

Development of Human Resources: The Key to the Green Transformation

Companies are today increasingly required to address environmental issues, creating a growing demand for “green human resources” possessing specialized knowledge of environmental issues and decarbonization technologies. This issue of *My Vision* explores the ideal profile of such human resources and strategies for their development.

About This Issue

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- Formulating Growth Strategies and Business Objectives Looking Towards the Green Transformation

Kazuhiro Higashi

Executive Vice President, NIRA / Senior Advisor to Resona Holdings, Inc.

As we look towards the realization of a carbon-neutral society, companies are increasingly required to address environmental issues in their business strategies, creating a growing demand for “green human resources” possessing specialized knowledge of environmental issues and decarbonization technologies. However, Japanese society as a whole does not yet share a clear profile of such human resources, encompassing the specific knowledge and skills required of them. What skills are expected of green human resources? We sought insights from experts across a variety of fields regarding the ideal profile of such human resources and strategies to accelerate their development.

Keywords...Osaka Expo 2025, green transformation, development of green human resources, comprehensive policy design

Expert Opinions

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What skills are expected of green human resources?

What strategies can we employ to accelerate the development of green human resources?

Standardize Green Transformation-related Skills, Across the Public and Private Sectors, Enabling Companies to Focus on the Development and Utilization of Human Resources

Hiromichi Nakahara

Director, Environmental Policy Division, GX Policy Group, Ministry of Economy, Trade and Industry

Keywords...Case studies of acquisition of human resources, skill standards for Green Transformation-related human resources, emissions trading system

Green Human Resources Will Be Essential to Our Future: We Must Work to Facilitate Their Development

Kohei Nishiwada

Founder and CEO, ASUENE Inc.

Keywords...Sustainability consultants, green and digital, groping towards educational expertise

T-Shaped Professionals Will Lead Social Transformation in Response to Climate Change

Shin-ichi Ohkoshi

Dean, Graduate School of Science, and Special Advisor to the President, The University of Tokyo

Keywords...SPRING GX, T-shaped professionals, global networking

Nurturing Talent That Can Decipher “Why” and Build a Common Understanding

Arisa Kishigami

Board Member, Japan Sustainable Investment Forum (A Specified Nonprofit Organization)

Keywords...Comprehensive approach, deciphering “WHY,” on-site experience

Collaborating with Asian Countries as Co-creation Partners to Address Global Challenges

Katsura Miyazaki

Executive Senior Vice President and Chief Sustainability Officer (CSO) of the Japan International Cooperation Agency (JICA)

Keywords...Capacity-development in developing countries, Science and Technology Cooperation on Global Issues, Co-creation and circulation of knowledge

Interview period : June–July 2025

Interviewer: Hinako Suzuki (Research Coordinator & Research Fellow, NIRA)

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Osaka Expo 2025 is currently attracting large crowds of visitors every day. One of the “Future Society Showcase,” where visitors can experience the future, is the “Green Expo.” The Green Expo showcases cutting-edge technologies aimed at realizing a carbon-neutral society. It does not need to be repeated that the “green transformation,” or the shift toward a carbon-neutral society, is a critical challenge that the entire world, including Japan, must address collectively for the future of the planet. This transformation involves shifting from industries that emit large amounts of greenhouse gases (GHGs) to those that consider the Earth's environment. At the same time, it will inevitably bring about structural changes in the nature of work.

According to a survey by the Organization for Economic Co-operation and Development (OECD), workers employed in occupations contributing to the green transformation and in industries providing green products and services already account for about 20% of overall employment in the advanced nations, and this figure is expected to further increase in the future. Additionally, a survey conducted by NIRA revealed that 31% of employed individuals in Japan work in “green-related” positions. The need to develop human resources with specialized knowledge in decarbonization technologies, sustainability, and environmental issues is growing not only in Europe, which leads the way in green policies, but also in Japan. However, the ideal profile of these “green human resources” remains vague. What skills should they possess; how can we develop human resources with the necessary specialized expertise? We do not yet possess sufficient shared knowledge in the abovementioned areas in Japan. At the same time, industries that emit large amounts of GHGs have long been the core of the Japanese economy. As the industrial structure undergoes transformation, achieving the transition of the human resources who have been engaged in these industries into new industries will also become a major issue.

In this issue of *My Vision*, we therefore focus on “green human resources.” We interview a government official leading policy initiatives, a corporate leader, and other experts to examine the current state of affairs and explore the future direction for the development of green human resources. Additionally, we consider Japan's contributions to decarbonization efforts in Asia.

Standardizing Green Transformation-related Skills for Cross-Industry Collaboration

The Ministry of Economy, Trade and Industry (METI) has begun defining the necessary human resources and identifying the skills that they will require from the perspective of Japan's green transformation (GX), which seeks to achieve decarbonization while enhancing industrial competitiveness and achieving economic growth. Hiromichi Nakahara, Director of METI's

Environmental Policy Division and a leader of the Ministry's GX policy, points out the unique challenges of GX, indicating that the issues faced by each individual company are distinct, and thus will not be solved by focusing on the development of human resources in specific fields. The ministry is collaborating with companies to compile case studies of cross-industry training and standardize the skills required for GX-related human resources, thereby creating a clear profile of the desired human resources. In essence, they are working to create a "language" that encompasses the necessary skills and training methods.

The need to enhance educational content and increase the number of specialized educational institutions for the development of green human resources is emphasized by Kohei Nishiwada, CEO of ASUENE, a company that supports decarbonization and offers human resources development and recruitment services. He points out that while demand for human resources is increasing in the growing green sector, there is a lack of accumulated knowledge in human resources development across Japanese society as a whole, and we are still groping towards the realization of expertise in this area.

While green transformation challenges vary by company, it will take time for individual companies to cultivate human resources with expertise in new technologies and systems. Compared to Europe, where societal frameworks such as tax systems and emissions trading are well-established, as a society Japan has limited knowledge and experience in the green sector. Given Japan's current status, how to cultivate human resources and meet demand remains a challenge. Standardizing skills could serve as the first step toward the development of green human resources and also provide a shared image of what those human resources should be, and become a benchmark for workers themselves.

A Multifaceted Perspective on Problem-solving and Human Resource Development

At the same time, multiple experts interviewed here emphasized the importance of a multifaceted perspective.

Shin-Ichi Ohkoshi, Dean of the Graduate School of Science and Special Advisor to the President at The University of Tokyo, who oversees the university's "SPRING GX" initiative, indicates that addressing global challenges requires not only technological innovation but also consideration of all aspects of economic and social systems, including legal and ethical frameworks. The SPRING GX program promotes cross-disciplinary exchanges among doctoral students and the establishment of a network of international research institutions through student exchanges. It is hoped that this will lay the foundation for an intellectual network that will drive society 30 years from now.

Additionally, Arisa Kishigami, a Board member of the Japan Sustainable Investment Forum, strongly emphasizes the need for efforts to build organizations with human resources capable of taking multifaceted perspectives and comprehensive approaches in both companies and the institutions that support them as investors and financiers. Essential to such human resources is the ability to pose "Why" questions (such as "Why should we address climate change?"; "Why is it valuable to conserve biodiversity?") and to truly understand their significance, as well as the ability to comprehensively visualize the interconnectivity across different issues. To nurture these qualities, it will be important to provide individuals with opportunities for on-site visits that allow them to gain diverse experiences in the field, in addition to enhancing management education and financial education centered on sustainability.

Furthermore, given that climate change is a global challenge, development cooperation is an essential endeavor. Japan has long been engaged in environmental cooperation with Asia, mainly through the Japan International Cooperation Agency (JICA), with the aim of increasing the capacity of developing countries to address environmental issues through their own efforts. Katsura Miyazaki, Executive Senior Vice President of JICA, tells us that JICA's activities have a long history of contributing to the development of green human resources, and emphasizes that JICA will continue to promote the “circulation” of knowledge, which will lead to the resolution of issues on both sides through co-creation between Japan and other Asian countries.

Whether Industrial Transformation Can Lead to Innovation Will Depend on Human Resources

When Japan shifted its energy structure from coal to oil, the government established systems including education and training programs and job placement services for workers leaving the coal and mining industries, enabling many workers to move to new industries. Just as the modernization of the energy supply system established Japan as a manufacturing powerhouse, the transition to a green economy could be a turning point for the nation, allowing it to reestablish its international leadership. Comprehensive policy design to facilitate the smooth mobility of the workforce through reskilling and enhanced specialized education is once again demanded of the government.

In addition, companies themselves will also need to develop growth strategies and management targets with a view towards green transformation, and establish a shared recognition between employees and management that green human resources are core human resources for the realization of growth. Whether carbon-neutral industries can be nurtured into drivers of innovation in the Japanese economy depends on human resources. The question right now is the readiness of industry, government, and academia to take up the challenge of achieving this.

Mr. Higashi is an Executive Vice President of the Nippon Institute for Research Advancement and a Senior Advisor to Resona Holdings, Inc. He assumed his current position at Resona Holdings in June 2022, following his previous roles as Director, President, and Representative Executive Officer.

Expert Opinions

Standardize Green Transformation-related Skills, Across the Public and Private Sectors, Enabling Companies to Focus on the Development and Utilization of Human Resources



Hiromichi Nakahara

Director, Environmental
Policy Division, GX Policy
Group, Ministry of Economy,
Trade and Industry

The core focus of the Japanese government's Green Transformation (GX) initiatives goes beyond simply reducing carbon dioxide emissions. Through GX, the aim is to strengthen Japan's economy and industrial competitiveness while ensuring a stable energy supply, using decarbonization as a catalyst. The government is promoting the "Pro-Growth Carbon Pricing Concept," a measure bringing together 20 trillion yen in advance investment support and the phased introduction of carbon pricing. The advance investment support covers a wide range of areas, from transforming manufacturing processes in industries in which emissions reduction is difficult, through the introduction of batteries, hydrogen and ammonia, to buildings and vehicles, encouraging industry to take on the challenge of GX. The success of these efforts will depend entirely on the existence of outstanding human resources.

The Ministry of Economy, Trade and Industry has undertaken two major initiatives in the area of GX-related human resources. The first initiative is the publication of case studies on how individual companies are acquiring human resources. GX is an issue for all industries, and the technical fields involved are so broad that solutions cannot be realized simply by training human resources in specific fields; the issues involved and methods of addressing them vary depending on the industry and company. In order to offer each company concerned appropriate hints, it is important to first collect knowledge across industries. The case studies are based on interviews covering a wide range of industries and company sizes and comprehensively describe specific measures for acquiring and training human resources.

The second of our initiatives is standardization of the skills to be possessed by GX-related human resources, through collaborative efforts between companies actively engaged in GX and the government. Through discussions among industry, government, and academia in the "GX League," we defined cross-industry skills. First, the knowledge necessary to understand the importance of GX was included in an itemized list as "GX Literacy," and the human resources required to promote GX were classified into five categories. Additionally, the duties demanded of these human resources were then further subdivided, and the required roles and skills, and examples of collaboration with other roles, were outlined. To enable the cultivation and evaluation of these skills in the workplace, levels of achievement of skills were also defined for each role.

At present, there is an urgent need to develop human resources in preparation for the emissions trading system becoming mandatory next fiscal year. Under the new system, companies meeting the emissions threshold will be required to report their carbon dioxide emissions to the government, and this reporting will need to be verified by a third-party verification organization. As a result, there is a clear need for human resources at both relevant companies and registered verification organizations. In particular, regarding the recruitment and training of human resources for registered verification organizations, who require knowledge of quality management in addition to technical expertise, we will explore necessary measures such as the establishment of frameworks to cultivate specialized personnel through collaboration among stakeholders with diverse expertise, including audit firms and ISO certification organizations.

Mr. Nakahara is responsible for overseeing initiatives in the area of GX-related human resources at the Ministry of Economy, Trade and Industry. After completing graduate school (The University of Tokyo), he entered the Ministry of International Trade and Industry (now the Ministry of Economy, Trade and Industry). He has been involved in policy planning in the fields of industrial policy (growth strategy), energy and environmental policy, and nuclear policy. In 2018, Mr. Nakahara was seconded to the London Office of the Japan External Trade Organization (JETRO), where he worked as a Director for Industrial Research, conducting surveys on trends in trade and industrial policies and environmental and energy policies in the UK and Europe. He assumed his current position in 2024.

Expert Opinions

Green Human Resources Will Be Essential to Our Future: We Must Work to Facilitate Their Development



Kohei Nishiwada
Founder and CEO,
ASUENE Inc.

As we make the transition to decarbonization, it is estimated that the number of jobs related to green industries will increase by approximately 24 million worldwide by 2030. While the flow of human resources to climate change-related technological development and renewable energy industries is progressing, the supply of green human resources is unable to keep pace with demand, which is increasing rapidly year by year. On the other hand, Japan's efforts to decarbonize, which had previously lagged behind Europe, have made considerable progress in the past two to three years. The government's 7th Basic Energy Plan (February 2025) outlined plans to double the share of renewable energy in the power mix, which is expected to increase the demand for human resources in solar power generation and offshore wind power generation.

Currently, there is growing demand for knowledge-based human resources in the new category of “sustainability consultants.” This trend is driven by the growing requirement for listed companies to disclose sustainability-related information. Measuring a company's emissions and determining how to reduce them are tasks that are not easily accomplished in the absence of specialized education and training. Professionals with the necessary specialized knowledge to advise companies on information disclosure strategies and management that incorporates decarbonization strategies are in demand, but there is currently a shortage. Additionally, in Japanese companies, where job rotation is a given, a consequent delay in gaining experience among personnel responsible for these areas is a significant issue.

Furthermore, there is a limited number of green human resources with technical expertise in areas such as solar and offshore wind power generation. The new green transformation is a growth area that rivals the digital transformation. As the expansion of renewable energy progresses, the transition of the workforce from old industries such as nuclear power generation and coal-fired power generation, with their outmoded structures, to the green sector will become an increasingly important issue. There are also reports that engineers are already moving from tech giants such as the GAFAM companies. Green transformation-related human resources possessing both green and digital skills will be the core human resources of the next generation.

In Japan, the public-private partnership known as the “GX League” is working to standardize skills, but there are insufficient specialized educational institutions, and we are still groping towards the realization of expertise in education in this area. Even in the area of tax systems and emissions trading, Japan lacks speed and the ability to get things done compared to Europe, resulting in limited experience and knowledge and a lack of accumulated knowledge across society. However, the market value of green transformation-related human resources is rising in the new graduate hiring market, and there is a growing need to enhance one's value by positioning oneself in this growing market. It is essential that we improve educational content and establish public infrastructure that will support the development of human resources.

He graduated from Keio University and began his career at Mitsui & Co., handling renewable-energy investments and M&A across Japan, Europe, and Latin America. While posted in Brazil, he led post-merger integration at a distributed-energy company, invested in solar, won a Mexican auction, and structured a Japanese solar fund. In 2019, he founded ASUENE Inc. with the mission of “Changing the world for the next generation.” ASUENE offers decarbonization and ESG services: ASUENE for carbon accounting, ASUENE SUPPLY CHAIN for supply chain management, ASUENE VERITAS for third-party assurance, and Carbon EX exchange. He has completed five M&A deals and raised \$74 million, growing ASUENE to offices in Japan, the United States, Singapore, Europe, Thailand, and the Philippines. Recognitions include METI's J-Startup selection, ranked 86th on TIME's 2025 “World's Top GreenTech Companies (#86), the Forbes Japan 100, Rising Star Award, and “Top 20 Entrepreneurs 2025.” He attended COP27 and COP28 and is Co-CEO and Chair of Carbon EX and CEO of ASUENE USA and APAC.

Expert Opinions

T-Shaped Professionals Will Lead Social Transformation in Response to Climate Change



Shin-ichi Ohkoshi

Dean, Graduate School of Science,
and Special Advisor to the
President, The University of Tokyo

Climate change is casting a shadow over the Earth, humanity's shared asset. Climate change is deeply intertwined with all aspects of human activity and cannot be resolved through technological development in the narrow sense alone. In addition to technological innovation, it will be essential to build systems that encourage people to act and manage the Earth more effectively, taking in all aspects of economic and social structures, including legal systems, media, education, philosophy, and ethics.

In order to cultivate a sufficient number of highly-skilled professionals capable of leading such social change, The University of Tokyo launched the SPRING GX program in 2021 for doctoral students in all fields. This is a university-wide

initiative involving 15 graduate schools. The program aims to cultivate researchers who are endlessly curious and constantly engaging in challenging research, are knowledgeable in diverse fields outside their specialization and have a broad and sophisticated education, are able to conduct creative research with researchers in a range of fields, and adopt a perspective that looks towards the solution of social issues. In other words, what is needed are highly specialized professionals possessing research skills who can cultivate knowledge in different fields with a focus on climate change issues, or "T-shaped professionals."

In the main program, from April 2025, 1315 students from various fields of study, both in the liberal arts and the sciences, will attend lectures on green transformation (GX), and discuss relevant issues in groups. Through interactions with peers from different fields, students will learn, for example, that a philosophical framework is necessary to solve the problem of marine plastics, and that even if problems are the same, solutions will differ depending on the country due to differences in laws and systems. Furthermore, to expand this initiative internationally, the university is sending more than 400 students to over 30 countries and regions each year to begin building a global network for green transformation research. The destinations include universities and research institutions such as Stanford University in the United States, which are leading in SDG rankings.

The skills gained through the program are transferable and can be applied beyond the domain of research. 30 years from now, graduate students who acquire the ability to build relationships with researchers from different fields will undoubtedly play a central role in intellectual networks across a range of fields and industries, driving solutions to societal challenges.

Professor Ohkoshi has held a position as a Professor in The University of Tokyo's Graduate School of Science since 2006. He also serves as the Project Officer for the university's SPRING GX initiative, which aims to cultivate highly skilled human resources to lead green transformation (GX) efforts. His specialized field is physical chemistry. Since 2023, he has also served as the Dean of the Graduate School of Science and as a Special Advisor to the President (Vice President-equivalent). Professor Ohkoshi has an extensive history of involvement in joint research with overseas universities, and currently serves as the Director of DYNACOM (Dynamic Control of Materials), an International Research Laboratory (IRL) organized in cooperation with the French National Center for Scientific Research (CNRS), The University of Tokyo, and the University of Rennes. He is also an Honorary Professor at the University of Manchester. He has extensive experience in overseeing human resources development programs and has been instrumental in "developing and providing educational opportunities for pioneering advanced human resources" at The University of Tokyo. He is also actively involved in industry-academia collaboration, and currently leads joint research projects with 10 companies.

Expert Opinions

Nurturing Talent That Can Decipher “Why” and Build a Common Understanding



Arisa Kishigami

Board Member, Japan
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Organization)

Addressing climate change by focusing solely on decarbonization efforts is likely to be unsuccessful. The key to success lies in bringing together individuals who are able to adopt a multifaceted perspective and a comprehensive approach, and implementing activities with consideration of short-, medium-, and long-term impacts. Placing such diverse talent in both the companies and in the institutions that support them as investors and financiers will ensure the continued implementation of activities that are aligned with the real economy and environment rather than simply following trends.

The following three qualities and abilities can be considered essential for personnel within each organization.

First, is the ability to pose “Why” questions, such as “Why should we address climate change?” and “Why is it valuable to conserve biodiversity?” and to truly understand the importance of each of the topics considered. The ability to construct logical arguments that are convincing from the perspectives of companies, consumers, investors, and other stakeholders alike is required.

Second, is the ability to see the interconnectivity across different issues in a comprehensive manner. For example, the ability to foresee how the impact of climate change in foreign countries may lead to risks within the supply chains of domestic companies. Or the ability to foresee how the extraction of raw materials necessary for responding to climate change may impact both natural capital and livelihoods.

These two qualities can be cultivated by increasing on-site visits both locally and globally so as to learn firsthand about issues from multiple perspectives. It will also be important to increase the mobility of human resources and to recruit people with experience in different sectors, actors, and professions. In addition, systems which allow holistic evaluation of human resources will need to be adopted. For example, assessing the ability to generate long-term business ideas in addition to contributing to short-term performance, and the ability to work collaboratively with other departments, industries, and countries.

In recent years, with the demand for integrated management strategies, accounting and reporting, it has also become essential to effectively utilize expertise in line with these objectives. For this reason, the third quality expected is the ability to appreciate the demand and effectively coordinate expertise both within and outside the organization, using language, communication, and collaborative skills for coordination. Specific expertise may include the ability to grasp macro trends in climate and ecosystem changes, and analyze big data.

In order to develop such qualities and abilities, there is a need to enhance learning opportunities from both finance and managerial perspectives. It is to be hoped that, in addition to focusing on the “how” (investment methods, etc.), financial literacy programs will also explain the role that finance and investment plays in society and how it relates to economic activities. It will also be desirable, for example, for MBA programs to position “sustainability” not as an add-on lecture, but lying at the foundation of the course as establishing sound, sustainable management of a company.

In 2019, Ms. Kishigami launched an independent initiative, En-CycleS (Engagement Cycle for Sustainability), to promote corporate conduct and information-sharing towards the realization of a virtuous cycle of sustainable investment and management. With the Japan Sustainable Investment Forum, she works to extend the reach of sustainable investment in Japan, seeking to build a sustainable society through the sound development of sustainable investment. Ms. Kishigami is a member of the Financial Services Agency's Expert Panel on Sustainable Finance. For 13 years, she was extensively involved in the promotion of ESG and sustainable investment-related initiatives at FTSE Russell, including as Head of ESG for the Asia-Pacific Region.

Expert Opinions

Collaborating with Asian Countries as Co-creation Partners to Address Global Challenges



Katsura Miyazaki

Executive Senior Vice President
and Chief Sustainability Officer
(CSO) of the Japan

Countries in the Asian region, a locus of rapid growth, are facing the challenging task of transition to a decarbonized society. Japan, which successfully balanced environmental conservation and economic growth having been through a postwar era of high pollution, has promoted the sharing of its experiences with developing countries. The activities of the Japan International Cooperation Agency (JICA), which prioritizes sustainable development, have a history of contributing to the development of green human resources. Thailand, where I was stationed several years ago, was the starting point for Japan's technical cooperation on environmental issues. The Environmental Research and Training Center (ERTC) was established in Thailand in 1989 with JICA's cooperation; through the dispatch of experts, monitoring, research, and training, the Center

has served as a base for JICA's efforts to strengthen the capacity of developing countries to address environmental issues through their own efforts.

In recent years, human resource development programs have become more diverse. The Science and Technology Research Partnership for Sustainable Development (SATREPS), established by JICA in collaboration with the Japan Science and Technology Agency (JST) and the Japan Agency for Medical Research and Development (AMED), promotes international joint research between Japan and developing countries. Since 2008, 214 projects have been approved in 62 countries. In the four research areas of environment / energy, bioresources, disaster prevention and mitigation, and infectious diseases control, researchers from Japan and developing countries work together based on local needs to produce knowledge and technology that have practical utility, as well as human resources who can utilize them, and we ensure that these then benefit the countries concerned.

In addition, numerous other human resource development programs are being implemented. The GX Human Resource Development Program is a study program for government officials and engineers in developing countries to study cutting-edge technologies such as hydrogen, nuclear fusion, and next-generation nuclear power, in addition to subjects including the history of energy policy, analysis of energy transition models, and electric power company management at Japanese graduate schools, so that they can develop and implement scenarios for realizing decarbonization in their own countries. The program commenced with six participants in 2023 and plans to accept 25 participants in 2025. Additionally, the Climate Change Policy Program aims to develop younger human resources by enabling them to learn, for example, how to evaluate progress toward their countries' greenhouse gas emission reduction targets and how to formulate policies for reducing emissions in the transportation sector. Both programs are part of efforts to promote the Asia Zero Emission Community (AZEC) initiative.

Providing diverse opportunities for exchange and fostering mutually stimulating relationships will also benefit Japan. In many cases, technologies that would be difficult to test in Japan could be proven in developing countries which are continuing to grow. Through co-creation with Asian partners, we seek to further promote efforts to “circulate” knowledge by not only sharing Japan's technology and experience, but also utilizing knowledge gained from the efforts of other countries to address development challenges in Japan.

Ms. Miyazaki oversees sustainability initiatives at the Japan International Cooperation Agency (JICA). After graduating from Sophia University, she worked at a financial institution before joining JICA in 1992. Prior to taking up her current position in 2024, she held a variety of positions, including Senior Vice President, Chief Representative of the Thailand Office, and Director General of the Governance and Peacebuilding Department. JICA published its “JICA Sustainability Policy” in 2023, committing to actively address environmental and social challenges in developing countries through initiatives such as climate change countermeasures and cooperation for the transition to decarbonization.