

جامعة الصلك فهد للبترول والصعادن King Fahd University of Petroleum & Minerals

# IRC for Renewable Energy and Power Systems



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

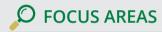


## CHALLENGES

- 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.



- 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.



#### 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.

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### **DEPARTMENTS INVOLVED**

- Mechanical Engineering
- Electrical Engineering
- Chemical Engineering
- Architecture Engineering
- · Civil & Environmental Engineering
- Systems Engineering
- Physics
- Chemistry

- Mathematics
- Business School
- Information Systems and Operation Management