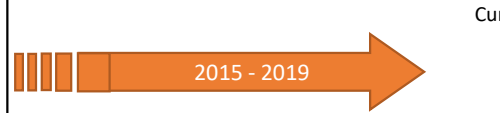
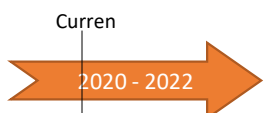


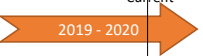


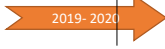
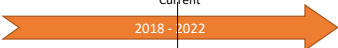







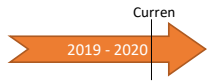




Country	Institute	Category	Related programs (with short summary)	Target / Goal Outcome	Lead person / Organization	Partnership (if any)	Related information
Japan	AIST	Photovoltaics / Devices	International Joint Research Program for Innovative Energy Technology / Research and development of high efficiency and low-cost solar cells using single-crystal CIGS and smart stacked multijunction technologies [2015-2019] 	Cost reduction of module power generation to 7 yen / kWh in 2030. Development of high efficiency solar cells with the conversion efficiency of over 30%.	Dr. SUGYAYA Takeyoshi / AIST	(Domestic) Universities, Private companies (US) National Renewable Energy Laboratory (Germany) Fraunhofer Institute for Solar Energy Systems (Germany) Helmholtz-Zentrum Berlin (HZB) (Switzerland) Swiss Federal Laboratories for Materials Science and Technology (EMPA)	
		Photovoltaics / Devices	Development of Technologies to Promote Photovoltaic Power Generation as a Primary Power Source / Research and Development of ultra high efficiency solar cell modules using multijunction technologies [2020-2022] 	Cost reduction of module power generation to 7 yen / kWh in 2030. Development of high efficiency solar cells with the conversion efficiency of over 35%.	Dr. SUGYAYA Takeyoshi / AIST	(Domestic) Universities, Private companies The Univ. Tokyo, Toyota Technological Institute, Univ. Miyazaki, Taiyo Nippon Sanso co., Sharp co., Idemitsu Kosan	
		Photovoltaics / Devices	Research and Development Program for Promoting Innovative Clean Energy Technologies Through International Collaboration / International collaborative R&D for low-cost and high-durability solar cells [2020-2023] 	Development of (i) novel passivating contact materials for Si, and (ii) quantum-dot hybrid perovskites, enabling low-cost and high-durability perovskite/Si tandem solar cells.	Dr. MATSUI Takuya / AIST	(Domestic) Nagoya Univ. (France) CEA-Liten	

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Japan	AIST	Battery	International Joint Research Program for Innovative Energy Technology / Development of Lithium-ion battery with high performance for severe temperature conditions [2015-2019] 	Development of novel Li-ion battery compatible with safety and performance under the severe temperatures. Degradation mechanisms in the batteries at low temperature was clarified by electrochemical and synchrotron X-ray analyses.	Dr. ASAKURA Daisuke, Dr. HOSONO Eiji / AIST Dr. SONE Yoshitsugu / JAXA	(Domestic) JAXA, Nagaoka Univ. Tech., Univ. Tokyo, KEK (International) LBNL, NREL, SLAC, JRC, DLR, ESTEC/ESA, NASA, Utrecht Univ., CEA-liten	
			Analyzing the Reactions of Electrolyte and Cathode in a Lithium/Sulfur- and Lithium/Metal Sulfide Battery [2019-2020] 	Understanding of the conversion reactions in lithium/sulfur (Li/S) and lithium/metal sulfide (Li/MxSy) batteries and to expand them.	Prof. Dr. Martin Winter / MEET Battery Research Center Prof. OSAKA Tetsuya / Waseda Univ.	(Domestic) Waseda Univ., Tohoku Univ. (Associate partner) (International) Münster Electrochemical Energy Technology (MEET), Dresden Univ. Tech., Forschungszentrum Jülich GmbH	
			Research and Development Program for Promoting Innovative Clean Energy Technologies Through International Collaboration / Metal-free redox flow battery for introduction of renewable energies into the grid [2020-2023] 	Development of high performance and low cost redox free batteries to provide large-scale storage on the power supply side.	Dr. HOSONO Eiji / AIST	(Domestic) Kyushu Univ. (International) CNR-ITAE	
			Enabling the manufacturing of advanced solid-state batteries 	This project has the overall objective to unlock the challenges related to the materials and manufacturing processes of solid-state batteries by investigating a number of innovative technologies to produce advanced SSEs from both inorganic and polymeric materials.	Dr. Alexis Laforge /NRC Dr. AKIMOTO Junji /AIST	(International) Natural Resources Canada-NRC, Blue Solutions, University of Sherbrooke	https://nrc.canada.ca/en/research-development/research-collaboration/programs/vehicle-propulsion-technologies-program

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Japan	AIST	Production	Advancement of Hydrogen Technologies and Utilization Project / Research and development of hydrogen production technology by thermal decomposition of methane [2019-2020] Current 	Feasibility study on production of hydrogen and solid carbon by methane decomposition	Dr. TAKAGI Hideyuki / AIST	(Domestic) NEDO, IHI, Kyoto Univ.	
			Lead research and development project for hydrogen utilization technology / Research and development of basic technology for advanced water electrolysis technology for hydrogen production/Advancement of alkaline and polymer-electrolyte water electrolysis [2018-2022] Current 	Formulation of guidelines and establishing the evaluation methods for electrolyte performance, durability characteristics and hydrogen production system to deliver hydrogen at 30 yen/Nm3 at production end	Prof. MITSUSHIMA Shigenori / Yokohama Natl. Univ..	(Domestic) Yokohama Natl. Univ., AIST, Kyoto Univ., Osaka Pref. Univ., Tohoku Univ., Ritsumeikan Univ., De Nora Permelec Ltd	
		Transportation /Storage	NEDO Feasibility Study Program / Development of CO2 conversion based on transition metal catalyst [2019-2023] Grant-in-Aid for Scientific Research / Development of efficient and durable catalyst for hydrogen production from formic acid-[2020-2022] Current 	Development of a catalyst for high-pressure hydrogen production from formic acid and methanol production from CO2 at lower temperature (< 100 °C).	Dr. HIMEDA Yuichiro / AIST	(Domestic) JST, NEDO, Osaka University, Tokyo Univ, TYTLABS (International) BNL, PNNL, EPFL, KAUST, Leibniz Institute for Catalysis, Dalian University of Technology	
			Development of Technologies for Realizing a Hydrogen Society / Approach to the Development of P2G System Technology Aiming to Build a CO2-Free Hydrogen Society in Yamanashi Prefecture [2016-2021] Current 	•Development of hydrogen storage materials and tank system for power to gas system.	Mr. SAKAMOTO Masaki / Yamanashi prefecture	(Domestic) Yamanashi prefecture, Subcontracting members: JSW, AIST	NEDO Leader of AIST's project: Dr. NAKAMURA Yumiko
			Cross-ministerial Strategic Innovation Promotion Program (SIP) / Energy carriers / Development of Ammonia Synthesis Process from CO2 Free Hydrogen [2014-2018] Current 	Development of high-efficiency ammonia synthesis process from CO2-free hydrogen produced from renewable energy or fossil fuel	Mr. FUJIMURA Yasushi / JGC Corporation	(Domestic) JST, JGC, JGC C&C, Numazu College, Hokkaido Electric Power, Osaka gas	https://www.jst.go.jp/sip/pdf/SIP_energycarriers2015_en.pdf
		Utilization	Advanced Evaluation and Analysis Technology on Degradation of SOFC Stacks [2020-2024] Current 	Development of Diagnostics for Long-term and High efficient SOFC stacks for 130,000 hours life time with 65% LHV Efficiency	Dr. HORITA Teruhisa / AIST	(Domestic)NEDO, Kyocera, Morimura SOFC, Denso, Aisin-Cosmos Corp., Osaka Gas M., Toho Gas, Tokyo Gas, CRIEPI, Univ. Tokyo, Kyoto Univ., Tohoku Univ., Kyushu Univ.	
			Development of Technologies for Hydrogen Refueling Stations / Development of novel thermochemical hydrogen compressor using high pressure metal hydride [2020-2023] Current 	Development of novel thermochemical hydrogen compressor pressurizing to 80MPa	Dr. SAKAKI Kouji / AIST	(Domestic) JMC	NEDO

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Japan	AIST	Artificial Photosynthesis, Solar Chemicals, Solar Fuels	Japan Society for the Promotion of Science / Production of useful chemicals using solar energy [2017-2022] 	Proposal and demonstration of cost effective artificial photosynthesis technologies using solar energy	Dr. SAYAMA Kazuhiro / AIST	(Domestic) Universities, Private companies (US) Brookhaven National Laboratory	
		Methanation	Development of Technology for Next Generation Thermal Power Generation Project / Development of Basic Technology for Next Generation Thermal Power Generation (Development of CO2 Utilization Technology) [2017-2020] 	Extraction of technical issues and providing possible solutions for realizing a 400 Nm3/h methanation plant	Dr. SAKANISHI Kinya / AIST	(Domestic) NEDO, INPEX Corporation, Hitachi Zosen Corporation, Nagoya Univ.	
		Power to X	Development of Technology for Next Generation Thermal Power Generation Project / Cutting-Edge Research for Development of CO2 Utilization Technology (Electrochemical Direct Decomposition of CO2)[2019-2020] 	Development of high efficiency advanced methane-base fuel synthesis technology with solid oxide co-electrolysis cells	Dr. KISHIMOTO Haruo / GZR, AIST	(Domestic) NEDO, Osaka gas Corporation	

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Japan	AIST	Thermoelectrics	Research and Development Program for Promoting Innovative Clean Energy Technologies Through International Collaboration / International joint research for advanced thermoelectric devices and metrology [2020-2023] Curren 	Development of high-efficacy thermoelectric devices and high-accuracy evaluation systems	Dr. OHTA Michihiro / AIST	(Domestic) Kyushu University (France) CEA LITEN, CNRS-Laboratory CRISMAT (Germany) German Aerospace Center (DLR) (Korea) KERI	
		Power electronics	Research and Development Program for Promoting Innovative Clean Energy Technologies Through International Collaboration / Development of innovative solution growth technology that improves productivity and quality of SiC crystals [2020-2023] Curren 	Novel SiC crystal growth technology that simultaneously achieve high growth speed (in the order of mm/h) and suppression of surface roughening and defect formation (high quality)	Dr. MITANI Takeshi / AIST	(Domestic) Univ. Tokyo, Tohoku Univ. (France) CNRS-SIMaP	