



# FUTUREGRID

CENTRO DE COMPETÊNCIA EMBRAPII LACTEC  
EM SMART GRID E ELETROMOBILIDADE

**EMBRAPII LACTEC COMPETENCE CENTRE**  
**Electrical Mobility**  
**Smart Grids**



**Lactec** is one of the largest  
**private research,**  
**technology and innovation**  
centers in Brazil.



**65 years**



# Our numbers



**+ de 300**

Professionals with solid experience, including masters and doctors.



**More than  
500 projects  
finalised**



**4 Unities in  
Curitiba and  
1 in Salvador**



# Main Clients



# Competence Centre

EMBRAPII accreditation of Institutes of Science & Technology (IST) that already have competence in the thematic area to meet the technological challenges of the industrial sector.

**Future Grid** is your EMBRAPII Competence Center for research and development in **Hardware for Smart Grids and Electromobility** that has all of **Lactec's** expertise and infrastructure.

# Goals

## Competence Center



**New EMBRAPPI operational model that seeks to:**

*Promote new knowledge in areas at the technological frontier (technology push) TRL 2 to TRL6.*

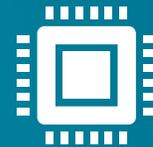
1. Expanding and strengthening **scientific and technological competence** in RD&I
2. Workforce training; undergraduate and graduate education **for RD&I**
3. Technological Association (**membership program**)
4. Attraction and creation of **startups**



## Electromobility Expertise

- Solutions to manage and improve the **charging of electric vehicles, AC and DC recharging systems** with different plugs for connection.
- Design of **power modules** for fast and ultra-fast chargers.
- **Vehicle communication** systems (recharging process and data monitoring).
- **Full control of demand** for charging electronics centers.
- Charging **management and billing** systems.

## Expertise in Smart Grids



We develop connected hardware solutions for applications in **electrical power systems**, including monitoring systems for transmission and distribution networks.



Instruments for measuring and controlling energy and quality of electrical energy, control of new sources, including distributed generation.

## Expertise in Smart Grids



Research into solutions for connectivity applied to **Electrical Grids, Smart Cities and the Internet of Things (IoT)**.



Connectivity hardware projects based on *Wi-SUN, LoRa, Zigbee, Bluetooth* protocols, among others.



Compliance with **electromagnetic compatibility** requirements for applications in environments with high **electromagnetic fields**.

# Main Research Lines

Expanding and strengthening scientific and technological competence in RD&I



# Smart Grids

## Energy Efficiency

Materials, components and topologies for energy storage

New lower-cost storage components based on materials abundant in Brazil (sodium and graphene)

Energy Harvesting

Ultracapacitors

## Sensors

Novel smart sensors for energy monitoring

Acquisition methods, signal and data processing and distributed intelligence

# Smart Grids

## Communication Technology

Mesh topology Networks

Star topology Networks

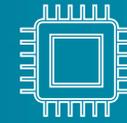
Power Line Communication

## Cyber Security

Embedded Authentication Protocols (TLS/SSL)

Hardware Embedded Cryptography

## Application



Smart Cities



Smart Grids



Industry

# Electrical Mobility

New methods, systems and components for **fast and intelligent EVs charging**

Technologies for **integrating renewable energy sources** into smart grids

Methods, systems and components for **storing and dispatching energy** in distribution systems

New materials, components and topologies for **BMS-Battery Management System**

# RD&I Plan Summary

## Communication Systems Embedded

New low-orbit satellite communication technologies

Narrowband Communication Technologies for sensors and IoT

Wired PLC Technologies

Low latency topologies – 5G, 6G, Open RAN

New technologies for ultracapacitors

## Cyber Security

Hardware-embedded cryptographic methods

## Electric Mobility

New wireless converter topologies for electric vehicles

Development of new electronic charging and demand control systems

New electronic components for electric vehicle charging converters

# Education

- Partnership with Federal University of Paraná – UFPR
- Lactec Professional Master's Degree
- **Specialization** Courses

# Stricto Sensu postgraduate courses

<b>Professional Master's Degree in Technology Development (Lactec)</b>	<b>Continuous Flow</b> — February to December
<b>Master's degree in Electrical Engineering (DELT – UFPR)</b>	<b>Feb/2024 and Aug/2024</b>
<b>PhD in Electrical Engineering (DELT – UFPR)</b>	<b>Continuous Flow</b> — February to December

# Lato Sensu postgraduate courses

**SmartGrid Specialization: Energy Distribution 4.0**

**Specialization in Design and  
Management of Microgrids and Distributed  
Energy Resources**

**Specialization in Energy Transition and ESG**

**Specialization in Automotive Engineering**

# Short-term Training Courses

**Monitoring and control for Smart Grid**  
Embedded cybersecurity

**Connectivity applied to Smart Grid**  
Energy Storage Technologies

**Microgrid Technologies**  
Electric vehicle charging technologies

**Distributed Energy Resources**  
Electrical Power Quality

**Energy Storage Systems Management**  
Intelligent Systems for SmartGrid and Electric Mobility

# Membership Program

Your company can be a member and enjoy several benefits.

Members will have access to the Center's **knowledge and infrastructure**, training and qualification programs in the areas of **Smart Grids and Electromobility**.



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Thanks!

[riella@lactec.com.br](mailto:riella@lactec.com.br)



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