Editorial: Role of Asia towards a Decarbonized World: Roadmap of Asian Countries

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Abstract

Progress is being made in efforts to minimize the impacts of climate change. After the Paris Agreement, adopted in 2015, set the goals of keeping the long-term temperature increase well below 2℃ and of pursuing efforts to limit the temperature rise to within 1.5℃ from the pre-industrial period, the Intergovernmental Panel on Climate Change (IPCC) issued a special report on the 1.5℃ goal in 2018. Since then, the world has come to share the recognition that we should first aim for a limit of 1.5℃ instead of 2℃. To that end, the total amount of global carbon dioxide (CO_2) emissions must be reduced to net zero by 2050, The term "net zero," in this context, expresses a situation where any emissions are balanced by schemes to offset an equivalent amount of greenhouse gases from the atmosphere, such as by planting trees or using technologies like carbon capture and storage. Carbon neutral and decarbonization are also similar terms. Based on this newly set goal, many countries have set net zero emissions as a long-term goal. In this special issue, members of the Asia-Pacific Integrated Model (AIM), an international project that has been ongoing for more than 20 years, will introduce the latest net zero research results in major Asian countries. Asia as a region has had some of the largest increases in greenhouse gas emissions in the world, and achieving net zero emissions in this region will be essential for achieving the analogous global target.

Key words: climate change, model analysis, net zero, Paris Agreement, social transition

1. Background

An extensive effort is being made to minimize adverse effect of climate change. When the United Nations Framework Convention on Climate Change (UNFCCC) was adopted in 1992, people had begun to nurture concern over climate change risks, but insufficient scientific findings had been accumulated to determine what levels would be dangerous. Article 2 of the UNFCCC states "(T)he ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner." It took many years, however, for the world to determine the "level" specified in Article 2.

Twenty-three years later, finally, the Paris Agreement clarified the level. It states in Article 2(a) the long-term goal of "(H)olding the increase in the global average temperature to well below 2℃ above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5℃ above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change". At the time of the Paris Agreement negotiations, 2℃ was perceived as the uppermost ambitious target that could be agreeable to all countries, because greenhouse gas had to be net zero globally by end of this century to reach that goal, and achieving this emission goal was not an easy task to fulfill. However, some small island countries asserted that they could not persevere with a goal of 2℃. The world was already about 1℃ above the pre-industrial level, and the impacts of climate change were already being observed in many parts of the world. Insertion of the 1.5℃ target was agreed upon during the last stages of the negotiation process.

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At the time of the Paris Agreement negotiations, however, there was little scientific knowledge as to what needed to be done to reach the 1.5℃ goal instead of 2℃. The IPCC was requested to work on an assessment of the 1.5℃ goal, and it published a special report on this theme in 2018 (IPCC, 2018). The report revealed a distinct difference between the two goals, 2℃ and 1.5℃, both in terms of climate change impacts and emission mitigation efforts required to achieve these goals. According to the report, the frequency and severity of adverse impacts of climate change such as extreme temperatures and weather events would be minimized if the temperature increase was limited to 1.5℃ instead of 2℃. With this message from the report, more people started seeing 1.5℃ as the primary goal. After the United Kingdom officially set a net zero goal by 2050 within its climate change law in June 2019 (Government of United Kingdom, 2019), many countries followed suit.

On 22 September 2020, during his speech to the UN General Assembly, Chinese President Xi Jinping announced that China would aim to have CO_2 emissions peak before 2030 and achieve carbon neutrality before 2060. In Japan, then Prime Minister Yoshihide Suga also announced that Japan would aim for carbon neutrality by 2050. Early in 2021, the newly elected US President Joe Biden announced the United States' new goal of net zero by 2050. By the autumn of 2021, more than 70 countries, including the biggest polluters-China, the United States and the European Union-had set net-zero targets, covering about 76% of global emissions (United Nations Net Zero Coalition, 2022).

The 26th Conference of the Parties to the UNFCCC (COP26) was held in Glasgow, United Kingdom, in the autumn of 2021. As the host, the United Kingdom's government wanted to see countries revise their emission reduction targets for the year 2030, set long-term goals for net zero, and confirm emission pathways towards 1.5℃. The cover decision called "the Glasgow Climate Pact" states that it "(R)eaffirms the Paris Agreement temperature goal of holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels" and "recognizes that the impacts of climate change will be much lower at a temperature increase of 1.5℃ compared with 2°C and resolves to pursue efforts to limit the temperature increase to 1.5°C" (UNFCCC, 2021).

Pledging a net zero emission goal is a significant step forward towards a safe climate. Meanwhile, to reach the long-term goals, mid-term emission targets should also be ambitious. Although many countries have revised their emission targets for the year 2030, the total amount of emission targets still overwhelms emission pathways for reaching the 1.5℃ goal.

2. Asia's Important Role in Reaching 1.5℃

Asia accounts for a great share of the world in many ways. It represents about 60% of the global population in size (Worldometers, 2022). About half of global greenhouse gases are emitted from Asia (UNEP, 2022). Asia covers major emitters, including China, India, Indonesia, Japan and Korea. Therefore, Asia's commitment to 1.5°C is a prerequisite for the world to reach that goal. Asia is already taking various actions to reduce emissions. As of August 2022, 39 out of 49 countries in the Asia-Pacific region have made carbon neutrality and net-zero pledges, and have started developing enabling frameworks to support implementation of their commitments (United Nations et al., 2022). However, very few of these pledges are supported by updated, ambitious mid-term emission commitments that will scale down greenhouse gas emissions to keep global warming within the 1.5°C pathway. This means that, once countries set long-term emission goals, it becomes important for them to set ambitious mid-term emission reduction targets, and implement sufficient policies to reach those targets (IPCC, 2022).

The Asia-Pacific Integrated Model (AIM) is a large-scale computer simulation model developed by the National Institute for Environmental Studies (NIES) of Japan, in collaboration with Kyoto University, Mizuho Information & Research Institute and several research institutes in the Asia-Pacific region. AIM assesses policy options for stabilizing the global climate, particularly in the Asia-Pacific region, with the objectives of reducing greenhouse gas emissions and avoiding the impacts of climate change. An AIM team was established in 1990, and has been networking with the team members in other Asian countries. The AIM core team in Japan has long been supporting the Japanese government in conducting comprehensive assessment of emission reduction targets whenever Japan needed to determine its emission reduction targets. Today, Japan's emission reduction target for the year 2030 is "a 46 % reduction from the level of the year 2013 by 2030," while further aiming at a 50% reduction. The AIM team has been contributing by developing options for reducing Japan's greenhouse gas emissions to achieve its emission targets for 2030, as well as its net zero goal for 2050. Similar consultations are being made in other Asian countries by other AIM team members.

With the most recent modeling activities for the years between 2020 and 2022 regarding emission pathways to net zero goals, this special issue aims at bringing together AIM team members from Asian countries. Each chapter reveals today's circumstances in an Asian country, and how the country may be able to reach its net zero emission goal. This special issue will contribute to enhancing the understanding of how Asia could arrive at

its net zero goals in the long-term while maintaining the wellbeing of its people and natural environment.

3. Structure of This Special Issue

This issue starts from assessment of potentials for use of renewable energy in Asia. This is mostly because maximum use of renewable energy is indispensable to all options for Asia to reach its net zero goals. Electricity can be transferred across borders, so regional assessments for Asia as a whole will be important for seeing how renewable energy could be utilized in the most efficient way in the region.

The following articles look into countries and economies in Asia: Japan, China, Indonesia, Thailand, Vietnam, Malaysia, Nepal, Laos and Taiwan. Each country has its own national circumstances. Because net zero goals need to be reached while the people are able to maintain healthy daily lives, any emission reduction policies must take into account non-climate socio-economic issues in each country. A country-level analysis is thus needed to merge emission reduction policies with other policies.

Although countries face different issues at the domestic level, all the countries covered in this issue have a firm determination to aim for net zero in the future. Their national determination is supported by private companies that invest in emission reduction projects. Public-private partnerships will be effective toward realization of a net zero society in Asia.

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