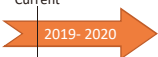
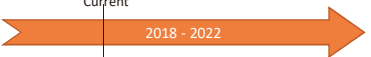






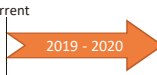

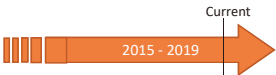
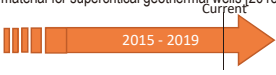




Country	Institute	Category	Related programs (with short summary)	Target / Goal Outcome	Lead person / Organization	Partnership (if any)	Related information
Japan	AIST	Production	Advancement of Hydrogen Technologies and Utilization Project / Research and development of novel hydrogen production technology by thermal decomposition of methane [2019-2020] Current 	Feasibility study on production of H2 and solid carbon by methane cracking	Dr. Hideyuki Takagi / AIST	(Domestic) NEDO, IHI, Kyoto Univ.	https://www.aist.go.jp/index_en.html
			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. Shigenori Mitsushima / Yokohama Natl. Univ..	(Domestic) Yokohama Natl. Univ., AIST, Kyoto Univ., Osaka Pref. Univ., Tohoku Univ., Ritsumeikan Univ., De Nora Permelec Ltd	
		Transportation /Storage	International Joint Research Program for Innovative Energy Technology / Hydrogen production and storage technology using CO2 -development of clean hydrogen carrier system using CO2 recycling technology--[2015-2019] Current 	Development of a catalyst for practical application that can generate hydrogen from formic acid with a hydrogen production rate (1m3/h H2/g metal), having durability of 2000 h at 70 MPa.	Dr. Yuichiro Himeda / AIST	(Domestic) JST, Osaka University (International) BNL, PNNL, EPFL	
			International Joint Research Program for Innovative Energy Technology / Development of hydrogen storage & utilization system with high efficiency & low cost for CO2-free hydrogen society [2016-2019] Current 	Proposal for high density hydrogen storage and effective utilization system using nano-structured hydride and intermediate temperature fuel cell	Dr. Kouji Sakaki / RIEF, AIST	(Domestic) QST (International) TU Delft, Bordeaux University, PNNL, University of Missouri	
			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	Yasushi Fujimura / JGC Corporation	(Domestic) JST, JGC, JGC C&C, Numazu College, Hokkaido Electric Power, Osaka gas	https://www.jst.go.jp/sip/pdf/SIP_energy carriers2015_en.pdf
		Utilization	Technology Development for Promoting SOFC Commercialization/ Rapid Evaluation Methods for SOFC Stack Degradation [2017-2019] Current 	Development of Evaluation Methods and Analytical Tools for 90,000 hours' durability of SOFC stacks	Dr. Teruhisa Horita / AIST	(Domestic) NEDO, Kyocera, NGK-Spark plug, NGK Insulator, Denso, Panasonic, Osaka Gas, Tokyo Gas, Toho Gas, CRIEPI, Univ. Tokyo, Kyoto Univ., Tohoku Univ., Kyushu Univ., Miyazaki Univ., Yokohama Natl Univ.	

Country	Institute	Category	Related programs (with short summary)	Target / Goal Outcome	Lead person / Organization	Partnership (if any)	Related information
Japan	AIST	Artificial Photosynthesis, Solar Chemicals, Solar Fuels	International Joint Research Program for Innovative Energy Technology / Production of useful chemicals using solar energy [2015-2019] 	Proposal and demonstration of cost effective artificial photosynthesis technologies using solar energy	Dr. Kazuhiro Sayama / RCPV, AIST	(Domestic) Universities, Private companies (US) Brookhaven National Laboratory	
		Methanation	Development of Technology for Next Generation Thermal Power Generation Project / Development of Fundamental Technology for Next Generation Thermal Power Generation Project/Developing of CO2 Utilization Technology Project [2017-2019] 	Extraction of technical issues and providing possible solutions for realizing a 400 Nm3/h methanation plant	Dr. Kinya Sakanishi / FREA, 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] 	Deverpoment of high efficiency advanced methane-base fuel systhesis technology with solid oxide co-electrolysis cells	Dr. Haruo Kishimoto	(Domestic) NEDO, Osaka gas Corporation	

Country	Institute	Category	Related programs (with short summary)	Target / Goal Outcome	Lead person / Organization	Partnership (if any)	Related information
Japan	AIST	Thermoelectronics	International Joint Research Program for Innovative Energy Technology / High-efficiency and cost-effective thermoelectric devices [2015-2019] 	Fabrication of cost-effective thermoelectric devices and demonstration of high conversion efficiency in thermoelectric power generation	Dr. Michihiro Ohta / iECO, AIST	(Domestic) Kyushu University Hiroshima University (US) Argonne National Laboratory (ANL) Brookhaven National Laboratory (BNL) (France) CNRS-Laboratory CRISMAT (Germany) German Aerospace Center (DLR)	
		Energy network	International Joint Research Program for Innovative Energy Technology / Development of Technologies for the High Implementation of Grid Cooperative DER (Distributed Energy Resources) [2015-2019] 	Challenges for the super-high implementation of photovoltaic (PV) and other variable power systems into existing power grids. Development of the test platform for "Smart Inverters" - Active and reactive power control - Voltage and frequency ride through	Dr. Kenji Otani / RENRC, AIST	(Domestic) Waseda University, CRIEPI (US) Sandia National Laboratory (US) National Renewable Energy Laboratories (DE) Fraunhofer IEE (EU) DERlab	https://www.aist.go.jp/fukushima/en/unit/ENT_e.html
		Geothermal	International Joint Research Program for Innovative Energy Technology / Development of simulator of enhanced geothermal systems (EGS) [2015-2019] International Joint Research Program for Innovative Energy Technology / Development of fundamental technologies and material for supercritical geothermal wells [2015-2019] 	Commercial geothermal power generation using supercritical geothermal resources in 2050 Nationalwide capacity: >Several GW Reduction of CO2 emission: Several tens million t-CO2/year	Dr. Hiroshi Asanuma / RENRC, AIST	(Domestic) Universities, Private companies (US) LBNL, SNL, LLNL, Brookhaven National Laboratory, Universities, Private companies (GER) GFZ (Italy) OGS (Iceland) ISOR, Universities, Private companies (SWISS) Universities (NZ) GNS Science	
		Wind power	International Joint Research Program for Innovative Energy Technology / Development of flow scanning method using LiDAR devices combined with a machine learning technique [2017-2019]  The accurate and reliable method for wind resource assessment using scanning LiDAR devices combined with a machine learning technique is developed and demonstrated in this Project.	Development of a wind measurement technique with an accuracy of a few percentages using multiple LiDAR devices	Dr. Kogaki Tetsuya / RENRC, AIST	(Domestic) - (DE) ForWind, (NL) ECN (TNO) (Desired collaboration) LiDAR field test, Horizontal wind speed retrieval model.	
		Photovoltaics	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 power generation to 7 yen / kWh in 2030. • Development of high efficiency solar cells with the conversion efficiency of over 30%.	Dr. Takeyoshi Sugaya / RCPV, 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)	