

Features

Version 14

www.globalesco.com - <u>info@globalesco.com</u> Phones: +30 6980904949 - +30 6932422544 Kifisias 99, Athens - 4, Chalkidi str., Moschato, Greece We **measure** resources' indicators and consumption, **analyze** the data, **implement** energy saving solutions and **manage** energy projects and energy use, enabling **you to...**





1.1 Introduction

1.2 Energy Management Systems [EnMS]

Energy Management System is an information system to collect, measure and visualize all the general and specialized information related with the energy performance of a site (Note: A site may be a block of buildings, commercial facilities, compounds etc.)

EnMS is a platform that energy managers -auditors rely on to transform Energy use in the buildings they serve and indeed to transform into business value the existing building information. EnMS is the ultimate platform to set and reach energy reductions goals, carbon reduction goals, and sustainability goals This is the platform to dramatically improve the efficiency of heating, cooling, lighting, ventilation, water and other building systems. EnMS have the proven ability to maintain the high levels of uptime and energy efficiency demanded by users by proactively monitoring, analyzing, understanding and improving building services infrastructure. It's the ultimate informational energy envelope for the building

Under Control

A EnMS monitors, manages and controls building services and plant, ensuring it operates at maximum levels of efficiency and reliability. It does this by maintaining the optimum balance between conditions, energy use and operating requirements.

Controlling an entire estate's building services from a centrally-managed location enhances the ability to interact with, and improve the quality of, the infrastructure. Intelligently understanding and responding to patterns of usage means that, for example, cooling can be fully optimized and lighting turned off in unoccupied areas.

Being aware of the way a building properties and usage works makes it possible to determine which best practices to implement to protect assets, while minimizing costs and the potential for downtime.



Energy levels

Efficient use of energy is clearly no longer just an option and there is a growing raft of legislation and regulation that is specifically designed to ensure that energy consumption and carbon emissions are measured accurately, and that any applicable data is available for analysis. An EnMS is without doubt the most effective way to gain a true understanding of where savings can be made, monitored and sustained. A properly specified, installed and maintained EnMS will ensure that building services operate in strict accordance with demand, which will also help to deliver the lowest power usage effectiveness (PUE) rating. Far from being 'fit and forget', an EnMS can evolve with the building over a period. It must be regularly maintained and, where necessary, adjusted to ensure that it provides the best possible quality of service.

The bigger picture

Sustainability isn't just about energy usage. A EnMS can also limit wear and tear on plant equipment by using it more efficiently and making sure that any maintenance issues are highlighted. In addition, a properly configured EnMS will be scalable, future proof and full backwards compatible. A system that allows easy upgrading and reconfiguration is always preferable – not all systems are the same and the costs of installation can vary depending on the protocol used.

Trend is committed to ensuring the backwards compatibility of its technology.

Always on

As well as being incredibly inconvenient, it is the damage to mission critical data, impact on organizational productivity, harm to equipment, legal and regulatory repercussions and lost confidence and trust among key stakeholders that can prove difficult to recover from. Alarms may be programmed into a EnMS, so that in the event of equipment malfunction the problem can be identified and rectified as quickly as possible. For instance, on an energy metering unit, if the power voltage is not stabile for a specific timeframe, an alarm is generated to the control center dashboard.



Rules and regulations

Compliance with statutory legislation, key performance indicators (KPIs) and SLAs are fundamental to the success of any data center.

A EnMS provides overall visibility of plant energy use and allows personnel to see in real time what's happening within a facility, helping make sure that equipment consumes/delivers energy within a manufacturer's specifications. A growing number of property management operators are also choosing to put an energy management system (EnMS) in place to achieve compliance with ISO 50001

Building EnMS

Building services are systems installed in buildings to make them comfortable, functional, efficient and safe. They can be controlled by simple mechanisms such as manual switching, clocks or detectors such as thermostats or motion detectors, or they can be controlled – extended by existing building management systems (BMS).

Building Energy management systems are computer-based systems used to monitor and control energy consumption building services such as:

- Lighting.
- Heating, ventilation and air conditioning (HVAC).
- ICT systems.
- Lifts.
- Industrial processes or equipment.
- Shading devices.
- UPS
- Smart meters.

Energy management systems help building managers understand how buildings are operating and allow them to adjust systems to optimize their performance. As well as collating data and allowing ease of control, EnMS can help; visualize data, automatically generate reports and create alarms and alerts when parameters are exceeded, failures occur, or with prognostic systems, when failures are likely to occur. They can also allow comparison between spaces, buildings and benchmark data.



The effectiveness of EnMS will depend on the range and quality of the information it receives from sensors and the programming of how this information is used. For example, information about external and internal conditions with historical data can be used to determine the level of energy resources required so that plant is operating with maximum energy effectiveness.

Historically, EnMS has been associated with large commercial buildings, however as equipment has become easier to control, monitoring and detection has become less expensive, and wireless technology has become available, buildings of all sizes are having increasingly complex control and monitoring systems installed including various and different types of metering systems. There are even EnMS systems for home usage. This can for example allow home owners to connect to their home and switch on devices such as lights and heating before they arrive and monitor/control home resources via an app on their smartphones (There are various solutions for Internet of things and smart buildings beyond the scope of this document)

EnMS can help:

- Give better control of systems and conditions.
- Data gathering and report generation.
- Increased savings.
- Allow allocation of operating costs within a business or to tenants.
 www.globalesco.com info@globalesco.com



- Allow more targeted use of resources for replacement and maintenance of equipment.
- Reduced operating costs and carbon emissions.
- Improved equipment life.

Small buildings may have independent controls for energy systems, but for larger or more complex buildings, sites with a number of buildings, or organizations with buildings on a number of sites, the integration of systems operation through EnMS offers greater control and can achieve significant savings.

EnMS provides real-time remote monitoring and integrated control of a wide range of connected systems, allowing modes of operation, energy use, and environmental conditions and so on to be monitored and allowing hours of operation, set points and so on to be adjusted to optimize performance and comfort. They allow records to be kept of historical performance, enable benchmarking of performance against other buildings or sites and may help automate report writing.

ISO-50001

This standard is relevant to all organizations wishing to ensure that they conform to a stated energy policy and wishing to demonstrate this to others. The ISO 50001:2011 provides a guidance framework of requirements to:

- Develop a policy for more efficient energy usage.
- Set targets and objectives to achieve the policy.
- Use data to assist with understanding and help inform decisions about energy use.
- Measure outcomes.
- Review the efficiency of the policy.
- Continually improve energy management.
- Key components

The standard is based on the Plan-Do-Check-Act approach and a general requirement of the standard is that an energy management system should be established and continually improved and documented. The approach is outlined as follows:

- Plan: Conduct an energy review and establish the baseline, energy performance indicators (EnPIs), objectives, targets and action plans necessary to deliver results that will improve energy performance in accordance with the organization's energy policy.
- Do: Implement the energy management action plan.

www.globalesco.com - info@globalesco.com



- Check: Monitor and measure processes and key characteristics of operations that determine energy performance against the energy policy and objectives, and report the results.
- Act: Take action to continuously improve energy performance and the Energy Management System.

1.3 Energy Improvements

There is a huge potential for energy improvements (or savings) and the collaboration of all the involved parties as a team for the buildings (as a whole) is crucial. Most important are the roles of energy auditor and the energy manager, the former to evaluate and prioritize energy improvements and the latter. Principles for energy improvements include:

- Comprehensiveness. We want to look at a building as a whole, treat it as a whole, and improve it as a whole.
- Transparency. We want our work to be clear and our assumptions to be clear so that they can be checked and confirmed.
- Do-no-harm. We want energy improvements to not damage a building or place the occupants at risk.
- Evidence-based. We want energy predictions to be based on evidence, not based on wistfulness or sales-based promotions. Savings estimates should be based on proposed physical changes to the building, not on assumed percent savings or other rule-of-thumb estimates, with savings based either on first principles of physics or on published and peerreviewed empirical studies.
- Truthfulness. We want our energy savings predictions to be truthful. We want to avoid the temptation to overestimate savings.
- Objectivity. We want to avoid bias in improvements, to avoid natural tendencies to favor specific improvements, either because they were promoted by vendors or for other reasons.
- Cost-effectiveness. We want to maximize energy savings by evaluating, choosing, and recommending improvements that are the most cost-effective, which allow the most savings to be delivered for a given budget.
- Choice. We want to give building owners and property managers choices; we want to avoid second-guessing their priorities or making decisions for them.
- Robustness and persistence. We want to evaluate, choose, and recommend improvements that are more likely to deliver energy savings, that are proven, and that are more likely to last over time, to deliver persistent savings.

www.globalesco.com - <u>info@globalesco.com</u>



• Certification to the ISO 50001 standard



1.4 R Energy Manager platform

R Energy Manager software is a tool of productivity improvement that satisfies all the needs of vertical energetic management, for all analysis, management and follow up of the most advanced energetic manager, including monitoring of KPI's of directive orders, sharing of information through dashboard, reports and notification to the final client.

R Energy Manager is the ideal tool as much for the expert in energy efficiency that needs powerful data analysis, as for the final client that wishes to access to his dashboard with key KPSs and to his consumption in a direct and intuitive way.

R Energy Manager allows to work with any energetic source (electricity, gas, water, thermic, biomass, etc.) with the wished analysis depth, applying fundamental business ratios (surface, occupation, production, etc.), and to aggregate data automatically. Furthermore, R Energy Manager has a powerful reports feature, not only with pre-established templates but also with custom reports, which count with real time updated data.

R Energy Manager is the most powerful and technologically advanced Energy Management



software and the easiest and most intuitive one. All the potency of the technologic vanguard at the service of the energy sector.

R Energy Manager is a Saas (Software as a Service) energetic management platform, designed by and for energetic managers, that allows the service beneficiary to make use of it through a simple web navigator, as Google Chrome or Microsoft Edge, from a portable computer, tablet or mobile phone, without needing to install or configure any initial infrastructure, nor servers, nor client application - which reduces dramatically the propriety cost, that is, the initial investment cost.

R Energy Manager is a platform open to the IoF (Internet of Things) world with an API (Application Programming Interface) that allows the interconnection with any ERP, CRM, or 3rd party IT system.

R Energy Manager implements a real-time savings validation system, using the IPMVP of EVO protocol, and it's the ideal tool to help organizations to get and keep certified by the ISO 50001.

R Energy Manager is a tool that allows analysis and energetic efficiency project execution in bulk of thousands of buildings, in an easy and efficient way:

- Allows the detection and improvement of the energetic behavior of the building.
- Allows the follow up of consumption and cost, as well as the optimization of their tariffs and contracted power.
- Allows to communicate the consumption profile
- Easies the business ratio management
- Allows to manage self-consumption
- Activates mechanisms in order to bill consumed energy by your tenants
- Can predict and simulate consumptions
- Allows active analysis of linear regressions
- Allows the management of Measurement and Verification projects including ESE / ESCO investment projects
- Includes the functionality of managing your carbon footprint (Carbon equivalent, CO2, NO2 ...)
- Helps to achieve the RD 56/2016 European transposition
- It's the ideal tool to achieve the ISO 50.001 certification

www.globalesco.com - info@globalesco.com



R Energy Manager is built over fours main blocks:

- Dashboards
- Energetic analysis
- Reports
- Alerts

1.4.1 Dashboards

The dashboards in R Energy Manager allows following up with the main project indicators, in a flexible and personalized way for the user.

Personalized for the Manager, Financial Director, Energetic Manager and maintenance technician, each user can configure his consumption/business dashboards, as well as inherit the ones already configured by superior roles.

The dashboards in R Energy Manager allow the visualization of a variety of information:

- Analysis over maps
- Complex usage data
- Personalized layouts
- Schematic visualization with key data
- By area and by ratio data visualization
- Sharing of dashboards within users

R Energy Manager allows the integration of each Dashboard Widgets in yours' or your clients' website.

1.4.2 Analysis

R Energy Manager has key analysis features as consumption evolution, cost, benchmarking, comfort, peak demand, reactive, passive consumption, linear regression, forecast and managing consumption simulations, managing fuel tanks, heat maps, carbon footprint, data quality, consumption analysis according with the opening hours, and a lot more, as validation of saving in real time according the IPMVP protocol of EVO.

With R Energy Manager, you can certify saving that come from Energy Efficiency Improvements comparing the theoretical consumption with the baseline.



1.4.3 Basic and advanced reporting

R Energy Manager allows an easy communication with all relevant stakeholders and customers, no matter their role. R Energy Manager allows to configure ready-made standard reports, or to create a customized report template with the desired information to be used as a one-time or periodical report.

R Energy Manager allows communicating in an easy and effective way to all interested parties, no matter their perfil. Reports can be configured using the existing templates in R Energy Manager, or by creating a custom configuration using the data analysis, that better suits the user.

Reports can be sent via e-mail in .PDF, .HTML or .CSV format. They can be configured to be generated and send automatically in a periodic way - either daily, weekly or monthly.

All this considerably easies the process of promoting awareness throughout the organization members regarding the impact of their actions and to keep relevant persons informed. Once you share the results in a instant and automatic way, you have the task of communicating the evolution of your project goals made much easier.

1.4.4 Alerts

Another fundamental building block from R Energy Manager is the set-up of alarms. Alarms give real time notification to the desired user or users, and inform you which set-up condition was met, in the moment that it happens.

You can configure "no data", "threshold", "cost" and "reactive excess" alerts. These alerts allow a fast reaction when faced with inadequate behaviors.

1.5 Data integration

R Energy Manager is one of the platforms with more capability of integrations: it has uncountable ways of connecting and and capture data, not only through hardware, but also to third party IT systems.

Allows selecting within more than 30 manufacturers and hundreds of natively integrated hardware devices (Schneider, Circutor, Socomec, Carlo Gavazzi...).

www.globalesco.com - info@globalesco.com



Regarding within systems communication, R EM is integrated with SCADAS, BMS, GMAOs, ERPs, CRMs, etc., using sharing files systems or through API (Application Programming Interface)

1.6 R Energy Manager open platform – IoT oriented

R Energy Manager's API allow an open door to go further in R Energy Manager and its energetic consumptions analysis.

Either the features that R Energy Manager includes can be of input from other systems, or other systems can interoperate with R Energy Manager through API.

Energy Apps Market's features from R Energy Manager are an example of interoperability, considering they use R Energy Manager's API, and that they can the developed by 3rd party developments. R Energy Manager's API allows the technologic partner the ability to design and execute the best solution with within systems integration.

Integration with IoT platforms - to receive from and send to - it's not a problem for us, but actually an opportunity to interrelation data of different nature data and this way improve further the client's competitive power. In order to



2. R Energy Manager features

2.1 Structure

2.1.1 Dashboard/ Analysis/ Reports/ Alerts



Information is classified in four basic pillars of the energy management, allowing a quick access of them. These are Dashboard, Analysis, Reports and alerts.

The arrangement of the four pillars of an energy efficiency Project, reduces time navigation and improves the access of the information.

2.2 Navigation

2.2.1 Multi-location



Readings obtained from multiple locations can be viewed globally or individually, being able to compare same area meters or different area meters.

Essential for multipoint projects, where benchmarking different locations is key.

2.2.2 Hierarchy of locations



Location organization based on hierarchical / Geographical criteria. It allows to better analyses geographically, adding energy consumption of electricity, gas or water.

Basic on multi-locations projects where you want to maintain a logical structure and have indicators aggregated by area quickly and efficiently.



2.2.3 Filtering of locations by tags



Possibility of adding tags to the locations with the purpose of filtering each location and analyses it. Essential on multi-locations projects with different types of buildings allowing comparing them properly and in a most accurate way.

2.3 Data visualization

2.3.1 Hourly / daily/ weekly/ monthly energy consumption



Real time energy consumption plots: Electricity, gas, water, oil...

- Same time nodes/groups selection
- Date navigation: reference day, date range, etc.
- Plot ready to download in .png
- Excel data export
- Zoom available

To observe the evolution of our facility, current pattern uses and detect potential inefficiencies.

2.3.2 Submetering



Submetering by systems or different areas of our facility.

- Same time nodes/groups selection
- Date navigation: reference day, date range, etc.
- Plot ready to download in .png
- Excel data export
- Zoom available

Needed to make a thorough analysis of our facility, focusing in particular systems (air conditioning, lighting, power, etc.).



2.3.3 Comfort parameters



2.3.4 Other parameters



Temperature / humidity / lighting real time plots: Same time nodes/groups selection Date navigation: reference day, date range, etc. Plot ready to download in .png Excel data export Zoom available To observe the evolution of the temperature / humidity and lighting in facilities, detecting

humidity and lighting in facilities, detecting anomalies in HVAC systems, free-cooling potential's, etc.

Gas volume, occupancy, maximeter, active and reactive power, power factor, current, voltage, harmonics, etc.

Any parameter provided by meter

Same time nodes/groups selection

Date navigation: reference day, date range, etc.

Plot ready to download in .png

Excel data export

Zoom available

Key to see in real time any parameter that provided by meters.

2.3.5 Summary Tables

Comparar	con	Período anterio	r (04/09/20
Dispositivos/Grupos	Total	Media	Mediana
General (Edifici A)	19.266,87 kWh	117,48 kWh	97,08 k\
	-6,2 %	+ 9,8 %	-1,2
general Edificio C (Edifici C)	3.622,48 kWh	22,36 kWh	16,91 k\
	-15,1 %	+ 0,6 %	-8,{
device 3 (Edifici C)	610,33 kWh	3,77 kWh	3,79 k\
	-10,7 %	+ 5,8 %	+ 5,7

R Energy Manager allows to know in a detailed way, using tables, the most significant data of your most significant devices. This way, in a quickly you can check which device is consuming the most. Very useful to compare similar devices



2.4 Configuration of Energy Manager

2.4.1 Locations



It is the logical unit of R Energy Manager. Navigate between the different locations to observe consumptions.

Define as many locations as desired. Ability to introduce specific data for the installation (surface, economic sector, etc.) Full versatile node architecture Nodes can be shared between locations Key to make a good study of benchmarking in multi- projects.

2.4.2 Multi-vendor Plug&Play data acquisition



Easy to get data from many different hardware vendors. Fully integrated with many gateways. ModBus, MBus meters CircutorPower Studio Scada Schneider EGX 300 Virtual weather meters Device sign in through web interface. Plug&Play



2.4.3 Manual data insertion

																		-		1
transmitte	Núria																			
\$ Samilietos y tertas	Cords	pariocala Dispo	osilios	01013	ERCEL	Chris	e lettere													
¹ A ¹ Concentrations																				
HI Pardenotros	Núria	a																		
																	0			
		and the second	1000	2	100	4		100	3		100	11	0	15	14	15	15	a.	- 10	18
		Device	12																	
		Factorial	10121																	
		Delte																		
		62640010 00 18	289.5																	
		01640510-0010 84840510-0010																		
		04040010 00 00 00																		
		004405101010																		
		\$7545010 00 00																		
	11	60540010 00 00	175.8																	
	10	00040010 00.08																		
		10040010 00.00																		
	14	11840018-00-08																		
	14	12040210 00:08	212.8																	
	14	12640010 S0 M	212.8 212.8																	
	14 15 15 15	12842211 00.00 13842211 00.00 14842211 00.00	212.5 212.5 107.5																	
	14 15 16 17	120440210 00.00 130440210 00.00 140440210 00.00 140440210 00.00	202.5 212.5 107.5 205.5																	
	1 1 1 1 1 1	1284/0278 58:08 1384/0278 58:08 1484/0278 58:08 1484/0278 58:08 1484/0278 58:08	202.8 212.8 181.8 205.8 182.8																	
	2 2 2 2 2 3 3	120440210 00.00 130440210 00.00 140440210 00.00 140440210 00.00	212.8 212.8 187.8 285.8 180.8 180.8 206.8																	
	1 2 2 2 2 3 3 3 3	12842018 30 38 13840018 30 38 14840018 30 38 14840018 30 38 13840018 30 38 17840018 30 38 17840018 30 38 19840018 30 38	202.5 202.5 205.5 205.5 206.5 206.5 107.5 207.5																	
	14 15 16 17 16 16 16 16 17 17 17 17 17 17 17 17 17 17 17 17 17	120440010 00 00 13640010 00 00 14640010 00 00 14640010 00 00 10640010 00 00 10640010 00 00 10640010 00 00 20640010 00 00	212.5 212.5 105.5 205.5 105.5 206.5 105.5 206.5 105.5 105.5																	
	14 15 17 18 19 10 10 10 10 10 10 10 10 10 10 10 10 10	12842018 30 38 13840018 30 38 14840018 30 38 14840018 30 38 13840018 30 38 17840018 30 38 17840018 30 38 19840018 30 38	212.5 212.5 105.5 206.5 105.5 206.5 105.5 206.5 105.5 105.5 105.5																	

Manual data insertion available through MS EXCEL Spreadsheet template. You can give facility contour data in order to calculate EnPl's.

Occupancy

Production

Raw materials consumption

Refunds

Required for calculation of Energy Performance Indicators (EnPI's) with the aim of studying their evolution alongtime.

2.4.4 Grouping consumption by zones or by logical groups

Información	Dispositivos	Grupos	Medidores de referenci	a	Asignar sumi	nistros y tarifas	Ratios
Nue	vo grupo						
	to grupo						
Nombre			*	ID	\$	Descripción	
Distribució	per fases			G_2	5		
Fases				G_7			
resto				G_2	4		

Add or subtract from several meters with the objective of gathering / discern consumption.

E.g. sum of two partial HVAC machines to get Total HVAC consumption. Quantification of unmonitored consumption get from total consumption subtracting sub-metering.

2.4.5 Energy and wireless meters data storage

Sonda NTC +		Valor	Hora de recepción
Pulsos	Muestreo:	600 segundos	22/09/2010 14:40 CEST
#20b	Parámetro	Valor	Hora de recepción
NTC Fridge	Temperatura	7,90 °C	22/09/2010 14:40 CEST
	Pulsos	10080,00	22/09/2010 14:40 CEST
	Temperatura max diaria	10,00 °C	22/09/2010 12:30 CEST
	Temperatura min diaria	4,90 °C	22/09/2010 12:36 CEST
	Temperatura media diaria	6,70 °C	22/09/2010 12:42 CEST
	Temperatura mitjana horaria	8,24 °C	22/09/2010 13:55 CEST
	temperatura mitjana diaria	6,71 °C	22/09/2010 12:51 CEST
	Temperatura máxima diària	10,00 °C	22/09/2010 12:52 CEST

R Energy Manager can store and manage millions of readings from a wide range of meters and sensors. Each parameter can be configured to display on the scale and units desired by the user.



2.4.6 System status

	Parámetro	ID	Valor	Hora de recepción
	Energía Activa	402	12351.51 kWh	31/10/2012 11:15 CET
	Energía reactiva	404	0.0 KVArh	31/10/2012 11:15 CET
	Energia Reactiva horaria	40411	0.0 KVArh	31/10/2012 11:00 CET
	Maximetro	100402	0.0 KW	31/10/2012 11:15 CET
	Hourly CO2 Emissions	140211	1.1078125 Kg	31/10/2012 11:00 CET
	Tn de CO2 semanales	140231	0.1142903 Tn CO2	29/10/2012 00:00 CET
	Energía eléctrica cuartohoraria	40201	0.0 KWh	31/10/2012 11:15 CET
	Maximetro	40205	0.0 KW	31/10/2012 11:15 CET
	Energía eléctrica horaria	40211	2.7695312 kWh	31/10/2012 11:00 CET
	Energía eléctrica diaria	40221	61.189453 kWh	31/10/2012 00:00 CET
	Energía eléctrica semanal	40231	423.2974 kWh	29/10/2012 00:00 CET
	Energía eléctrica mensual	40241	2834.6094 kWh	01/10/2012 00:00 CEST
CT 142				
	Parámetro	ID	Valor	Hora de recepción
	Energía Activa	402	17376.5 kWh	31/10/2012 11:15 CET
	Energía reactiva	404	0.0 kVArh	31/10/2012 11:15 CET
	Energia Reactiva horaria	40411	0.0 kVArh	31/10/2012 11:00 CET
	Maximetro	100402	0.0 KW	31/10/2012 11:15 CET
	Hourly CO2 Emissions	140211	0.31171876 Kg	31/10/2012 11:00 CET
	Tn de CO2 semanales	140231	0.048094783 Tn CO2	29/10/2012 00:00 CET
	Energía eléctrica cuartohoraria	40201	0.0 kWh	31/10/2012 11:15 CET
	Maximetro	40205	0.0 KW	31/10/2012 11:15 CET
	Energía eléctrica horaria	40211	0.7792969 kWh	31/10/2012 11:00 CET
	Energia electrica norana			

Screen with all the information useful for the maintenance of the system in order to prevent and detect some failures of the system.

These include: Meter failures alerts: email or SMS alerts

2.4.7 Date, numbers, and currency formats configuration

Formatos del sistema	
Posición de la moneda	Después 🔻
Fechas	dd/MM/yyyy v
Números	Separador decimal: "," - Separador de grupos: "." 🔻
Set de iconos	Euro 🔻



2.4.8 Flexible tariff system



2.4.9 Managing users

Tariff and costs have been breakdown into concepts like energy cost, demand, penalties, etc to provide a flexible way to represent your tariff at a desired level. The following strategies have been implemented: Energy cost using fully customizable Time of Use Bands. Available demand charge in kVA, kW for - unique and multiperiods. Penalties for demand excess (Mexico, Spain, France) Penalties for reactive excess (Mexico, Spain) Custom taxes, fixed costs and levies.

Funcionalidades	SuperAdmin	Administrador	Gestor	Cliente	Dashboard	Demo
Gestión de Cuentas	Ø	8	8	8	8	8
Configuración del Dashboard	Ø	Ø	Ø	0	Ø	0,
Compartir Dashboards	Ø	0	8	8	8	Q
Configuración de Widgets	0	0	Ø	0	Ø	0
Visualización y análisis de datos	0	0	0	0	8	0
Configuración de Proyectos MyV	Ø	0	Ø	8	8	Q
Contabilidad Energética - Configuración	0	0	Ø	8	8	9
Consultas	0	0	Ø	Ø	8	Q
Introducir comentarios	0	0	Ø	0	8	Q
Configuración de Informes	Ø	Ø	Ø	8	8	Q
Visualización de Informes	Ø	0	Ø	0	8	0
Definición de Alertas	0	0	Ø	8	8	Q
Configuración de Localizaciones	0	0	0	8	8	Q
Asignar Suministros y Tarifas	0	0	8	8	8	Q
Configuración de Suministros y Tarifas	0	0	8	8	8	Q
Configuración de Concentradores	Ø	0	8	8	8	Q
Creación y edición de parámetros	0	0	8	8	8	Q
Crear y eliminar Usuarios	Ø	0	8	8	8	8
Asignar Perfiles	Ø	0	8	8	8	8
Configuración de Preferencias	0	0	8	8	8	Q



R Energy Manager enables the creation and access of unlimited users, applying a role that defines the level of visibility of the platform. Includes:

- Administrator
- Manager
- Customer
- Customer -Utility
- Dashboard
- Demo

2.4.10User profiles

Usuarios Perfiles
Gestionar perfiles
Crea un nuevo perfil Acciones v Q Busca un perfil
Recepció i consergeria Editar Personal de recepció i consergeria dels campus Usuarios Dashboards
Direcció i administració Editar Personal d'administració de les unitats
4 Usuarios 2 Dashboards

User profiles allows to create settings profiles and associate them to a group of users, reducing configuration time So useful in multi-locations projects that require access to the platform of a large number of users

2.4.11Selection of Energy sources



Fuentes energéticas habilitadas	
	Electricidad Gas Gas (Vol) Gas (NVol) Agua Gasoil Gasoil (Vol)
	Electricidad producida Térmica (calor) Térmica (frio) Volumen de aire comprimido
	Gas natural licuado (GNL) Biomasa

2.4.12More than 250 Energy Management variables to work with

Temperatura	301
Humedad	302
Potencia	401
Energía Activa	402
Energía gas	420
Energía activa exportada	452
Energía eléctrica pronosticada	482
service 998	998

R Energy Manager offers a standard way of mapping different significant variables to analyze any Energy Management need. Moreover, the system permits to create brand new variables from scratch.

Do you need a signal quality variable? You have it already in R Energy Management. Do you need to track occupancy, produced pieces or wind speed? They're ready to use too.



2.5 Analysis Features

2.5.1 Dashboard



Dashboard screen allows to quickly see the status of the facility. Distribution and comparison of consumption, maximeter gauge, benchmarking between a group of stores, weather forecast, etc.

Customizable according to user's role: technical, financial, corporate social responsibility, etc.

2.5.2 Multiple data frequencies at once

Frecuencia



Multiple frequencies available, pre-calculated for you ready to analyze.

No matter how you send data, R Energy Manager arranges and pre-calculates all available frequencies for you. Data Analysis never went so fast.

2.5.3 Daily, weekly, monthly or annual historic data



Access to historical data and visualization through configurable queries. Create and save custom queries All information is displayed in graph or table format, being able to export. To detect at first glance unnecessary consumption after hours (nights and weekends) and compare it with previous weeks, to see savings evolution.



2.5.4 Ratios, KPIs / EnPI's



Normalization of Energy/water consumption regarding weather or contour data: building surface, occupancy, production, etc.

You will obtain Key Performance Indicators for each location along time, allowing you to benchmark and detect which is the most inefficient one.

Time saving application that helps you to discover which locations require energy efficiency investment.



2.5.5 Ratio configuration: KPI's / EnPI's

Selección del tipo de ratio



It is allowed to created three types of ratios: Ratio by parameter: parameters which vary hourly, daily etc. such as occupation.

Constant ratio: parameters that normally do not vary during the project, such as the surface of a building.

Ratio by date range: Parameters that do not vary widely, and can be defined by temporal ranges, such as office workers.

Great flexibility and freedom to set ratios, facilitating energy normalization.

2.5.6 Comment system

Fecha referencia del comentario 28/05/2012	5	Visibilidad del comentario
Asunto		Tipo
Consumo excesivo refrigeración		Incidencia 💌
Comentarios		Localización asociada
Se ha detectado un consumo excesivo (climatización: Realizar control preventivo		Casa Dani 💌

Insert comments on your consumption charts to point out significant events, improvements made, best practices, inefficiencies, savings.

Comments help on the historical view and analysis of consumptions, providing context information.

Have better control over decisions and improvements made in the given consumption.



2.5.7 Apply cost to consumptions

Consumo	Liectroited 🕈 🕻	Gas 🛔 Agus 🌢				
Coste	Dispositivo Ve	er Día de referencia	Saministro	Simular con		
Evolución	General • r	mes • 01/06/2012	Escomesa Cenesal	Simulació 3.	1-3.1A Peninsula -	Actualizar
Maximetro						
Confert	550.6					
Por dispositivo	500 C -					
uses						
Cons. pasiros	450 € -					
Reactiva	400€ -					
Contabilidad Ener	350 K -					
Consecutions Ener						
Consultan	300€-	100 Baller		PE-44,23 R		
Consultan	250 6 -	100		PE 44,224		
Consultan	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		1111	PE 44,231		
Constan	250 6 -			99144238 94132798		
🛚 Consultan	250 K - 200 K -					
lt Consultan	200 6 - 200 6 - 150 6 -					
Consultan	200 4 - 200 4 - 150 4 - 100 4 - 50 4 -			PE 2221		
(Constan	200 6 - 200 6 - 150 6 - 150 6 -		Ju 11			
Constan	200 4 - 200 4 - 150 4 - 100 4 - 50 4 -			145,3472 Jac 10		202
Consultas	200 6 - 200 6 - 150 6 - 100 6 - 50 6 - 0 6 -	1 P2 1 P3 1 P4		145,3472 Jac 10		
(Consultan	200 6 - 200 6 - 150 6 - 100 6 - 50 6 - 0 6 -			145,3472 Jac 10	Coste	2-3 2-3
Consultan	200 6 - 200 6 - 150 6 - 100 6 - 50 6 - 0 6 -	F2 F2 F3 F4 Icación del contrato vigente :	N N N N N	(2) 202 (2) (2) 202 (2) (2) (2) (2) 202 (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2)		
Consultan	200 6 - 200 6 - 150 6 - 100 6 - 50 6 - 0 6 -	P2 P3 P3 P3	Tarifa 0,500.155 6000 0,127655 6000	Pit 10201	Coste 2:540,50 € 1.483,43 €	
Consultan	200 6 - 200 6 - 150 6 - 100 6 - 50 6 - 0 6 -	P2 P5 P icación del contrato ligente : Período P1 P2 P3	Tarifa 0, 190415 6000 0, 127855 6000 0, 127855 6000	PE 10210 PE 10200 PE 102000 PE 102000 PE 10000000 PE 1000000 PE 1000000000000000	Coste 2540.50 4 1.483,43 € 1.229.00 €	
Consultas	200 6 - 200 6 - 150 6 - 100 6 - 50 6 - 0 6 -	P2 P3 P3 P3	Tarifa 0,500.155 6000 0,127655 6000	Pit 10201	Coste 2:540,50 € 1.483,43 €	

Introduce and apply your pricing to obtain real time costs and to detect which consumptions have most impact on your cost. Related to electrical supplies for instance: Cost per tiers Preconfigured Tariffs Daily / Weekly / Monthlyl / Annual views Summary Table Know your total cost of energy. Specially important to create awareness and communicate in terms of money

2.5.8 Apply cost to Gas & Thermal



Introduction and application of pricing tariffs to gas and thermal, as well as to electricity. Cost in monetary units. Time evolution of tariffs. Daily / Weekly / Monthlyl / Annual views Summary Table Economical result of gas and thermal consumption. Useful tool to see money impact on heaters, burners, etc.



2.5.9 Apply cost to Water



Same as previous energy sources, applying cost to water allows the energy manager translate all consumptions and inefficiencies into a common economical value. Know your total cost of energy. Water of course also included.

2.5.10Pricing strategies simulation (Electricity / Gas / Water)



This feature allows the user to simulate new tariffs over the same consumption to observe the cost differences related to the current cost. Cost per tiers Daily / Weekly / Monthlyl / Annual views Summary Table Key feature to analyze best pricing strategy.

2.5.11Evolution



Compare consumptions with up to 5 previous time ranges. Select 5 time ranges. Daily, Weekly, Monthly, Annual view. ASvsilable for any device/group. Summary table. Cumulated savings. Normalization (weather conditions, surface, occupancy, ...) Observe consumption evolution of a given device. Track savings from a given device.



2.5.12Hourly filtering



Available on the evolution screen permits to analyze and focus only on the desired hours.

Select desired key hours to focus on, and analyze the consumption evolution over time.

2.5.13Measurement and Verification Projects (Baseline)



Track and validate savings real-time related to your defined baseline. Based on the EVO IPMVP protocol

Baseline definition (formula or historical data)

Targets definition

Rutinary and Non-rutinary adjustments.

Statistical "Error" management

Key feature to track and validate savings obtained thanks to implementation of improvements.



2.5.14Data Correlation



2.5.15Passive consumptions



2 axis chart visualization comparing variables to see direct correlation:

Configurable

Statistical/Dynamical Analysis

Possibility to add all devices/groups needed.

Option to save analysis performed as shortcuts Useful to observe consumptions related to other influence variables.

Feature that analyzes the consumption curve and detects un-normal consumption on passive hours. In absolute value In percentage Devices/groups Summary Table Useful to see night, out-of-hours consumptions in our buildings. Cutting theses consumption will have a direct impact on total savings.

2.5.16Reactive Energy Analysis per pricing Tiers



This feature allows to analyze the evolution of the reactive energy penalties (cos phi, ...)

Useful to decide whether to install a capacitor battery, or to detect failure of such batteries.

This feature allows to calculate Reactive energy pealties based on Active Energy, Reactive, and cos phi.



2.5.17Calculated parameters creation (CO2, BTU, Tep, etc.)

Pa	rámetros básicos Parámetros calculados	Parametros	externos							
nh:	ero parámetro calculado						1/1	2 de 32 <	1	2 3 >
	Nombre	• 10	 Peràmetro base 	Conversión	• Frecuencia	• Unidades	• Visible	e Peso e		
	Producción diaria	13121		acumulado	diarie		•	15	Editar	
	Producción semanal	13131		acumulado	semanal		0	15	Editar	
	Producción mensual	13141		ecumulado	mensual		0	15	Editar	
	Temperatura media horaria	30112	Temperatura	promedio	horario	τ	0	15	Editor	Recalcular
	Temperatura media diaria	30122	Temperatura	promedio	diario	Υ.	•	15	Editar	Recalcular
	Temperatura máxima diaria	30123	Temperatura	max	diario	τ	0	15	Editor	Receicular
	Temperatura minima diaria	30124	Temperatura	min	diario	r.	0	15	Editar	Recalcular
	Potencia máxima horaria	40113	Polencia	max	horario	W	0	15	Editar	Receicular
	Potencia minima horaria	40114	Potencia	min	horario	W	0	15	Editar	Recalcular
	Potencia màxima diaria	40123	Potencia	max	diario	w	0	15	Editor	Receicular
	Potencia minima diaria	40124	Potencia	min	diario	W	0	15	Editar	Receicular
	Energia eléctrica cuartohoraria	40201	Energía Activa	acumulado	cuartohorario	1008	0	15	Editer	Recalcular

R Energy Manager allows to create new data series from the consumption readings, obtaining easily the data series that represent, average, min , Max, values. Basic functionality to obtain maximal monthly power demand, and compare with available temperatures

2.5.18Automatic degree days calculation (Heating / Cooling)



Automatic degree days calculation (Heating / Cooling) based on configurable reference temperatures. Used for data normalization sake.

2.5.19Consumption forecasting



Project future consumptions in an easy way thanks to forecasting algorithms.



2.5.20Photovoltaic production



Follow the energy production in your rooftop, with capabilities to introduce values such as irradiation, inverter power, and calculate performance ratio. Does your installation produce less than expected? Look at the performance ratio. Under a 75% you might need to work out maintenance.

2.5.21Aggregated data consumption

Visualize aggregated data without losing info of the disaggregated data. What's the largest contribution to a consumption? At what time? Aggregated consumption in stacked bars allows this kind of analysis.

2.5.22Pie charts



See the distribution of certain consumptions easily. EWher to focus first? Where to invest? Which is the most consuming system? Analyze such information here.

www.globalesco.com - <u>info@globalesco.com</u>



2.6 Alerts

2.6.1 Configuration of alerts and notifications vía e-mail

DEXCEIN ENERGY MANAGER 3.0	cados Supermercado Barcelona Q+				
Dashboard Análisis Informes Alertas					
ALERTAS					
🔔 TODAS					
Exceso maximetro	Fecha 🔺 Disp				
	22/11/2012 23:00 CET Ilumi				
Supermercado Barcelona 1	21/11/2012 23:00 CET Ilumi				
▼ 🖡 Alerta umbral	20/11/2012 23:00 CET Ilumi				
Iluminación Domingo					
Iluminación nocturna	19/11/2012 23:00 CET Ilumi				
Climatización Domingo	19/11/2012 00:00 CET Ilumi				
lluminación noche 46	19/11/2012 00:00 CET Clim				
Ausencia datos	17/11/2012 23:00 CET Ilumi				
	16/11/2012 23:00 CET Ilumi				
	15/11/2012 23:00 CET Ilumi				

Create alerts to detect anomalies in energy consumption, comfort parameters, etc. Notifications can be received at R platform, by e-mail to one or more users, such as maintenance staff. Threshold alert: alert under a specific condition. No data alert: if the system detects data missing, we will receive an alert.

2.6.2 Advanced alerts – Load Excess, Cost and Reactive penalty

) — (2)							
Información básica							
Dispositivo	Genera	al					
Esctructura tarifaria	3.0A P	enínsula	1				
Periodos de aplicación	P1	P2	P3				
	0		0				
	•	•	•				
IET aplicada ¿Activar?	ORDEN	(IET 20	12 084	43 A2 3.0A			
	ORDEN		12 084	43 A2 3.0A			
¿Activar?	ORDEN	C r	12 084		=	SMS Selectione	
¿Activar? Notificaciones	ORDEN	C r	12 084 No		=		1
¿Activar? Notificaciones Tiempo real	ORDEN	Or Email Seleo Email	12 084				
(Activer? Notificaciones Tiempo real Resúmenes Informe diario	ORDEN	Or Email Seleo Email	12 084 No				1
¿Activar? Notificaciones Tiempo real Resúmenes	ORDEN	C r Email Seleo Email Email	12 084				

R Energy Manager platform allows you to set up advanced alerts, which need more intelligence than common alerts.

Load Excess alert will alert (or report) you if your facility is exceeding contracted Load for a tariff time band. Reactive Penalty alert will alert (or report) you if your facility is consuming too much reactive energy according to contract configuration for receiving penalties in your invoice.

Cost alerts are very useful when we want to know when we have consumed a certain amount of money in the form of energy.



2.7 Reports

2.7.1 PDF report generation

		0			
10005			3/ 30 64 228 🤇 3 2 3 4		
Básico energético	Fecha	* Nombre	e Estado e		
Coste y energia	12/11/2012	Informe semanal General y Clima	Listo 4		
HVAC Regression	12/11/2012	Informe Semanal	Listo 4		
Simulación factura el	12/11/2012	Gemarial General	in and in a second seco		
_	12/11/2012	Ruminación Mensual	Listo .		
Noevo informe	05/11/2012	Informe semanal General y Clima	Usb .		
	05/11(2012	Informe Semanal	Usto		
	05/11/2012	Semanal General	Listo .		
	05/11/2012	Numinación Mensual	Listo		
	29/10/2012	Informe semanal General y Clima	Listo		
	29/10/2012	Informe Semanal	Listo		

From template gallery your report. Reports can be set up to be automatically generated (Eg. Each Monday, each 1st month day) by the platform, delivering them by e-mail. In addition, is possible to setup who of my users can get access to the reports. Adhoc reports can also be developed.

2.7.2 Custom Reports

In addition to the standard report templates, R Energy Manager allows the creation of your own custom reports - this way, the user can create their own reports without the need of additional code development or any other costs.

This functionality is transversal to the whole R Energy Manager and follows the principle "WYSIWYG" (What You See Is What You get).

Thanks to this custom reports philosophy the R Energy Manager's user has all the freedom to define, generate and periodize their analysis communications.



2.7.3 Available reports



Basic energy report

- Weekly consumption
- Comparison between weeks
- Weekly cost
- Maximum and minimum



- Monthly cost and consumption
- · Comparison
- Maximum and minimum



Energy cost report II

- Thermal chart with critical hours
- Cost vs consumption pie charts.



Bill report

- Bill simulation
- Many configuration options
- Cost by periods
- Excess calculations



Temperature report

- Temperature historic evolution
- evolution Maximum and mínimum
- Degree days calculation
- <page-header>

HVAC report

- HVAC evolution study
- Potential energy savings calculation
- **EnPI Evolution**
- www.globalesco.com info@globalesco.com





Weekly Pro report

- Compares the last week versus the average of the last 4 weeks
- Detection of significant deviations
- Passive consumption analysis
- Usage factor
- Reports allow logo and title customization.
- Available in English, French, Spanish, Catalan and Euskera.



Appendix A: Visualization



Energy Dashboard



Campus Water Benchmarking ID | M | Y | \$ | ► Ξ Location - London Campus Water (Jul-2017) Campus Water (Jun-2017) 8k 6k (m³) 4k 2k 0 23 24 25 26 27 28 29 30 31 20 22

www.globalesco.com - info@globalesco.com



Energy Benchmarking



Energy Stacked Bar (By Area)



www.globalesco.com - info@globalesco.com



Energy Consumption



Energy Contribution (By Area)



Energy Ranking (By Area)





Regression Analysis for Cooling





Dials





Heat Map (Central Building)