in a dropdown list when used in Definitions.

Convert(Self.Electricity.Meter Consumption.Total, Self.Electricity.Meter Consumption.Unit, Self.Electricity. Reporting Consumption.Unit)

The example converts the electricity consumption already saved in the Meter Consumption NodeField from the unit assigned to the Meter Consumption NodeField to the unit assigned to the Reporting Consumption. Changing the unit on the Reporting consumption will automatically recalculate the number.

6.6.23 ReplaceNull

A Null value is an empty field in the database. Null values appear when there has been no entering of readings after a period has completed. Null values cannot be calculated and any equation that has a Null value as input will also return a Null value as output.

Montage calculates output data when the first reading appears after the period has completed. When an equation is made up of output data, e.g. when an EAC is a sum of Meters consumptions, the equation is only calculated when all nodes referred in the equation exist. For this reason, a calculated EAC will have no calculated value until all nodes in the equation has a value.

In some cases you might want to be able to calculate on missing values and ReplaceNull can Replace the Null value with any number in the equation. It is only the result of the calculation which is affected, the Null values in the referred node remains.

ReplaceNull(E-20R-A SUB STATION swC3.Electricity.Reporting Consumption.Total,0)

Replace to 0 (zero) if you want missing meter reading to be considered to be 0, or replace to a large negative number e.g. -9999 it you want the number to be obviously wrong or you may use ReplaceNull to set an exception for the missing meter reading.

Note: *When reporting data on homepages, in reports and on the summary screen, you will se the "quality" of the data represented by colours (see section 4.3.5.1). When using the function ReplaceNull you are actually influencing this because you are able to insert "valid" numbers instead of blanks. The ReplaceNull is a powerful feature but you should be aware of this effect and only use it when you know it is right.*

6.6.24 WeeksInPeriod

Returns the number of weeks included in the period. WeeksInPeriod will return the number of 4.29 (weeks) in a month of 30 days when monthly frequency is used.

WeeksInPeriod()

6.6.25 DaysInPeriod

Returns the number of days included in the period. DaysInPeriod will return the number of 30 (days) in a month of 30 days when monthly frequency is used.

DaysInPeriod()

6.6.26 HoursInPeriod

Returns the number of hours included in the period. HoursInPeriod will return the number of 720 (hours) in a month of 30 days when monthly frequency is used.

HoursInPeriod()

6.6.27 MinutesInPeriod

Returns the number of weeks included in the period. WeeksInPeriod will return the number of 43200 (minutes) in a month of 30 days when monthly frequency is used.

MinutesInPeriod()

6.7 Calculating Data

Montage contains a powerful calculation engine which translates the raw meter readings entered at any interval into normalised data for management reporting and analysis.

6.7.1 Calculation processing

Montage pre-calculates output data for all configured NodeFields for each base period. The base period is typically 1 day, midnight to midnight, but it may be configured differently if required. The pre-calculated data assures that even very extensive reports are available quickly.

If you are requesting reports of a frequency that does not match the base period or an aggregated number of base periods, data is automatically calculated on demand. When calculating on demand Montage always reverts to the root of the data and calculates accurately down to each individual meter reading of all meters involved in the report. By using on demand calculation Montage can produce reports with down to a one minute interval, available just a few seconds after the readings have been entered.

A powerful dependency controller optimises the order in which calculations are performed. It manages the dependencies between nodes, equations, and attributes. The data is to ensure that only those calculations that need to be performed are addressed within a single calculation job to improve system performance.

For example, if an Electricity meter has data entered against it, the dependency controller determines only the associated nodes that are linked to that meter and recalculates only those branches of the structure as opposed to recalculating the whole structure. This reduces the volume of processing the calculation engine has to perform with increased speed.

The dependency controller will also make the association to any virtual meters that are derived from the amended meter.

You will never need to manually recalculate your data, Montage will recalculate automatically whenever data is entered or imported into the system and when configuration changes are made, that require calculation.

6.7.2 Outputs Total and Sub-total

As explained in section 6.5.2.1 each Node and NodeField may have multiple values called Sub-totals. Each of these values is treated in the same way and is each saved to each period according to the rules that apply in the Definitions filter settings.

6.7.3 Calculation Status

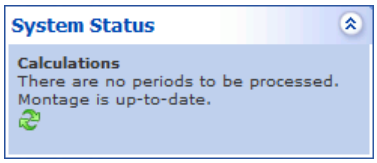
There are many activities that a user can perform within Montage that will trigger a calculation, and calculations may be following insertion of data from an AMR system (Automatic Meter Reading).

Typical examples will be:

- Entering a meter reading.
- Importing data.
- Changing an assigned definition.
- Changing Node attributes.

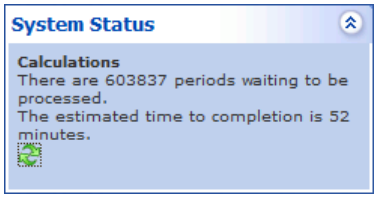
Whenever any of these events takes place, the calculation engine will evaluate the impact of the new data or the configuration change.

To ensure that the user has visibility of this event, a 'System Status' box is visible to all users on the Navigator. For the majority of the time, the System Status will display the information that no calculation is required as shown below:



When a change has been made the system will evaluate the impact of the change. During this time the 'System Status' box will display the message that some calculations are required but until the evaluation is complete Montage is not able to estimate how long it will be before the calculations are complete.

Once the evaluation is complete, the system will start to process the calculations, at which time the 'System Status' box will look as follows:



You will also note that the number of calculations that the system needs to make in order to complete the transaction is also presented (in this case 603837 periods of data). To assist the user further, an estimated completion time is calculated based on the average calculation over the past 10 minutes. This time will vary depending of which types of calculations are currently being performed. If the expected calculation time is more than 3 days no estimate will be provided.

The 'System Status' box also contains a refresh button represented as  . By selecting this, the 'System Status' box only is updated and not the whole Navigator screen. During calculations, this can be pressed every couple of seconds and shows the user that the number of periods waiting to be calculated is reducing with every refresh, and the balloons are turning colour.

The System Status box is also updated with every update of the screen.

The System Status box is also available to be displayed on the dashboard if required. See section 4.2.

6.7.4 Manually forcing a recalculation

Even though Montage will always recalculate whenever anything has changed and a recalculation is required, there is still an option for Administrator users to force a

manual recalculation. This should only be done after contacting Montage Support because the situation should never occur and a possible requirement should be investigated thoroughly.

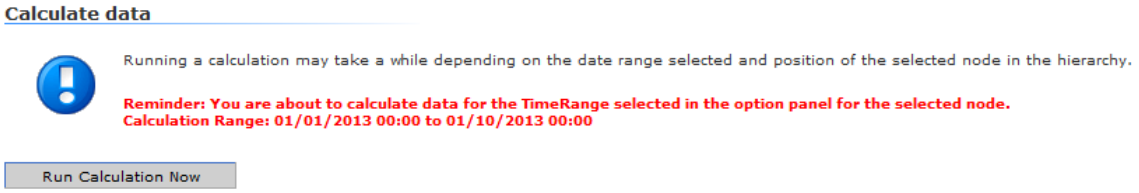
Manual calculations can either be done on single nodes or a full system recalculation.

Recalculating a single node

Through the use of the Navigator, any node can be accessed, providing you have sufficient permissions.

In order to trigger a calculation for a specific node (and all nodes depending on the node), select the required node from the node tree in the Navigator and select the 'Calculate' button located in the toolbar.

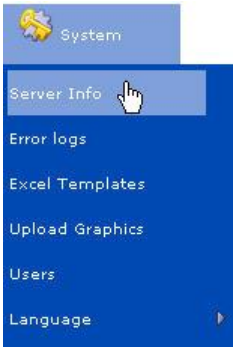
Upon selection, a warning screen will appear advising a recalculation may take a while depending on the date range selected and the position of the selected node within the hierarchy, as shown below:

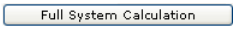


It is important to note that the calculation engine will process the command for the date range between the 'Start' and 'End Dates' selected in the Options panel. The larger the date range the longer the calculation time can be expected.

Full System calculation

A full recalculation of data within the entire system can be performed via the 'Server info' option in the 'System' menu.



The Server Info page contains and option called 

which when pressed will trigger the start of the calculation process.

This should under all normal conditions NEVER be necessary, and we advise you to contact support@montageum.com if you have reason to believe that a full system calculation could be required.

When pressed, all reports in the system will become invalid until the calculations have completed, which can take from a few hours (or less), up to about a day or so, depending on the size of the system.

7 SYSTEM ADMINISTRATOR FUNCTIONS

This section describes some of the functions that will mainly be used by the System Administrator at your site. A lot of the functions described in this section are not intended to be available to the general user, and access is governed by specific user privileges.

Specifically, this section will describe the following functions:

- Server information and Error logs.
- Uploading Excel templates.
- Uploading graphic images for use with the Graphics report.
- Creating Users, Roles and Profiles.
- Languages and Translations.
- Licence status.

All of the above functions can be found under the 'System' menu in the toolbar.

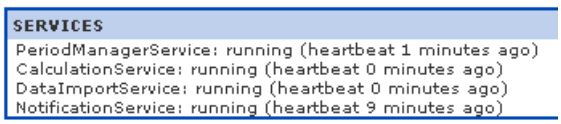
***NOTE**: this menu is only visible to those with the appropriate user rights.*

7.1 Server information

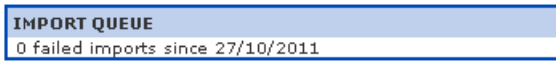
Providing access to view the status of the Montage server is used by the System Administrator to check on the state of the server. It contains other useful information as described below:

LICENCE — Informs whether the status of the software License is currently Active or has Expired.

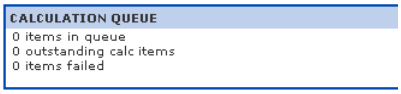
SERVICES — Informs on the status of the main processing components of the system, and shows the last time these areas provided a 'heartbeat'. *A heartbeat is a message sent from the server to indicate that although the system may not be actively required to process data at that time, it is still working as normal.*



IMPORT QUEUE — Informs of the number of failed calculations since a previous period



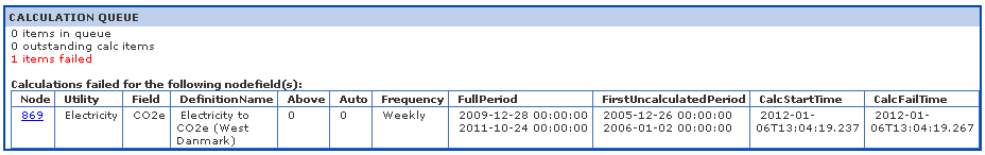
CALCULATION QUEUE — Whenever calculations are triggered in the system, they form a queue awaiting processing.



The “items in queue” is the number of events that are currently awaiting evaluation for calculations. As long as this number is not zero, the balloons on the Systems Status (see section 6.7.3) are red.

The “outstanding calc items” is the number of periods still needing to be calculated. This is the same number as displayed along with the balloons on the Systems Status.

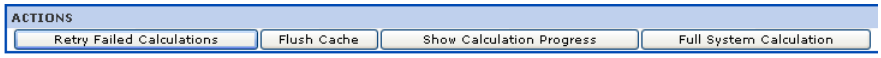
The “items failed” is the number of calculations that the calculation engine has given up on and which will not be calculated. You may press the button “Retry failed Calculations” (see below) and if the failure were due to temporarily server problems you may find that the calculation succeeds. However, it is most likely that there is a configuration mistake that require attention. If there are failed calculations these are listed below to help identifying the problem.



The Node number provides a link to the Node Setup screen of that node which is a good place to start looking for a reason.

ACTIONS

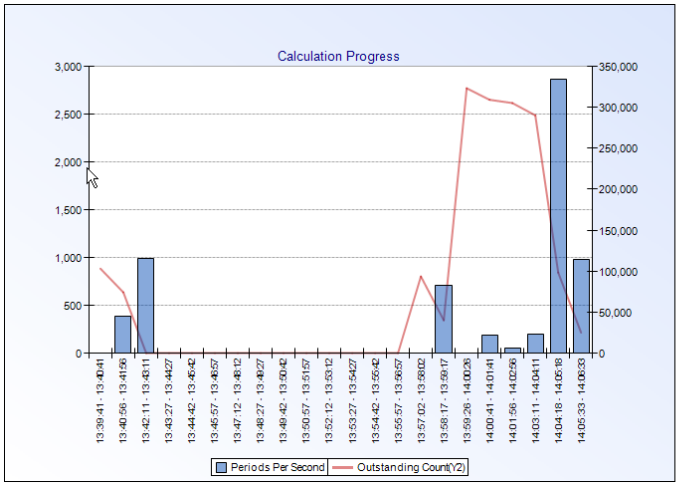
There are a number op optional actions you can take from this screen.



You can Retry Failed Calculations and the system will add the failed calculations back to the calculation queue. If a configuration mistake caused the failure it will eventually turn up again and it should be investigated.

You can Flush the Cache on the server. This resets the memory of the various temporarily items and should not be necessary. However it also cannot do any damage and in very special cases you may be asked by Montage Support to press it.

Show calculation progress will build a chart of the latest 25 minutes calculation progress. The log for this chart only exists in memory and is not saved so when you first open it you will see only the last minute. While left open it will update automatically. Calculation speed of 50 to 800 periods per second is typical, but you may from time to time see numbers between 1 and 4000. This is not an indication of issues, some calculations take much more time than others, and some may be extraordinarily fast.



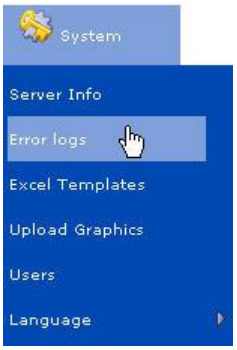
Calculations
There are 20538 periods waiting to be processed.
The estimated time to completion is 1 minute.

7.2 Error logs

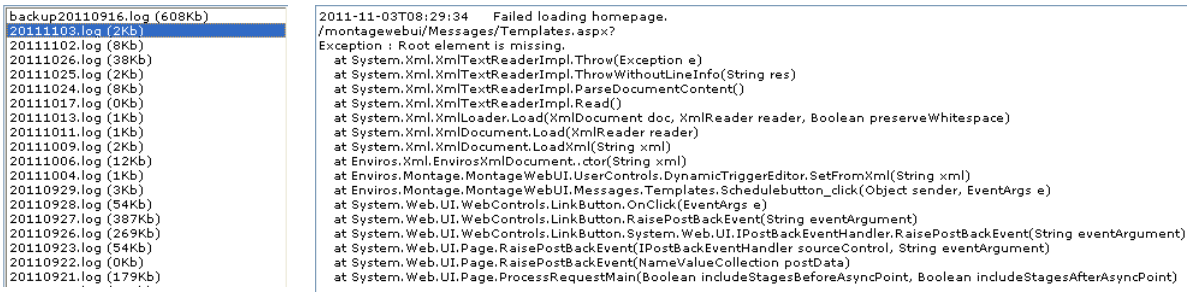
On occasions the users will find that the system cannot complete a required action due to a system error. Errors occur for many reasons, some may be bugs in the software code, others due to onsite technical issues and others just simply human error.

In the event that errors occur, Montage will automatically keep an audit trail of these errors in a log file. These files contain useful information for both the System Administrator and especially the Montage Software Development Team and the Montage Support Team.

These log files can be accessed from the 'System' menu and selecting Error logs.



This will bring the user to the screen that will display all the log files in a list down the left hand side of the page. Upon selecting a specific log file, the contents will be displayed in the panel on the right of the screen.



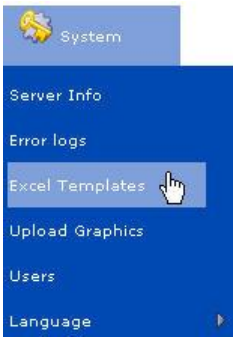
These files are the error logs for each day, although many error logs are not in fact errors that will impact the use of the system, but notifications of unusual situations.

Error logs that appear to be getting too large should however be investigated as there could be a simple resolution. Contact support@montageum.com for further assistance.

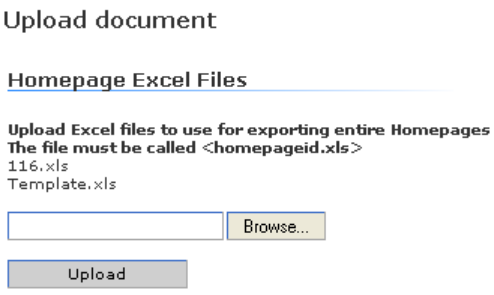
7.3 Uploading the Excel file to the Montage server

The ability to upload Excel files to the Montage server enables the users to export data contained in Montage reports into Excel. To ensure that when exported that the Excel template displays the data in the required format, the user is first required to create the Excel template after which it can be uploaded. Preparing Excel sheets is covered in section 5.2.4.1

In order to upload an Excel template, from the 'System' menu, select 'Excel templates'



The upload template screen will then be displayed as follows:



Use 'Browse' to find the file you wish to upload, select it and press 'Upload'. The file should be available for you right away and the Export to Excel button should visible in the menu bar of the Homepage.

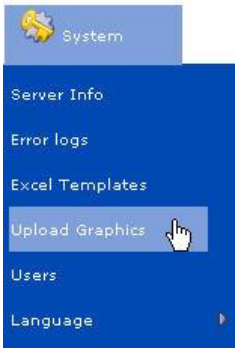
NOTE: *To delete a file you will need access to the folder on the Montage server, either via a traditional file manager on the server or via an ftp connection.*

7.4 Uploading Flow Diagram Images

The ability to upload graphic images enables the users to make use of the Report Type named 'Graphics'. This report type allows calculated values from Montage to be displayed in boxes strategically placed on the image.

Before this report can be created, the required image(s) needs to be uploaded to the Montage server.

In order to upload an image, from the 'System' menu, select 'Flow Diagram Images'.



The upload template screen will then be displayed showing samples of the images already uploaded.

To complete the action of uploading a new image, the user will 'Browse' to find the file you wish to upload, select it and press 'Upload'. The image file will then be displayed below and will be available to the user when creating a Graphics report.

***Note**: To delete a file you will need access to the folder on the Montage server, either via a traditional file manager on the server or via an ftp connection.*

7.5 Creating Users, Roles and Profiles

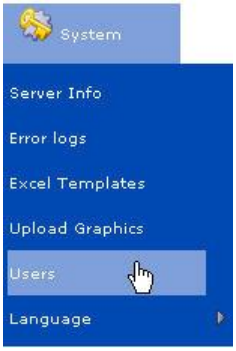
Montage is a web-based application and therefore allows multiple sites and users to gain access to the same system. Montage allows for this by providing a method of assigning Node restrictions to particular users. Therefore, a user can be limited to accessing a certain level of the Node tree and all Child Nodes to that level.

Montage will potentially be used by a much wider audience as companies are increasingly looking to incorporate sustainability into their reporting requirements. This creates whole new categories of Stakeholders who may only want to report on areas of the structure that report on, for example, absenteeism among staff or fuel consumed by the vehicle fleet.

7.5.1 To create a new user

Firstly, only users with the profile of either an 'Administrator' or 'Manager' have the ability to create a new user. A user can only grant access to the parts of the system he himself has access to so Managers of different sites in a corporate system may be creating users for their site only.

From the 'System' menu select 'Users'.



This will open the Users screen showing a list of existing user names down the left hand side of the screen, as shown below:

Provided you have the required user rights, click the ‘Create’ button.

Enter the User Details for the new user. The shaded fields are mandatory and therefore must be completed.

The Email address is important as this field will be used as the recipient for email reports scheduled by the system. You may enter several e-mail addresses separated by a semi colon “; “.

Click ‘Next’ to proceed to configure the User’s role.

Assign the appropriate user role by selecting it from the options and clicking ‘Add’. Roles can also be unassigned by selecting them and clicking ‘Remove’.

Managers and Administrators must also have the rights of User and Viewer, in order to be able to edit existing User and Viewer’s details.

Definitions of the User roles	
Role name	**Description**
Administrator	The highest level of access available, with access to all tasks and functions.
Manager	The second highest level of access, restricted to only specific functions around managing calculations.
User	Has the right to enter data but not to make any structural changes.
Viewer	Can produce reports and graphs, search, and input data.

Details relating to the specific functions that relate to each of these roles are highlighted below:

	Home		Tools										Navigator														
						DataImport							Reports			Setup						Action					
	Create Homepage	Export to Pdf	Users	Definitions	Reading Forms (Create)	Import Configuration	Queue	Upload document	Reporting Frequency	Target setting Wizard	Full System Calculation	Search	Export to Pdf	Export to Excel	Edit parameters	History	Attributes	Reporting Frequencies	View Node Fields	Edit NodeFields		DataInput		Create	Delete	Copy	Move
Viewer	x	x										x	x	x	x	x	x		x								
User	x	x				x	x	x				x	x	x	x	x	x		x			x					
Manager	x	x	x	x	x	x	x	x		x		x	x	x	x	x	x	x	x	x		x		x	x	x	x
Node Administrator	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x		x	x	x	x

Click ‘Next’ to proceed to select the nodes that the User will be granted access to.

Multiple nodes can be added simply by selecting them from the tree on the left-hand side and selecting ‘Add’. Selecting the parent node will also provide access to the respective child nodes, therefore reducing the number of selections necessary.

You can only grant access to parts of the system that you yourself can access.

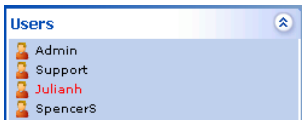
Click the Finish button to create the new user or 'Back' to return to the previous screen.

***Tip!** If the user is permitted to access many nodes but regularly works in one area only (Burtonwood), grant permissions to both the high level node (The Bowdens Group) as well as assigning the regularly worked node. This will reduce the number of clicks required when drilling down to locate the regularly worked node (Burtonwood).*

***Tip!** To test the user security, click 'Logout' which will return you to the Login page. Enter the username and password of the user you've just created and click 'Navigator'. This will display the nodes on the tree that the user is permitted to access.*

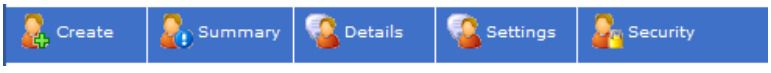
7.5.2 To change a user's details

Select 'Users' from the 'System' menu, and then select the username of the profile you wish to change from the users list on left-hand side.



This will display the 'Summary' of current setup for the selected user.

The menu at the top of the screen provides access to the different areas of the users profile and their respective settings:

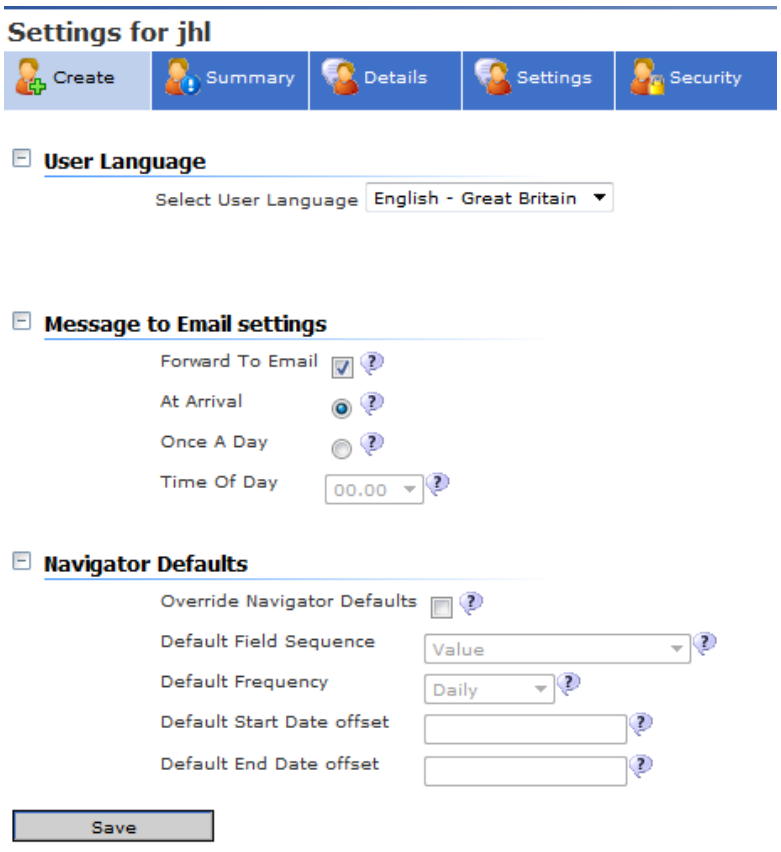


- Click 'Create' to create a new user.
- Click 'Delete' to delete an existing user (only available to certain user rights)
- Click 'Summary' to display a summary of the users profile (as shown above).

- Click ‘Details’ to view and update user name, password and address details.
- Click ’Settings’ to view user specific preferences (see below)
- Click ‘Language’ to select the user language (e.g. English, French, German, etc).
- Click ‘Security’ to amend the user's permissions within Montage.

7.5.3 User settings

This area contains settings specific to individual user preferences. These include a choice of language to which the user would expect to see the text in the user interface, rules for managing the receiving of emails from Montage Messages and the default settings for how the contents of the Options panel will be displayed when accessing the Navigator.



7.5.4 Using Windows authentication

It is also possible to have Montage recognise the Windows user currently operating the Internet explorer. When using this feature, the user will not need to know a specific Montage user name and password and the operation of Montage will appear seamless to the personalized Windows installation. This feature, which needs to be set in the configuration of the server, is explained in the installation manual.

7.6 Languages and Translations

Montage is designed to be an enterprise application; meaning with one central installation the software will be accessible to multiple users, across multiple sites spanning multiple geographic boundaries. What this means in reality, is that Montage will need to serve users in different countries who will naturally have a preference for viewing the screens and information in their local language.

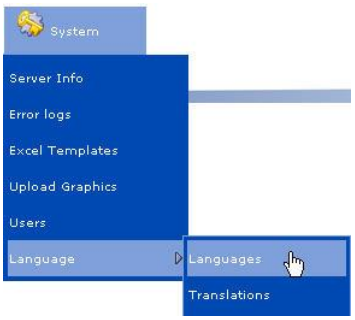
In order to support this functionality within Montage's user interface, we provide a translation tool that will enable the translation of any character from the standard default language (English-GB) to any other language.

Over time language packs are being developed and made available to customers as part of the installation process. However, depending on the language of choice, if it is not currently available in the standard list of language packs, the translation tool will enable the customer to conduct their own translations.

This section will provide an introduction to the language and translation functions.

7.6.1 Available languages

In order to check which language packs are available within your installation, from the 'System' menu select 'Language' followed by the options for 'Languages'



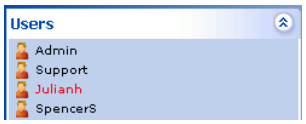
The screen listing all the global languages will appear. Those with a tick mark indicate which ones are activated on your installation and therefore available to be selected. The active ones will be displayed at the top, thereafter being displayed in alphabetical order.

Active	Language Name	Language Code	Language LCID
☑	Dansk - Danmark	da-DK	1030
☑	English - Great Britain	en-GB	
☑	French - France	fr-FR	1036
☑	German - Germany	de-DE	1031
☑	Polish - Poland	pl-PL	1045
☑	Spanish - Mexico	es-MX	2058
☑	Spanish - Spain	es-ES	1034
☐	Albanian - Albania	sq-AL	1052
☐	Arabic - Algeria	ar-DZ	5121
☐	Arabic - Bahrain	ar-BH	15361

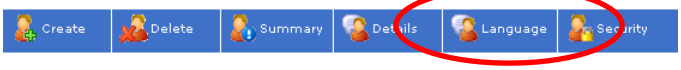
7.6.2 Selecting a user's language

In the case whereby the required language is available within the standard installation, this is a simple process.

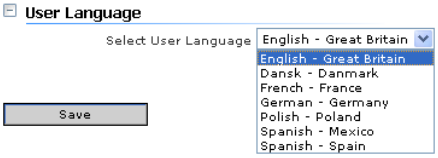
Select 'Users' from the 'System' menu, and then select the username of the profile you wish to change from the users list on left-hand side.



From the toolbar, select 'Language' as shown below:



Select the language of choice from the drop down list and press 'Save'.



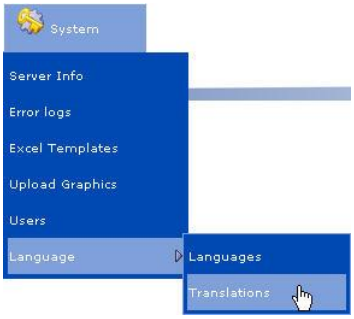
***Note**: the list within your installation may have more/less language choices available. Contact support@montageum.com if there is a language that you require that is not contained in the list.*

You can now test that the language has been activated by logging out of the system and logging back in as the user with the updated profile. The screen literals, menu options, NodeField names and system messages should now be displayed in the local language.

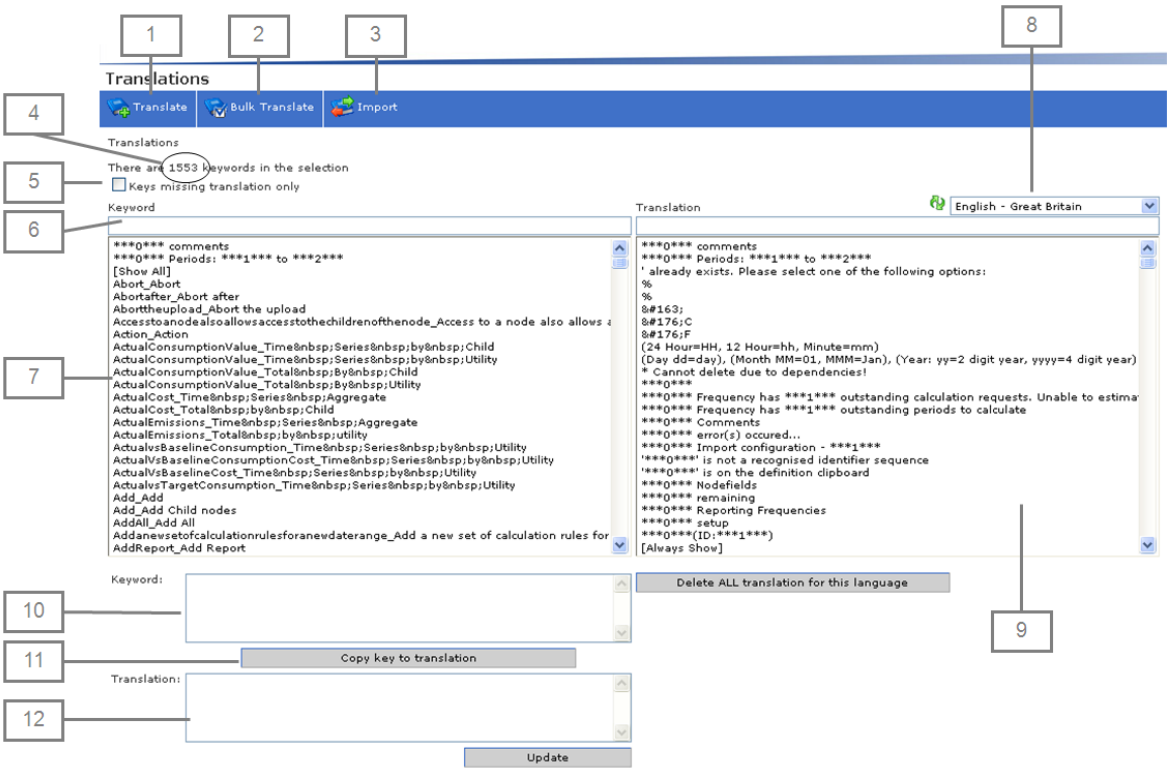
7.6.3 Introduction to the translation tool

In the case whereby the required language is not available in the list, the translation tool will enable the creation of new languages. Typically it is Scanenergi Solutions who undertakes this activity on behalf of the customer, although the functionality has now been added to the general user interface therefore allowing the user to access this functionality directly.

From the 'System' menu, select 'Language' followed by 'Translations'.



This will open the Translation screen as shown below. This screen can appear complex due to the very nature of the amount of translatable text that appears. However, having become familiar with its functions it becomes less intimidating. The various functions available to the user are described below.



1

Translate

Allows the user to create a new translation.

2

Bulk translate

Open the interface to translate – or review – multiple languages in one screen.

3

Import

Allows for translations completed in an external file (e.g. Excel) to be imported into Montage as an alternative mechanism to using the translation functions.

4

Number of keywords

This shows the user doing the translation the number of keywords requiring translation.

5

Keys missing translation

This tick box will filter out all of the translated keywords leaving only those left to translate.

6 **Keyword search**

Entering a keyboard in this field will return all the word strings that use this keyword.

7 **Keyword list**

Lists all the keywords within the system that require translation. These are listed alphabetically.

8 **Language selector**

The user can select the translated language they wish to view.

9 **Translated keywords list**

This box will display the current status of the keyword translations corresponding to the original text displayed in #7.

10 **Selected keyword**

Displays the keyword that has been selected from the Keyword list (#7) .

11 **Copy key to translation**

Will copy the keyword in its original format to the translated keywords list.

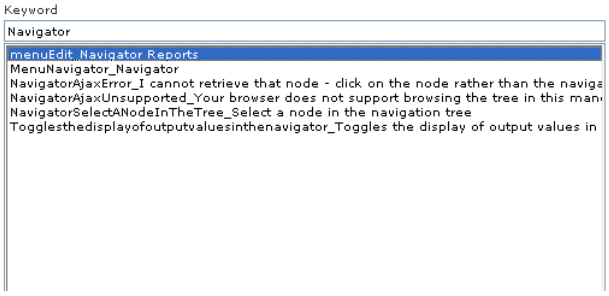
12 **Translation**

The box whereby the user can enter the translated text for the selected keyword.

7.6.4 Translating keywords

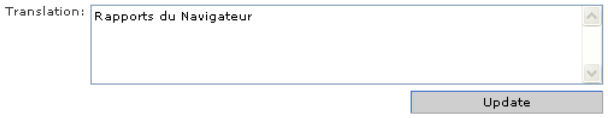
The keyword search function is a useful way to start translating words and phrases. Often the most effective way to start translating is by translating the keywords that appear in the general user interface, rather than the sentences that appear in system messages. This way it is easier to see an immediate impact and to see whether the translation has been successful.

As an example, by searching for the keyword ‘Navigator’ the system will return the following:



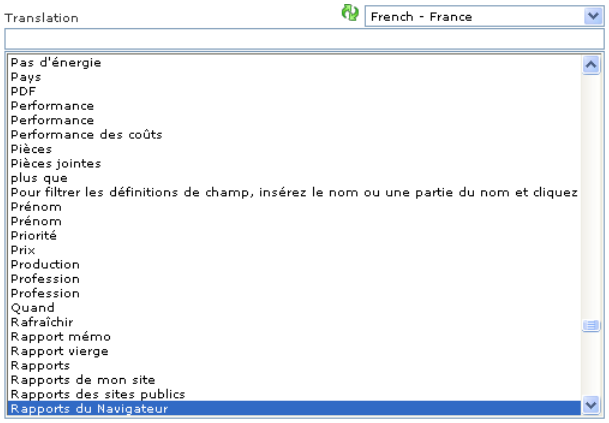
The selection above will then display this character string in the box below:

In the case whereby a French translation is required, the user would then enter the translated text as follows:



It is the text that comes after the 'menuEdit_' that gets translated. The first part of the text informs the user of the location of the text within the system.

Pressing 'Update' will then add the translated text to the translated text list as follows:

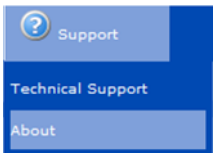


With close to 1,500 keywords requiring translation it is not a quick process, although to deliver a system in local language to each user will have a bigger impact than expecting them to adopt a system in a second or third language.

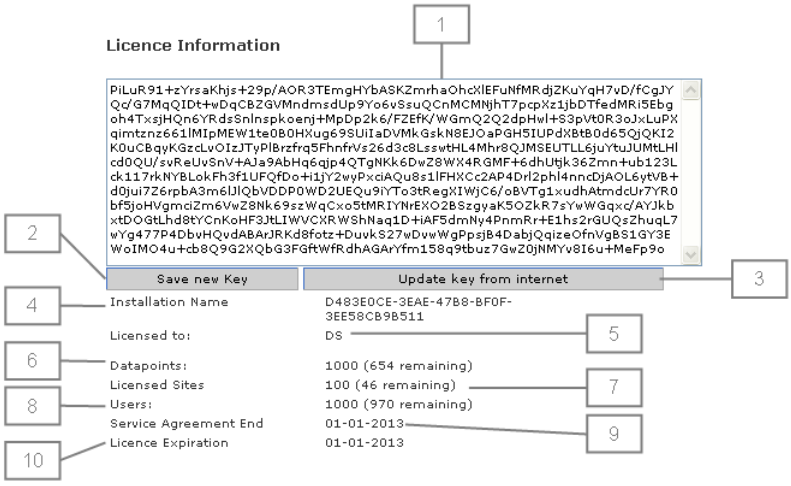
7.7 Licence management

Montage has an in-built Licence Management tool that allows for both Scanenergi Solutions and the User to keep track on the Licence status.

The Licence information can be accessed via' Help' and selecting 'Licence'.



This will present the characteristics and status of the Licence, as shown below:



These references are further described below:

1

Unique Licence Key

Displays the Licence Key generated by Montage Support at the point of installation and updated from time-to-time.

2

Save New Key

When a new Licence Key is generated, it will replace the existing key and will be activated upon pressing ‘Save’.

3

Update key from the Internet

If the server has access to the internet, the Licence Key can be requested and updated automatically without delay.

4

Installation Name

Each installation has a unique name which is recorded by Montage Support to assist in identifying installations.

5

Licensed to

Displays the name of the company licensed to use the software.

6

Data Points

One of the criteria that governs the Licence Fee. Displays the number of Data Points (meters, variables etc) currently in use (plus the amount remaining to be used before exceeding the Licence Agreement).

7

Licensed Sites

Displays the number of sites licensed to use the software (and those remaining before exceeding the License Agreement)

8

Users

Displays the number of users created as users within the system. This is not used to determine the Licence cost, but provides useful information on

occasions.

Service Agreement End

Displays the date that the Montage Plus Service Agreement ends and is due for renewal to ensure the Licence remains up-to-date and supported.

Licence Expiration

In the case whereby the supplied Licence is accessible only during an agreed term (12/24 or 36 months), the expiration date will be displayed here.

8 Appendix

8.1 Standard Unit conversion factors

The following unit conversion factors are entered in Montage and can be used by the Convert() function as explained in section 6.6.22.

From	To	Conversion factor
Energy		
kWh	kWh	1.0
kWh	MWh	0.0010
kWh	J	3600000.0
kWh	KJ	3600.0
kWh	MJ	3.60
kWh	GJ	0.00360
kWh	Kcal	860.050
kWh	BTU	3412.1410
Time		
Seconds	Seconds	1.0
Seconds	Minutes	0.0166666666666667
Seconds	Hours	0.0002777777777778
Seconds	Days	0.0000115740740741
Volume		
Litres	Litres	1.0
Litres	hl	0.010
Litres	gal US	0.264172050
Litres	cu ft	0.035314660
Litres	m3	0.0010
Mass		
Kg	Kg	1.0
Kg	tonnes	0.0010
Distance		
m	m	1.0
m	km	0.0010

More units, with or without corresponding conversion factors, may be added to a site at any time. A unit may exist without an available conversion factor.

8.2 Glossary of terms

Term	Description
Attributes	Items of information about a node that do not include any equations or calculations.
Baseload	The amount of utility consumed when there is no external influence (e.g. electricity used when nothing is being produced)
Calc groups	Component of a definition defined by the start date of the equation. A calc group may have one or more equations or calc items.
Calc items	An equation with the components, filter, condition, frequency and destination.
Calculated values	Numbers derived from formulae
Calculation engine	Component within the software that translates the raw meter readings entered at any interval into normalised data
Condition	Component of a calc item defined by how the equation should be applied.
Cusum (Cumulative sum)	Cumulative sum of previous values to give a running total
Data Entry Point (or data point)	Node that accepts raw data (e.g. node types of Variable and Meter only) and not nodes that display calculated values (e.g. Deriver meter, EAC)
Data Input	Source of entering data e.g. meter readings, invoice costs.
Definitions	Equations that when assigned to a NodeField determine the calculated value. E.g. Main meter value (12353) * Unit cost (0.056) = calculated value (£691.77)
Dependency controller	Component within the software that optimises the order in which calculations are performed
Derived meter (or virtual meter)	Not a physical meter, but a meter reading that is calculated from an equation
Destination	Component of a calc item defining whether the equation calculates all or part of the consumption
Energy Account Centre (EAC)	A method of categorising the site to assist in the management and control of cost and consumption. Typical categories will include production type, area,

	person responsible.
Exception	An Exception is understood as an unusual occurrence of recorded data. Typically an Exception can be variance between consumption and target/ budget or it can be meters with “zero” readings. Configuration wise an exception is identified by an IF statement in a calculation and the result is typically an integer number used in reports to highlight the exception in reports and on Homepages. Basically an Exception is a named output from a calculation; it can hold the result of any calculation and as such identify any condition which is considered to be unusual.
Field definitions	See ‘Definitions’
Filter	Component of a calc item defined by when the equation should be applied.
Frequency	The batch or time period for which data is stored or expected. Reporting frequencies are the periods over which data is reported for nodes.
Homepage	The initial screen after login displaying a users requested reports containing up-to-date information
Input entities	Methods used to enter data into the system
Input type	Function used for differentiating manually entered data as either Meter Readings or Invoice Costs.
Meter type: Consumption	A Meter that counts the consumption since last reading. A typical use of this Meter type is recording of production numbers – goods produced during a daily cycle, for instance recorded every morning at 06:00, or when filling a tank - it can be understood as meters that are reset to zero at every reading.
Meter type: Incrementing	A meter that counts continuously. The consumption since last reading is the difference between this reading and the previous. This is the most commonly used Meter type for recording of Utility consumption.
Meter type: Absolute	A Meter which measures a snapshot value which considered being valid since last reading. When normalising the value on output frequencies, this value is recorded for all periods of all frequencies that has been completed since the previous reading. One typical use of this is recording of average outside temperature or measures of raw material quality.
Module (Report Module)	A report or graph that can be added to a homepage
Multiple regression analysis	Statistical method for identifying the relationships between resource use (Electricity consumption) and

	more than one level of activity (e.g. production and temperature)
Navigator	The area of the system which displays the site structure and calculated values for each selected node on the structure.
Node description	Free text field explaining the purpose of the node.
NodeField definition	The definition (equation) that has been assigned to the NodeField in order to produce a calculated value.
NodeField(s)	Field used in calculations of output.
Node ID	Unique reference for the node assigned automatically by the system upon creation
Node name	The node the user defines for the node
Node(s)	Any point on the Navigator tree such as a meter, department, site, opportunity etc.
Normalised	The method whereby imported readings are calculated into recorded data which is distributed over a given period and stored as recorded values. For consumption Meters (incremental and consumption) the consumption is divided into equal amounts for each period of the same length. Absolute Meter type readings are not normalised.
ODBC	Open Database Connectivity (ODBC). Interface that makes it possible for applications to access data from a variety of database management systems
Output	An Output in this sense is a named variable containing specific types of calculation results. The most commonly used output is Total, which holds the total amount (Typically Utility consumption) for the period. Outputs such as Baseload/Variable load each holds the share of a total which is respectively independent/dependent of production figures, and Outputs such as Day-/Night shift holds the share of consumption which is within a part of the time, covered by the frequency. A special type of Output is the Exception, which holds the result of a calculation put in place to identify unusual occurrences.
Parent node	The node one level higher on the Navigator tree
Regression analysis	Statistical method for identifying the relationships between resource (Electricity consumption) use and the level of activity (e.g. production)
Report Module	See ‘Module’
Report templates	Determines the specification for the report

Report titles	Determines the number and type of equations (displayed as columns of data in a text report) in a that will be displayed in the report
Report types	Determines how the report will be sorted (e.g. Aggregate, Time-series)
Reporting frequency	The frequency for which calculated values are presented in reports (e.g. Weekly frequency would present one value for each week, irrespective of whether data was input at a higher frequency (e.g. daily)
Self	Used to make equations generic and indicates that it will use the nodes own factors such as units, frequency and utility.
Single Regression analysis	Statistical method for identifying the relationship between resource use (Electricity consumption) and one level of activity (e.g. production)
Sum up (Sum above)	Allows the values from the NodeFields to be aggregated to the parent nodes. It can be used, for example, to add the storage consumption from two meters to provide combined storage consumption at the parent node.
Target Equations	Equations created using the target Setting Wizard which will be a measure of performance
Tariffs	Entries stored in the system to reflect the unit cost of utilities
Text files	A method used to export data e.g. csv, where data values are separated by commas
Unit conversions	Formulae used to convert a value from one unit to another e.g. kWh to MWh)
Units	Indicates whether the value is a currency, kWh, cubic metre etc.
Utility type	Identifies whether the utility is electricity, gas, water etc.
Value	The original reading from the meter/variable before the definition converts it to another number
Variable load	The calculated data that will vary according to level of influence (e.g. electrical consumption may vary according to production level)
Virtual meter	See ‘Derived meter’
Wizards	Software feature that leads the user through the

	required steps.
XML files	eXtensible Markup Language. Allows information to be stored in a meaningful structure and is used primarily for information exchange.