



جامعة الملك فهد للبترول والمعادن
King Fahd University of Petroleum & Minerals



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IRC for Renewable Energy and Power Systems

MISSION

Development of sustainable and energy efficient solutions having the social, environmental, and economic impact to achieve the objectives of the SAUDI VISION 2030.

CHALLENGES

- Development of technologies for zero energy buildings.
- Stable power supplies with bulk RE integration.
- Smart management of energy systems and efficiency improvement with incorporation of IR 4.0 solutions.
- RE materials under harsh weather.
- Polymer based materials for RE solutions.
- Enabling RE technologies for energy transitions and hybrid systems.

TARGET SECTORS

- Public and Private Energy Stakeholders
- Energy Systems and Renewables.
- Utilities (Electricity and Water).
- Buildings, Industries, Transportations, and Agriculture, and Other Sectors.
- Education, Training and Consultation.

FOCUS AREAS

RE Materials

- PV cells and systems under harsh weather (temperature, UV, and dust).
- Thermal (heat) management in different renewable energy technologies and smart building.
- Wind turbine and concentrated solar power (CSP) materials.

Power Systems

- Power system planning, operation, control, protection, stability, and resilience considering bulk RE integration.
- Smart grids, micro-grids, IR4.0, IoT, cybersecurity, block-chain technologies.
- Energy storage systems and electric vehicle integration into electric grid.
- Electricity markets and power electronic converters for RE grid integration

Hybrid Renewables

- Integrated and hybrid renewable energy systems for power, cooling, and heating applications.
- Hybrid RE systems for ammonia and hydrogen production.
- Hybrid RE systems for water desalination.
- Hybrid RE systems for other applications (agriculture, park, and military).
- RE systems assessment under harsh weather conditions (dust, UV, and temperature).
- RE systems maintenance (cleaning and operation).

Intelligent Energy Management

- Smart energy systems management for buildings, industries, and commercial facilities.
- Application of IR 4.0 technologies for energy managements.
- Energy auditing and efficiency improvement recommendations for buildings and plants.
- Policies and standards for energy systems and IR 4.0 technologies.
- Supporting Saudi Energy Efficiency Center.

Policies & Regulations

- Provide a research and academic hub for the interdisciplinary study of energy policy.
- Work collaboratively with stakeholders and researchers on the economics and politics of energy to find new and innovative approaches for enabling the transition to a low carbon, sustainable and affordable energy system in KSA.

DEPARTMENTS INVOLVED

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| • Mechanical Engineering | • Civil & Environmental Engineering | • Mathematics |
| • Electrical Engineering | • Systems Engineering | • Business School |
| • Chemical Engineering | • Physics | • Information Systems and Operation Management |
| • Architecture Engineering | • Chemistry | |