UL Solutions

Supporting moves toward a safer, more sustainable energy transition

The world is shifting toward a more sustainable future. But with such significant change comes new issues to address, especially if we are to keep safety at the heart of how we produce, store and use energy. Here's what's at stake.

The need

By 2035, advanced economies need to reduce emissions by **80%** and emerging/developing economies need to reduce emissions by **60%** to meet 2050 goals.[1]

The scale

To meet 2050 goals, annual global renewable power capacity additions will need to reach an average of **1,066 GW** per year.[2]

The cost

Annual clean energy investment worldwide needs to more than triple by 2030 to nearly **$4 trillion (USD)** to meet energy transition goals and achieve net-zero emissions by 2050.[3]

Against this backdrop, stakeholders across the energy transition cannot sacrifice safety and performance in favor of speed to market. A more decarbonized society requires strategies to help evaluate new products, projects and systems for greater safety and performance against a broad range of risks and conditions. At UL Solutions, we are ready to empower customers as they take on challenges across **five key pillars of the energy transition.**

01 Accelerating renewable energy

How we can help:
We offer testing and certification services to evaluate the safety and performance of renewable technologies as well as software tools to help developers, utilities, manufacturers and grid operators derisk projects across the entire life cycle.

The need:
To accelerate deployment, stakeholders in renewable energy development benefit from our services that help assess the safety and performance of underlying technologies and the viability of projects.

Risks:
Equipment or software failures can disrupt operations, endanger safety and diminish trust in the industry overall, reducing investment. Other emerging challenges like interconnection delays can slow project development and slow deployment.

02 Advancing safer, more sustainable battery energy storage

The need:
Battery energy storage systems (BESS) are a key component of many energy transition efforts, including power grid applications, electrifying transportation and designing a more sustainable built environment.

Risks:
BESS can introduce significant risks, including fire risks posed by thermal runaway. Supply chain constraints and shifting regulatory and compliance frameworks can also slow development.

How we can help:
We offer strategies and services to mitigate risks across the BESS life cycle. With testing and certification services for battery storage in both EVs and industrial environments, our experts can assess system safety and performance and help manufacturers, original equipment manufacturers (OEMs) and other stakeholders navigate differences in standards, codes and certifications across different jurisdictions and markets.

03 Promoting safer grid integration and greater resilience

How we can help:
We help our customers by testing and certifying their products for safety and performance even as innovation accelerates and relevant regulations, codes and certifications evolve.
We also participate in working groups and industry boards to stay up to date with industry shifts to support customers as they keep up with the pace of innovation.

The need:
A more decentralized grid means more grid-connected devices and a more digitized power system. These transformations offer benefits such as enhanced flexibility, efficiency and sustainability. They also amplify existing risks and introduce new potential threats.

Risks:
A more digital, decentralized power grid opens up new cybersecurity threats as more devices connect. Enhanced interoperability and connectivity are crucial, as gaps can lead to compliance issues and performance challenges.

04 Creating a sustainable built environment

The need:
Technologies like renewable energy resources (DERs) and BESS are quickly integrating into the places where we live and work. Innovative technologies, whether smart building control systems or more sustainable building materials, can contribute toward meeting decarbonization goals.

Risks:
New products and building materials can also introduce new challenges, whether related to fire safety, challenges with interoperability and cybersecurity, or even risks to physical safety of occupants.

How we can help:
We offer testing, inspection and field evaluation programs that help customers demonstrate compliance with safety, security and sustainability standards for new products and materials in the built environment. We also participate in working groups to understand how new innovations impact relevant standards, codes and certifications.

05 Electrifying transport

How we help:
We provide comprehensive testing and certification services for automakers, manufacturers and providers of charging equipment and infrastructure to assess and evaluate the safety and performance of their products. We also offer hardware and software testing services focused on identifying cybersecurity vulnerabilities in automotive systems.

The need:
The automotive landscape is undergoing an electric revolution with the potential to transform vehicles into interconnected components of power grids and other electrical infrastructure.

Risks:
EVs and charging infrastructure introduce new risks and requirements for safety and performance testing and certification as well as new risks spanning interoperability and cybersecurity. As regulations, standards, codes and certifications evolve alongside innovation, rapid shifts can make maintaining compliance difficult.

Advancing a safer, more sustainable future

As a global leader in safety science, we have deep expertise and offer a wide range of services to support stakeholders across the energy transition as they work toward building a safer, more sustainable future. Our experience in safety and performance testing and certification, combined with our engagement in working groups and industry boards, positions us to stay ahead of the curve in terms of where the industry is headed so that we can help our customers do the same.

[1] Tracking climate pledges: can the Global Stocktake be a landmark moment for energy sector ambition?, International Energy Association, IEA, October 2023, https://www.iea.org/commentaries/tracking-climate-pledges-can-the-global-stocktake-be-a-landmark-moment-for-energy-sector-ambition
[2] IRENA, World Energy Transitions Outlook 2023 VOLUME 1, https://www.irena.org/Digital-Report/World-Energy-Transitions-Outlook-2023
[3] Net Zero by 2050: A Roadmap for the Global Energy Sector, International Energy Association (IEA), May 2021, https://www.iea.org/reports/net-zero-by-2050

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