CIC energiGUNE

MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

DEGRADATION MECHANISMS & Battery safety

Ensuring reliable and safe battery performance

Supporting industry with advanced testing and diagnostics

Why Degradation and Safety Matter?

Understanding how and why batteries fail is essential to improving their performance, lifespan, and safety.

At CIC energiGUNE, we provide a comprehensive service that helps manufacturers, integrators, and end users to:

- **Identify degradation causes and failure modes**
- **Validate chemistries under realistic conditions**
- **Anticipate and prevent safety risks**

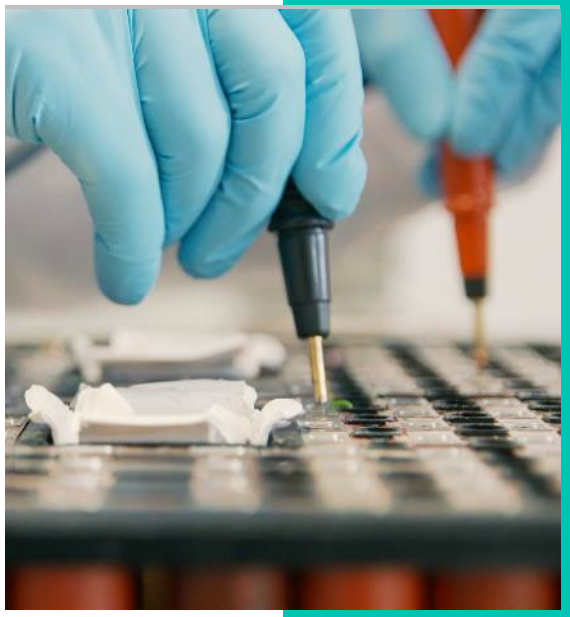
Our integrated expertise bridges research and industrial needs, supporting reliable and safer batteries for mobility and stationary applications.

Our Value Proposition

Controlled Cell Opening

We perform controlled cell opening to safely examine internal components and identify degradation causes.

- **In-depth analysis of cylindrical, prismatic, and pouch cells**
- **Non-invasive imaging with microCT for internal structure insights**



Advanced Characterization

Advanced characterization techniques enable us to analyze materials and detect failure patterns for design improvements.

- **SoH diagnostics and failure mode identification**
- **Structural analysis to detect degradation**

Abuse Testing

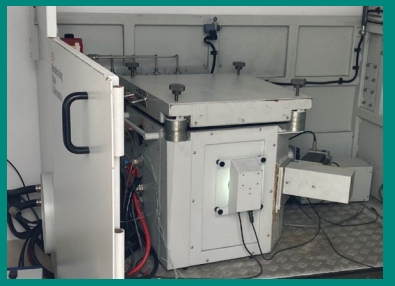
Abuse testing simulates extreme conditions to assess cell safety and reliability in real-world scenarios.

- **Electrical, thermal, and mechanical stress testing**
- **Thermal runaway analysis and safety assessments**

Unique Capabilities and Infrastructure

A DEDICATED GLOVEBOX FOR SAFE AND CONTROLLED CELL OPENING

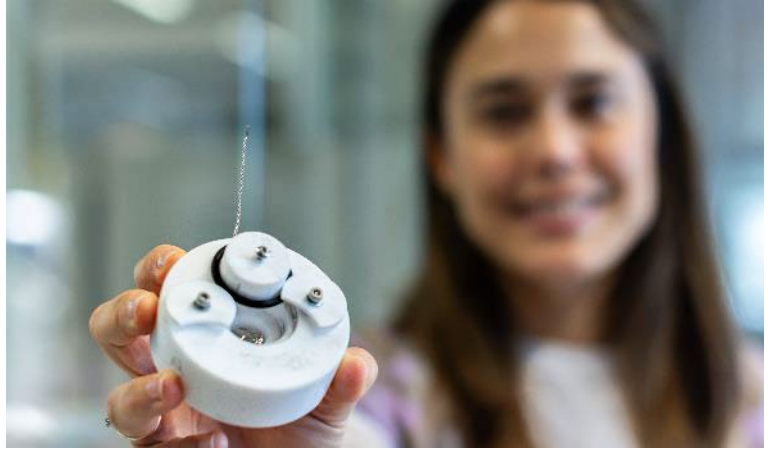
ADVANCED CHARACTERIZATION PLATFORMS FOR MATERIALS AND COMPONENT ANALYSIS



ARC CALORIMETRY FOR SAFETY ASSESSMENT

CLIMATIC AND SAFETY CHAMBERS FOR REALISTIC ABUSE TESTING

ELECTROCHEMICAL TESTING LABORATORIES FOR PERFORMANCE AND DEGRADATION STUDIES



An Offer Adapted to All Technologies

Our degradation and safety services cover all electrochemical storage systems, from commercial cells to emerging technologies:

- **Lithium-ion and Sodium-ion batteries**
- **Metal-air and Lithium-sulfur systems**
- **Zinc-based and Nickel-based chemistries**
- **Solid-state, polymer, and ceramic electrolyte batteries**
- **Supercapacitors and hybrid systems**

Partnering for Safer Batteries

We have collaborated with leading companies in stationary and mobility sectors, performing **ante- and post-mortem analysis, safety testing, and lifetime validation.**

Industrial collaborations include:

CAF

Iberdrola

AEG

zgr

cecasa

Bcare
tech by CIC energiGUNE

VOLVO

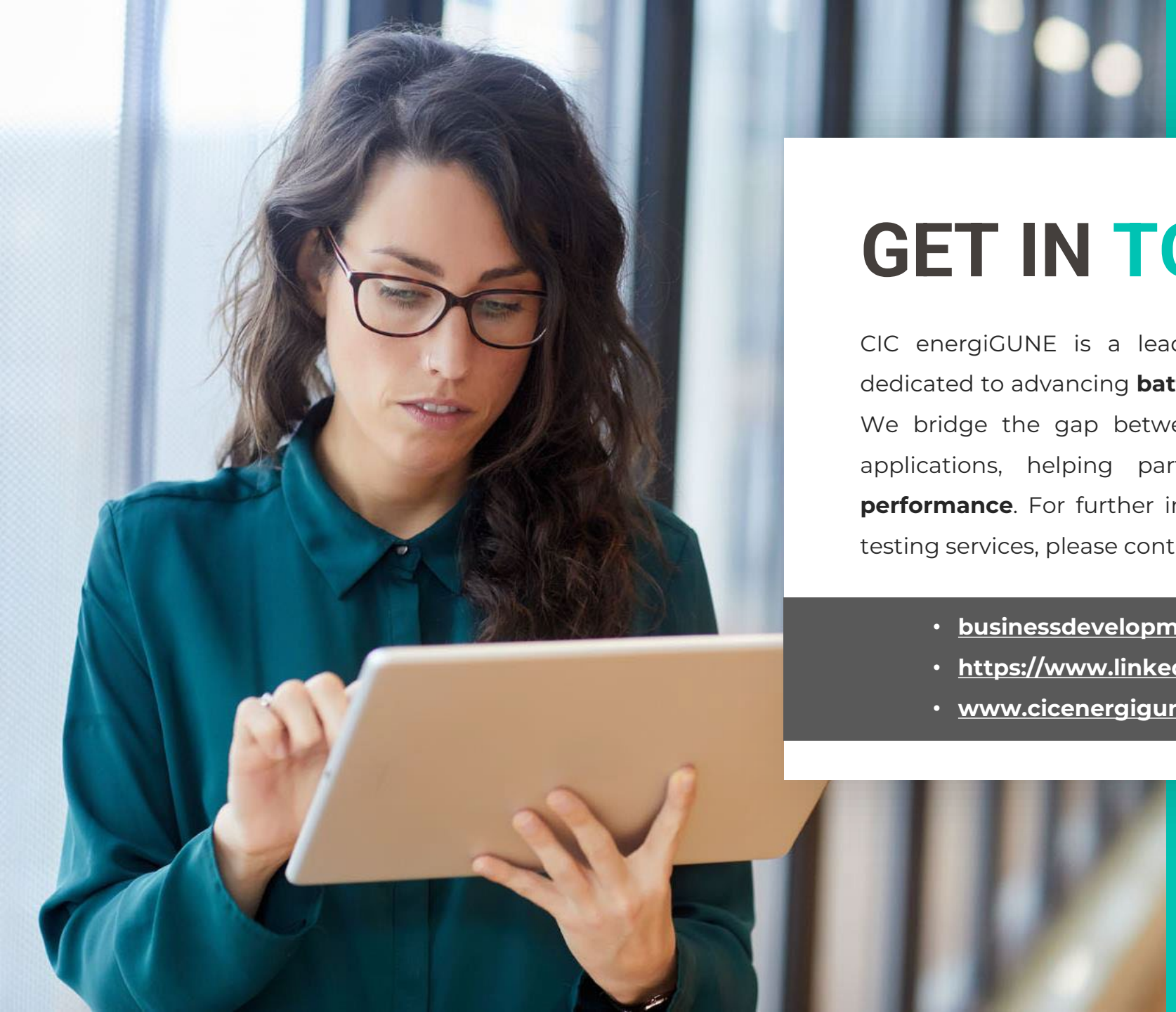
SKELE+ON
TECHNOLOGIES

These partnerships strengthen the design of **safer, longer-lasting, and more reliable battery systems** across Europe.

Benefits for Our Partners

Our competitive advantage lies in our ability to **replicate real conditions**, conduct **controlled abuse testing**, and deliver **actionable insights** that enhance performance and safety.

- **Avoid risks related to unsafe or underperforming cells**
- **Identify optimal technologies for each application**
- **Reduce operational costs by extending battery life**
- **Comply with safety regulations through validated testing protocols**
- **Accelerate product development with expert consulting and rapid feedback loops**



GET IN TOUCH

CIC energiGUNE is a leading research centre in energy storage, dedicated to advancing **battery safety and degradation mechanisms.** We bridge the gap between cutting-edge research and industrial applications, helping partners **improve battery reliability and performance**. For further information on our degradation and safety testing services, please contact us:

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THANK YOU