

# Research and Development 20

for Clean Energy Technologies



## The 5th RD20 Conference

Conference of leading research institutes from G20 members  
focusing on clean energy technologies

Date: October 4–6, 2023

Venue: Hotel Hamatsu (3-18 Toramaru-cho, Koriyama-City, Fukushima Pref.)  
(<https://www.hotel-hamatsu.co.jp/> )

Organizer: AIST (The National Institute of Advanced Industrial Science and Technology)

Co-organizers:

Ministry of Education, Culture, Sports, Science and Technology (MEXT)

Ministry of Economy, Trade and Industry (METI)

Ministry of the Environment (MOE)

New Energy and Industrial Technology Development Organization (NEDO)

Launched in 2019, the RD20 is a framework for international research and development aiming to strengthen international collaboration and promote innovation by leading research institutes in G20 countries and regions that develop the world's most advanced technologies for achieving carbon neutrality. RD20 provides opportunities for participants to exchange R&D activities, experiences, and best practices related to clean energy technologies across countries and regions, as well as to explore the potential for international joint research. It also serves to deepen and develop new partnerships among relevant industry, academia, and government stakeholders.

The 5th RD20 conference will be held in Fukushima, the site of Japan's renewable energy frontier. Several international actions, including task forces on PV and hydrogen, summer school in France, and the Gigaton Hydrogen Workshop have been already launched. Leaders and experts of the institutes from G20 members will gather to accelerate collaboration and release the outcome all over the world.

Session	Date	Time (in Japan)	Attendance
Technical Session	Oct. 4	8:50 – 18:00	On-site and online
Leaders Session	Oct. 5	8:00 – 17:00	On-site and online
Panel Exhibition	Oct. 4–5	10:00 – 18:00	On-site
Site Visit	Oct. 6	8:30 – 17:00	*Invitation-only event

### i) Technical Session, 4<sup>th</sup> Wed October – On- site and Online

Time	Content
	<p align="center"><b>Plenary Session(open)</b></p> <p align="center"><b>Theme:</b> High-level talk that frames one of the technical sessions</p> <p align="center"><b>Moderator:</b> Dr. William Tumas (NREL, US)</p>
8:50-9:00	<p align="center">Introduction: RD20 goals, recommendations, progress, future plans</p> <p align="center">Dr. Haruhiko Obara (AIST, Japan)</p>
9:00-9:25	<p align="center">Global perspective of H2, challenges/opportunities, applications of H2 for decarbonization of energy sectors</p> <p align="center">Prof. Dr. Christopher Hebling (Fraunhofer ISE, Germany)</p>
9:25-9:50	<p align="center">Large-scale PV deployment, challenges and opportunities (TW workshop overview and other concepts), bringing circularity to PV</p> <p align="center">Dr. Silvana Ovaitt (NREL, US) (online)</p>
9:50-10:15	<p align="center">CCUS challenge/opportunities/perspectives and opportunity for integration concepts, include value proposition</p> <p align="center">Dr. Dietmar Tourbier (CSIRO, Australia)</p>
10:15-10:45	<p align="center">Panel Discussion among the speakers</p>
10:45-11:00	<p align="center"><b>Coffee Break</b></p>
11:00-11:15	<p align="center">Activity Report of PV Task Group (TG1-1)</p> <p align="center">Dr. Harald Muellejans (JRC, EU)</p>
11:15-11:30	<p align="center">Presentation from the task forces (make the task force important —short talks from task force leader) H<sub>2</sub> LCA</p> <p align="center">Dr. Amgad Elgowainy (ANL, US)</p>
11:30-12:00	<p align="center">Panel discussion on RD20 collaborations, status and future</p> <p align="center">Advisory Board Members</p>
12:00-13:30	<p align="center"><b>Lunch Break</b></p>

	<p align="center"><b>TS1:</b>  <b>Applications and impacts of H2 for decarbonization of energy sectors and for power to X</b></p> <p align="center">Moderator            Dr. Florence Lefebvre-Joud            (CEA-Liten, France)</p>	<p align="center"><b>TS2:</b>  <b>LCA and environmental impacts on large-scale deployment of PV</b></p> <p align="center">Moderator            Dr. Christian Thiel            (JRC, EU)</p>	<p align="center"><b>TS3:</b>  <b>CCU — with a focus on CCU value proposition and integration themes</b></p> <p align="center">Moderator            Dr. Dietmar Tourbier            (CSIRO, Australia)</p>
<b>13:30-13:55</b>	<p align="center">Overview –            Decarbonization by Sectors</p> <p align="center">Dr. Florence Lefebvre-Joud            (CEA-Liten, France)</p>	<p align="center">Overview</p> <p align="center">Prof. Dr. Michio Kondo            (Waseda University &amp; AIST,            Japan)</p>	<p align="center">Opportunities and Challenges            for Integrating CO2 Capture            and Conversion</p> <p align="center">Dr. Joshua Schaidle            (NREL, US)</p>
<b>13:55-14:20</b>	<p align="center">Outbrief from Gigaton H2            Workshop</p> <p align="center">Dr. Bryan Pivovar            (NREL, US)</p>	<p align="center">Environmental assessment of            large-scale photovoltaic            deployment</p> <p align="center">Dr. Myriam Merad            (CNRS-Paris Dauphine,            France)</p>	<p align="center">Levelized cost of CO2            abatement (LCCA) framework            for Carbon Capture and            Utilization (CCU) – Case            studies and applications for            R&amp;D and policy gaps.</p> <p align="center">Dr. Farid Bensebaa            (NRC, Canada)</p>
<b>14:20-14:45</b>	<p>Reversible Solid Oxide Cells:            A Flexible Energy Device for            Both Power Generation and            Hydrogen Production            (* NEDO Program)</p> <p align="center">Dr. Kazunari Sasaki            (Kyushu University, Japan)</p>	<p align="center">Chemical risk assessment on            photovoltaic (PV) panel</p> <p align="center">Dr. Kyoko Ono            (AIST, Japan)</p>	<p align="center">High-Temperature Solar            Thermal Usage for            Thermochemical Carbon            Dioxide Splitting and Its            Application to CCU            (* NEDO Program)</p> <p align="center">Dr. Koji Matsubara            (Niigata University, Japan)</p>
<b>14:45-15:10</b>	<p align="center">Current Status of Green            Ammonia Production and            Utilization Research            in South Korea</p> <p align="center">Dr. Hyung Chul Yoon            (KIER, Korea)</p>	<p align="center">Environmental assessment due            to high penetration of PV</p> <p align="center">Dr. Leandro Michels            (UFMS, Brazil)</p>	<p align="center">An overview of the CSIR's            research on biogenic carbon            capture and utilisation to low-            carbon, sustainable hydrogen</p> <p align="center">Mr. Zama Duma            (CSIR, South Africa)</p>
<b>15:10-15:35</b>	<p align="center">The multivector integrated            smart systems, microgrids and            hydrogen valley at ENEA, for            accelerating the energy            transition</p> <p align="center">Dr. Giorgio Graditi            (ENEA, Italy)</p>	<p align="center">India solar missions and            impacts as well as aspects of            large-scale PV deployment</p> <p align="center">Dr. Anil Kottantharayil            (IITB, India)</p>	<p align="center">CCU in the Context of            Hydrogen Storage and            Synthetic Fuels</p> <p align="center">Dr. Florian Nestler            (Fraunhofer ISE, Germany)</p>
<b>15:35-16:00</b>	<p align="center">Decarbonizing Shipping            Industries</p> <p align="center">Dr. Vibha Dhawan            (TERI, India)</p>	<p align="center">Overview of the potential and            challenges for Agrivoltaics</p> <p align="center">Ms. Anatoli Chatzipanagi            (JRC, EU)</p>	<p align="center">CCU technology for the            production of e-fuels and            e-chemicals</p> <p align="center">Dr. Donghyun Chun            (KIER, Korea)</p>

16:00-16:25	Techno-economic prefeasibility analysis for zero-carbon maritime fuel at 2 South African ports  Mr. Thomas Roos (CSIR, South Africa)	French-Japanese International Collaboration in R&D of Next Generation Solar Cells and Beyond (* NEDO Program)  Dr. Takaya Kubo (The University of Tokyo, Japan)	Materials for an effective desfossilization  Dr. Juan Ramón Morante Leonart (IREC, Spain) (online)
<b>Coffee Break</b>			
17:00-18:00	TS1: Wrap-up session (closed)  Panel discussion—focus on international collaboration opportunities, RD20 future actions  Summary of potential recommendations/actions Speakers and leader	TS2: Wrap-up session (closed)  Panel discussion—focus on international collaboration opportunities, RD20 future actions  Summary of potential recommendations/actions Speakers and leader	TS3: Wrap-up session (closed)  Panel discussion—focus on international collaboration opportunities, RD20 future actions  Summary of potential recommendations/actions Speakers and leader

\* NEDO Research and Development Program for Promoting Innovative Clean Energy Technologies Through International Collaboration  
As of 3rd Oct.  
(Program time and contents are subject to change.)

## ii) Leaders Session, 5<sup>th</sup> Thu October – On-site and Online

Time	Theme, Speaker
8:00-12:30	<b>Leaders Session (closed)</b> RD20 members and invited persons only
14:00-18:00	<b>Leaders Session (open)</b>
14:00-14:10	<b>Welcome address: METI, MOE, MEXT, F-REI</b>
14:10-14:15	<b>Opening remarks from Chair</b>
14:15-15:45	<b>Plenary lectures</b> 14:15- Dr. Akira Yoshino (AIST, Japan) “ET Revolution: Perspective towards a 2050 Zero-emission Society” 14:45- Dr. Eleanor Webster (Mission Innovation, UK) 15:15- Mr. Markus Exenberger and Mr. Timo Bollerhey (H2Global, Germany) 15:35- Dr. Akiko Imura (NEDO, Japan) “NEDO’s Contribution to Addressing Climate Change Issues Through International Collaboration”

<b>15:45-16:00</b>	RD20 Summer school: general report, presentation of “Recommendation from Early Career Researchers”
<b>16:00-16:20</b>	Break
<b>16:20-17:00</b>	<b>Overview of RD20 Task Forces</b> 16:20- Reports of TS and wrap-up session in 5th RD20, Future topics for collaboration 16:30- LCA H <sub>2</sub> Task force 16:40- PV Task force 16:50- WS: Report of Gigaton H <sub>2</sub> workshop, next steps, future plan
<b>17:00-17:45</b>	<b>Round Table Discussion:</b> Summary of morning discussion followed by Open discussion on 1) Future meeting venues 2) enhancing collaborations and furthering the RD20 value proposition 3) recommendations for next year including researcher exchange 4) Key points for summary statement from Leaders
<b>17:45-18:00</b>	<b>Closing remarks</b> – Recommendations – Key elements for Leaders summary
<b>18:00</b>	<b>Adjournment</b>

As of 3rd Oct.

(Program time and contents are subject to change.)

### iii) Panel Exhibition (Hotel Hamatsu Lobby)

#### Industries

	<b>Exhibitor</b>	<b>Title</b>
1	Hitachi, Ltd.	Building Flagship Models Toward the Realization of a Carbon Neutral Society
2	SHIMIZU CORPORATION	The world's most advanced approach to building carbon neutrality: "Hydro Q-BiC®" hydrogen utilization system installed in an actual building
3	TOYOTA MOTOR CORPORATION	Toyota's efforts toward achieving carbon neutrality
4	Mitsubishi Heavy Industries, Ltd.	"MISSION NET ZERO" Mitsubishi Heavy Industries Group's answer to achieving carbon neutrality
5	SEKISUI CHEMICAL CO., LTD.	The progress of Sekisui Chemical Company toward implementation of Perovskite solar cell.

6	CHIYODA KOGYO CO., LTD SANKEI Co., Ltd. & AIST	Wood sustainable composites realizing negative CO <sub>2</sub> emissions
7	AISAN INDUSTRY CO., LTD & AIST	High-quality and efficient forming technology by semi-solid high-pressure die-casting
8	ISHIHARA SANGYO KAISHA, LTD & AIST	New Heat Storage Material 「HASClay®」 , Energy saving application using high-performance adsorbent 「HASClay®」
9	SANNO Co., Ltd.	Electrodeposition Hydrogen Permeable Membrane
10	Frontier Laboratories Ltd.	A Simple, Effective Solution for Analyzing Microplastics Using Pyrolysis-GC/MS Introduction of Frontier Laboratories and applications using its products

### Local Governments

	Exhibitor	Title
1	Fukushima Prefecture	“Renewable energy-related facilities in the Prefecture” “To the Future FUKUSHIMA” “Shared power transmission lines project and the expansion of hydrogen” “Initiatives to foster and cluster renewable energy & hydrogen related industries”
2	Koriyama City	“Koriyama’s Climate Change Initiatives” “Koriyama’s Industrial Innovation”

### Researchers

	Exhibitor	Title
1	Dr. Florian Nestler (Fraunhofer ISE, Germany)	Dimethyl Ether (DME) via Dynamic Methanol Synthesis: One Concept for Global Point-to-Point H <sub>2</sub> Carriers
2	Dr. Huyen N Dinh (NREL, US)	Clean Hydrogen Production – A Consortium Approach
3	Dr. Alex Badgett (NREL, US)	Opportunities and Implications for Low-Cost Hydrogen Production from Water Electrolysis in a Decarbonizing Power Sector
4	Dr. Josh Schaidle (NREL, US)	Electrons to Molecules
5	Dr. Jason Paterson (NZTC, UK)	Hydrogen: Fuel of the future
6	Dr. Kenji Otani (AIST-FREA)	Energy Network Team(outline)

7	Dr. Tetsuya Nanba (AIST-FREA)	Hydrogen Energy Team (outline)
8	Dr. Tetsuhiko Maeda (AIST-FREA)	Hydrogen Carrier Utilization Team (outline)
9	Dr. Tetsuya Kogaki (AIST-FREA)	Wind Energy Team (outline)
10	Dr. Takuya Matsui (AIST-FREA)	Photovoltaic Device Team (outline)
11	Dr. Katsuto Tanahashi (AIST-FREA)	Photovoltaic Module and Application Team (outline)
12	Dr. Takashi Oozeki (AIST-FREA)	Photovoltaic System and Application Team (outline)
13	Dr. Takurou Murakami (AIST-GZR), Dr. Masahiro Yoshita (AIST-FREA)	Development of Perovskite Solar Cells: -Materials and Fabrication Technology, Performance Characterization, and Standardization-
14	Dr. Akito Ozawa, Dr. Yuki Kudo (AIST-GZR)	Scenario Analysis for Achieving Carbon Neutrality in Japan by 2050
15	Dr. Hideyuki Takagi (AIST-GZR)	Development of Synthetic Liquid Fuel Production Technology from CO <sub>2</sub>
16	Dr. Kazuhiro Sayama (AIST-GZR)	Artificial Photosynthesis Technology for Economical Production of H <sub>2</sub> and Valuable Chemicals
17	Dr. Shinichirou Morimoto (AIST-GZR)	Evaluation of Carbon Capture and Utilization Technologies using AIST Assessment Tool
18	Dr. Shinichirou Morimoto, Mr. Atsushi Yamamoto (AIST-GZR)	Feasibility Study of Enhanced Mineralization Based on LCA/TEA Platform
19	Dr. Nishio Masahiro, Mr. Atsushi Yamamoto (AIST-GZR)	Tokyo Zero-emission Innovation Bay
20	Dr. Hiroaki Hatori (AIST-GZR)	GZR research activities
21	Dr. Masahiro Shikano (AIST-FREA)	Fukushima Renewable Energy Institute, AIST (FREA)

As of 29<sup>th</sup> Sept  
(Contents are subject to change.)

### Expected participating countries and regions



For registration and most up-to-date information on RD20 conference, please visit:  
<https://rd20.aist.go.jp/>

Contact: RD20 Secretariat [M-rd20secretariat-ml@aist.go.jp](mailto:M-rd20secretariat-ml@aist.go.jp)