

Saudi arabia energy storage technologies

Energy Storage in Chemical Fuels and Electricity Generation: Reducing green ...

King Abdullah University of Science and Technology (KAUST) is leading the charge on renewable energy and storage solutions through its newly created Center of Excellence (CoE) for Renewable Energy and Storage Technologies. By empowering collaborative efforts with national and global partners, KAUST aims to help the Kingdom meet its environmental and economic goals.

Professor Husam Alshareef is the KAUST CoE's Chair, with Professor Zhiping Lai as co-Chair. Its goal: To be the industry-academia hub for developing and deploying innovative renewable energy and storage technologies, as per Vision 2030, supporting KSA's climate goals and transition to sustainable energy.

"The Center of Excellence for Renewable Energy and Storage Technologies aims to focus on homegrown technologies, invented at KAUST and owned by KAUST," Alshareef said. By turning novel ideas into tangible solutions, the Center intends to attract investments, partnerships and market interest that lead to commercial adoption. "We will use the available resources at KAUST to build prototypes of our inventions and ensure their reliability. We will then scale up our prototypes by engaging our partners or through outsourcing."

In so doing, the Center's research will contribute to enhancing energy security, reducing environmental impact and creating jobs. The U.S.-Saudi Business Council anticipates renewable energy could support 750,000 new jobs in the Kingdom by 2030.

For its part, the Center is investing heavily in education, training and workforce development to advance and localize renewable energy research. By building a strong reputation for excellence, the CoE aims to attract both academic and industry collaboration, positioning itself as a premier research hub and a global destination for students, researchers and faculty.

This center's research focuses on prototyping and scaling technologies across six key themes designed to enhance the efficiency, reliability and sustainability of energy production, storage and utilization. Many of the proposed projects use groundbreaking technologies invented at KAUST and developed with industrial partners, with KAUST holding partial or full intellectual property rights. The six themes include:

Advanced Photovoltaics: Research aimed at advancing solar panels and scaling them for industrial use, testing them in Saudi Arabia's harsh climate to ensure they are durable and perform well. The theme lead is Professor Osman Bakr, Material Science and Engineering.

New Battery Chemistries: Projects focused on developing hydrogen batteries for cost-effective, long-term grid

storage and high-temperature batteries to reduce cooling needs and fire risks in harsh conditions. Professor Alshareef, Material Science and Engineering, is the lead for this theme.

Lithium Extraction and Battery Recycling: Securing lithium supplies and strengthening KSA's battery industry by developing membrane technologies to extract lithium locally and recycling batteries for valuable metals. Professor Zhiping Lai, Chemistry, is the theme lead.

Advanced Cooling Technologies: Developing renewable cooling technologies to enhance the efficiency and lifespan of electronic devices such as solar panels and LEDs. The theme lead is Professor Qiaoqiang Gan, Material Science and Engineering.

Energy Storage in Chemical Fuels and Electricity Generation: Reducing green hydrogen production costs through cheaper catalysts and membranes, and exploring formic acid as an affordable hydrogen carrier. Professor Kuo-Wei Huang, Chemistry, is the theme lead.

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