

DOSSIER ON ENERGY CONSULTING SERVICES



Laborelec's structural expansion continues with new CEO

In May 2008, Laborelec appointed Bart Boesmans as its new CEO. His goal is to establish Laborelec as the technical competence centre of choice within the GdFSuez Group. He will continue to hold the balance between research and industrial services, and expand Laborelec's resources to enable structural growth. The new CEO can rely on the firm base laid out by his predecessor Paul Lemmens, whose accomplishment earned both the respect and appreciation of the entire Laborelec staff.

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New auditing methodology for French market

Laborelec has been carrying out energy audits for the Benchmarking/Audit Covenants and the 'Accords de branche' in Belgium for many years. In collaboration with Electrabel France, Laborelec has transposed this methodology to the French market by further developing it to enable audits with a result commitment. An auditing methodology featuring an energy efficiency index is now being offered in France. It can be applied to energy consumers from industrial and tertiary sectors.

Index highlights energy efficiency gains

The methodology includes an energy efficiency index which is defined for an entire site or just part of it. This index precisely indicates the energy efficiency gains of the implemented measures compared to the initial situation. Its evolution can be monitored monthly or annually.

The reliability of the index depends primarily upon the precision of the calculation of the site's initial energy consumption and on the correct identification of the parameters that affect consumption levels. Laborelec carries out all of these calculations and, using this information, draws up the site's energy balance sheet.

Energy efficiency plan outlines expected improvements

The methodology also features an energy efficiency plan, which lays out

how the energy efficiency index can be improved. It assesses the technical feasibility of improvements and calculates the expected return on investments. The plan also includes more detailed audits of specific consumption areas, such as lighting, steam, heating, cooling, and air conditioning.

Pilot tests at five different types of companies

Specific amendments were made to provide a suitable methodology to the French market. For instance, local subsidy mechanisms had to be taken into account.

The methodology is currently being tested at five pilot sites: a water treatment facility, an airport, a data centre, a large office building, and an automotive equipment plant.

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CONTENTS

Laborelec's structural expansion continues with new CEO	p. 1
New auditing methodology for French market	p. 1
Identifying energy costs in vinyl production processes	p. 2
Fine-tuning energy use in production processes	p. 2
High frequency sampling measurements of power loads	p. 3
Synchronized wave measurements assess power quality in IT hosting centre	p. 3
Growing energy awareness thanks to sustained coaching	p. 3
Evaluating the source of gas detection false alarms	p. 4
Metallurgy plant disturbs truck electronics	p. 4



Identifying energy costs in vinyl production processes

Floor coverings manufacturer Domo decided to conduct an in-depth energy audit of its vinyl production line in order to identify possible energy savings opportunities. Laborelec experts have drawn up an energy balance based on energy consumption measurements in each production phase.

The production of a Domo vinyl floor covering is a technically advanced process. The floor covering is gradually built-up in many different layers in order to guarantee quality and strength. As a result however, the process requires a great deal of intermediate heating, cooling, and other energy consuming treatments. Our experts identified the different process steps and analyzed the associated energy resources, such as IR (gas) and UV radiators, electrical equipment, compressed air, cooling-water, and thermal oil. In close collaboration with the Domo energy manager, we collected all available data and conducted additional measuring campaigns where necessary. The results have enabled us to draw up a detailed energy balance, revealing the exact energy consumption of each production step. As a result we can also determine the exact energy cost of three main product families from this line, since each product uses a unique and specific set of treatments in its production. This will also enable us to make recommendations for energy savings within the framework of the Benchmark Covenant.

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Fine-tuning energy use in production processes

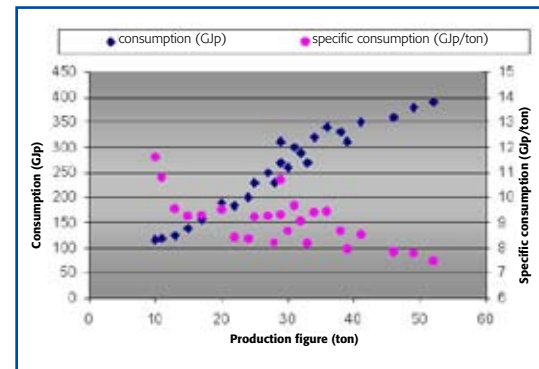
Measuring campaigns are required to detect energy saving potential

Manufacturing companies typically focus on utilities such as cooling-water, compressed air, and steam production installations when looking for energy savings. The production processes themselves are often ignored even though they have rarely been optimized from an energy use viewpoint. Now, with rising energy prices and second phase Audit Covenant demands, the issue has become critical. Laborelec has developed a new service to fill this gap.

Authorities in charge of Audit Covenant follow-up confirm that the 2006 round at most production sites focused on energy consumption of utilities. In the second phase, critical focus will be on the processes themselves. Indeed, while the production process is almost always fully optimized for quality assurance, this seldom holds true for energy consumption. In their defence however, manufacturers often lack the required facts and figures to tackle the problem appropriately. Laborelec advises them to first conduct a series of thorough measurements.

Measurement units at different points in the process

An energy audit of the production process is generally conducted in two steps. Our preliminary study analyzes general energy consumption versus the established production output, providing among other things, an accurate set of statistical facts. Anomalies in these statistics often suggest where certain production components or processes might be ill-tuned regarding energy use. In a second phase we conduct detailed analyses of specific production components and processes. Measurement units are installed at different points in the process, giving priority to processes with higher energy saving potential. Whenever the need for more detailed information arises, the measurement system can always be expanded.



We analyze and compare energy consumption versus production volumes. Statistical anomalies often suggest where certain production components may be ill-tuned regarding energy use.

Quick detection of energy saving potential

The preliminary study requires a limited investment and enables a quick estimate of potential energy saving. The detailed study that follows enables the gradual fine-tuning of the energy consumption of production components and processes without compromising quality. We are currently conducting a detailed study at the Aveve Group in close collaboration with their engineers. The company is steadily gaining considerable insight into the energy behaviour of its production processes. This knowledge is also proving to be very useful in the evaluation of new investments to develop production capacity even further.

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High frequency sampling measurements of power loads

Laborelec has carried out measurements in the United Kingdom on a grid featuring a number of decentralized generation units and electricity consumers. The goal of the measurements was to characterize a load profile with a short integration period.

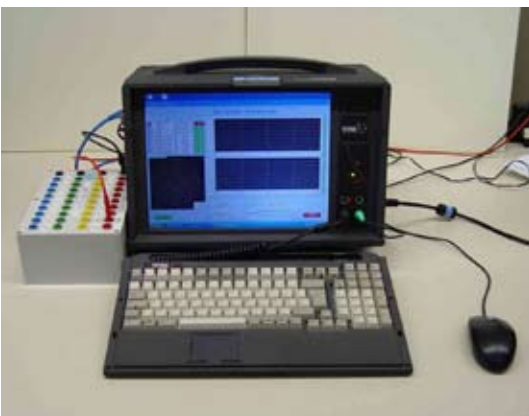
The principal reason for bundling the production of various decentralized units is that, in the United Kingdom, a producer must be able to provide a certain quantity of electricity in order to be a player on the energy market. This concept is known as site aggregation: several production and/or consumption sites are considered as a whole and

a centralized management system efficiently pilots the system by taking into account the constraints and specificities of each site.

The pilot project was carried out as part of the European EU-DEEP project on decentralized electricity production. Managing such an environment may require smooth load switching to ensure local grid balance. This is because renewable energy production cannot be entirely forecasted with precision, hence the need to measure power loads in real time.

Using its Digital Wave Recorder (DWR), Laborelec is able to measure load curves with an interval of 20 milliseconds. In addition, the DWR tool can maintain this high sampling frequency over extended periods of time. During this pilot project, power loads were measured for an entire week. The project will be continued throughout 2008 and 2009.

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Growing energy awareness thanks to sustained coaching

Energy awareness is steadily growing at Ravago in Arendonk. Thanks to sustained coaching by our experts, the plastics manufacturer is gaining more insight in the energy consumption of their production process and is achieving significant energy savings.

In 2006, following Audit Covenant requirements, we established an energy plan to be carried out in a phased approach by 2010. In 2007, Ravago saved approximately five per cent thanks to measurements proposed by Laborelec. More savings will follow planned investments in 2008. We are now monitoring the continuation of this plan on a yearly basis, and we prepare an annual scheme of action in close collaboration with the Ravago energy manager.

We also propose and conduct additional measurement campaigns in order to detect more energy saving opportunities, especially in compressed air, electricity, and heat recovery. Our consultants then help establish an investment plan for the upcoming years.

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Synchronized wave measurements assess power quality in IT hosting centre

Stable power supply is particularly important in an IT hosting centre. In one such centre, a problem occurred when switching to the back-up power source. Laborelec was able to carry out synchronized wave measurements at several network points, with a very high sampling frequency, to assess this issue.

Fellow SUEZ Group company Axima Services recently undertook maintenance works at this large IT hosting centre. During these works, they noticed malfunctions when switching from the main power supply to the back-up power source. They called upon Laborelec to assess the problem.

Laborelec assisted Axima in carrying out a series of intensive tests over a week-end to try out various types of manipulations. Measuring and comparing the respective voltage phases at various points in the network requires synchronized measurements, which is a highly specialized technique.

Such synchronized measurements are made possible by using a Digital Wave Recorder (DWR), an advanced measuring tool developed internally at Laborelec. The DWR is able to measure waves with a sampling frequency of up to 48 kHz for periods lasting several days. Multiple DWRs can be synchronized by coupling them to a GPS system.

This set-up is able to identify the cause of any malfunction. However, since no problem occurred at the hosting centre during the test period, further tests may be required.

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In 2007, Ravago saved approximately five per cent on energy consumption. More savings will follow planned investments in 2008.

Metallurgy plant disturbs truck electronics

Truck drivers at NYRSTAR's zinc production plant were often surprised to notice abnormal board instrument behaviour on their vehicles. An assessment by Laborelec revealed that the disturbances were most likely due to high DC magnetic fields next to the electrolysis building.

The zinc production process at NYRSTAR uses electrolysis powered by high DC currents of up to 200 kA. Drivers frequently reported that their board instruments did not behave normally after driving through a specific zone. To avoid any safety issues, NYRSTAR decided to have the site inspected. The company contacted Laborelec regarding the complaints.

After assessing the situation on site, Laborelec's EMC experts concluded that the troubles occurred every time the trucks passed on the road next to the zinc electrolysis building. The particularly high DC magnetic fields on this road seemed to disturb the sensors of the EBS instruments of vehicles passing by. Extensive tests confirmed however that the DC magnetic fields were within the acceptable safety limits for staff. This rare type of EMC disturbance is specific to the electrochemical industry. Although it is due to the DC magnetic fields generated during the electrochemical process, shielding the board equipment proves difficult. Therefore, Laborelec has recommended NYRSTAR to change the routing of the vehicles.

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Evaluating the source of gas detection false alarms

Revision of grounding network solves the problem

Production activities at semi-conductor manufacturer AMIS have been disturbed by a series of gas detection false alarms. Laborelec identified the cause of the problem as electro-magnetic interferences due to an imperfect grounding network.

The manufacturing process at AMIS involves the use of hazardous gases. The plant has installed sensors able to detect minute quantities of these gases in the factory. Recently, AMIS has had to deal with reoccurring alarms which, after close investigation, turned out to be false. The false alarms caused production losses and created an insecure working environment. The company therefore decided to call upon Laborelec to determine the cause.

Complete audit of grounding network

After inspecting the installations, our experts recommended to ground the shielding of the sensor cables at both ends. Before this action, Laborelec advised the company to verify the grounding network: continuity, types and arrangement of the metallic trays for cables, length of grounding cables, grounding of the cabin and of the electrical equipment in the cabin.

Importance of EMC illustrated

Since AMIS implemented these recommendations, the number of false alarms has dropped to virtually zero.



The electro-magnetic interferences with the gas detection alarms were solved by improving the grounding network

This case highlights the importance of grounding the shielding at both ends and of ensuring the electrical continuity of the grounding network to avoid differences in electric potential. Following the success of our advice, the company requested that Laborelec conduct a complete electro-magnetic compatibility (EMC) audit of its site.

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