

MAINTENANCE AND ENGINEERING | COURSE BROCHURE

Battery Energy Storage Systems (BESS): Design, Operation and Safety

5 days | Classroom training | English

SMART HORIZON

info@smart-horizon.eu
Amsterdam
The Netherlands

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Course content

Why attend

Battery energy storage systems are being deployed rapidly to support renewable energy integration, grid stability, peak shaving and backup power. This course provides a practical understanding of BESS technology, applications, sizing, system design, integration with solar and grid systems, operation and maintenance, performance monitoring and safety, including fire risk management. Participants evaluate a BESS project case and develop a project assessment covering technical, economic and safety aspects.

Organisations in energy, utilities, industry and real estate are investing in battery storage, but projects require specialist knowledge to design, operate and manage safely. This course gives engineers and managers a solid foundation to evaluate, specify and operate BESS installations.

Professional Problems This Course Is Designed to Solve

• Difficulty translating subject knowledge into practical workplace decisions.
• Inconsistent approaches to the activities covered in the course outline.
• Lack of a structured plan for applying and reviewing new skills.

Course methodology

The course combines technical presentations, sizing and economic exercises, safety case studies, operations and maintenance workshops and a project evaluation activity.

Course objectives

By the end of this course, participants will be able to:
• Explain battery technologies and their characteristics
• Identify BESS applications and revenue or saving opportunities
• Size and specify a battery energy storage system
• Understand integration with renewable generation and the grid
• Plan operation, maintenance and performance monitoring
• Manage BESS safety, including thermal runaway and fire risks



Course content

Target audience

This course is suitable for:
- Electrical and energy engineers
- Renewable energy project developers and managers
- Facilities and energy managers
- Utility and grid professionals
- Maintenance and operations engineers

Target competencies

Participants will develop competencies in:
- Battery technology
- BESS sizing and design
- Grid and renewable integration
- Energy storage economics
- BESS operation and maintenance
- Energy storage safety

Course outline

Day 1: Energy Storage Fundamentals

09:00–09:54	Role of energy storage in modern power systems
09:54–10:48	Battery chemistries: lithium-ion, LFP and alternatives
10:48–11:00	Key parameters: capacity, power, efficiency and cycle life
11:00–11:30	**Coffee break**
11:30–12:12	Key parameters: capacity, power, efficiency and cycle life (continued)
12:12–13:06	Market trends and costs
13:06–14:00	Exercise: Comparing storage technologies

Day 2: Applications and Economics

09:00–09:54	Peak shaving, load shifting and backup power
09:54–10:48	Renewable smoothing and self-consumption
10:48–11:00	Grid services and market participation



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11:00–11:30	**Coffee break**
11:30–12:12	Grid services and market participation (continued)
12:12–13:06	Business case and financial modelling
13:06–14:00	Workshop: BESS business case

Day 3: System Design and Integration

09:00–09:54	Battery modules, racks and battery management systems
09:54–10:48	Power conversion systems and inverters
10:48–11:00	Integration with solar and the grid
11:00–11:30	**Coffee break**
11:30–12:12	Integration with solar and the grid (continued)
12:12–13:06	Sizing methodology
13:06–14:00	Exercise: Sizing a commercial BESS

Day 4: Safety and Standards

09:00–09:54	Thermal runaway and fire hazards
09:54–10:48	Fire detection, suppression and ventilation
10:48–11:00	Site layout and separation
11:00–11:30	**Coffee break**
11:30–12:12	Site layout and separation (continued)
12:12–13:06	Relevant standards and permitting
13:06–14:00	Case study: Lessons from BESS incidents

Day 5: Operation and Maintenance

09:00–09:54	Commissioning and testing
09:54–10:48	Monitoring state of charge and state of health
10:48–11:00	Degradation management and warranties



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11:00–11:30	**Coffee break**
11:30–12:12	Degradation management and warranties (continued)
12:12–13:06	Maintenance planning and end-of-life recycling
13:06–14:00	Capstone: BESS project evaluation

The timings provided are estimates and may vary depending on the number of participants and the discussions taking place during the sessions. They are indicative only and do not constitute a binding commitment.

Dates, venues and fees

Current published course plans. Fees are per participant in EUR, excluding unconfirmed taxes.

Venue	Start date	End date	Fee (EUR)
Dubai Confirmed dates	9 Nov 2026	13 Nov 2026	**€6,300.-**
Online Confirmed dates	9 Nov 2026	13 Nov 2026	**€1,250.-**
Cape Town Confirmed dates	16 Nov 2026	20 Nov 2026	**€3,780.-**
Online Confirmed dates	16 Nov 2026	20 Nov 2026	**€1,250.-**
Frankfurt Confirmed dates	23 Nov 2026	27 Nov 2026	**€5,300.-**
Online Confirmed dates	23 Nov 2026	27 Nov 2026	**€1,250.-**



Course content

Dates, venues and fees (continued)

Venue	Start date	End date	Fee (EUR)
Kuala Lumpur Confirmed dates	7 Dec 2026	11 Dec 2026	**€2,900.-**
Online Confirmed dates	7 Dec 2026	11 Dec 2026	**€1,250.-**
Paris Confirmed dates	14 Dec 2026	18 Dec 2026	**€5,720.-**
Online Confirmed dates	14 Dec 2026	18 Dec 2026	**€1,250.-**
Istanbul Confirmed dates	11 Jan 2027	15 Jan 2027	**€5,300.-**
Online Confirmed dates	11 Jan 2027	15 Jan 2027	**€1,250.-**
Amsterdam Confirmed dates	25 Jan 2027	29 Jan 2027	**€5,080.-**
Online Confirmed dates	25 Jan 2027	29 Jan 2027	**€1,250.-**
Singapore Confirmed dates	8 Feb 2027	12 Feb 2027	**€5,640.-**



Course content

Dates, venues and fees (continued)

Venue	Start date	End date	Fee (EUR)
Online Confirmed dates	8 Feb 2027	12 Feb 2027	**€1,250.–**
Vienna Confirmed dates	15 Feb 2027	19 Feb 2027	**€5,880.–**
Online Confirmed dates	15 Feb 2027	19 Feb 2027	**€1,250.–**
London Confirmed dates	22 Feb 2027	26 Feb 2027	**€4,900.–**
Online Confirmed dates	22 Feb 2027	26 Feb 2027	**€1,250.–**
Dubai Confirmed dates	8 Mar 2027	12 Mar 2027	**€6,300.–**
Online Confirmed dates	8 Mar 2027	12 Mar 2027	**€1,250.–**
Frankfurt Confirmed dates	22 Mar 2027	26 Mar 2027	**€5,300.–**
Online Confirmed dates	22 Mar 2027	26 Mar 2027	**€1,250.–**



Course content

Dates, venues and fees (continued)

Venue	Start date	End date	Fee (EUR)
Kuala Lumpur Confirmed dates	12 Apr 2027	16 Apr 2027	**€2,900.-**
Online Confirmed dates	12 Apr 2027	16 Apr 2027	**€1,250.-**
Barcelona Confirmed dates	19 Apr 2027	23 Apr 2027	**€5,680.-**
Online Confirmed dates	19 Apr 2027	23 Apr 2027	**€1,250.-**
Paris Confirmed dates	26 Apr 2027	30 Apr 2027	**€5,720.-**
Online Confirmed dates	26 Apr 2027	30 Apr 2027	**€1,250.-**
Istanbul Confirmed dates	10 May 2027	14 May 2027	**€5,300.-**
Online Confirmed dates	10 May 2027	14 May 2027	**€1,250.-**
Amsterdam Confirmed dates	24 May 2027	28 May 2027	**€5,080.-**



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Dates, venues and fees (continued)

Venue	Start date	End date	Fee (EUR)
Online Confirmed dates	24 May 2027	28 May 2027	**€1,250.–**
Rome Confirmed dates	7 Jun 2027	11 Jun 2027	**€4,900.–**
Online Confirmed dates	7 Jun 2027	11 Jun 2027	**€1,250.–**
Singapore Confirmed dates	14 Jun 2027	18 Jun 2027	**€5,640.–**
Online Confirmed dates	14 Jun 2027	18 Jun 2027	**€1,250.–**
London Confirmed dates	21 Jun 2027	25 Jun 2027	**€4,900.–**
Online Confirmed dates	21 Jun 2027	25 Jun 2027	**€1,250.–**
Dubai Confirmed dates	12 Jul 2027	16 Jul 2027	**€6,300.–**
Online Confirmed dates	12 Jul 2027	16 Jul 2027	**€1,250.–**



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Dates, venues and fees (continued)

Venue	Start date	End date	Fee (EUR)
Frankfurt Confirmed dates	26 Jul 2027	30 Jul 2027	**€5,300.-**
Online Confirmed dates	26 Jul 2027	30 Jul 2027	**€1,250.-**
Kuala Lumpur Confirmed dates	9 Aug 2027	13 Aug 2027	**€2,900.-**
Online Confirmed dates	9 Aug 2027	13 Aug 2027	**€1,250.-**
Rome Confirmed dates	16 Aug 2027	20 Aug 2027	**€4,900.-**
Online Confirmed dates	16 Aug 2027	20 Aug 2027	**€1,250.-**
Paris Confirmed dates	23 Aug 2027	27 Aug 2027	**€5,720.-**
Online Confirmed dates	23 Aug 2027	27 Aug 2027	**€1,250.-**
Istanbul Confirmed dates	13 Sept 2027	17 Sept 2027	**€5,300.-**



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Dates, venues and fees (continued)

Venue	Start date	End date	Fee (EUR)
Online Confirmed dates	13 Sept 2027	17 Sept 2027	**€1,250.-**
Amsterdam Confirmed dates	20 Sept 2027	24 Sept 2027	**€5,080.-**
Online Confirmed dates	20 Sept 2027	24 Sept 2027	**€1,250.-**
Singapore Confirmed dates	11 Oct 2027	15 Oct 2027	**€5,640.-**
Online Confirmed dates	11 Oct 2027	15 Oct 2027	**€1,250.-**
Cape Town Confirmed dates	18 Oct 2027	22 Oct 2027	**€3,780.-**
Online Confirmed dates	18 Oct 2027	22 Oct 2027	**€1,250.-**
London Confirmed dates	25 Oct 2027	29 Oct 2027	**€4,900.-**
Online Confirmed dates	25 Oct 2027	29 Oct 2027	**€1,250.-**



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Dates, venues and fees (continued)

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Dubai Confirmed dates	8 Nov 2027	12 Nov 2027	**€6,300.–**
Online Confirmed dates	8 Nov 2027	12 Nov 2027	**€1,250.–**
Frankfurt Confirmed dates	22 Nov 2027	26 Nov 2027	**€5,300.–**
Online Confirmed dates	22 Nov 2027	26 Nov 2027	**€1,250.–**
Kuala Lumpur Confirmed dates	6 Dec 2027	10 Dec 2027	**€2,900.–**
Online Confirmed dates	6 Dec 2027	10 Dec 2027	**€1,250.–**
Paris Confirmed dates	13 Dec 2027	17 Dec 2027	**€5,720.–**
Online Confirmed dates	13 Dec 2027	17 Dec 2027	**€1,250.–**



Course content

Plan your next step

Dates, availability, exact venue, taxes, inclusions and payment terms require written confirmation. This brochure is not a quotation, registration, booking confirmation or visa invitation. Participants receive a Smart Horizon certificate of attendance; programmes are not externally accredited and do not award a professional qualification or designation. Confirm arrangements before booking travel.

For group or in-house training, contact our learning team to discuss your objectives and delivery arrangements.

Contact Smart Horizon

info@smart-horizon.eu
Amsterdam
The Netherlands

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