BATTERY ENERGY STORAGE SYSTEMS (BESS)

SAFETY CONSIDERATIONS IN INTERNATIONAL GUIDELINES

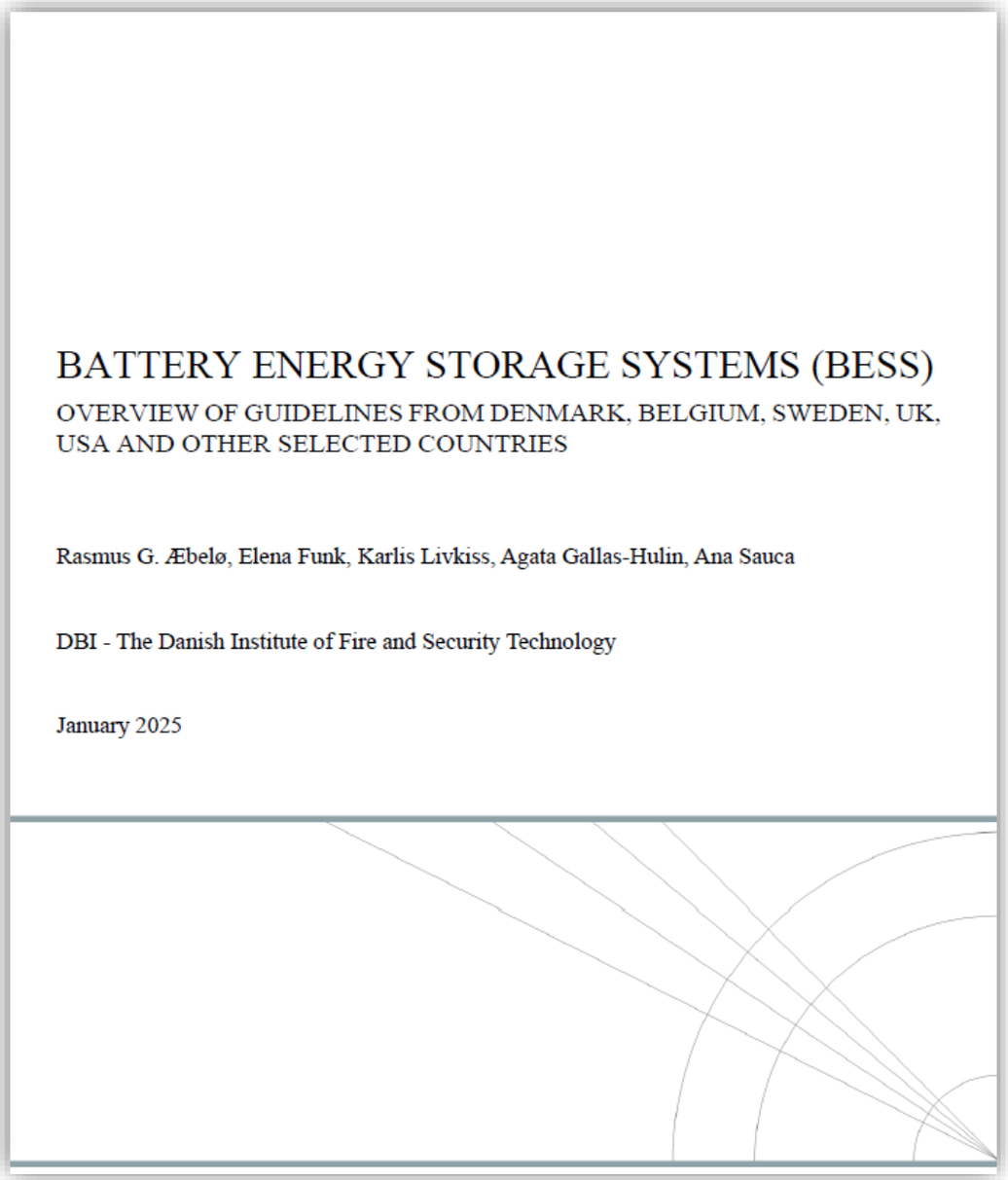
Ana Sauca

October 3rd, 2025

BATTERY ENERGY STORAGE SYSTEMS (BESS)

https://sympower.net/articles/bess-demand-response-whats-the-connection

STATUS OF THE BESS INTERNATIONAL GUIDELINES



BATTERY ENERGY STORAGE SYSTEMS (BESS)

OVERVIEW OF GUIDELINES FROM DENMARK, BELGIUM, SWEDEN, UK, USA AND OTHER SELECTED COUNTRIES

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DBI - The Danish Institute of Fire and Security Technology

January 2025

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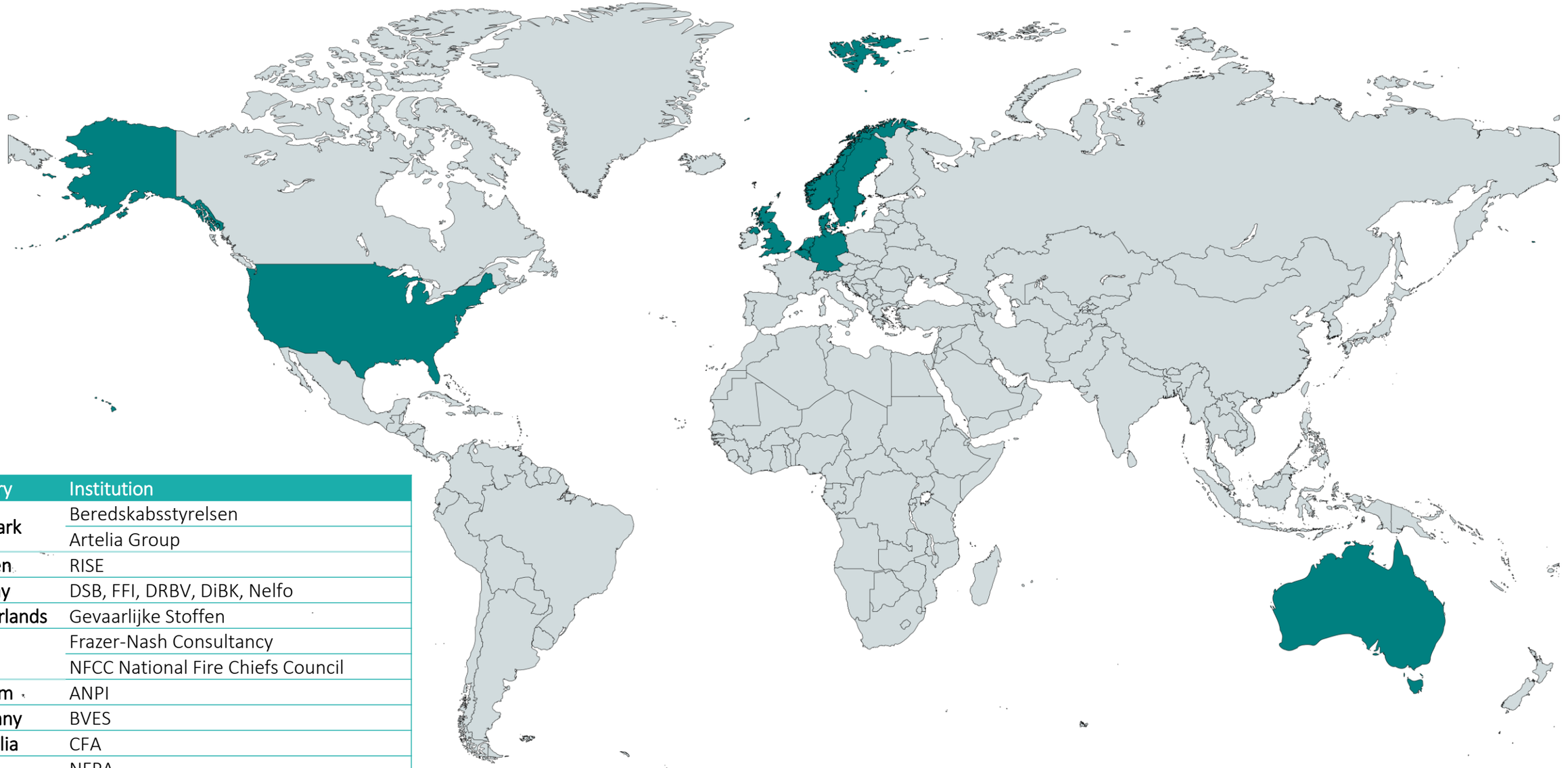
OVERVIEWED GUIDELINES



Country	Institution
Denmark	Beredskabsstyrelsen
	Artelia Group
Sweden	RISE
Norway	DSB, FFI, DRBV, DiBK, Nelfo
Netherlands	Gevaarlijke Stoffen
UK	Frazer-Nash Consultancy
	NFCC National Fire Chiefs Council
Belgium	ANPI
Germany	BVES
Australia	CFA
USA	NFPA
	FM Global

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METHODOLOGY

Group of interest	Parameters/aspects
Documentation aspects	Involved parties, liability and documentation circulation
Hazard mitigation	Risk analysis and management Thermal runaway control Mechanical impact risk management Fire and explosion testing
Passive fire protection	Compartmentation Separation distances Fire barriers
Active fire and explosion protection	Detection Explosion prevention Suppression
Firefighting and water disposal	Emergency response Extinguishing water management
Lifecycle procedures	Commissioning Operation and training Regular inspections and maintenance Decommissioning procedures and disposal
Repurposing and refurnishing	Repurposed and refurbished batteries

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SUMMARY

Group of interest	Parameters/aspects	DK1	DK2	SE1	NO1	NL1	UK1	UK2	BE1	DE1	AU1	USA1	USA2
Documentation aspects	Involved parties, liability and documentation circulation												
Hazzard mitigation	Risk analysis and management												
	Thermal runaway control												
	Mechanical impact risk management												
	Fire and explosion testing												
Passive fire protection	Outdoor installations												
	Indoor installations												
Active fire and explosion protection	Detection												
	Explosion prevention												
	Suppression												
Firefighting and water disposal	Emergency response												
	Extinguishing water management												
Lifecycle procedures	Commissioning												
	Operation and training												
	Regular inspections and maintenance												
	Decommissioning procedures and disposal												
Repurposing and refurbishing	Repurposed and re-furbishing batteries												

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DETECTION

Regulation	Recommendation regarding detection
DK1	CO, NO_2 and HCl
DK2	Optical smoke detector (high/low) CO, NO_2 and HCl Thresholds given
SE1	smoke detection, gas detection (H_2, CO and/or CO_2), and temperature. 25% LEL triggering ventilation
NO1	Smoke detection with CO sensor
UK1	BMS H_2, CO and VOC. Connect and trigger ventilation
BE1	No details
DE1	No details
AU1	BMS Detecting all: smoke, heat and toxic gas high/low No details
USA1	Smoke or radiating heat Smoke detection NFPA 72 Gas detection (H_2, CO and/or CO_2) BMS
USA2	BMS Temperature and VOC

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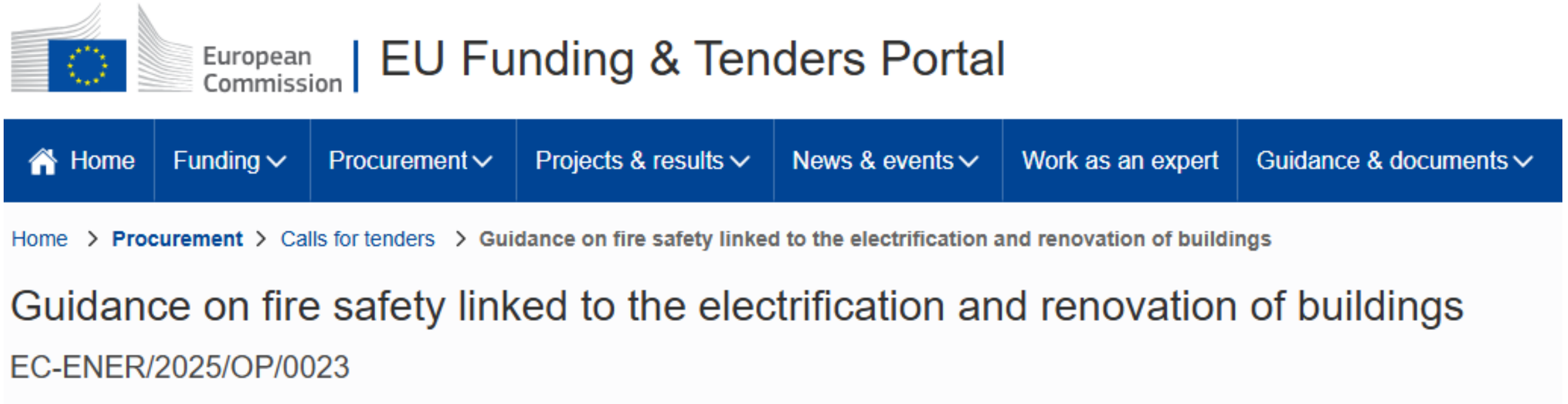
Guidelines are missing for several groups of interest!

Guidelines are not harmonized across countries!

The basis of the guidance is often not clear!

HIGH ON THE AGENDA



CONCLUSIONS

We need more knowledge!

We need safe, harmonized and adaptive guidelines!

We need more collaboration among stakeholders!

THANK YOU!

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ACKNOWLEDGMENT TEAM

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