TÜVNORD

Battery and Energy Storage System
储能电池及系统

TÜV NORD Renewable Energy
TÜV NORD 可再生能源

Energy Storage System
储能系统(ESS)

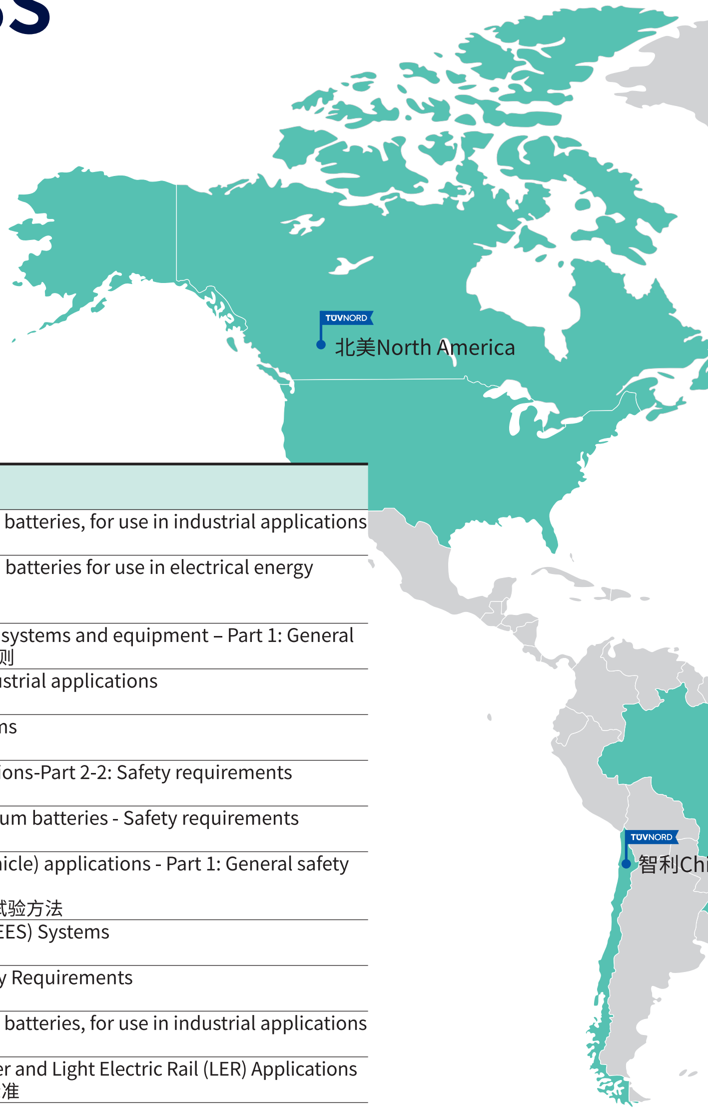
In recent years, the trend of integrating electrochemical energy storage with new energy develops rapidly and it is common to transition from household energy storage to large-scale energy storage power stations. TÜV NORD offers one-stop solutions to ESS clients, from testing, inspection and certification, to feasibility & bankability evaluation, risk analysis & mitigation solutions, performance evaluation, project certification, and O&M support, which cover the entire project life cycle.

近年来电化学储能与新能源结合的项目趋势发展迅猛，从户用储能到大型储能电站屡见不鲜。TÜV 北德为储能客户提供涵盖整个生命周期的一站式解决方案，从检测、检验、认证，到可行性和融资评估，风险分析和缓解方案，性能评估，项目认证和运维支持。

One-stop Solution
一站式解决方案

- Testing, Inspection and Certification 检测检验和认证
- Risk Analysis & Mitigation Solution 风险分析和缓解方案
- Field Evaluation 现场评估
- Feasibility & Site Investigation 可行性及现场调查
- Project Development Support 项目开发支持
- Training 培训

Global Access for ESS
储能产品全球准入

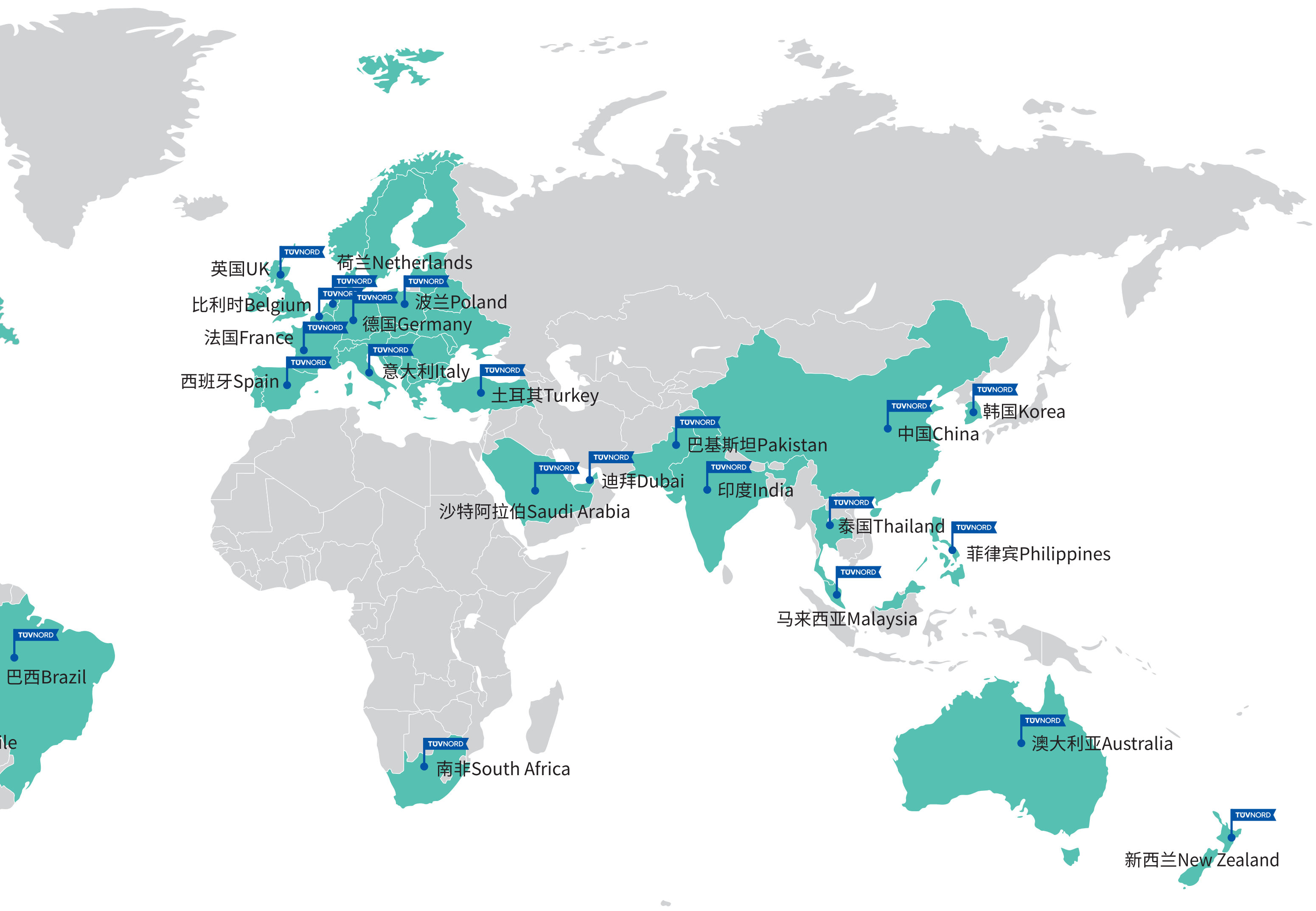


Global Market Access
全球市场准入

Countries and Regions 国家和地区		Requirements 要求
Europe & IEC counties 欧洲及其 IEC 体系国家	IEC 62619	Safety requirements for secondary lithium cells and batteries, for use in industrial applications 工业用二次锂电池和电池的安全要求
	IEC 63056	Safety requirements for secondary lithium cells and batteries for use in electrical energy storage systems 电能存储系统用二次锂电池和电池的安全要求
	IEC 62477-1	Safety requirements for power electronic converter systems and equipment – Part 1: General 电力电子转换器系统和设备的安全要求 - 第 1 部分 : 总则
	IEC 62620	Secondary lithium cells and batteries for use in industrial applications 工业用二次锂电池和电池的性能要求
	IEC 62933-5-2	Safety requirements for grid-integrated BESS systems 并网电化学储能系统的安全要求
	IEC 62932-2-2	Flow battery energy systems for stationary applications-Part 2-2: Safety requirements 固定式液流电池储能系统安全要求
	VDE-AR-E 2510-50	Stationary battery energy storage systems with lithium batteries - Safety requirements 固定式锂离子电池储能系统 - 安全要求
	EN 50604	Secondary lithium batteries for light EV (electric vehicle) applications - Part 1: General safety requirements and test methods 轻型电动汽车二次锂电池 第 1 部分：通用安全要求和试验方法
China 中国	GB/T 36276	Lithium battery used for Electrical Energy Storage (EES) Systems 电力储能用锂离子电池
Australia 澳洲	AS IEC 62040-1	Uninterruptible Power Systems (UPS) - Part 1: Safety Requirements 不间断电源安全要求
	AS IEC 62619	Safety requirements for secondary lithium cells and batteries, for use in industrial applications 工业用二次锂电池和电池的安全要求
North America 北美洲	UL 1973	Batteries for use in Stationary, Vehicle Auxiliary Power and Light Electric Rail (LER) Applications 固定式，车辆辅助动力和轻电铁路 (LER) 用安全电池标准
	UL 2743	Standard for portable power packs 便携式电池安全要求
	UL 9540	Energy Storage Systems and Equipment 储能系统及设备
	UL 9540A	Test method for evaluating thermal runaway fire propagation in Battery Energy Storage Systems 评估电池储能系统热失控火灾蔓延的测试方法
Transport 运输	UN 38.3	UN manual of tests and criteria, Part III, Subsection 38.3 联合国危险物品运输试验和标准手册
EMC 电磁兼容	EN IEC 61000-6 -1/-2/-3/-4	Electromagnetic compatibility (EMC) 电磁兼容性 (EMC)

Solution to European Regulation (EU)2023/1542 for Energy Storage Batteries
储能电池欧盟法规(EU)2023/1542解决方案

Safety, performance and durability test certification of battery 电池安全、性能和耐用性测试验证	Substance limit testing and assessment of battery 电池物质限用测试和评估
Pre-assessment of battery compliance 电池法规合规性预评估	Due diligence system review and evaluation for battery supply chain 电池供应链尽职调查体系审核和评估
Electronic passport information compliance assessment of battery 电池电子护照信息符合性评估	Compliance assessment of battery label, identification and information 电池标签、标识、信息符合性评估
Review of battery regulations and technical documents 电池法规技术文档审核	Composition and content testing of hazardous substances 有害物质成分和含量测试
Carbon footprint audit and certification of battery life cycle 电池全生命周期碳足迹审核和认证	Stationary energy storage system safety test 固定式储能系统安全测试
Process supervision, factory inspection for battery 电池制程监造、工厂检查	



Grid Code for PCS
PCS并网要求

Countries and Regions 国家和地区		Grid Standard 并网标准
Europe 欧洲	Germany 德国	VDE-AR-N 4105 低压并网 VDE-AR-N 4110 中压并网 VDE-AR-N 4120 高压并网 VDE-AR-E 2510-2
	EU 欧盟	EN 50549-1 低压并网 EN 50549-2 中压并网 EN 50549-10
	Spain 西班牙	NTS631 UNE 217002 UNE 217001
	France 法国	NF EN 50549-1 NF EN 50549-2 NF EN 50549-10 FD C11-519-11 FD C11-519-12
	Italy 意大利	CEI 0-21 低压并网 CEI 0-16 中压并网
	UK 英国	EREC G98 EREC G99 EREC G100
	Belgium 比利时	C10/11

Countries and Regions 国家和地区		Grid Standard 并网标准
Oceania 大洋洲	Australia 澳大利亚	AS/NZS 4777.2
	New Zealand 新西兰	AS/NZS 4777.2
South America 南美洲	Brazil 巴西	ABNT NBR 16149 ABNT NBR 16150 ORDINANCE No. 140, OF MARCH21，2022 ORDINANCE No.515，OF NOVEMBER 10，2023
	Chile 智利	NTCO 并网
Africa 非洲	South Africa 南非	NRS 097-2-1 SAGC
Asia 亚洲	Dubai 迪拜	DEWA DRRG
	Thailand 泰国	PEA 并网：曼谷以外地区 MEA 并网：曼谷地区
	India 印度	IEC 61727 IEC 62116
	Korea 韩国	KS C 8565
	China 中国	NB/T32004 GB/T34120

Quality and Performance Assurance
质量与性能保障

In recent years, electrochemical energy storage system as a new product widely used in generation side, grid-connected side and user side. Due to the complexity of its application scenarios, there are many challenges in design, operation and maintenance. Based on extensive experience in on-site inspection of the energy storage system and components, TÜV NORD can minimize the probability of operational failures during product delivery to the site or in use, and avoid connection failures, large capacity attenuation and damage during the transportation and installation.

近年来，电化学储能系统作为一个新的产品，被广泛运用于发电侧，并网侧以及用户侧。由于其运用场景复杂，在设计、运行及维护中存在了很多挑战。TÜV NORD 基于丰富的储能产品、零部件认证，现场检验，系统验收等项目经验，帮助降低产品交付到现场或使用中出现运行故障的概率，避免发生连接故障，容量大幅衰减以及运输安装使用过程中损坏等情况。

Electrochemical Energy Storage System Service
电化学储能系统服务内容

Energy storage system design review
储能系统设计审核

- Site evaluation 站址评估
- Equipment selection 设备选型
- System architecture 系统架构
- Auxiliary services and operational modes 辅助服务和运行模式
- Civil, electrical & structural engineering 土建、电气和结构
- Grid connection and operation mode 接入条件和运行模式
- Protection & data acquisition 保护和数采
- Fire and safety 消防和安全
- Environmental & Social Due Diligence (ESDD) 环境和社会尽职调查

Components technical supervision
储能部件技术监督

- Production supervision 生产过程监造
  - -Cell 电芯
  - -Battery pack 电池
  - -Battery rack 电池簇
  - -PCS 储能变流器
  - -Battery container 电池舱
  - -Booster container 升压舱
  - -BMS 电池管理系统
  - -High voltage switch cabinet 高压开关柜
  - -Main transformer 主变压器
  - -Gas Insulated Switchgear GIS 开关
- Lab test 实验室测试
- Factory quality assurance audit 工厂质量保证能力审查
- FAT 成品出货检查
- On-site installation training 现场安装指导
- After-installation assessment 安装后评估

Energy storage systems grid-connection acceptation
储能系统现场验收

- Documents review 资料核查
- Consistency review 一致性核查
- Installation quality inspection 安装质量检查
- Foundation & isolation protection inspection 基础和隔离防护检查
- Fire protection system inspection 消防系统检查
- Air conditioning system inspection 通风空调系统检查
- Safety test 安全性测试
- Thermal imaging inspection 热成像检查
- Parameter test 参数测试
- Performance test 性能测试
- BMS system inspection BMS 系统核查
- Data acquisition and transmission 数据采集和传输
- Booster system inspection 升压系统检查
- EMS/SCADA inspection

Energy storage systems LTA(Lenders' technical advisor)
储能系统 LTA

- Compliance review 合规性审查
- Environmental assessment 环境评估
- Supplier evaluation 供应商评价
- Qualification review of related parties 相关方资质审查
- Design review 设计审查
- Contract review 合约审查
- Quality assurance review 质保审查
- Facility financability 设备可融资性
- Equipment selection 设备选型
- Key certification review 关键认证核查
- Fire protection and explosion prevention inspection 储能消防及防爆核查
- Fire safety review 消防安全核查

Smart Charging Safety Certification
智能充电安全认证

In the rapidly evolving electric vehicle era, TÜV NORD offers comprehensive support to ensure the safety and compliance of charging infrastructure. We provide strategic consulting, product development, testing and certification, as well as installation training and qualification review services. Our goal is to help businesses optimize designs, meet international standards, and ensure compatibility with local power systems. Partner with TÜV NORD to advance electric transportation infrastructure and embrace the opportunities of the new energy age.

在全球电动汽车迅猛发展的时代，TÜV NORD 致力于提供全方位服务支持，以确保充电基础设施的安全与合规。我们提供战略咨询、产品研发、检测认证，以及安装培训和资质审核服务，助力企业优化设计，符合国际标准，并确保技术与当地电力兼容。携手 TÜV NORD，推动电动交通基础设施建设，迎接新能源时代的机遇。

Service Offerings for Electric Vehicle Charging
电动汽车充电设施服务内容

Charging station **充电桩**
IEC 61851-1, IEC 6185-23, IEC 61851-24, IEC 61851-21-1, IEC 61851-21-2, IEC 62752, EN 61851-1, EN 6185-23, EN 61851-24, EN 61851-21-1, EN 61851-21-2, EN 62752, TR25-1, TR25-2, TR25-3, TR25-4
Charging module **充电模块**
IEC 61851-1, IEC 6185-23, IEC 62477-1, EN 61851-1, EN 6185-23, EN 62477-1
Charging cable **充电线缆**
IEC 62893-1, IEC 62893-2, IEC 62893-3, IEC 62893-4
EV plugs/EV socket-outlets **充电枪 / 插座**
IEC 62196-1, IEC 62196-2, IEC 62196-3, IEC TS 62196-3-1, EN 62196-1, EN 62196-2, EN 62196-3
Residual current device **漏电流保护器**
IEC 62955

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