Undertaking an energy efficiency approach in buildings

ENERGY MANAGEMENT SYSTEMS
Recommendations for decision makers

Gimélec
The need for action

Given the regulatory environment, rising energy and utility bills in addition to environmental responsibility reputation, public and private organizations have an incentive to adopt sustainable energy and utility management programmes.

To undertake such an improvement plan, one must take the right actions and measure their efficiency and sustainability outcomes. In this context, an Energy Management System (EMS) allows continuous tracking of energy consumption, usage and the related costs.

This document concerns all the players involved in the construction, management and maintenance of public or private assets. It presents the EMS functionality and features as well as the benefits for the user. It also provides recommendations regarding the selection and implementation of a solution.

Toward the liberalization of energy sector

In a liberalized energy market, without any regulated price of energy, consumers must subscribe to a market supply contract with the supplier of their choice.

The EMS will facilitate your choice among different supply contracts and reduce the financial impact of your consumption.
You want to...

- Improve your energy efficiency in order to reduce and control your operating expenses?
- Manage your assets to the regulations on energy or the environment?
- Generate and release reports on the energy performance of one or more buildings?

- Determine and validate the return on investment for your energy efficiency projects?
- Reduce your environmental footprint?

The EMS provides an appropriate response to all these concerns.

**Mandatory energy audit**

The transposition of Article 8 of the European directive on energy efficiency makes it mandatory for enterprises in every Member state (except SMEs) to perform an energy audit.

The EMS will be a major tool to support your approach to energy audit.

**Did you know?**

Thanks to the Energy Management System, the financial decision maker can establish a system for internal charging of energy according to actual use.

The energy bill is in that case no longer merely a line in the overheads; it becomes a cost accounting management factor.
The Energy Management System (EMS) makes it possible to collect and analyse consumption data and facilitates the day to day management of energy and utilities.

Thanks to its intuitive and collaborative functionalities, the EMS raises the awareness of the various stakeholders, decision makers and users, and unites them around a process of continual improvement of the performance of their buildings.

**Monitoring and optimizing your energy efficiency**

The EMS can analyse all the pertinent data for monitoring and improving the energy performance of a building or group of buildings. It greatly improves day to day management: ongoing consumption monitoring, energy cost allocation, implementation of an energy reduction and optimization programme/policy, attainment of certification (HQE operation, BREEAM In-Use, LEED, ISO50001, etc.), monitoring of the actual performance of your energy efficiency projects.

**Reducing your energy costs by 5% to 15%***

The EMS is an appropriate solution for the management of all types of building and property assets (offices, educational institutions, hospitals, administrative buildings, etc.).

Experience and feedback confirm that energy expenditure can be reduced by 5% to 15% thanks to the implementation and use of an EMS.

*Source: BCC Research*
Could you do without an EMS?

<table>
<thead>
<tr>
<th>What are your objectives?</th>
<th>With an EMS</th>
<th>Without an EMS</th>
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</thead>
<tbody>
<tr>
<td>Reducing the environmental impact and establishing energy performance indicators</td>
<td>🎉</td>
<td>🙁 Manual (partial) audits producing incomplete and static reports</td>
</tr>
<tr>
<td>Facilitating decision making and energy purchasing policy</td>
<td>🎉</td>
<td>🙁 Energy bills as the only source of information on consumption (macro level)</td>
</tr>
<tr>
<td>Minimizing the financial impacts in case of dysfunctions</td>
<td>🎉</td>
<td>🙁 Reactive detection of dysfunctions (i.e., waiting for the next bills to determine)</td>
</tr>
<tr>
<td>Allocating internal costs based on actual use and including energy in management control</td>
<td>🎉</td>
<td>🙁 Notes to the annual income statement without details</td>
</tr>
<tr>
<td>Prioritizing energy renovation (improvement) measures for buildings</td>
<td>🎉</td>
<td>🙁 Recommendations based on visual observations or partial audits</td>
</tr>
<tr>
<td>Involving stakeholders, decision makers and users in energy performance programmes</td>
<td>🎉</td>
<td>🙁 Information obsolete, incomplete or not available; no possibility of verifying the impacts of measures and actions</td>
</tr>
<tr>
<td>Improving asset management and financial performance</td>
<td>🎉</td>
<td>🙁 «Energy» issues not incorporated in the enterprise’s asset management</td>
</tr>
</tbody>
</table>

* Functions available depending on EMS versions
Successfully incorporate the EMS in your decision-making organization

The EMS’s of the Gimélec members assist you in the interpretation of your energy data and guide you in establishing and monitoring an improvement plan. They enable you to optimize the consumption of your buildings and better manage local production of renewable energy.

The building has become an essential data source which enhances your decision-making information system. Based on their expertise in the energy distribution and measurement industry, the Gimélec members are your natural partners for establishing Energy Management Systems and can offer you expert support throughout their operating life.
Let’s review the situation...

How do you currently manage your energy data?
- Is energy data collected manually?
- Is data hard to organize? Does it contain errors?
- Is it stored on a server, backed up and accessible anywhere and at any time?
- Can you easily share this data with other locations and various types of users?
- Do you need skilled resources to analyse it? Have you outsourced this function?

Is data sufficiently homogeneous to allow coherent energy reporting?
Are you able to take the right decisions regarding your energy utilities?

Do you manage a large number of sites and do you want to establish performance indicators?

Discover everything that an EMS could provide you with...
Numerous benefits

**Functions**

<table>
<thead>
<tr>
<th>Data collection</th>
<th>Avantages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Records remotely and centralizes all useful data. Compatible with old and new equipment.</td>
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</tbody>
</table>

**Benefits for the end user**

- Automation of repetitive and mistake-prone manual meter reading
- Increase in data quantity and quality
- No risk of loss of data
- Regular information updating
- Adaptation to changes in technical installations
### Functions

<table>
<thead>
<tr>
<th>Functions</th>
<th>Avantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm/alert management</td>
<td>Rapidly detect energy performance problems (excessive consumption, systems out of order, maintenance required, etc.) to rectify them as soon as possible.</td>
</tr>
<tr>
<td>Data analysis</td>
<td>Understand and model consumption profiles. Understand influencing factors. Document activities, provide evidence and secure commitments and resources.</td>
</tr>
<tr>
<td>Breakdown of energy expenditure</td>
<td>Increased quality of budgeting, cost allocation and overall accounting</td>
</tr>
<tr>
<td>Incorporation in the organization’s information system</td>
<td>Share data with other applications. Enrich energy analysis using outside information (e.g., maintenance management systems, weather forecasts, booking systems, etc.).</td>
</tr>
</tbody>
</table>

### Benefits for the end user

**Control of energy costs:**
- Real-time access to results
- Increased monitoring of waste and excessive consumption
- Accounting allocation of energy expenditures for each entity of a firm, inclusion of energy costs in cost accounting

**Benefits for the end user**
- Quick starting with the EMS due to full integration with the organization’s information system
- Enriched analyses of external data
Functions | Advantages
---|---
Reporting | Decision support thanks to personalized summary reports
Advanced calculations (energy performance indicators) | Modelling of an investment in installations or an action on a system
Tool for communication with users | Highlighting results, validating decisions, providing evidence of results, and quantifying and evaluating them

Benefits for the end user

- Increase in the value of assets by providing real, dynamic evidence of their energy performance. Possibilities of performance benchmarking between locations belonging to the organization or with other similar organizations
- Identification of potential sources of savings, choice of the best lever for improving the performance of your assets - creating cost-based project case presentations, justification of investments, budget allocation monitoring
- Aid in choosing new energy contracts

Benefits for the end user

- Increased awareness and engagement of all the project stakeholders
- Highlighting and rewarding of the positive actions of each stakeholder
Recommendations for implementation

How does the EMS fit in with an energy management programme?

The establishment of an EMS is an essential component of the programme. But the success of such an approach depends on:

• A defined, ambitious policy of energy management (supply and consumption);
• A dedicated operational strategic organization;
• Appropriate human and financial resources and means for the improvement plan;
• Involvement of all the stakeholders and highlighting of their contributions to the improvement plan.

Improvement plan

An improvement plan generally comprises actions whose implementation should be organized and managed with firm deadlines in accordance with a continual improvement cycle. These actions may be of a behavioural nature with the involvement of the occupants of the location, but also initiatives concerning heating, cooling, ventilation and lighting systems, work on the shell of buildings (passive energy efficiency) and the implementation of active energy management systems (active energy efficiency). The EMS is the essential tool which supports all these measures.
At what stages of the improvement plan is the EMS involved?
An EMS is implemented continuously as a tool supporting decision-making at each stage of the overall energy management approach: from the upstream phase (for diagnosis and a review of the existing situation) to the operating phase (for monitoring investment and maintenance performance).

What kinds of skills to administer the EMS?
You can only manage well what you can measure... But information is not knowledge. To maximize the benefits of an EMS deployment, it is essential to identify as soon as possible the players who will be in charge of operating the system (as well as the ones maintaining the assets affected), provide an expert viewpoint on the analysed results, identify corrective measures to be implemented, and validate the success of those measures.

The time to be devoted to such tasks shall also be estimated and, moreover, allocated, in order to ensure its compatibility with the timetables of the various players.

It is recommended to put in place an energy manager dedicated to supervision of the organization’s energy policy/programme. The EMS will therefore be the main tool supporting him in his everyday work.
What is the source of the data processed by the EMS?
The data may be collected:

- by **regular, automatic remote reading** of the data coming from multi-manufacturer measuring equipment (meters, power monitoring units, sensors, probes) and data acquisition equipment (hubs, PLCs), via appropriate communication media (field bus, Ethernet, GPRS, GSM);

- by **automatic integration** of data coming from files (.csv, .xml) or databases of third-party systems (BMS, CTM, ERP, etc.);

- by **manual entry** for data that cannot be processed automatically by one of the above solutions (e.g. isolated water meter with no remote reading capability).

In addition to the data collection function, the EMS performs a checking function enabling it to ensure the **integrity** and **quality** of the data collected.
Is the data secure?

Whatever the hosting mode chosen, EMS’s should be used as business applications which handle increasingly strategic data. The integrity, availability and confidentiality of your data are key to the solutions designed by the Gimélec stakeholders.

Should I choose the SaaS mode or buy a licence?

EMS’s can be implemented in licence mode or in SaaS mode*. Each of the options has its advantages.

<table>
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<tr>
<th>Modes</th>
<th>Advantages</th>
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</thead>
<tbody>
<tr>
<td>Licence mode</td>
<td>The data remains on the premises of the customer owning the EMS solution. This mode allows the customer to use the existing IT infrastructure.</td>
</tr>
<tr>
<td>SaaS mode (cloud hosting)</td>
<td>No extra costs due to IT infrastructure or data backups. The foreseeable costs are invoiced on an annual or monthly basis and include constant updating.</td>
</tr>
</tbody>
</table>

Can I implement an EMS as of now?

Yes. Implementing an EMS is an essential aspect of the implementation of a progress plan. The latter provides the Owner with the long-term view needed to plan any measures and investments. It is also necessary to build a metering plan. Gimélec has published a Measurement User Guide which will help you define the measuring plan corresponding to your performance objectives.

For monitoring an Energy Performance Contract, a Measurement and Verification Plan will specify the procedures for checking the commitments made (e.g., IPMVP). Here again, the EMS will be the essential, independent tool which will support this monitoring.

* Software as a Service
By calling on the Gimélec members to implement your EMS, you can:

- Capitalize on significant experience in the field of building energy efficiency;
- Maximize the potential of your existing technical infrastructure;
- Benefit from constant product support and development (frequent updates for more advanced functionalities);
- Manage all types of utilities, energy and information from multiple data sources;
- Benefit from numerous support services to get the most from your EMS;
- Have all the key data to control your consumption and purchasing.
The implementation of an EMS is the first step to improve the energy performance of your assets and to control your energy purchasing and consumption.

This document was produced by the members of Gimélec Division A64: “Information and decision support systems for building performance”.
List of members on www.gimelec.fr

Gimélec is a trade association representing 200 companies that provide electrical and automation solutions for the power, building, industrial, data centers and infrastructure markets. Gimélec members employ 69,000 people in France where they achieve a turnover of over €12 billion - 57% of which come from exports. Responding to ambitious EU and French energy efficiency and CO₂ emission reduction objectives, Gimélec member companies contribute to a sustainable industrial policy by manufacturing products, equipment, systems and solutions to:
- manage the energy performance of new and existing buildings (including data centers),
- develop smart grids to optimise energy supply and demand,
- roll out electric vehicles,
- connect distributed, carbon-free energy sources to the grid and manage their production,
- manage industrial processes in a secure, energy-efficient way.