

A close-up photograph of a worker wearing a white hard hat, safety glasses, and heavy-duty gloves. The worker is using a blue spirit level and an orange tool to install a cable onto a metal structure. The background shows a snowy, mountainous landscape. A blue semi-transparent box is overlaid on the top right of the image, containing the title text.

Renewables

Power Performance Testing



Empowering Trust™

About us

Leaders in Global Services for Renewable Energy

UL is a trusted independent advisory, testing, inspection and certification body for a broad range of industries. In the renewable energy space, UL works to help manufacturers, developers, owners, investors, lenders, utilities and policy makers navigate the risk and complexity associated with renewable resources. We have become a trusted advisor by providing access to proven science and expert engineering, and by offering innovative solutions to meet the unique challenges of the renewable energy industry. We pride ourselves on being accessible, flexible and keenly responsive to the needs of our clients.

UL now delivers an even more extensive portfolio of renewable energy services, through the acquisitions of AWS Truepower (2016) and DEWI (2012). With offices in over 140 countries, a team of over 500 experts and 35 years of experience, we advise on wind and solar projects as well as battery and energy storage technologies, helping our clients make them safer, compliant and perform to the highest standards. Our goal is to empower trust in renewable energy throughout the project lifecycle and across the supply chain.

UL OPERATES IN
MORE THAN
140
COUNTRIES



35+
YEARS OF
RENEWABLE
ENERGY
EXPERIENCE

200,000+ MW
TOTAL MEGAWATTS ASSESSED

500+ RENEWABLE
ENERGY EXPERTS



ADVISED 90%
OF THE WIND INDUSTRY'S TOP PROJECT
DEVELOPERS AND PLANT OWNERS



INDEPENDENT/OWNER'S
ENGINEER FOR
500+
WIND AND SOLAR PROJECTS
SINCE 2012

FORECAST PROVIDER FOR
70+ GIGAWATTS
OF INSTALLED RENEWABLE
ENERGY PROJECTS





Power Performance Testing

The success of your wind project relies heavily upon the wind potential and the performance of the selected turbines. The manufacturer often guarantees the performance of the turbines; however, many contracts require an independently performed power performance test to obtain the guarantee. Additionally, some power curves vary based on terrain and local conditions. UL can help you calibrate and verify site-specific power curves in order to benchmark and manage performance expectations with turbine suppliers.

We will test turbines for power performance based on the IEC standards for wind turbine operations. We identify appropriate turbines at the site to perform obstacle and terrain analysis, site calibration, and performance test set-up and execution.

UL Accreditations / Quality Agreements

The following accreditations are valid for the UL locations, test and calibration procedures mentioned in the certificates. The certificates are available on request or at www.dakks.de.



How does UL test wind turbine power performance?

Testing performance is essential to ensuring that turbine and plant performance meet expectations and contractual obligations. Put simply, Power Performance Testing is measuring wind speed, measuring a turbine's power output, then plotting the power versus wind speed and comparing that to the warranted power curve. While the concept is simple, the actual testing requires numerous in-depth steps. The steps to complete a Power Performance Measurement campaign vary somewhat depending on the client and situation, but generally they include:

Engineering and Design

- Power Performance Measurement Plan including Met Mast Design
- Power Performance Measurement Plan Approval
- Installation Plan
- Installation Plan Review & Approval

Met Instrumentation and Commissioning

- Procure and Install Met Towers
- Order Equipment
- Equipment Lead Time and Assembly
- Ship Equipment to Site
- Instrumentation Installation
- Met Tower Commissioning
- Provide Complete Commissioning Documentation

Power Measurement Instrumentation and Commissioning

- Order Equipment
- Equipment Lead Time
- Equipment Assembly
- Equipment Shipped to Site
- Power Measurement Equipment Installation
- Power Measurement Equipment Commissioning
- Provide Complete Commissioning Documentation

Power Performance Measurement Data Collection, Analysis and Reporting

- Data Collection and Monitoring
- Data Analysis
- Prepare Final Power Performance Test Report

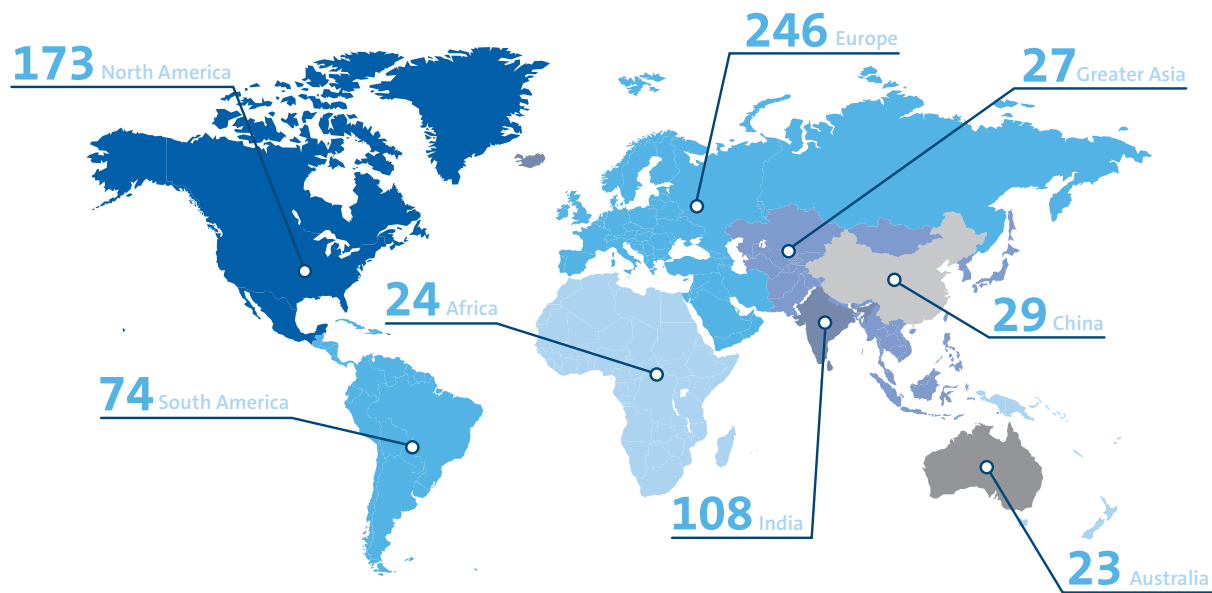
UL brings a flexible and communicative approach to the power performance testing effort, which has earned us a reputation of being both highly responsive and technically excellent within the field of power performance testing.



UL HAS COMPLETED **POWER PERFORMANCE TESTS**
ON 350+ WIND PROJECTS

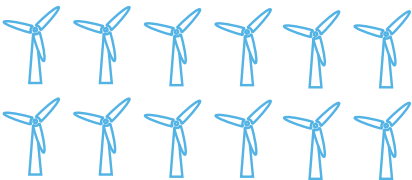
700+ POWER PERFORMANCE
TESTS PERFORMED

WIND TURBINE POWER PERFORMANCE TESTS PERFORMED BY REGION



200+ WIND TURBINE MODELS TESTED

	# OF TURBINE MODELS ASSESSED	# OF TURBINE TESTS PERFORMED
ENERCON	12	20
GE/ALSTOM	28	146
GOLDWIND	6	14
NORDEX/ACCIONA	16	109
SIEMENS/GAMESA	28	124
SUZLON	14	59
VESTAS	19	108
OTHERS	87	124



UL HAS PERFORMED POWER
PERFORMANCE TESTS ON
**60+ WIND TURBINE
MANUFACTURER BRANDS**

Information reflects project database values as of September 2017.

LOCATION: Nebraska, United States

Power Performance Measurement for Nebraska Wind Project

For a confidential client with a project in Nebraska, UL tested three GE 1.5 MW wind turbines in accordance with IEC specifications. The initial work included a terrain and obstacle analysis, which led to a site calibration. Then we installed and commissioned the power measurement equipment on the three selected turbines and monitored their performance for three months. The conclusions were delivered in a comprehensive report to the client.





LOCATION: China

Type Testing for Wind Turbine Manufacturers in China

UL has been conducting power performance measurements for a number of wind turbine manufacturers as part of type testing activities in China. These turbines range in size from 2-5 MW with rotors over 150 m in diameter. The work included preparing a test plan detailing the equipment, configuration, and methodology to be used for testing, as well as procuring and installing the power measurement equipment as part of a larger type testing exercise. The power performance data was analyzed and summarized in a final report in accordance with IEC 61400-12-1.

LOCATION: Spain

Power Performance Measurement Programs in Spain

UL conducted power performance measurements for manufacturers and developers in Spain. The turbines ranged in size from 600 kW to 5 MW with rotors over 130 m in diameter. The work included preparing a test plan detailing the equipment, configuration, and methodology to be used for testing, as well as procuring and installing the power measurement equipment. The power performance data is analyzed and summarized in a final report in accordance with IEC 61400-12-1.

Key Office Locations



AFRICA

Johannesburg, SOUTH AFRICA

ASIA PACIFIC

Beijing, CHINA

Suzhou, CHINA

Bangalore, INDIA

Ise, JAPAN

Tokyo, JAPAN

Seoul, KOREA

EUROPE

Lyon, FRANCE

Bremen, GERMANY

Cuxhaven, GERMANY

Hamburg, GERMANY

Oldenburg, GERMANY

Wilhelmshaven, GERMANY

Milan, ITALY

Ansoain (Navarra), SPAIN

Barcelona, SPAIN

Izmir, TURKEY

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Buenos Aires, ARGENTINA

São José dos Campos, BRAZIL

Rio de Janeiro, BRAZIL

Bogotá, COLOMBIA

Mexico City, MEXICO

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Albany, New York, UNITED STATES

Northbrook, Illinois, UNITED STATES

San Diego, California, UNITED STATES

San Jose, California, UNITED STATES

[UL.com/Renewables](https://www.ul.com/renewables)