



TECHNICAL TRAINING

Battery Energy Storage Systems (BESS) training

Master the Technical, Operational and Safety Aspects
of Battery Energy Storage Systems

DETAILED PROGRAMME

A practical understanding of the complete BESS lifecycle

Battery Energy Storage Systems have become critical assets in modern power systems. Yet their successful deployment requires expertise that extends far beyond battery chemistry alone.

This training provides a comprehensive overview of the complete BESS lifecycle, covering technology selection, system integration, performance assessment, safety engineering, operational monitoring, maintenance and lifecycle management.

Developed and delivered by ENGIE Laborelec's Storage Lab specialists, the programme combines engineering fundamentals, practical project experience, lessons learned from operational assets and recognised industry best practices.

What you will learn

- ✓ Understand the main battery technologies and their applications
- ✓ Assess performance, ageing and battery lifetime
- ✓ Identify safety risks and mitigation strategies
- ✓ Understand monitoring and operational performance assessment
- ✓ Gain practical insight into operation and maintenance
- ✓ Evaluate technical risks throughout the project lifecycle
- ✓ Discuss BESS projects confidently with suppliers, developers, investors, insurers and technical stakeholders

Core modules | Part 1

1

Introduction to Battery Energy Storage Systems

This introductory session provides a common foundation and places battery storage within the broader context of the energy transition.

- BESS market overview
- Main applications and value drivers
- Role of storage in the energy transition
- Overview of current industry challenges
- ENGIE Laborelec Storage Lab capabilities and experience

2

Battery Technologies

Understand the technologies shaping today's energy storage market.

- Battery fundamentals
- Technology performance characteristics
- Technology selection criteria
- Lithium-ion batteries and operating principles
- Comparison of major battery technologies
- Emerging battery technologies
- Practical technology selection considerations

3

BESS Architecture & System Integration

Explore how the different components interact within a complete BESS installation.

- Cells, modules, racks and containers
- Battery Management Systems (BMS)
- Power Conversion Systems (PCS)
- Energy Management Systems (EMS)
- HVAC and thermal management
- Communication and SCADA systems
- Electrical and mechanical interfaces
- Integration considerations for utility-scale projects



Core modules | Part 2

4

Performance, Ageing & Lifetime Assessment

Learn how batteries age, how performance changes over time and how lifetime can be evaluated.

- Performance assessment methodologies
- Degradation mechanisms
- State of Health (SoH)
- Lifetime prediction approaches
- Impact of operating conditions
- Cell balancing
- Warranty interpretation and limitations

5

Safety & Risk Management

Explore one of the most critical areas of modern BESS projects.

- Battery failure mechanisms
- Thermal runaway
- Fire and explosion hazards
- Toxic and flammable emissions
- Detection technologies
- Fire suppression approaches
- Emergency response considerations
- Industry standards and best practices
- Risk assessment methodologies

6

Monitoring, Analytics & Performance Assessment

Understand how modern BESS assets are monitored and evaluated.

- Monitoring architectures
- EMS and BMS data analysis
- Performance analytics
- Predictive diagnostics
- Warranty compliance monitoring
- Safety monitoring
- Operational performance indicators

Core modules | Part 3

7

Operation & Maintenance

Gain practical insight into the day-to-day management of battery storage assets.

- Preventive maintenance
- Spare parts strategy
- Performance testing
- Troubleshooting methodologies
- Battery imbalance analysis
- State of Charge concepts
- Asset health assessment
- Operational reporting

8

Applications & business considerations

Understand where and how battery storage creates value.

- Frequency regulation
- Ancillary services
- Renewable energy integration
- Energy arbitrage
- Capacity mechanisms
- Revenue stacking concepts
- Technical performance drivers

Additional topics available upon request

BESS Project Development Case Study

- Development strategy
- Procurement considerations
- Factory acceptance testing
- Installation and commissioning
- Asset management
- Decommissioning planning

End-of-Life, Recycling & Circularity

- EU battery regulations
- Recycling technologies
- Waste transport requirements
- End-of-life risk management
- Circular economy considerations

Delivered by industry experts

Learn from professionals actively involved in BESS projects worldwide

The training is delivered by ENGIE Laborelec Storage Lab specialists who support energy storage projects through:

- | | |
|----------------------------------|---|
| ✓ Technology qualification | ✓ Technical due diligence |
| ✓ Supplier assessment | ✓ Procurement support |
| ✓ Performance and ageing studies | ✓ Failure investigations |
| ✓ Safety engineering | ✓ End-of-life and recycling assessments |
| ✓ Monitoring and analytics | |

Participants benefit from practical experience gained across the entire BESS value chain, from technology evaluation and project development to operation, safety and asset management.

Training format

- ✓ Technical presentations
- ✓ Engineering exercises
- ✓ Practical examples
- ✓ Interactive discussions
- ✓ Dedicated Q&A sessions

*The training course can be given
in a 2-day or 3-day format.*

*Tailored sessions are available for
organisations and project teams.*

NOTE

This training is technology-neutral and does not promote specific battery suppliers, products or technologies. Its objective is to provide participants with the technical knowledge required to make informed decisions throughout the BESS lifecycle.

Interested?

Contact our team to discuss your training needs.
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