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Carbon Recycling Fund (CRF) Policy Recommendations 2025

**Enhancing Regional Vitality and National Economic
Security through Carbon Recycling**

**January 2026
Carbon Recycling Fund**

Introduction

In August 2019, the Carbon Recycling Fund (CRF), led by Tsugio Mitsuoka, who concurrently serves as Chairman of the Board of IHI Corporation, was launched as a private-sector initiative to drive innovation in carbon circularity and help Japan achieve carbon neutrality by 2050. With more than 250 member organizations across many industries, the CRF funds pioneering research, raises public awareness of carbon recycling, supports regional deployment, and develops talent. In particular, through its early-stage research grants, the CRF serves as a translational bridge that advances promising results into national programs (e.g., NEDO) and related initiatives. By organizing working groups with local governments and leveraging existing regional infrastructure, the CRF helps develop and scale carbon-recycling projects led by both local companies and member companies.

While members' efforts—backed by government support—have made significant progress, whole-of-nation challenges still remain.

To revitalize regions and strengthen the nation, the CRF makes the following recommendations.

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Innovation and education

To reach carbon neutrality, Japan must embrace “CO₂-as-a-resource” and foster innovation in carbon recycling. We at the CRF recommend that the government publish a clear roadmap while enhancing support for industry, academia, and the public sector, and expanding next-generation education and public relations activities.

○ Creation of innovation in carbon recycling involving the Ministry of Economy, Trade and Industry (METI), the Ministry of the Environment (MOE), the Ministry of Education, Culture, Sports, Science and Technology (MEXT), the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), and the Cabinet Office (CAO).

Toward achieving carbon neutrality by 2050, it is necessary to adopt the concept of utilizing CO₂ as a resource and to foster innovation based on this concept. To this end, the government should implement policies to cultivate researchers committed to carbon recycling and develop leaders capable of creating and steering projects.

For the development of carbon recycling technologies, sustained, stage-specific support is essential under inter-ministerial collaboration.

METI has formulated a Carbon Recycling Roadmap, which serves as a major guideline for industry and academia. However, as innovation progresses and needs arise, this roadmap should be reviewed and updated in a timely manner. In addition, in September 2025, the MOE formulated a roadmap for artificial photosynthesis to promote industry-academia-government collaboration for early real-world deployment.¹

○ Expansion of the carbon recycling sector, and prioritization of global warming countermeasures (METI; MOE; Ministry of Agriculture, Forestry and Fisheries (MAFF); and MEXT)

The field of carbon recycling is not confined to a single sector; rather, it is a cross-cutting theme that spans all sectors. Accordingly, we recommend a carbon-recycling portfolio within the NEDO Green Innovation Fund (GI Fund) and the further promotion of research support for advanced technologies such as CCS siting (e.g., disused coal mines, basalt formations).

In addition, measures to reduce climate-related disaster risks will become increasingly important in the future. We believe that focused support for measures to address global warming is also necessary. In particular, climate change is closely related to biodiversity (e.g., quantifying links between climate change and rising numbers of bear attacks on humans).

Furthermore, satellite observation data and other information are relevant to the efficient creation of biomass maps, the reduction of methane emissions from rice paddy fields, the generation of credits related to blue carbon, and ensuring transparency in greenhouse gas emissions. Therefore, proactive consideration of methods for utilizing such data is necessary.

¹ The “Roadmap for the Social Implementation of Artificial Photosynthesis,” formulated in September 2025, sets the following targets: achieving partial social implementation of artificial photosynthesis technologies by 2030, and realizing mass production of basic feedstock materials and the manufacture of high-value-added products by 2040.

○ Introduction of educational programs (METI; MEXT; and MOE)

Carbon-recycling content should be introduced across school curricula—from elementary and junior high to high schools and universities—and practical learning should be expanded through carbon-recycling R&D sites and NEDO special programs.

○ Expansion of community outreach programs and public awareness (METI and MOE)

It is important to communicate the significance of carbon recycling to the public and local communities in an easy-to-understand manner. Specifically, we request the further promotion of initiatives such as Japan’s national “*Decokatsu*” decarbonization campaign as well as the use of digital media and social media to reach a broad range of people, including the younger generations. Japan’s approach and know-how should be shared not only domestically but also internationally.

[Examples of CRF initiatives]

◇ CRF Research Grant Program (Provision of funding for research proposals)

The CRF has operated a grant program (up to 10 million yen per project) funded by private donations and other sources to support ideas related to carbon recycling by innovative researchers. While promoting the program not only to research institutions in Japan but internationally, including those in the United States and ASEAN countries, the CRF has supported startups and selected international joint research projects. To date, approximately 100 outstanding research projects have been adopted under the program.

In 2022, the CRF awarded a research grant to a startup working on Metal-Organic Frameworks (MOFs), which contributes to a project under the Global South initiative supported by NEDO and METI. The global significance of MOF research was further underscored when Professor Susumu Kitagawa (Kyoto University) received the 2025 Nobel Prize in Chemistry, highlighting the scientific momentum behind this field. The startup is now seeking to scale MOF production in Japan and establish manufacturing capacity in Southeast Asia, and the CRF will continue to follow and support its progress.

◇ Education Field Activities (CR University)

Through its educational platform, “CR University,” the CRF develops and delivers structured training programs on carbon recycling to cultivate the next generation of specialists.

◇ Public Relations Activities

The CRF promotes public understanding of carbon recycling through accessible digital content, including YouTube videos and collaboration with local companies and universities. Working jointly with the Resource Recycling Council, the CRF also carries out nationwide awareness-raising initiatives in partnership with major media and sports organizations. In addition, the CRF engages with international forums and partner institutions to disseminate Japan’s approach to carbon recycling globally.

Energy and materials

We believe the greatest challenges are to reduce the cost of CR products and to expand demand. Particularly given the high cost of CO₂ separation and capture, it is essential to organize appropriate applications by CO₂ concentration.

It is important to enhance and strengthen policy support for developing infrastructure and other facilities for CR products, while ensuring that the government itself plays a leading role in expanding demand for CR products. In addition, many initiatives in this field are being led by startups, so we request support for them.

○ CO₂ separation and capture (METI and MOE)

CO₂ separation and capture are the key bottlenecks in converting CO₂ into energy and materials. Current separation and capture technologies are designed to concentrate CO₂ to near-100% purity, and the associated costs constitute a major barrier. Therefore, we request that the GI Fund and other programs be used to promote intensive research and development as well as large-scale demonstration and social implementation, not only to reduce the costs of amine-based chemical and physical absorption methods but to advance adsorption technologies using Metal-Organic Frameworks (MOFs), membrane gas separation technologies, chemical looping, and similar approaches.

Meanwhile, many technologies are available that can utilize low-concentration CO₂ in the range of 10–20%, such as algae cultivation and mineralization. Looking ahead, including through the implementation of the Act on Carbon Dioxide Storage Business, we believe it will be effective to define suitable utilization options for each CO₂ concentration level (including impurities) and to provide business support by concentration-based categories to accelerate social implementation.

○ Support for expanding production of CR products (METI; MOE; and MLIT)

The commercialization of methanation technologies and synthetic fuels (e-fuels) requires large volumes of hydrogen, and achieving a substantial reduction in hydrogen procurement costs is essential while making use of existing infrastructure in specific regions. To this end, it is desirable to enhance subsidy programs, tax credits, and other policy measures to promote the introduction and expansion of renewable energy-derived hydrogen and to support the development of infrastructure for hydrogen transport and storage.

It is important to encourage investment in CR products and CCU projects, making it necessary to introduce preferential measures such as large-scale tax incentives similar to the 45Q tax credit in the United States, as well as capital investment subsidies. These measures will create an environment in which companies can take risks more readily, thereby accelerating social implementation.

○ Creation of environmental value and demand expansion for CR products (METI; MOE; and MLIT)

To accelerate the social implementation of carbon recycling, it is essential not only to advance technological development but to form markets and establish institutional foundations that create

demand for CR products; develop product standards and evaluation criteria; and build an environment in which CR products continue to be accepted by society.

There is an urgent need to establish standards for CR products, including new fuels and materials derived from biomass and CO₂. Doing so is expected to enhance incentives for the production and distribution of CR products.

Market expansion can be accelerated by establishing mechanisms for the government to proactively utilize CR products and to take the lead in creating demand. Specifically, as advocated for in Keidanren's regulatory reform proposals, we request the establishment of mechanisms to proactively adopt CR products in public works and procurement, including making CR products eligible under the Act on Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities.

At Expo 2025 Osaka, Kansai, exhibitions featuring CO₂ concrete, methanation, and artificial photosynthesis helped raise public awareness of carbon recycling to a certain extent. To raise awareness of CR products, we request that outreach activities continue to be carried out at major events, such as the International Horticultural Expo 2027 in Yokohama.

Regarding sustainable aviation fuel (SAF), the government has already set supply targets, which function as strong incentives for companies to enter the business. Similarly, in other fields such as marine fuels and general-purpose products, the government's establishment of clear targets and frameworks ahead of the rest of the world is expected to promote corporate investment and market entry.

Also, it should be noted that systems such as emissions trading that are designed to achieve carbon neutrality will begin operation, and it is necessary to ensure that they do not impose significant burdens on industrial activities or people's lives.

○ Harmonization of the carbon credit system (METI and MOE)

Regarding carbon recycling-derived credits, it is important to develop comprehensive LCA-based standards at an early stage to facilitate reliable market transactions.

○ Support for startups (METI and MOE)

Toward the goal of achieving carbon neutrality by 2050, many startups are taking on the challenge of developing new materials, new fuels, new biological functions, and more. However, carbon recycling requires a substantial capital investment, and there is a shortage of funding to bridge the gap between the research and demonstration stages. As a result, major companies and financial institutions are concerned about the technological risks and have not made sufficient investments. From these perspectives, for motivated startups, in addition to government financial support, proactive promotion of their CR products and related initiatives is necessary.

[Examples of CRF initiatives]

◇ Strengthening collaboration with organizations involved in hydrogen

Recognizing that low-cost hydrogen is critical for the commercialization of methanation, the CRF supports the development of the hydrogen supply chain by facilitating information sharing and stakeholder engagement. In collaboration with the Japan Hydrogen Association (JH2A), the CRF disseminates updates on hydrogen supply-chain development, clarifies its interfaces with carbon-recycling technologies, and helps build networks among key industry stakeholders.

◇ Collaborating with companies to foster market creation

The CRF disseminates information on CR products, such as new materials and new fuels developed by member companies, to society and supports market creation. Together with the Resource Recycling Council, the CRF promotes the establishment of JIS standards for CCU-derived calcium-carbonate composite plastics and supports studies to enable domestic production and commercialization through local supply chains.

Regions and food

It is important to create carbon recycling industries tailored to regional conditions. In particular, we request that the R&D and Demonstration Base for Carbon Recycling (CR) in Osakikamijima Town, Hiroshima Prefecture, be further developed and strengthened as an international hub for carbon recycling.

In addition, agriculture, forestry, and fisheries are important carbon recycling industries, and it is necessary to promote collaboration among agriculture, commerce, and industry in each region to increase Japan's food self-sufficiency rate.

○ Developing the R&D and Demonstration Base for Carbon Recycling (CR) into an international hub (METI)

An important consideration is how to utilize existing infrastructure while leveraging regional characteristics. The R&D and Demonstration Base for Carbon Recycling (CR) in Osakikamijima Town, Hiroshima Prefecture has grown into a core facility leveraging CO₂ captured from an existing thermal power plant and hosting more than ten NEDO projects to date. To strengthen its role as an international hub, the facility should be further enhanced—particularly through the development of infrastructure capable of supplying CO₂ via Direct Air Capture (DAC) in collaboration with relevant ministries.

○ Developing carbon recycling industries adapted to regional characteristics (METI and MOE)

It is important to develop resource circulation models for each region by leveraging existing infrastructure, such as thermal power plants and chemical complexes. For example, Saga City is attracting industries such as cosmetic manufacturing that utilize CO₂ from waste incinerators. These initiatives represent promising models of regional CO₂ utilization and should be supported for scaling and replication nationwide.

Given anticipated increases in electricity demand—driven in part by data center development—region-specific energy strategies should be formulated as part of national energy policy, including pathways toward carbon neutrality for coal-fired power plants.

Designating GX special zones in collaboration with prefectural governments can help attract carbon-recycling investment aligned with regional characteristics, supported by shared infrastructure linking startups, universities, and major companies.

○ Support for agriculture, forestry, and fisheries as carbon recycling industries (MAFF)

Agriculture, forestry, and fisheries are vital components of the carbon-recycling ecosystem—particularly the biomass sector, which is closely linked to carbon circularity. In addition, food production can be enhanced through CO₂-utilizing agriculture and the planned installation of large-scale artificial reefs. We therefore request that efforts be made to improve the food self-sufficiency rate.

For abandoned farmland, afforestation with fast-growing trees and cultivation of energy crops can deliver greater benefits in terms of disaster-risk reduction and biodiversity compared with solar-panel installations.

Given that forests cover approximately 70% of Japan's land area, robust ecosystem assessment and forest management practices are essential. We recommend refining the J-Credit scheme to recognize activities such as afforestation with fast-growing species and expanded wood utilization, while updating land-use and fuel regulations to enable the use of next-generation biomass fuels, including in post-FIT facilities.

[Examples of CRF initiatives]

◇ Establishment of regional carbon recycling models

The CRF has supported the development of the R&D and Demonstration Base for Carbon Recycling (CR) in Hiroshima Prefecture and participates in regional initiatives such as carbon neutrality councils. Most notably, in Saga City, the CRF has conducted a study on applying the J-Credit scheme to a waste incinerator.

◇ Awareness-raising activities at regional hubs

At the commercial facility "Iroha Gura Park" in Sakata City (Yamagata Prefecture), the CRF has supported hands-on demonstrations that allow residents and visitors to directly experience carbon-recycling technologies. In Akita Prefecture, the CRF has contributed to NEDO projects aimed at demonstrating SAF production technologies using mixtures of forest resources and waste materials.

Oceans and international affairs

Japan is a maritime nation, and we particularly encourage proactive efforts to establish ocean-related rules for CO₂, not only for shipping but from the perspectives of offshore wind power and blue carbon.

Also, it is important to establish rules for carbon recycling technologies in which Japan holds comparative advantages while promoting collaboration with ASEAN countries and others. It is necessary to firmly maintain frameworks such as the Asia Zero Emission Community (AZEC) and to provide support to ensure that concrete projects make progress.

○ Roles of Japan as a maritime nation (MOE; MLIT; and MAFF)

Technological advances in marine development have been constrained by challenging conditions such as water pressure, depth, and limited accessibility. Nevertheless, strengthening the use of marine resources is essential both for climate-change mitigation and for Japan's national security.

Japan should work proactively with other maritime nations to develop international rules, accounting frameworks, and verification methodologies for CO₂ absorption in the ocean. To expand the potential of blue carbon, Japan should advance the creation of seaweed beds, research and demonstration of deep-sea algae sinking for long-term CO₂ sequestration, and the evaluation of associated crediting approaches.

In addition, there is a close relationship between the ocean and biodiversity. Japan should also advance methodologies to quantitatively assess CO₂ sequestration through biomineralization, including the biological processes of shellfish and corals. This includes developing crediting approaches for “Marine White Carbon”—CO₂ sequestered through the formation of biogenic carbonates—and establishing evaluation methods for the contributions of microalgae to CO₂ absorption and nutrient-cycle enhancement through water purification functions.

Japan should position emerging technologies, such as Direct Ocean Capture (DOC), which extracts CO₂ from seawater with higher CO₂ concentrations than the atmosphere, within international collaboration frameworks and actively support large-scale research, demonstration, and deployment.

○ Offshore wind power generation and port utilization (METI; MAFF; MLIT; and MOE)

Fixed-bottom offshore wind power is closely linked to CCS projects, and the institutional framework should therefore be revised promptly and carefully. Floating photovoltaic systems may also be deployed in relatively calm waters such as the Seto Inland Sea. Combining these initiatives with large-scale artificial reef installations can enhance the potential of blue carbon absorption. Importantly, these efforts must be undertaken with the understanding and cooperation of fisheries stakeholders, who play a central role in regional ocean-use management.

With regard to port areas, ongoing studies—such as those on carbon-neutral ports—should be advanced as national model projects in coordination with offshore wind development and fuel conversion efforts in the maritime transport sector.

○ Promotion of international collaboration across industry, academia, government, regions, and sectors (METI and MOE)

The International Conference on Carbon Recycling has served as a key platform for collaboration among industry, academia, and local governments.

Such collaboration should be sustained and expanded in cooperation with partner countries to strengthen global understanding of carbon-recycling approaches. As many emerging Asian economies face the dual challenge of rising energy demand and decarbonization, sharing made-in-Japan technologies and business models can support regional progress toward carbon neutrality while creating growth opportunities for Japanese industries.

○ Strengthening of collaboration with the Asia Zero Emission Community (AZEC) (METI and MOE)

Collaboration with ASEAN countries through the Asia Zero Emission Community (AZEC) is particularly important for Japan to lead global efforts in carbon recycling. Concrete bilateral and multilateral cooperation projects should be promoted—especially in areas such as fuel conversion and synthetic fuels—to accelerate the deployment of Japan’s technologies.

○ Proactive engagement in the formation of international standards and rules (METI and MOE)

Japan should take a leading role in establishing international standards, certification schemes, and evaluation methodologies for CR products and carbon credits, ensuring that Japanese technologies and systems are widely adopted in global markets.

[Examples of CRF initiatives]

The CRF has compiled and shared insights on blue-carbon techniques, including the CO₂-absorption effects of seaweed-bed creation and artificial-reef installation, through collaboration with blue-carbon operators and research institutions. The CRF also partners with organizations conducting demonstration projects—such as Tokyo Metropolitan Government’s initiative on deep-sea algae sinking for long-term CO₂ sequestration—to advance practical applications of emerging blue-carbon technologies.

Further collaboration is underway with the Japan Blue Economy Association, which promotes voluntary blue-carbon credits. The CRF has also supported the establishment of the Aquatic Integrated Carbon Sequestration (AICaS), which develops comprehensive evaluation methods for marine-carbonate-based CO₂ sequestration and promotes related credit certification, basic research, and consulting.

Internationally, the CRF works with Low Emission Technology Australia (LETA) to advance joint research and information exchange and participates in the Cleaner Energy Future Initiative for ASEAN (CEFIA) to strengthen regional cooperation on decarbonization.

Conclusion

Achieving carbon neutrality will require Japan to make full use of its existing infrastructure—particularly thermal power plants—and accelerate the deployment of carbon-recycling technologies. The R&D and Demonstration Base for Carbon Recycling in Osakikamijima, Hiroshima Prefecture, has already produced significant results and gained international attention. This facility should be further enhanced and developed into a global hub for carbon-recycling research and innovation.

The CRF's research grant program has generated numerous outcomes that have led to national projects, demonstrating the value of early-stage support. The growing global recognition of Metal-Organic Frameworks (MOFs) research—highlighted by the 2025 Nobel Prize in Chemistry—underscores the importance of sustained investment in technologies that address CO₂ separation, capture, utilization, and storage. Continued assistance is essential for commercializing these technologies in ways that reflect regional needs, including innovations such as compact methane-storage systems.

Going forward, Japan must establish regional model hubs for carbon-recycling businesses by linking related facilities—such as hydrogen-supply infrastructure—and ensuring an appropriate balance between financial incentives and regulatory frameworks. The 2030 target of achieving 10% Sustainable Aviation Fuel (SAF) usage is a major milestone toward 2050 carbon neutrality and will require strong support for regional initiatives, complemented by measures such as GX Economic Transition Bonds.

Because Japan alone cannot significantly influence global emissions trajectories, it is crucial that the country lead the creation of international standards, certification schemes, and rule-making frameworks. In particular, collaboration with ASEAN countries through platforms such as AZEC must be accelerated to establish shared methodologies for evaluating CR products, carbon credits, and CO₂-reduction pathways.

In parallel with mitigation efforts, Japan must also advance adaptation strategies to address climate-related disasters that are already occurring. Carbon recycling should not be perceived merely as a constraint; rather, it represents a strategic driver for revitalizing regions, strengthening economic security, and building a resilient national economy. This includes promoting the circular economy, enhancing regional value chains through collaboration among agriculture, commerce, and manufacturing, developing new industries in GX special zones, and advancing the use of marine resources together with carbon-neutral port development.

The CRF will continue to deepen collaboration with the national government, local authorities, businesses, and relevant organizations. In partnership with domestic and international funds, the CRF will foster innovation, promote regional revitalization, and strengthen international cooperation—contributing to the realization of a sustainable and competitive carbon-recycling society.