



## **RESEARCH AND SERVICES ELECTRICITY, GRIDS AND END-USE**

Operational excellence for grid operators, power plants, industry, and the tertiary sector

- > Energy processes
- > Electrical equipment
- > Electrical networks

# EXPERT KNOWHOW AND SPECIALIZED SERVICES

For grid operators, power plants, industry, and the tertiary sector

**Laborelec is a centre of expertise for electrical power technology. Among our customers are transmission and distribution grid operators, power plants, and industrial and tertiary companies.**

Our experts have an in-depth knowledge and understanding of various types of electrical equipment, electrical system dynamics in networks, and electromagnetic compatibility, among others. This valuable background enables us to offer a broad range of specialized services.

## “Accurate advice based on accurate measurements”

- > **Operational research** in energy efficiency, material and equipment assessment, distributed generation, and (smart) grid technologies.
- > **Practical solutions** for all types of energy-related challenges. Our advice is always based on measurements, analyses, or simulations in our state-of-the-art laboratories or in the field.
- > **Training sessions** in each area of competence. We bring your employees up to date on new technological evolutions and guide them in the assessment of their infrastructure.



*Laborelec is accredited and ISO-certified to conduct measurements both on site and in the laboratory.*

# MULTIDISCIPLINARY COMPETENCY

Our experts have in-depth knowledge in multiple domains of electricity generation, supply, and consumption.



## ELECTRICAL POWER SYSTEMS

### What?

Industrial and public electricity networks.

### How?

- > Complex voltage, current, and power measurements
- > Selectivity and harmonic load studies
- > Concept development for high, medium and low-voltage power systems
- > Evaluation of the impact of distributed generation technologies on the grid
- > Electricity grid technologies of the future

### References:

- > Design of the world's first intelligent microgrid for the Princess Elisabeth research station in Antarctica
- > Selectivity study and redesign of the medium voltage network in New-Caledonia and in a variety of industries
- > Study of the impact of heat pumps on the Dutch distribution grid

### CONTACT

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## METERING AND MONITORING

### What?

Electricity generation, distribution, and use.

### How?

- > Conformity tests and calibrations of measurement devices
- > Measurement of bidirectional data transfer over power lines
- > Short and long-term power quality monitoring
- > Performance monitoring of renewable energy sources
- > Specific monitoring solutions (electrical vehicles, ...)

### References:

- > Advice on the optimal frequency band and on-site troubleshooting for noise-free and stable power line communication for Belgian distribution network operators
- > More than 500 measurement points for monitoring the power quality on electricity grids
- > Nearly 100 measurement points for voltage dip monitoring at industrial customers

### CONTACT

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## ELECTRICAL EQUIPMENT

### What?

Analysis and design of network equipment and rotating machines.

### How?

- > Technical specifications for medium and low voltage equipment
- > Failure analysis of cables, switchgear, transformers, ...
- > Factory acceptance tests and quality assessments of transformers, generators, ...
- > Online and offline measurements of partial discharges in the insulation of small to large generators

### References:

- > Technical specifications for transformers for various operators and companies throughout Europe
- > Condition assessments of medium voltage cables based on partial discharge measurements in a variety of industries (chemistry, steel, ...)
- > Factory acceptance test on a newly built transformer revealed quality issues and helped the customer demand a new transformer that did meet their requirements

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## ELECTROMAGNETIC COMPATIBILITY (EMC)

### What?

Identifying and avoiding electromagnetic influences between various installations.

### How?

- > Accredited EMC laboratory tests
- > On-site measurements of electric and electromagnetic fields
- > Audits and troubleshooting of existing equipment
- > Design advice based on simulation results, modern earthing and cabling techniques, and lightning protection

### References:

- > EMC design of the Princess Elisabeth research station in Antarctica
- > Weekly EMC trainings for electrotechnicians in Belgium and the Netherlands
- > EMC laboratory simulations of the influence of high and medium voltage installations on pipes
- > Assessing the electromagnetic impact of trams on neighboring natural gas lines

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## END-USE ENERGY EFFICIENCY

### What?

Energy consulting services for industry and tertiary sector.

### How?

- > Accredited and certified energy efficiency audits linking knowledge of industrial and tertiary processes with energy system competencies
- > Energy performance coaching to achieve the highest possible efficiency with the current installation or hardware
- > Advice on innovative energy technologies

### References:

- > More than 70 audits per year identifying 5 to 15% energy efficiency improvements in various international manufacturing plants
- > Establishing continuous energy consumption improvement programs in industrial sectors such as the food, textile and automotive industry
- > Performance assessments and benchmarking of various technologies such as heat pumps, solar panels and electrical vehicles for manufacturers and grid operators

### CONTACT

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## LIGHTING

### What?

Industrial, tertiary, and public lighting systems.

### How?

- > Lighting audits of light sources, auxiliary devices, light management systems and maintenance
- > Lifetime assessments of all types of luminaires and lamps, including LEDs
- > Photometric and radiometric tests of emergency and signalling lights
- > Calibration of lamps as well as lux, luminance and UV meters

### References:

- > Photometric measurements of public lighting technologies for the Belgian network operators
- > Testing energy efficiency and reliability of different luminaires in outdoor laboratory
- > Lifetime assessment of LED tubes at a large retailer in Belgium

### CONTACT

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## CONDITION MONITORING THROUGH OIL ANALYSIS

### What?

Transformers and rotating machines.

### How?

- > On-site training for lubricant and insulating oils sampling
- > Certified and accredited oil analyses in fully equipped laboratory
- > Acceptance tests of new oils for producers and end-users
- > Oil management audits, including storage and sampling
- > Interpretation of oil analysis results and determination of best practices in maintenance

### References:

- > Condition monitoring of more than 3,000 transformers and 400 lubricant oil circuits per year
- > The in-house developed interpretation schemes for dissolved gas analyses enable to quickly identify internal faults in transformers of distribution network operators or industrial customers before breakdown
- > Analyses of lubricant oils to identify wear and sources of vibrations for various types of lubricant oil circuits

### CONTACT

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# QUALITY SERVICES TO ESTABLISH OPERATIONAL EXCELLENCE

**Our activities aim to offer customers operational excellence. Our goal is to help you reduce operations and maintenance costs, increase efficiency, and maximize availability and reliability of your electrical equipment.**

## REDUCE OPERATIONS AND MAINTENANCE COSTS

### – secure your electrical environment

Electromagnetic compatibility, network conformity, security optimization ... our experts ensure that your electrical networks and applications can work under the best and safest circumstances, limiting the costs of maintenance and repairs.

### – extend the lifetime of your equipment

Our experts help you extend the lifetime of your electrical machines and networks. In-depth measurements and monitoring enables them to ensure longer use of your equipment.

## MAXIMIZE AVAILABILITY AND RELIABILITY

### – minimize downtime

Our experts help avoid unforeseen breakdowns by optimizing your maintenance plan. In the event of an incident, we identify the root cause and offer advice that enables to resume safe operation quickly and avoid similar incidents.

### – choose the proper equipment

Are you considering new electrical equipment? You can count on our experts for sound advice during selection and purchasing. They list the technical specifications and perform tests to make sure the equipment matches the manufacturer's quality assurance.

## INCREASE EFFICIENCY

### – make efficient use of your energy

Our experts audit the energy efficiency of processes and installations in a variety of sectors. They quickly identify the main energy consumers and propose optimizations based on international best practices.

### – enhance equipment and process performance

We can help maximize the quality, efficiency, and reliability of your electrical equipment and processes. We also offer expert advice on how to optimize power quality and enhance network performance.





## FIVE REASONS FOR YOU TO CHOOSE LABORELEC

- > One-stop shopping for your energy related services
- > 50 years of experience
- > Increased profitability of your installations
- > Independent and confidential advice
- > Recognized and certified laboratory

The Technical **Competence Centre**  
In **energy processes** and **energy use**  
From **innovation** to **operational assistance**

### Contact

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