

Quality and Performance Assurance 质量与性能保障

In recent years, electrochemical energy storage system as a new product has been widely used in power station, 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 the rich experience in on-site inspection of the energy storage system and components, TÜV NORD can reduce the probability of operation 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, 被广泛运用于电站端, 并网侧以及用户侧。由于其运用场景复杂, 在设计、运行及维护中存在着很多挑战。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	
<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • Production supervision 生产过程监督 -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 	<ul style="list-style-type: none"> • 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 acceptance 储能系统现场验收	
<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Facility financability 设备可融资性 • Equipment Selection 设备选型 • Key certification review 关键认证核查 • UL9540A review UL9540A 核查 • Fire safety review 消防安全核查 • Environmental & Social Due Diligence (ESDD) 环境和社会尽职调查

TÜVNORD

80^{GW} 全球光伏产品及光伏系统评估量
Worldwide PV Product and PV System Performance Evaluation

150⁺ 全球分支
Global Branches

400⁺ 年度工厂检查
Annual Factory Audit

5000⁺ 项目总数
Project Amounts

30⁺ 全球市场准入
Global Market Access

280⁺ 全球覆盖区域
Global Regions

800⁺ 并网认证
Grid-connection

4000⁺ 证书签发
Certificates

TÜVNORD

Battery and Energy Storage System 储能电池及系统

TÜV NORD Renewable Energy
TÜV NORD 可再生能源



TÜV NORD 可再生能源部

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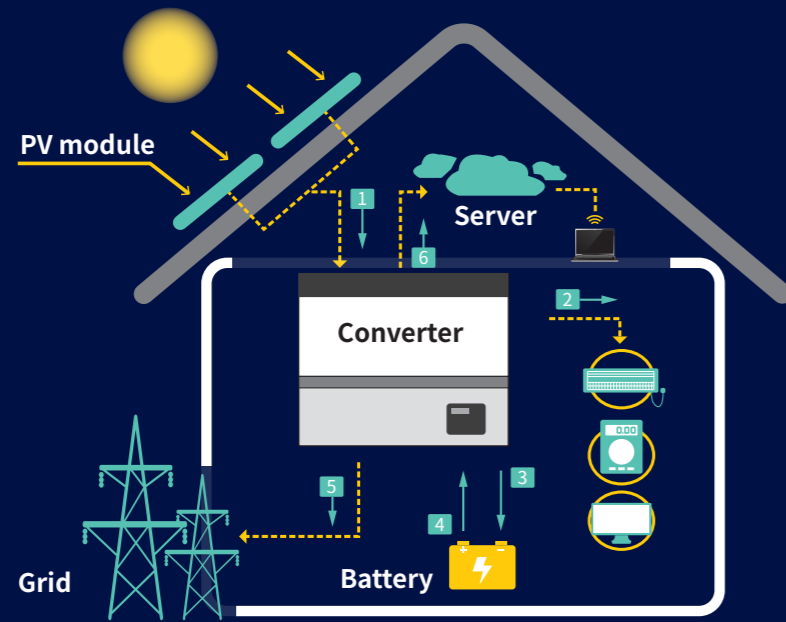
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Energy Storage System 储能系统(ESS)

In recent years, the trend of combining electrochemical energy storage with new energy develops rapidly and it is common to move from household energy storage to large-scale energy storage power stations. Based on its experience and technology in photovoltaic and energy storage batteries, TÜV NORD develops the internal standards for assessment and certification of energy storage systems to fill in the gaps in the early ESS technical specifications. TÜV NORD not only provides product testing and certification services, but also provides training, assessment as well as complete technical solutions.

近些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 NORD 凭借在光伏与储能电池领域的经验和技能，针对储能系统的评估验收及认证编制了内部标准，填补早期 ESS 技术规范的缺失。TÜV NORD 不仅可为 ESS 厂家提供产品测试与认证，还可以提供相应的培训、评估及完整的技术解决方案。



Testing and Certification 检测与认证

Application 应用	Standard/Instruction 标准或指令
Portable Applications 便携式应用	IEC 62133-1:2017
	IEC 62133-2:2017
	IEC 61960-3:2017
Industrial Applications 工业应用	IEC 62619:2022
	IEC 63056:2020
	IEC 62620:2014
Photovoltaic Application 光伏应用	IEC 61427-1:2013
	IEC 61427-2:2015
Valve Regulated Types 铅酸蓄电池	IEC 60896-21:2004
	IEC 60896-22:2004
Flow Battery Energy Systems 液流电池	IEC 62932-1:2020
	IEC 62932-2-1:2020
	IEC 62932-2-2:2020
Electrical Energy Storage Systems 电力储能系统	IEC 62933 series
Stationary Battery Energy Storage Systems with Lithium Batteries 固定式锂离子电池储能系统	VDE-AR-E 2510-50

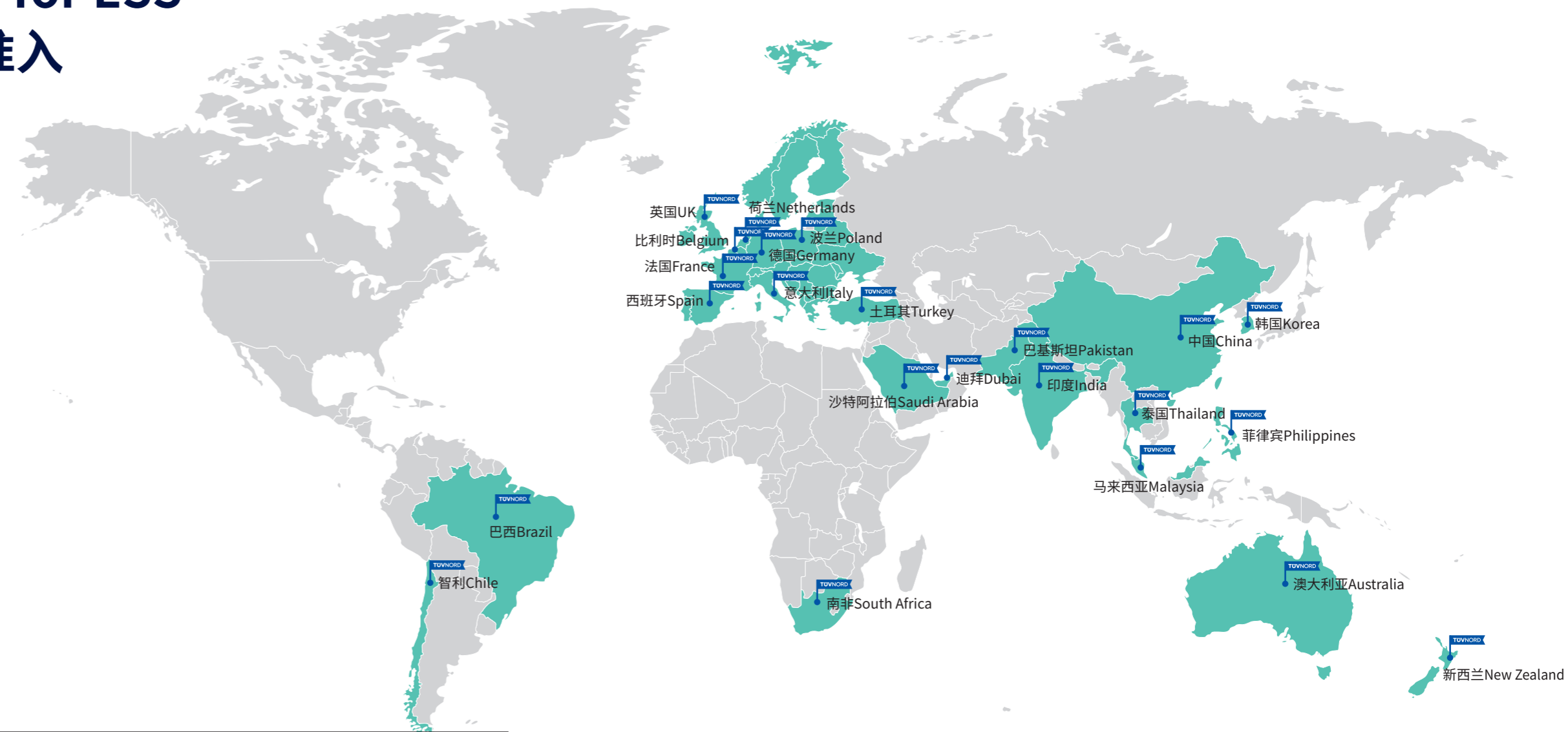
Global Access for ESS 储能产品全球准入

TÜV NORD provides the global one-stop certification service for energy storage products and systems. For battery products, TÜV NORD carries out strategic cooperation with many laboratories around the world to help customers complete the test quickly which is recognized worldwide. For PCS products and energy storage containers, TÜV NORD develops corresponding testing and certification solutions according to the requirements of different regions and national grid access standards.

TÜV NORD 提供储能产品与储能系统的全球一站式认证服务。对于电池产品，TÜV NORD 与分布全球的众多实验室进行战略合作，助力客户就近快速完成测试，做到一次测试，全球认可。对于 PCS 产品及储能集装箱，根据不同地区和国家电网准入标准的要求制定对应的认证解决方案。

Global Market Access 全球市场准入

Countries and Regions 国家和地区	Requirements 要求
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
Europe & IEC countries 欧洲及其 IEC 体系国家	IEC 62477 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 - VDE
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
AS IEC 62040-1	Uninterruptible Power Systems (UPS) - Part 1: Safety Requirements 不间断电源安全要求
Australia 澳洲	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
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 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
North America 北美洲	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)



Grid Code for PCS PCS并网要求

Countries and Regions 国家和地区	Grid Standard 并网标准
Germany 德国	VDE-AR-N 4105:2018 低压并网
	VDE-AR-N 4110:2018 中压并网
	VDE-AR-N 4120:2018 高压并网
	VDE-AR-E 2510-2:2021
Netherlands 荷兰 Poland 波兰 Turkey 土耳其	EN 50549-1:2019 低压并网
	EN 50549-2:2019 中压并网 EN 50549-10:2022
Spain 西班牙	NTS631
	UNE 217002:2020 UNE 217001:2020
Europe 欧洲	UTE C15-712-1:2013
	NF EN 50549-1:2019 NF EN 50549-2:2019
Italy 意大利	CEI 0-21:2022 低压并网
	CEI 0-21, V2(2024)
	CEI 0-16:2022 中压并网 CEI 0-16, V3(2024)
UK 英国	EREC G98 Issue 1 Amendment 7(2022)
	EREC G99 Issue 1 Amendment 9(2022)
Belgium 比利时	C10/11:2019 ed2.2

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 4777.2:2020 AS/NZS 4777.2:2020 Amd 1:2021
	New Zealand 新西兰 AS/NZS 4777.2:2020 AS/NZS 4777.2:2020 Amd 1:2021
South America 南美洲	Brazil 巴西 ABNT NBR 16149:2013 ORDINANCE No. 140, OF MARCH 21, 2022
	Chile 智利 ORDINANCE No.515, OF NOVEMBER 10, 2023 NTCO:2016 并网
Africa 非洲	South Africa 南非 NRS 097-2-1:2024 ed3.0 SAGC
	Dubai 迪拜 DEWA DRRG:2016 PEA: 2016
Asia 亚洲	Thailand 泰国 并网: 曼谷以外地区 MEA: 2015 并网: 曼谷地区
	India 印度 IEC 61727:2004 IEC 62116:2014
	Korea 韩国 KS C 8565:2015 NB/T32004:2018 China 中国 GB/T 34120-2017