

# NEWS: focus on Laborelec's innovative research environment



## Energy-efficient laboratories mark Laborelec's future

The inauguration of the renovated laboratories—which entailed a 10 million euro investment—marks the first step in Laborelec's master renovation plan. It is not a coincidence that the renovation of the laboratories is the project's first stage.

'We want to provide our customers expert advice based on measurements on site as well as in our own laboratories. This investment in the laboratories demonstrates our commitment to giving objective, accurate advice,' explains Bart Boesmans, Managing Director of Laborelec.

### Laboratories setting new standards for energy efficiency

The renovated laboratory facilities set an example in terms of energy efficiency. The building has adjustable double walls for optimal insulation, solar thermal collectors for low-temperature heating and high-temperature cooling, climate ceilings, and heat pumps with internal circuits for underground heat storage by means of boreholes. 'The incorporation of such new energy technologies enabled us to decrease the energy loss coefficient from 75 for the old building to 21 for the renovated building. The energy coefficient dropped from 242 to 50 and is lower than the legal requirement for new buildings. This makes our building a reference for renovation projects,' concludes Boesmans.

### Moving confidently into the future

Laborelec's renovation project has been applauded by senior management officials within the GDF SUEZ Group. GDF SUEZ Vice-Chairman and President Jean-François Cirelli explained during the inauguration ceremony that the new laboratory facilities give Laborelec the means to help the GDF SUEZ Group address global energy challenges. It will enable Laborelec to improve the power plants' operational excellence, as well as contribute to prospective research. In addition, Executive Vice-President, in charge of the Energy Europe & International business line, Dirk Beeuwsaert, described Laborelec's master plan as a culmination of the company's evolution over the past years. The new laboratory facilities mark a milestone in Laborelec's history and indicate a positive outlook for the company's increasingly international activities.



## Strengthening our expertise, investing in state-of-the-art laboratories

On 14 October 2011, Laborelec inaugurated its new laboratory facilities at its corporate headquarters in Belgium. The renovated building is highly energy-efficient and provides a comfortable environment for conducting innovative research. During the inauguration, participants were able to discover Laborelec's top-notch research facilities firsthand. In this special edition of Laborelec News, we are going to take you on a virtual tour.

*Bart Boesmans*



*From left to right: Jean-François Cirelli (GDF SUEZ Vice-Chairman and President), Philippe Van Troeye (Executive Vice-President Generation Belux), Dirk Beeuwsaert (Executive Vice-President, in charge of the Energy Europe & International business line), Bart Boesmans (Managing Director Laborelec).*



## New laboratories, new website

Not only did Laborelec renovate its laboratories, but it also gave its website a thorough make-over. The new website has a different layout and features a lot of new content on our experiences with energy technology and sustainability. Moreover, it highlights our services, as well as our research and innovation-related activities. A new item on the website is the blog, which will inform visitors of exciting general news about Laborelec and the latest innovations in energy technologies.

[www.laborelec.com](http://www.laborelec.com)

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## New state-of-the-art laboratory facilities

Combining sustainability and innovation to create a top-notch research environment

**Sustainability and innovation are essential attributes of our service offering and work environment. Over the past few years, Laborelec has further solidified its commitment to these aspects by investing in new state-of-the-art laboratory facilities that are designed around five pillars.**

### Comfortable

#### A pleasant and healthy work environment

The new facilities offer ideal working conditions at all times. This is based on three axes:

- > Perfect temperature, in both winter and summer: Climate ceilings in the open office space, controllable air heating/cooling system with fume hoods in the labs.
- > Clean air. A balanced air inlet and outlet system in the labs. An automated system in the office space, based on the number of people present in the room.
- > Lighting without the blinding effects. Maximum use of natural light; LEDs and T5 fluorescent lamps provide additional lighting comfort.

### Liveable

#### An open office space, providing peace and quiet

The new laboratory facilities are housed in a building that includes open office spaces with landscape desks and optimal 'living' conditions:

- > Acoustic insulation. Perforated ceilings, fitted carpets, and acoustic file cabinets block any disruptive sounds.
- > Meeting room capacity. Every floor features a mixture of large and small meeting areas.
- > Kitchen and sanitation. Each floor also has a fully equipped kitchenette, separate toilets, and shower facilities.

### Sustainable

#### Maximum comfort, minimum environmental footprint

Total cost of ownership and trias energetica are the essence of the building's design. The result is an energy level of 50 and an insulation K factor of 21, figures that match those of a newly built energy-efficient facility.

- > Carbon emissions avoidance. Renovation enabled us to recover the old building's bricks.
- > Energy efficiency. The building's design helps limit the energy needs for heating, cooling, and lighting.
- > Efficient energy technologies, such as a heat pump, climate ceilings, a sun boiler, and LED lighting.

### Safe

#### In line with the strictest safety standards

The new facility complies with the strictest safety guidelines for fire resistance and management of gases and toxic substances.

- > Maximum fire resistance. The offices are fire-resistant for one hour; the laboratory spaces for two hours.
- > Safe use of gases and toxic substances. Inert, oxidizing, and inflammable gases are stored in a separate space. Fire cabinets and storage cabinets are available.

### State-of-the-art

#### The state-of-the-art environment will be the subject of research itself

The new building features numerous modern energy technologies. The built-in measuring equipment enables us to monitor the performance of the entire building, as well as that of various innovative technologies separately.

- > Anticipating a flexible electricity network by using switchable loads and power sockets.
- > Ready to conduct practical LED tests.



*Laborelec's focus on innovation and sustainability is evident in its new Belgian laboratory facilities, featuring a wide variety of energy-efficient technologies, among others.*

## Fully equipped laboratories for a multidisciplinary expert approach

The renovated building at Laborelec headquarters houses state-of-the-art laboratories. They are fully equipped in order to execute a wide range of tests, measurement and monitoring campaigns, and analyses.

### Biomass analysis

The Laborelec biomass lab is equipped to measure all relevant chemical and physical parameters of firing biomass:

- > Calorific value
- > NO<sub>x</sub> and SO<sub>x</sub> Emissions
- > Slagging, fouling, and corrosion
- > Trace elements

We also offer biomass-related services, such as fuel specifications and milling tests.

### Material analysis and testing

The material laboratories offer a broad range of tools to assess the condition of both metallic and non-metallic materials and calculate their remaining lifetime:

- > Creep resistance and stress relaxation testing
- > Metallographic examination of metallic samples
- > Material characterization via electron scanning microscopy, x-ray techniques, and different types of spectroscopy
- > Chemical analysis of various types of deposits, filters, etc.
- > Analysis of solid biofuels
- > Characterization of electrical insulating materials
- > Determination of the thermal properties of soil

### Water chemistry

The chemistry laboratory is equipped to perform a variety of water treatment and carbon capture and storage (CCS) activities:

- > Three fume hoods make it possible to set up specific tests, such as hydrazine degradation test, reclaiming test, solvent degradation test, etc.
- > Analytical equipment, such as a TOC analyzer, a spectrophotometer, or a particle counter, enable us to monitor water quality.

The flexible laboratory is able to accommodate our increasing scope of activities. For example, the laboratory welcomes a Gas Chromatography to support our CCS activities and will be shared with Laborelec's Mathematics, Data Processing, and IT Team for the fabrication of printed circuits.

### Remote monitoring and diagnostics

Laborelec has the tools needed to monitor plant components remotely and diagnose issues at an early stage. We are able to monitor the power plant as a whole, but we also have the tools to monitor the condition of specific equipment. We focus on:

- > Predictions of impending failure based on historical data for all the assets
- > Generator monitoring
- > Transformer monitoring (including those at industrial sites)
- > Combustion dynamics monitoring in gas turbines
- > Wind turbine condition monitoring

We are also equipped to remotely monitor vibrations of large rotating machinery.

### Integrity assessments

Our experts carry out tests and analyses in our dedicated laboratory:

- > Metallographic investigations and fractography
- > Mechanical tests
- > Modal analyses
- > Material stress calculations
- > Operating parameter analyses

### Oil analysis

Laborelec is recognized worldwide for analyzing insulating and lubricating oils. Our state-of-the-art laboratory is fully equipped and accredited to perform a broad range of oil analyses.



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## At the forefront of new energy technology research

Laborelec is constantly acquiring more knowledge about existing and emerging energy equipment. Our experts are active in collaborative research programs, international workgroups, taskforces, and in-house research projects using the wide variety of tools and labs available at Laborelec headquarters.

### Smart Home Energy Lab – testing residential energy technologies

The Smart Home Energy Lab is dedicated to testing residential energy management systems. The lab enables us to carry out independent technical evaluations of the systems, focused on metrological precision and user-friendliness, and verify the feedback that consumers receive from their systems. It also enables us to test the performance of sub-metering and load management systems, as well as their reactions to real-time inputs.



### Outdoor lighting lab – researching LED luminaires for public lighting in real-life conditions

Laborelec has created an on-site test environment with fourteen LED luminaires from different manufacturers to assess the use of LEDs for public lighting under actual operating conditions. Our tests focus on evaluating both the luminous efficiency and durability of the individual units.



### Microgrid test site – investigating microgrid stability and power quality

The Laborelec microgrid is perfectly integrated into our on-site electricity network. It incorporates various types of photovoltaic systems, as well as a tracking system to maximize the solar radiation on the PV panels. The microgrid is also connected to two micro wind turbines. The tests on the grid focus on microgrid stability and power quality.



### Electric vehicles – monitoring behaviour, performance, and wear

Laborelec has developed a tool that monitors the behaviour of electric vehicles, such as battery performance as a function of driving style, climate conditions, and travel time. The tool also gathers information on the driver's behaviour—for example, whether the cars are recharged at home or at work. Our experts are currently in charge of monitoring more than eighty electric vehicles for Electrabel, Cofely Services, and a Dutch consortium, including the city of Rotterdam. Laborelec is actively using two Peugeot Ions as leasing cars and one as a service vehicle.



### Heat pump – monitoring, energy management, and advice

The heating and cooling processes in the new laboratory facilities are powered by a heat pump with a Borehole Thermal Energy Storage (BTES) system as source. It is one of the first practical applications of this system in Belgium. Laborelec is monitoring critical parameters such as temperature and throughput in order to optimize the installation's performance and return knowledge to engineering and maintenance companies.

