

[NEWS :

Audits and consultancy for electricity end-users

EXTENSIVE LIGHTING AUDITS IN BELGIAN NUCLEAR POWER PLANTS

Maximizing safety while reducing total cost of ownership

Belgium's nuclear power plants in Doel and Tihange recently called upon Laborelec for a lighting audit. In this particular type of plant, Laborelec focuses first on the safety and robustness of the systems, as well as on the lighting quality. We also provide recommendations on how to reduce maintenance costs.

'In a nuclear environment, energy savings are seen as a plus, but are not the first priority,' says Jean-Michel Deswert. 'The primary focus is always put on safety. Regarding lighting, this means that it must ensure good visibility and comply with electrical safety requirements. We therefore not only assessed lighting problems, but also listed any incidents encountered. In addition, we examined the age and condition of the luminaires as well as their intrinsic safety.'

[Appropriate lamps for each environment

Laborelec made an inventory of the plant premises at both locations and classified three types of environments:

- The nuclear reactor areas, with specific requirements in terms of lighting quality and lifetime of the lamps
- The traditional industrial areas such as the machine rooms
- The office spaces using more conventional lighting systems

'We evaluated the appropriateness of the luminaires in each of these environments and made specific recommendations,' adds Deswert. 'When the technologies used in Doel were different from those in Tihange, we compared the costs and benefits of each and evaluated possibilities to harmonize their usage.'

[Support in writing out purchase specifications

Laborelec's intervention went much further than a typical lighting audit. 'We also carried out simulations to assess potential energy savings and made recommendations on how to minimize maintenance costs,' stresses Marc Vanden Bosch. 'We provided the plants with guidelines on how to write the purchase specifications for the installation of any new lighting system. We also developed a list of luminaire types that best fulfil specifications. Our recommendations always feature the latest proven technologies that can be supplied by at least three different manufacturers.'

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ENABLING ENERGY EFFICIENCY AT ELECTRICITY END-USERS

In 2008, Laborelec realized 25% of its turnover at customers outside the GDF SUEZ Group. This was an increase of 5% compared to the previous year and confirms that electricity end-users increasingly value the breadth and depth of our service offering. Power quality troubleshooting, energy audits, and lighting studies are just a few examples. Read more about it in this edition of Laborelec News.

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[From lighting comfort to environmental impact

Laborelec is ISO9001 certified for its lighting audits. Aspects assessed during an audit include the lighting comfort, luminance control, electric safety, and robustness.

In addition, an audit also analyzes operational aspects such as energy consumption, maintenance costs, and environmental impact. The cost and return on investment are indicated along with every recommendation.

[In short

- Laborelec's lighting audits focus on quality, safety, and operational aspects
- The appropriateness of the lamps is evaluated for all types of premises
- Laborelec also makes maintenance recommendations and provides assistance with purchase specifications



Laborelec evaluates the appropriateness of the lamps for each type of environment.

ENERGY SCANS IN FOUR EUROPEAN PLANTS OF A MULTINATIONAL COMPANY

Identifying energy saving potential and best practices

Laborelec is conducting Energy Scans in four European sites of a multinational group. This enables us to investigate potential energy savings as well as identify and spread best practices throughout the group.

The project kicked off in the UK. 'During one week, we analyzed the energy consumption of all utilities and processes on site. We also conducted a flue gas analysis of the boiler house and spot measurements for the production of compressed air,' states Pieter-Jan Stockmans.

[Energy saving potential of 5%

Based on their analyses, Laborelec suggested ten measures with a total energy saving potential of 5%. These include heat recuperation from the compressors in the process and pre-heating of the burner intake air. All suggested measures have an estimated return on investment of less than two years. 'The report also features conceptual propositions, such as changes to production processes,' adds Stockmans. 'These measures must first be studied in greater detail before implementation, but could increase the total energy saving potential up to 15%.'

[Cross-border energy comparisons

Laborelec will also investigate the energy consumption at the group's other sites in France, Germany, and Spain. Laborelec's worldwide experience with energy audits and its international staff make it a perfect partner to perform cross-border investigations. 'The UK assignment has given us a thorough understanding on how the processes work,' says Stockmans. 'This enables us to identify best practices within the group, limiting their energy consumption worldwide. Not only in the field of its utilities, but also in the production process.'

[Covering the entire energy value chain

Along with its international scope, Laborelec's position in the GDF SUEZ Group also proved to be a major asset. Stockmans: 'We closely collaborated with our sister company COFELY in the UK. Based on their input, we were able to translate the suggested improvements into concrete investment figures.' The connection with GDF SUEZ Group members is also beneficial for the customer's next steps in reducing energy consumption. 'With our local connections, we can immediately put the client in touch with appropriate local contractors. This certainly smoothes the implementation process and leads to turn key projects,' concludes Stockmans.

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[Assisting in the design of a new energy-efficient factory

A large car manufacturer is planning the construction of a new production facility. The new site's activities such as melting steel and assembling vehicles will all be energy-intensive. The group contacted GDF SUEZ to limit energy costs by 20 to 30% compared to traditional plants.

Former GDF joined with Tractebel and Laborelec in this project. GDF focused on heating, ventilation, and air-conditioning, while Tractebel studied the potential of renewable technologies such as photovoltaic systems and wind turbines. 'We studied maximizing the energy efficiency of the entire production chain,' notes Pieter-Jan Stockmans.

"CROSS-BORDER ENERGY COMPARISONS ENABLE US TO IDENTIFY BEST PRACTICES, LIMITING THE GROUP'S WORLDWIDE ENERGY CONSUMPTION"

[In short

- Analyzing energy consumption of utilities and processes at various European sites of a multinational group
- Suggesting concrete and conceptual measures to save up to 15% on total energy consumption, with a return on investment of 2 years
- Identifying best practices throughout the group
- Covering the entire energy value chain through collaboration with sister companies of the GDF SUEZ Group



Investigating multiple sites not only identifies energy saving potential, it also enables group-wide energy comparisons.

Joining GTI for troubleshooting power quality in a Dutch canal lock

GTI was asked by the Dutch Ministry of Transport, Public Works, and Water Management to analyze a problem with one of its canal locks. Each time a ship passed through the lock, the lights along the quayside went out and lighting inside the surrounding buildings started flickering.

GTI experts installed power quality analyzers throughout the site and collected data for a week. They then turned to Laborelec for interpretation of the results. Michiel Van Lumig of Laborelec's subsidiary in the Netherlands: 'Analysis of the data showed that starting up the electric motors to open up the gates caused a voltage drop in the site's switchboard.' Moreover, the flicker level at the on-site switchboard was above standards set out in the Dutch Net Code. 'The lock gates are opened several times per hour. This causes frequent voltage drops, which in turn explains the continuous high flicker levels,' explains Van Lumig. Laborelec advised the installation of soft starters on all electric motors. 'This limits the start-up energy needed and therefore the resulting voltage drops,' concludes Van Lumig.

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Seasoned approach to energy audits in the tertiary sector

Laborelec has a long track record conducting energy audits in hospitals, data centres, office buildings, and other tertiary sector organizations. Laborelec has developed a semi-standardized approach to guarantee the efficiency of the audit. It also takes into account the specific circumstances of each individual company.

The initial step is for the client to fill in a customized checklist. Ralf Bosch: 'For data centres, for instance, the list focuses on the dissipated heat from servers, whereas for a hospital it concentrates on heating, ventilation, and compressed air.' The check list identifies the annual consumption figures. This enables Laborelec to work out an energy balance, which helps us gain insight into the energy situation before conducting the on-site audit.

Laborelec has conducted many energy audits as part of the Flemish Benchmarking and Audit Covenants. In doing so, we have accumulated an extensive range of sophisticated instruments such as infrared thermographic cameras, and HVAC monitoring and calculation tools.

Based on the audit, the Laborelec expert draws up a report, including suggestions on how to improve the energy situation. 'We propose measures that eliminate unnecessary energy consumption, improve energy performance, and analyze the potential of on-site energy generating capacity,' observes Bosch. 'These propositions are then ranked according to their return on investment.'

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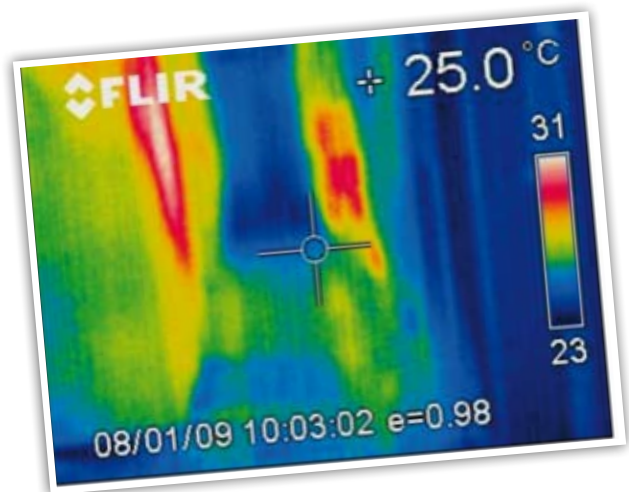
- Operators of a Dutch canal lock noticed problems with the lights along the quayside and inside the surrounding houses
- GTI performed an on-site power quality study
- Laborelec was called in to interpret the collected data and advise on the appropriate solution



GTI and Laborelec joined forces to tackle the power quality issues at a Dutch lock.

[In short

- For its tertiary energy audits, Laborelec uses a customized checklist to identify the energy balance
- Years of experience and state-of-the-art tools enable Laborelec to conduct energy audits efficiently



Laborelec uses its infrared camera to detect hotspots in a data centre.

UNIQUE POWER QUALITY MEASUREMENTS

Providing precise answers to specific industry requests

Laborelec offers a broad range of specialized electrical measurement services. These combine our expertise and the use of programmable devices to give precise answers to specific customer demands. An Electrabel Combined Heat Power (CHP) plant and a large data centre in Belgium provide two examples.

[Acceptance testing for a large data centre

A large data centre recently asked Laborelec to carry out acceptance tests on their server back-up system. 'The system features an uninterruptible power supply (UPS) unit that ensures power supply for a couple of minutes in case of a black-out. This is largely enough time to ensure that the back-up diesel generator is up and running,' explains Bernard Dethy. 'We tested the various redundancy mechanisms and examined whether the back-up system was taking over smoothly in the case of an unexpected power loss.' The tests were carried out over a week-end using four Digital Wave Recorders (DWR). The DWR is a measurement tool developed by Laborelec that records and samples sinusoidal waveforms, and saves them in its memory. 'We synchronized the DWRs at different places on the network by GPS with a deviation of less than eight thousands of a second,' adds Dethy. 'This tuning enabled the precise detection of the sequence of events. Based on these tests, the data centre concluded that the installation complied with their demands.'

[Soft start troubleshooting at an Electrabel CHP at Lanxess

The Lanxess site near Antwerp approached Laborelec recently regarding problems with the soft start of two 5 MW pumps. 'The start-up of large motors can sometimes generate voltage dips and the subsequent stoppage of the installation,' explains Michèle De Witte. 'A soft start system can prevent this, if it operates as it should. The problem was that every time a pump was started up, it would stop shortly after because the inverse current relay was activated.'

A soft start limits the start-up current. This also limits the voltage drop and prevents a system shutdown. Once the motor is started and operating at nominal power, the soft start system is by-passed. At Lanxess, however, the bypass had a delay when switching on the motor. Because of that, the motor currents fell to zero and the motor was started up with full power. The resulting high currents caused voltage dips and an unbalance in the currents. This activated the inverse current relay. 'By adjusting the soft start settings, we were able to ensure that the bypass would activate more rapidly,' stresses De Witte. 'The measurement precision of less than 40 milliseconds provided by the DWR enabled us to rapidly identify the problem.'

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[From signatures to continuous measurements

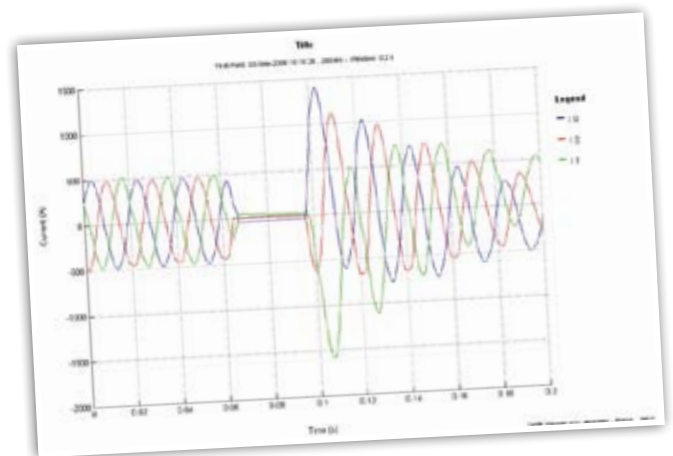
Laborelec's range of electrical measurements primarily includes:

- **Electrical 'signatures':** these are extremely precise measurements that are limited in time - some of Laborelec's testing and calibration activities are accredited by BELAC
- **Monitoring:** these are long-term measurements that register the sinusoidal wave at given intervals - our monitoring activities are ISO 9001 certified
- **Perturbography measurements:** these consist of pre-defining operational limits and analyzing when these limits were exceeded

In addition to these measurements, Laborelec also configures testing equipment and interprets results.

[In short

- Laborelec has the know-how and tools to carry out very precise electrical measurements
- The high precision of the DWR tool enabled us to troubleshoot the soft start of pumps at Lanxess
- High speed synchronization tests enabled our experts to test the efficiency of a back-up system for a large data centre



Laborelec experts are able to make extremely precise sequencing measurements using the DWR tool.