

TEC4
ENERGY

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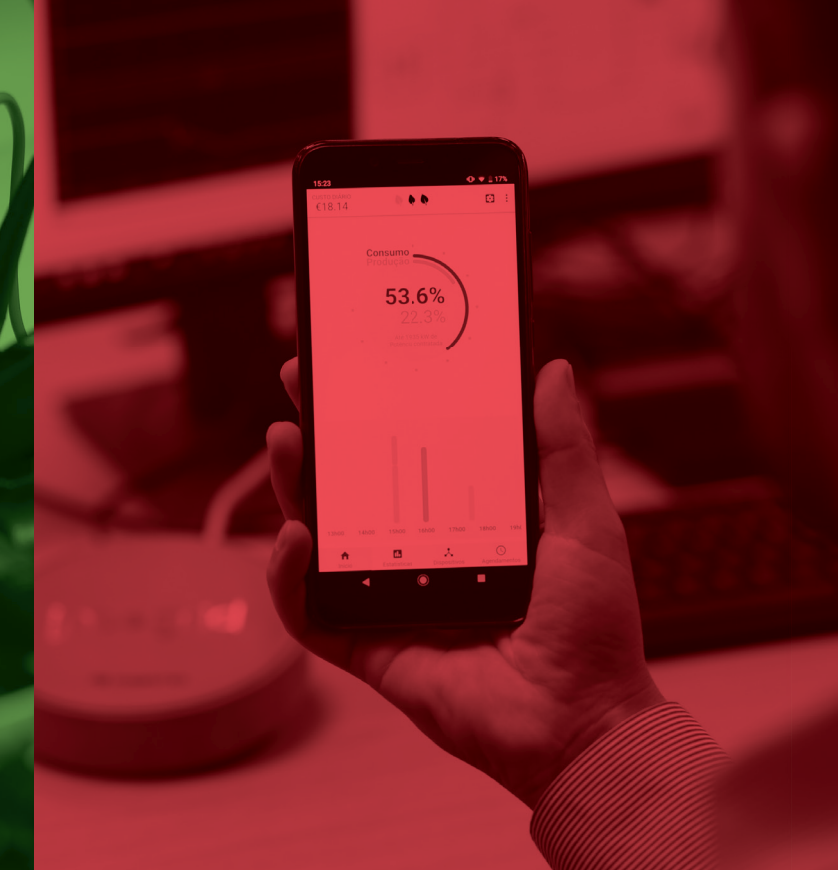
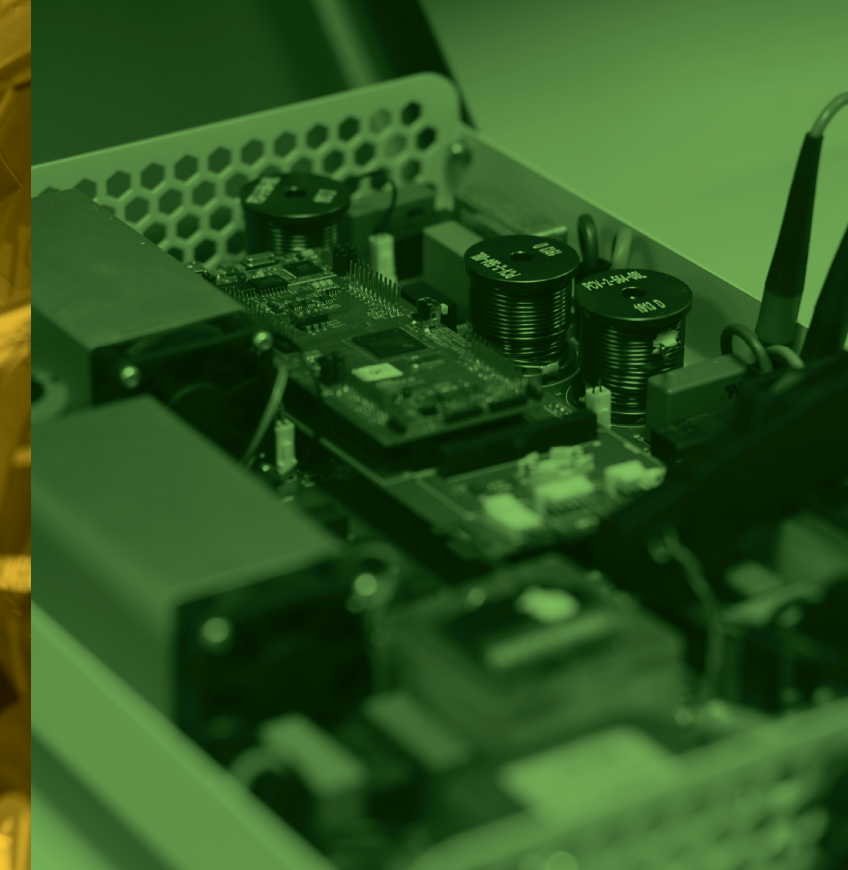
FCT

Fundação
para a Ciência
e a Tecnologia

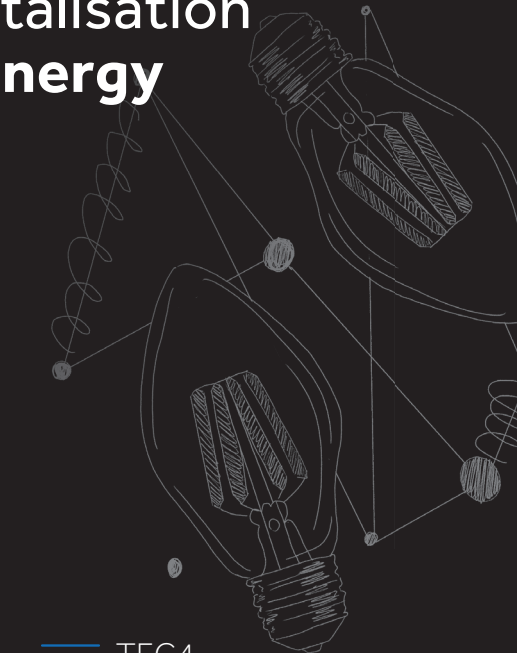


UNIÃO EUROPEIA

Fundo Europeu de
Desenvolvimento Regional



Decarbonisation and digitalisation of the energy sector



TEC4
ENERGY

INESC TEC is a private, non-profit association dedicated to scientific research and technological development, technology transfer, advanced consulting and training, and pre-incubation of new technology-based companies, in the domains of Power and Energy, Computer Science, Industrial and Systems Engineering and Networked Intelligent Systems.

TEC4ENERGY is INESC TEC's innovation initiative for the power and energy sector.

INESC TEC has a strong recognized expertise in power systems, with more than 20 years transferring technology to manufacturers, software vendors, electric utilities and large energy users, contributing to an increasingly digitalised and decentralised energy sector that encompasses innovative user-centric and market approaches, and leveraging large-scale renewable energy grid integration initiatives.

R&D COMPETENCES

- Energy analytics and forecasting
- Energy economics and regulation
- Industrial electronics
- Static and dynamic behaviour analysis of power systems
- Decision - aid and optimisation
- Power electronics – generation, consumption and storage
- Asset management
- Data science / data mining
- Computer graphics and virtual environments
- Machine learning and artificial intelligence
- Cryptography and information security
- Distributed systems
- Robotics - aerial and underwater
- Underwater acoustics for positioning, navigation and communications
- Wireless networking
- Computer vision, audio-visual content analysis

SGEVL - SMART GRIDS AND ELECTRIC VEHICLES LABORATORY

INESC TEC's laboratory for the simulation, testing and validation of **smart grids** and **electrical vehicles** solutions exploiting specific control and management solutions for key **distributed energy resources** (DER) such as micro-generation and **storage** units.

The laboratory allows the emulation of power electronic and control solutions of the electric distribution systems. It is equipped with technologies such as **microgenerators, microgrids, SCADA** systems, **building energy management systems** (BEMS), electrical vehicles **smart converters (chargers and inverters)**.

INNOVATION COMPETENCES

- DMS/EMS and network automation
- Smart grids – microgrids and energy communities
- System planning and reliability
- RES & DER integration
- Smart transformers
- Assessment and enhancement of power system stability
- Electricity markets
- X-energy management systems
- Smart homes and buildings (demand response)
- Multi-energy networks
- Electric mobility
- Predictive and prescriptive maintenance
- VR/AR-based training
- Event and anomaly detection
- Recommendation systems, personalization and behaviour modelling
- Polyglot data management
- Cloudification services
- Digital single market platforms
- Reliable SW systems specification and validation
- Offshore renewable energy integration & maintenance
- Visual inspection and monitoring
- Advanced and smart metering technologies
- Narrowband and broadband wireless networks