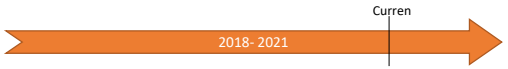
Country	Institute	Category	Related programs (with short summary)	Funding resource	Target / Goal Outcome	Lead person / Organization	Partnership (if any)	Related information
Korea	KIER	PV	Prosumer-Type Next-Generation Solar Cell Technology for Urban Application 	KIER	1) High-efficiency Si/Perovskite tandem solar cell/ conversion efficiency >35% by 2025 2) Light-weight flexible CIGS compound thin-film solar cell/ power-to-weight >100W/kg by 2025	Jae Ho Yun, Ph.D. / KIER	(Domestic) KAIST, DGIST, UNIST, Korea Univ., Hanbat Natl. Univ., Ewha Womans Univ., Hanyang Univ., Chonnam Natl. Univ., KHNP, Seoul Energy Corp., Shinsung E&G, Hanwha Solutions, Hyundae Energy Solutions, etc. (US) Univ. Delaware, etc.	
		Wind	Offshore-wind farm optimal design for high efficiency 	KIER	LCOE reduction >10% by low-cost O&M technol	Sung-jo Kwak, Ph. D. / KIER	(Domestic) Doosan Heavy Industries & Construction, Hyosung Heavy Industries, Unison Co., Ltd, Hanjin Ind Co., Ltd	
		Energy Integration	Plus-Energy Community Platform based on Renewable Energy for Urban Power Generation 	KIER	100% energy self-sufficiency rate and 50% self-consumption rate through operation of a demonstration platform for a plus-energy community	Kyoung-ho Lee, Ph.D. / KIER	(Domestic) KOLON Global (US) FREE, Univ. Delaware, etc.	
		Utilization	Forecasting and Nowcasting Renewable Energy Variability based on Satellite Imagery 	KIER	Integrated System Performance Model Error Rate < 10%	Hyun-goo Kim, Ph.D. / KIER	(Domestic) Seoul Natl. Univ., Korea Univ., Chungnma Natl. Univ., Dongkuk Univ., KPX, KMA (US) UCSD CER	

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Korea	KIER	EMS with Batteries	Next-Generation Secondary Batteries for Fast-Charging EV and Grid-Scale ESS 	KIER	1) High-energy density (400Wh/kg) all-solid state secondary battery by 2025 2) High-capacity (85 Ah/L) Redox-flow couple material by 2025	1) Jeong-gu Yeo, Ph.D./ KIER 2) Kyoung-hee Shin, Ph.D./ KIER	(Domestic) Teratechnos, Schunk Carbon Technology, Daeyoung Chaevi, Dpeco, Misumsystech, Chungnam Nat'l Univ., KITECH (US) Harvard University	
			Cyber Physical System Technologies to Interconnect Distributed Energy Resources for RE3020 	KIER	Distributed Resource Control Achievement Rate 95%	Suyong Chae, Ph.D. / KIER	Domestic) Semyung University, Polytechnic University	

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Korea	KIER	Production	Design of pressurized modular high-purity hydrogen production unit 	KIER	Reforming unit : 500kg/day Hydrogen production efficiency (HHV) : 80% Purity : 99.999%	Wang Lai Yoon, Ph.D. / KIER	Domestic) Korea University, Chungnam Universtiy, Yunsei Universtiy	
			Design of large-scale water electrolysis cells and stack under dynamic operation 	Ministry of Science and ICT	H2 production rate: 3 Nm3/h energy consumption (stack) < 49.25 kg-H2, H2 production efficiency (HHV) > 80%, dynamic operating range: 5 ~ 150 %	Chang-hee Kim, Ph.D. / KIER	(Domestic) Gwangju Institute of Science and Techonology, Pohang University of Science and Technology, Dankook University, Korea Institute of Industrial Technology, Inha University, Sejong University (International) University of Notre Dame, University of Scouth Carolina	
			Development of large-scale reversible-solid oxide electrolysis cell (r-SOEC) system using wastes-fueled boiler system 	Ministry of Science and ICT	H2 production rate: 15 Nm3/h, hydrogen production efficiency (HHV) > 95%, operating temperature: 700 ° C	Sang-kuk Woo, Ph.D. / KIER	(Domestic) Korea Institute of Machinery and Materials	
		Transportation /Storage	Development of carbon emission-free ammonia synthesis technology 	KIER	NH3 synthesis rate : 90 ℓ/m2h Faradaic efficiency : 25% NH3 synthesis : 0.5 kg/day	Hyung-chul Yoon, Ph.D. / KIER	(Domestic) Chungnam National University	
		Utilization	Development of low-cost high-performance core materials for building application fuel cells 	KIER	Development of core materials for fuel cells (PEMFC & SOFC) MEAs including hydrocarbon-type electrolyte membrane, core-shell catalyst, electrodes, cell components and also scale-up processes	Gu-Gon Park, Ph.D. / KIER		

Country	Institute	Category	Related programs (with short summary)	**Funding resource**	Target / Goal Outcome	Lead person / Organization	Partnership (if any)	Related information
Korea	KIER	CCUS	CCS Overseas Demonstration and Development of Core Technology Project 	KIER	1 ton-CO2/day full chain CCS Demonstration (Reboiler heat duty ≤ 2.0 GJ/ton-CO2, CO2 recovery ≥90%)	Dr. Yeoil Yoon / KIER	(Domestic) Chungnam National University, Korea South-East Power Co. (US) Talen Energy	
Korea	KIER	CCUS	Development of the Fundamental Technology for CCUS Project 	KIER	Development of future innovative CO2 capture sorbent (Regeneration energy ≤ 1.5 GJ/ton-CO2) Low-power catholyte-free electrochemical conversion (Power usage ≤ 3 kWh/kg-CO2)	Dr. Young Cheol Park, Dr. Ki-Tae Park / KIER		
Korea	KIER	CCUS	Development of a Moving-bed Continuous Process for Post-combustion CO2 Capture Capable of Reducing Regeneration Energy Project 	KIER	□ For silica-PEI, to reduce regeneration energies to approaching 2 GJ/tonne of CO2 through pilot-scale testing of formulations containing additives to enhance the kinetics of CO2 desorption and dynamic capture capacity, minimize oxidation and moisture co-adsorption. □ Optimise the preparation of PIF-derived activated carbon granules or pellets having approximately 0.5 mm diameter with sufficient attrition resistance for process	Dr. Young Cheol Park / KIER	(UK) University of Nottingham	

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Korea	KIER	Clean Coal Technology	Development of clean fuel and high value-added technology for coal syngas 2017 - 2021 (R&D span) Curren	KIER	Development of Integrated Chemical Material Design and Operation Technology Using Synthetic Gas Produced in Gasification Process		