www.kier.re.kr

KIER, leading the K-Energy

Korea Institute of Energy Research





152 Gajeong-ro, Yuseong-gu, Daejeon, 34129 Republic of Korea.



Mission & Function



#### Role & Responsibility (R&R)



Organizational Vision



#### **Personnel** (as of Aug 31, 2023)





## **KIER**, leading the K-Energy

The KIER fosters R&D on hydrogen production and use, innovative renewables, smart energy efficiency, storage, and clean energy. The KIER will lead the K-Energy into the world through energy technology innovation fulfilled on the level of super-convergence and super-gap.

#### Research Focus

| New energy            | Hydrogen                   | Hydrogen production and storage technology, convergence materials, and demonstration, etc.                           |
|-----------------------|----------------------------|--|
| Renewable energy      | Solar power                | Highly-efficient tandem solar cells, ultra-thin solar cells, solar panel recycling, etc.                             |
|                       | Wind power                 | Wind power plant and system technology and O&M technology, etc.  |
| Fossil fuel clean use | CCUS                       | Greenhouse gas capture, conversion and utilization and combustion technology, etc.                                   |
|                       | Energy ICT                 | Smart, digitalized and distributed energy system R&D, etc.   |
| Efficiency upgrade    | Energy systems integration | Zero-carbon sector coupling in buildings, industries, and conversion, etc.   |
| Shared base           | ESS                        | R&D on next-generation secondary battery technology and power<br>storage technology with renewable integration, etc. |

#### • Supreme Achievements for Carbon Neutrality and Promoting to **Industries and Businesses**



#### No. 2 in research productivity among 25 research institutes under the \*NST in 2021

\*National Research Council of Science & Technology



| World's Best Technology | Development |
|-------------------------|-------------|
|-------------------------|-------------|

Localization and commercialization of global

top-ranked hydrogen production technology

<12 billion won of technology transfer contract >



|   | Achievements<br>Building the hydr   |
|---|---|
| RESULT  | - Success in comm   |
| ECONOMICALLY  | Economic effe<br>Securing the loca<br>two major pillars<br>- Technology transfe |
| €\( <sup>m</sup> m<br>€ <u></u><br>↓\F_1<br>┦_\_ੵ~= | Social effects<br>Fostering transiti  |

| Building the hydrogen economy by localizing top-ranked hydrogen production technology<br>to the level of 100%<br>- Success in commercializing a locally developed hydrogen reformer for 2,000 kg/day |
|--|
| Economic effects   |
| Securing the localization of hydrogen production technology and cost competitiveness, two major pillars of the hydrogen energy value chain   |

- Technology transfer of 12 billion won and national hydrogen community demonstrations (in Pyeongtaek and Ansan)

#### Social effects

| Fostering transition to the hydrogen economy by the early localization of hydrogen production                      |
|--|
| technology   |
| - 100% localized technology helps to achieve the goal of hydrogen economy road map and to build the infrastructure |

| Next-genera   | tion Solar Cell Recording the World's                 |
|---------------|---|
| Highest Effic | iency   |
|               | :), Nature (21)>                                      |
| ۱             | Achievements  |
|               | Realizing energy transition to carbon neutrality with |



Stable pe

ding 24.8% and 0.3-V voltage los

Excellent solar cell achievements published in Science and Nature

- Small-scale and large-scale perovskite solar cells with the world's best efficiency

#### **Economic effects**



- Building the foundation for local solar cell industries' global competitiveness

#### Social effects



Securing key technology to carbon neutral transition with super-gap next-generation solar cell technology - Small-scale perovskite solar cell's efficiency of 25.6% and large-scale 21.83% surpassing the world's best record - KIER's perovskite/silicon tandem solar cells (4T) achieve the world's best efficiency of 31.5%.



#### **C4 Olefin Separation**

1991.11

Low-cost and highly efficient separation of C4 compounds from naphtha cracking
Technology transfer to SK Energy Co., Ltd (600 million won in licensing revenue)

### 1990 Ceveloping Era

#### Korea Institute of Energy Research renamed

#### Home-use Condensing Boiler

• **15% efficiency upgrade technology compared to the commercial boiler** - Technology transfer to KyungDong Navien, Daesung Celtics Co. Ltd

# **K**

#### LED Traffic Signal Lights

• Energy conservation, long-life LED technology for traffic signal lights - Technology transfer to MIT Enterprise, Korea Electric Co., Ltd, Atodisplay Corp.

1977.09

#### Korea Institute of Energy Conservation

Founding Era

1977 🔘



Organizational Sites

## Headquarters of the Korea Institute of Energy Research in **Daejeon**



Homepage: https://www.kier.re.kr

Ulsan

#### Fuel Cell Research & Demonstration Center in Buan



Function: Fuel cell demonstration and improving high reliability with world's top-tier fuel cell assessment facilities

#### Ulsan Advanced Energy Technology R&D Center in Ulsan



**Function:** Next-generation secondary battery, solar cell, hydrogen utilization R&D, in response to the local technological demand

#### Gwangju Clean Energy Research Center in Gwangju

#### Jeju Global Research Center in Jeju



Function: Land and sea energy convergence original technology, sector coupling R&D for locally specialized energy sustainability



**Function:** Eco-friendly secondary batteries and bio-energy R&D for sustainable energy paradigm shift