KERI

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Changwon-si, Gyeongsangnam-do,
Korea 642-120
TEL : +82-55-280-1114
FAX : +82-55-280-1216
www.keri.re.kr

Ansan Office

111, Hanggaul-ro, Sangrok-gu,
Ansan-si, Gyeonggi-do, Korea 426-170
TEL : +82-31-8040-4114
FAX : +82-31-8040-4099
www.medicenter.org

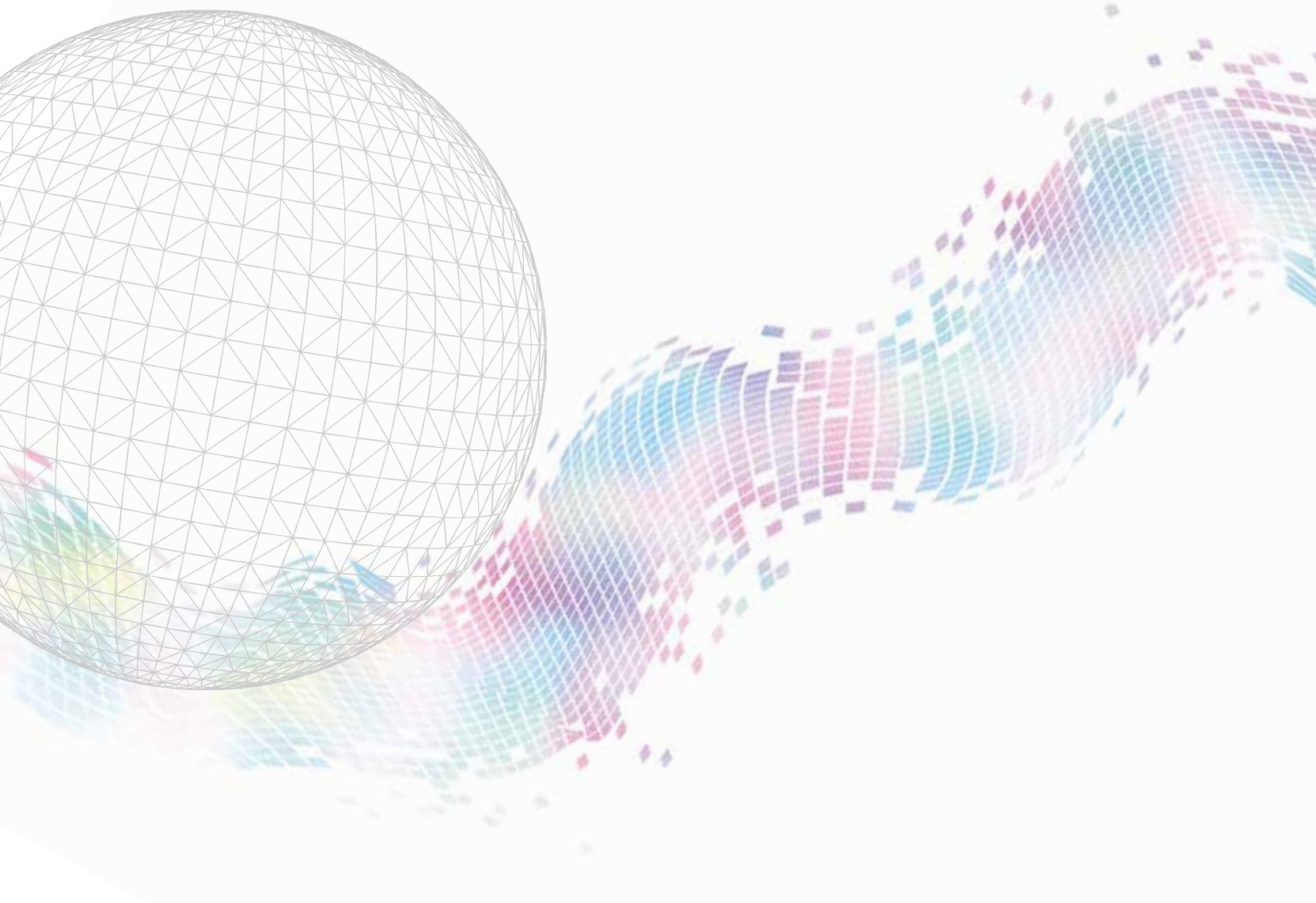
Uiwang Office

138, Naesonsoonhwan-ro,
Uiwang-si, Gyeonggi-do, Korea 437-808
TEL : +82-31-420-6105
FAX : +82-31-420-6029

KERI

Korea Electrotechnology Research Institute

First in Korea! Best in the World!

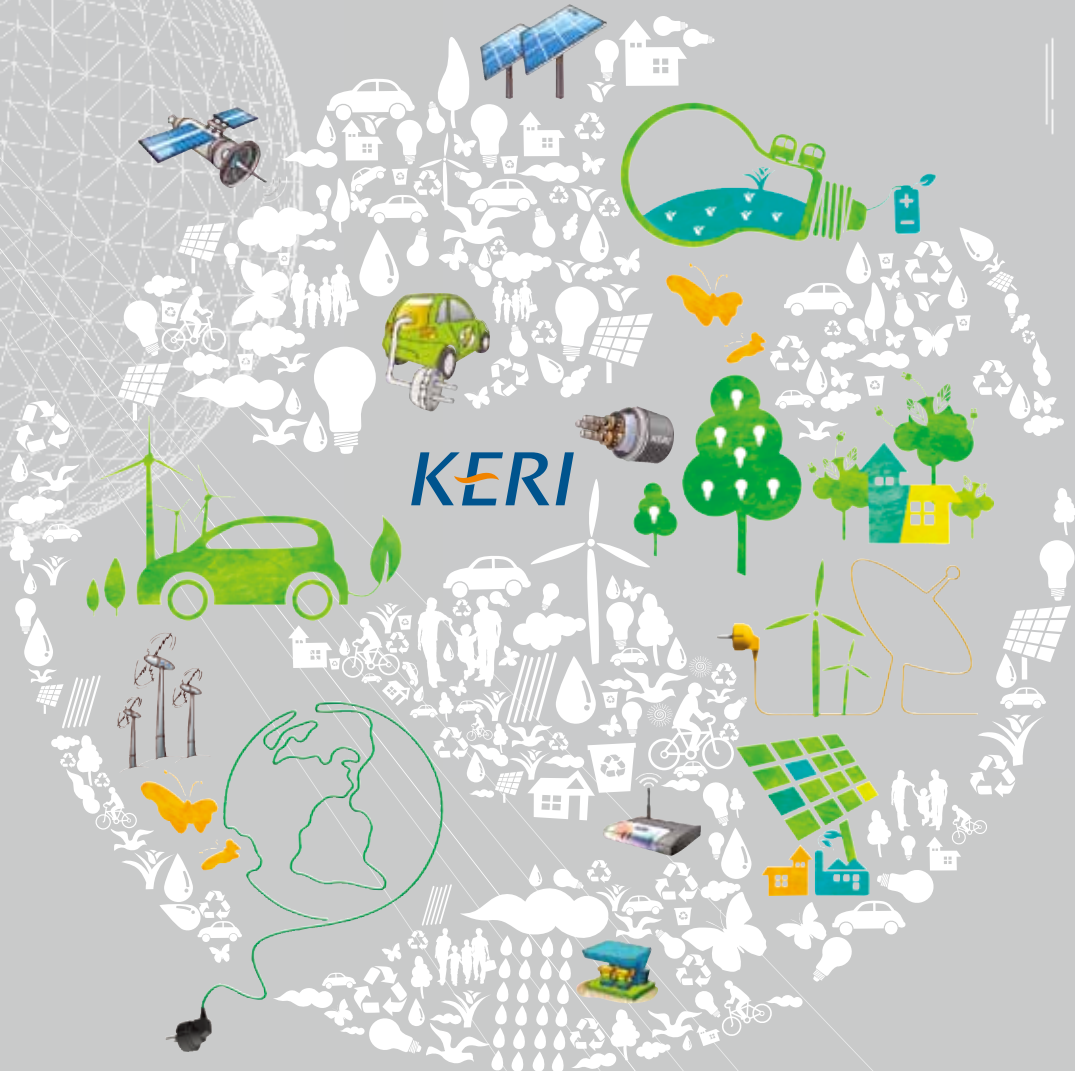


KOREA ELECTROTECHNOLOGY RESEARCH INSTITUTE

"Contributing to National and Industrial
Development through Electrical Technology"

KERI, A Proud Global Organization

KERI! The world's top research institute in the field of electricity


KERI

KERI! First in Korea, Best in the World

The Korea Electrotechnology Research Institute(KERI)is a government-supported research institute specialized in electrical engineering, with its main campus located in Changwon and branch campuses in Ansan and Uiwang, Gyeonggi-do.

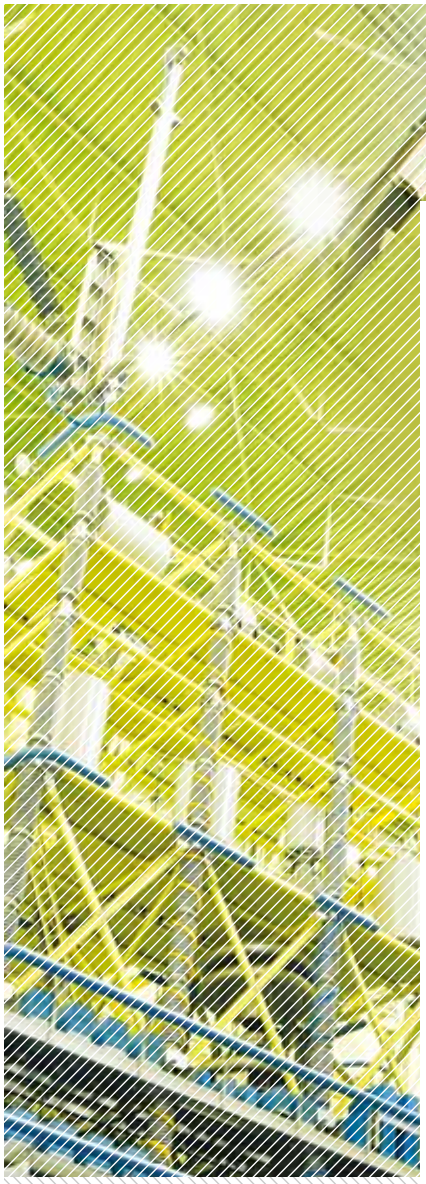
Since its foundation in 1976, KERI has made great contributions to the development of the national economy and quality of life improvements through research and development achievements in fundamental technologies for diverse fields including power plants, heavy electricity apparatuses, energy, new materials, superconductivity and electrical medical devices. KERI has also played a key role in improving domestic heavy electrical equipment industry export competitiveness, as one of top three testing and certification organizations in the world.

As president of KERI, my current focus is on my responsibility to ensure world-class R&D competitiveness by transforming each R&D department into small and strong R&D teams under "the First in Korea, Best in the World" slogan. With a strategic R&D target in low-carbon, high reliability and multidisciplinary technology, KERI is focused on the research and development of major technologies like advanced power grids, electrical propulsion, HVDC and testing & certification for heavy electrical equipment in its quest to become one of the top global research institutes.

KERI is producing public benefit in electrical supply and demand and usage, as well as supporting electrical industry at home and abroad based on this accumulated base of technology and achievements. KERI is contributing to Korea's economic development and its public welfare through continuing initiatives in creating new value. KERI is dedicated to fulfilling its social responsibilities, promoting scientific culture and supporting the improvement of local communities.

Thank you.

President, KERI
Korea Electrotechnology Research Institute



MISSION

The Korea Electrotechnology Research Institute(KERI) is a government-funded research institute, which has carried out a range of R&D since its foundation in 1976, into electrical technologies to benefit industry and the public. KERI disseminates technological information and transfers the industrial source, commercial and public-benefit technologies necessary for industry and the public at large. KERI provides testing and certification services for heavy electrical equipment manufacturers at home and abroad.

VISION & STRATEGY

Mission	Contributing to the Development of Nation and Industry through Electrical Technology Development
Vision	Entering the World Stage as an Electrotechnology Research Institute through Value Creation
Goal	Taking a Leading Role to Secure Top-Tier Original Technology and Helping to Develop a Smart Grid Society for Korea

Strategic Direction
Core Technologies

R&D

Low-carbon

- Advanced Power Grid Technology
- Electrical Propulsion Technology

High Reliability

- HVDC Technology
- Heavy Electrical Equipment Testing & Certification Technology

Convergence

- Medical Diagnostic and Treatment Convergence Technology
- Nano-based New Electrical Materials Technology

Manage-ment

Demand-oriented

- R&D Planning System Design
- Intensive Demand-oriented R&D
- Implementation of Customized Support System for Small and Medium-sized Businesses(SMIs)

Outcome-oriented

- Steady Foundation Construction
- Advanced Productive R&D System Building

Globalization

- Open R&D System Development
- Globalized Competent Personnel Recruit and Training

Communications

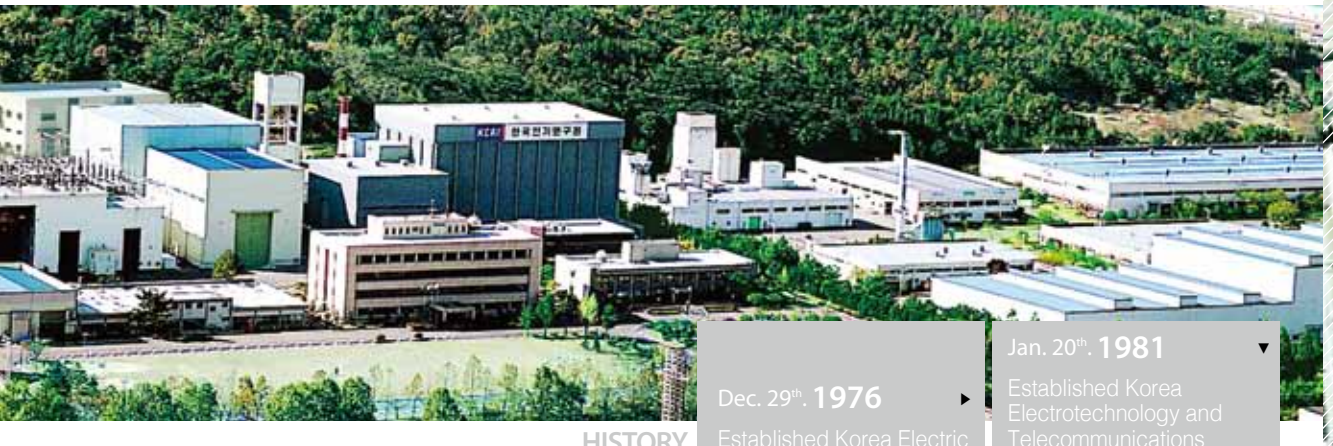
- KERI's Organizational Culture Implementation
- External Communications Strengthening
- Sustainable Innovative Management System Establishment

Core Values Creation · Innovation · Convergence

Slogan First in Korea, Best in the World

Organization

- President
  - Future Strategy Division
  - P.R. & Cooperation Department
- Auditor
  - Auditor Office
- Vice President for R&D
  - Advanced Power Grid Research Division
    - Smart Power Grid Research Center
    - Smart Distribution Research Center
    - Electrical Environment Research Center
    - Power Telecommunications Research Center
    - Electricity Industry Policy Research Center
  - HVDC Research Division
    - Power Conversion & Control Research Center
    - Power Apparatus Research Center
    - Power Semiconductor Research Center
    - Superconductivity Research Center
  - Electric Propulsion Research Division
    - Electric Propulsion Research Center
    - Electric Motor Research Center
  - Creative and Fundamental Research Division
    - Hybrid Nano Technology Research Center
    - Future Nano Fabrication Research Center
    - Creative Electrotechnology Research Center
  - Advanced Medical Device Research Center
  - Battery Research Center
  - RSS Center
- Vice President for Testing & Certification Services
  - High Power High Voltage Testing & Evaluation Division
    - High Voltage Testing Department
    - High Power Testing Department 1
  - Power Apparatus Testing & Evaluation Division
    - Electric Apparatus Testing Department
    - Smart Grid Testing Department
    - High Power Testing Department 2
  - Quality Certification Department
  - Conformity Assessment Team
  - High Power Laboratory Planning Division



HISTORY

Dec. 29th. 1976
Established Korea Electric Research and Testing Institute(KERTI)

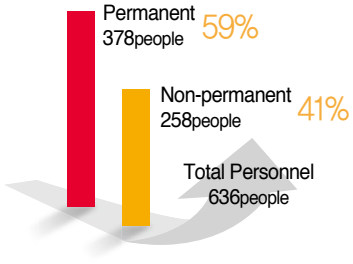
Jan. 20th. 1981
Established Korea Electrotechnology and Telecommunications Research Institute (KETRI)(Merged with Korea Telecommunications Research Institute)

Jan. 1th. 2001
Renamed Korea Electrotechnology Research Institute(KERI)

Jun. 17th. 1985
Established Korea Electrotechnology Research Institute

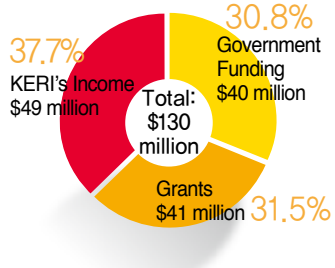
- **Planning & Coordination Division**
  - Management & Planning Team
  - Budget Team
  - Project Management Team
  - Performance Diffusion Team
  - Small & Medium Business Support Team
  - Knowledge & Information Service Team
- **General Administration Division**
  - General Affairs Team
  - Human Resource Development Team
  - Accounting and Financial Team
  - Procurement Team
  - Facilities Management Team
  - General Administration Team

PERSONNEL
(As of Apr. 2012)



Researchers 60%,
Engineers and Technicians 23%,
Administrative Staffs 17%

BUDGET
(Revenue of 2012)



KERI's Income 37.7%
Government Funding 30.8%
Grants 31.5%

KERI Makes a Better Future

For a Tomorrow Full of Comfort, Hopes, and Dreams.

KERI is dedicated to providing Hope and Comfort.
KERI will always be with you as we dream of a better tomorrow.

KERI INITIATIVES

- Advanced Power Grid R&D
- Electric Propulsion R&D
- HVDC R&D
- Advanced Medical Device R&D
- Creative and Fundamental R&D
- RSS Cooperative R&D
- Testing and Certification
- Battery R&D
- Inter-national Cooperation

Advanced Power Grid R&D

Climate change is the most challenging issue of the 21st century. The core smart grid business for low carbon environmentally sound development is designed to help reduce electricity consumption by up to 10% by 2030.

KERI is dedicated to research and development in a range of electrical power applications such as renewable energy based smart grid architecture, energy management systems, IT convergence telecommunications, electrical environment technologies and electricity industry policies including real time pricing, demand response and renewable portfolio systems.

Smart Power Grid Research

KERI's mission is R&D to produce advanced technology for the improvement of power system reliability and efficiency and to discover optimum solutions to promote low carbon environmentally sustainable development.

▸ Major Research Initiatives

- Enhancement of power system security and efficiency improvement for the national grid
- Utilization of expertise in energy management system development and wide area monitoring protection and control(WAMPAC)
- Establishment of an electric power grid and micro-grid system with renewable/distributed resources and storage
- Provision of unique analysis and measurement tools, and solutions to facilitate innovative technologies for an advanced smart electric power grid

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Electrical Environment Research

With an increased demand for more comfortable living conditions and recently tightened regulations on electromagnetic fields(EMF) and improved protective device durability against electromagnetic pulses(EMP), the development of technological solutions and countermeasures has emerged as the most vital task in the electrical industry.

▸ Major Research Initiatives

- EMP/EMI/EMF technologies including the development of environmentally friendly technology for HVDC/HVAC transmission lines, power plants and substations, and power facilities for new and renewable energy
- Lightning surge protection design and lightning arrester technologies
- EMF exposure-reducing technology, etc.

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Smart Distribution Research

Smart Distribution research focuses on developing design, control and operation technologies for Smart-Grid Distribution and Customer Systems to be put into practical and commercial use.

▸ Major Research Initiatives

- Application and performance test of renewable energy systems
- Energy storage systems(ESS) applications into distribution and customer systems
- Design, control and operation of Grid-tied/Stand-alone MicroGrid systems
- Design and analysis of smart distribution grid including DC networks

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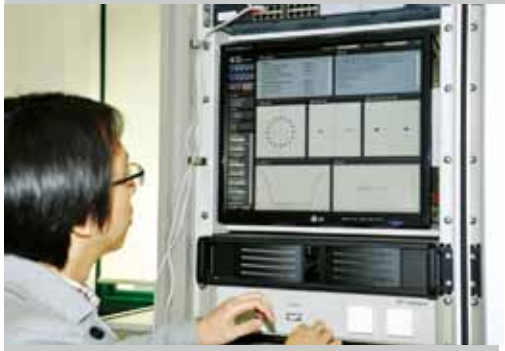

Power Telecommunication Research

KERI has developed integrated energy and communication network technologies like smart grid ICT, intelligent power telecommunication networks and broadband convergence networks for the smart power grid.

▸ Major Research Initiatives

· Smart grid ICT and energy web systems
· Smart energy home grids / Home area networks
· Next generation power line communications technology
· Industrial wired / wireless signal sensing & application technology

Tel : +82-31-8040-4121, E-mail : wtlee@keri.re.kr

Electricity Industry Policy Research

KERI has taken the lead in electricity and renewable energy policy R&D for system planning, rate design, demand response, project F/S and RPS(Renewable Portfolio Standards).

▸ Major Research Initiatives

· Electricity supply and demand analysis
· Demand Side Management(DSM) evaluation and Demand Response(DR) program design
· Real Time Pricing(RTP) design and market analysis
· Renewable energy policy and system development
· Power plant project feasibility study and business modeling

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Homepage : www.eprc.re.kr

HVDC R&D

Given the rapid growth of renewable energy in power grids and the necessity of grid interconnections between countries and continents, the deployment of reliable long-distance power transmission technology is currently in high demand for power systems. The government is also considering the adoption of HVDC transmissions in the grid to prevent possible blackouts by stabilizing supply and demand in the electricity market. HVDC transmissions are thus one of key technologies for the improvement of today's power systems.

KERI is working hard to obtain competitive technologies for the highly reliable power conversions, power apparatuses, high power semiconductor and superconducting power lines for HVDC transmission.

Power Conversion & Control Research

KERI has been researching new areas including power conversion devices for HVDC, innovative new power transmission technology, renewable energy, grid-connected PCS, and control systems for industrial equipment.

▸ Major Research Initiatives
- 100MW(±250kV, 200A) Modular Multi-level Converter for HVDC
- Power Conversion System for Renewable Energy and Smart Grids
- Core Technologies for DC Distribution
- Control Systems for Industrial Equipment

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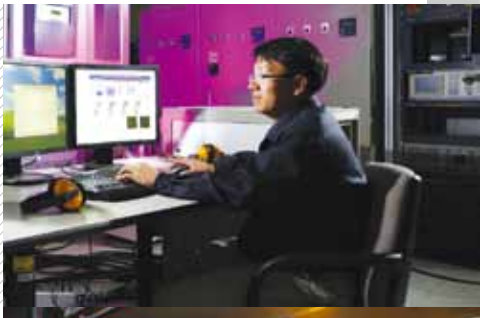

Power Semiconductor Research

KERI has developed power discrete semiconductors and power integrated circuits(ICs) to improve the energy efficiency of the electric and electronic systems including power transmission, electric vehicles, and diverse power electronic systems for industry applications.
KERI is presently developing semiconductors with less power dissipation and high-quality electrical characteristics.

▸ Major Research Initiatives
- High voltage and high power semiconductors based on silicon and silicon carbide materials(600V~20kV)
- Power ICs for smart and energy-efficient electric/electronic systems

Tel : +82-55-280-1603, E-mail : nkkim@keri.re.kr

Power Apparatus Research

In order to develop the power apparatuses with low-carbon, high-reliability and fusion technology, it has concentrating its energy on the development of the optimization design, the prediction of capability and the CMD (condition monitoring and diagnosis) technologies.

▸ Major Research Initiatives
- Design & Performance Verification Technologies
- Diagnosis & Life Estimation Technologies for Power Apparatuses
- Design Technology for HVDC Circuit Breakers
- Diagnosis Technologies for the Power Facilities of Renewable Energy Source and so on.

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Superconductivity Research

Nowadays, the world is confronting the crisis of environmental pollution symbolized by the climatic change and an exhaustion of natural resources represented by expensive oil prices. The superconductivity which is technologies of low loss, high efficiency and environment-friendly will contribute to these crises overcome. For this purpose, we are going to develop superconducting technologies focused on generation, transmission and storage.

▸ Major Research Initiatives
- High Temperature Superconducting(HTS) power cables
- Superconducting generators and motors
- Superconducting Magnetic Energy Storage(SMES)
- High field superconducting magnets
- Superconducting wires and more

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Electric Propulsion R&D

Electric Propulsion Research is aimed at developing high efficiency, high power and high speed next generation electric motors and propulsion systems. Research currently covers electric vehicles(including infrastructure), electric ships, pulsed power, electric projectiles, electric motors, motor drives, special generators/controllers, magnetic levitation and magnet applications.

Electric Propulsion Research

KERI is developing eco-friendly electrical technology for people and the environment. Finalized R&D results will be transferred to industry for commercialization.

▸ Major Research Initiatives

- Electric propulsion technology for transportation (Highspeed trains, EV)
- Chargers and infrastructure for EVS, electric energy storage, and smart- grid(Vehicle to Grid) technology
- Pulsed power supplies for electric and electro-magnetic propulsion
- High voltage power supply for industry applications
- Ultra wide band pulsed power sources in the nano-second range
- Electro-magnetic shock generators for medicine & bioengineering
- High frequency plused power generators based on semiconductor

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Electric Motor Research

KERI is focused on developing high power, high efficiency, high speed, and high precision electric drive systems.

▸ Major Research Initiatives

- High efficiency and high speed motors and motor systems
- Highly efficiency premium-class induction motors
- Magnetic levitation
- High power, high torque transverse motors
- Industrial motor system platforms(high and low speed motors, high torque DD systems)
- Special generators

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Creative and Fundamental R&D

In the 21st century, radical progress is being made in the IT industry based on semiconductor technologies. Korea should thus establish a low-energy, low carbon society to aid with energy security and environmental preservation. To achieve such a goal, KERI has endeavored to find new ways to use efficient, environmentally friendly technologies through the application of advanced electrical materials and devices based on nano science and technology, including hybrid nano-materials, with aid of computer simulation technologies, carbon-related nano-materials and devices, and nano-scale imprint technologies.

Nano Hybrid Technology Research

KERI is developing next-generation nano-hybrid materials and devices for electronic and electric applications.

▸ Major Research Initiatives

- Highly transparent and conductive materials based on CNT and Graphene for flexible displays, solar cells, etc.
- High performance transparent conductive film technologies based on nano-carbon materials for thin film transistors, etc.
- TCO-free and highly flexible dye sensitized paper solar cells with TiO_2 fiber felt
- Synthesis of high purity ceramic sol materials for multi-purpose nano-hybrid materials
- Multi-purpose coating materials made from thermoset resins and ceramic sol materials

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Nano process research

KERI focuses on the development of cylindrical mold fabrication technology for large area nano imprint applications, to open new prospects in the display and printed electronics industries.

▸ Major Research Initiatives

- Nano-scale control technology for magnetically levitated stages
- Electron-beam nano-lithography on magnetically levitated cylindrical imprint molds
- Plasma etching technology for nano-patterns on cylindrical imprint molds
- Application technologies utilizing nano-patterns on cylinder molds

Tel : +82-55-351-3870, E-mail : hallo_oh@keri.re.kr

Creative Electrotechnology Research

KERI is set to be a world leader in thermoelectric power generation technology by developing materials, devices and systems through its use of advanced computer calculation and nano-process technologies.

▸ Major Research Initiatives

- Advanced solid state energy conversion technology based on thermoelectric phenomena
- Development of high performance nano-domain embedded thermoelectric materials through computer calculations
- Development of high efficiency thermoelectric power generation modules
- High performance thermoelectric power generation systems for industrial & vehicle waste heat recycling

Tel : +82-55-280-1636, E-mail : john@keri.re.kr

Advanced Medical Device R&D

KERI is striving to become a world leader in innovative medical science and engineering for future health care to improve public safety and quality of life. It has likewise been collaborating with hospitals and businesses to accelerate interdisciplinary medical device research and development.

▸ Major Research Initiatives

- Next generation digital medical imaging diagnostic systems for early cancer detection
- Digital X-ray sensor, Carbon nano-tube(CNT) based X-ray sources, Radiation therapy systems
- Laser induced fluorescence and interference diagnostic systems, U-health systems, Biomedical optics
- THz wave diagnostic and E-beam projection technology
- Wireless power delivery systems for medical and industrial applications

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Battery R&D

Battery applications have become increasingly diversified from use in children's toys to space shuttles. Advanced battery technology is therefore in high demand in all areas on the consumer level, the national level and even for military applications. KERI has been developing new battery and capacitor materials, battery and battery module management systems and advanced batteries for energy storage and electric vehicles including portable electro-communications devices.

▸ Major Research Initiatives

- Secondary batteries, capacitors and metal-air batteries
- New-concept rechargeable batteries
- Battery design, fabrication, module and pack development
- Performance evaluation and certification
- International standards& battery evaluation methods

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RSS Cooperative R&D

Russia Science Seoul(RSS) is carrying out research in bio medical and laser technology opto-electrical areas, based on electrical and electronic techniques and manufacturing commercial systems. The work is being done in cooperation with Russian research institutes and universities including S. I. Vavilov State Optical Institute, Ioffe Physical Technical Institute, Saint Petersburg State University, Moscow State University and Saint Petersburg State Medical University, which have outstanding fundamental technologies in the areas of medical images, lasers, aero-space and basic science.

▸ Major Research Initiatives

· Development of combined systems with cutting edge medical image devices and light sources
· Development of high-power femto second lasers and green processing systems

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Testing and Certification Services

KERI has provided customers worldwide with testing, certification and inspection services for electrical equipment, ranging from low to extra high voltage as an independent third-party testing and certification body in compliance with ISO/IEC. KERI provides these services in premium testing facilities, and are now globally recognized as a testing and certification body for technical capability according to international standards. KERI is accredited by the Korea Laboratory Accreditation Scheme(KOLAS), which signed the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement(ILAC-MRA) in the scope of heavy electric equipment. Furthermore, KERI is globally accepted as a KAS product certification body, a regular member of the Short-circuit Testing Liaison(STL) group, an IECEE certification body and a product certification body with ACCREDIA of Italy. KERI's test reports and certificates are accepted by a host of member nations around the world as well as the Korean market.

Electric Apparatus Testing Services

▸ **Changwon** (Main Office)
Switchgears and controlgears, Circuit-breakers, Switches, Dis-connectors and Earth Switches, Power transformers, Fuses, Cables, Surge arresters, Insulators/Bushings, Motors, PV inverters, Batteries, and more

· High voltage testing
Tel : +82-55-280-2401
E-mail : hvl@keri.re.kr

· High power testing
Tel : +82-55-280-2402
E-mail : hpl@keri.re.kr

· Product certification
Tel : +82-55-280-2403
E-mail : cert@keri.re.kr

▸ **Ansan · Uiwang** (Gyeonggi Office)
Switchgears and control gears, Circuit-breakers, Switches, Power transformers, Miniature-fuses, Insulators and Bushings, Current transformers and Potential transformers, Smart-Grid devices, Protective relays, Watt meters, Surge protective devices, EMC, Material analysis and more

· Electric apparatus testing
Tel : +82-31-8040-4401
E-mail : gad@keri.re.kr

· Smart-Grid devices testing
Tel : +82-31-8040-4402
E-mail : gad@keri.re.kr

· High power testing
Tel : +82-31-420-6007
E-mail : gad@keri.re.kr

Testing Services

Test Types

- Pre-service inspection of electrical facilities for private use according to domestic electric business laws
- Routine tests to guarantee the electric apparatus performance for manufacturers and purchasers
- Verification of whether or not the performance of newly developed products meet specific standard requirements such as IEC standards(Type, KS and national safety marks, KAS certification, STL certification, IECEE CB certification)
- Evaluation of product or important parts performance in accordance with a specific standard or specifications submitted by the manufacturer

Certification & Inspection Services

Product Certification Body

The product certification system comprises the procedures for a third party product certification body to assure that products, processes and services meet specific requirements through documentary evidence.

▸ ACCREDIA Product Certification Body(Changwon)

KERI is a third party product certification body for electric equipment accredited by ACCREDIA, an Italian recognition organization. Certificates of product type conformity are now issued in accordance with ISO/IEC Guide 65.

PRD N° 071B
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

▸ KAS Product Certification Body(Changwon and Ansan)

KERI has been accredited by KAS(Korea Accreditation Scheme) as a third-party product certification body for electrical equipment. Based on this accreditation, KERI can issue product certifications and documents which assure product type conformity. Our certification scheme provides KERI-LV, KERI-HV and also KERICERT/3 in accordance with the ISO/IEC Guide 65.

Tel : +82-55-280-2403, E-mail : ktlee@keri.re.kr

KOLAS Inspection Body (Ansan)

KERI has been accredited by the Korea Laboratory Accreditation Scheme(KOLAS)as an inspection body. KERI can issue type approval certification and watt meter inspection reports under Korean measurement laws.

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IECEE Certification Body(Ansan)

KERI has been designated as part of the IEC system of Conformity Assessment Schemes for Electrotechnical Equipment and Components(IECEE), the National Certification Body(NCB), and the CB Testing Lab(CBTL). KERI can issue globally recognized CB Testing Certifications within the scope of 47 IEC standards in 5 categories such as Circuit-breakers, Switches, Fuses, CT/ PT and EMC.

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International Cooperation

Japan	CRIEPI, Nagaoka University of Technolog, APERC
Netherlands	KEMA
Viet Nam	STAMEQ
Cambodia	EDC
The USA	UCLA University, LBNL, EPRI, ORNI, EEI, MAXWELL, ITT
Russia	IPERCA , ESI , VOSTOKENERGO, HCRI , HVRI , VEI , NIIEFA , SOI
China	SEPTRI , IFP , IEPE , EPRI, PERI, WHVRI, XIHARI
India	CERI , CEPRI
Poland	LODZ Univ., TEOL
Germany	TRIER(Univ. of Applied Science in Trier), ITEP
Romania	IMT , ICPE-CA , PUB

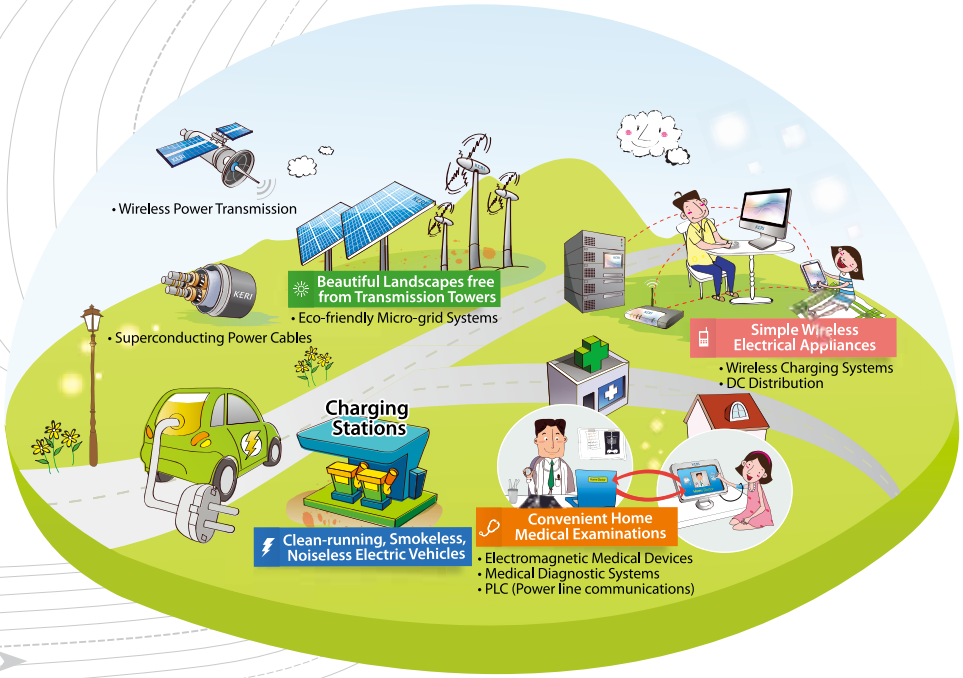
A Proud Global Organization

KERI! The world's top research institute in the field of electricity

KERI
Best Achievements

1. Korea Distribution Automation System (KODAS)
2. Nuclear Reactor Power Control and Rod Control System
3. 765kV Electric Facilcty
4. Korea High Speed Train Electrical System Engineering
5. Superconducting Wires & Equipment
6. Korea Energy Management System(K-EMS)

KERI Best Achievements



Implementation of KERI's Achievements for the Community and the Future