

Roundtable with Teiko Kudo, Prof. Yukari Takamura, Tatsuya Terazawa, & Masakazu Toyoda

Assessment of COP26 & the Challenges Ahead on Japan's Path to Carbon Neutrality

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Assessment of COP26

Toyoda (Chairman of JEF): Today, we bring together three outstanding opinion leaders to conduct an “Assessment of COP26 and the Challenges Ahead on Japan’s Path to Carbon Neutrality.” From academia, Prof. Yukari Takamura from the University of Tokyo, from finance, Teiko Kudo, a member of the Board of Directors at Sumitomo Mitsui Banking Corporation, and from the intersection of academia and pragmatism, Tatsuya Terazawa, chairman and CEO of the Institute of Energy Economics, Japan.

Let’s begin with the outcome of COP26. First, I’d like to have each of you give an assessment of COP26. Was it a success or failure, and why? Prof. Takamura, could you go first?

Takamura: I have heard different evaluations of COP26 as a success or a failure. From my point of view, I would say that it was definitely a success in terms of making significant progress in combating climate change. At COP26, countries have resolved to “pursue the efforts to limit the temperature increase to 1.5°C above pre-industrial levels”, which has been stipulated as an aspirational goal under the Paris Agreement, and I believe that the COP has made the 1.5°C goal appear front and center on the international stage as a goal for the international community.

The damage caused by extreme weather events and disasters is on the rise, which is considered to be caused by climate change. The agreement to pursue efforts to achieve the 1.5°C goal is based on the most recent scientific findings, such as the ones provided by the

Intergovernmental Panel on Climate Change (IPCC), which indicates that it is necessary to limit temperature increase to a much lower level so as to mitigate the risk of future climate change. It is also commonly recognized that emission reductions over the next 10 years, up to around 2030, are critical to achieving the 1.5°C goal.

In the run-up to COP26, many countries, including Japan, set carbon/climate neutrality goals. Major industrialized countries share the goal of achieving climate neutrality by 2050, while China, Russia, and Saudi Arabia, a major oil producing country, also aim to achieve carbon/climate neutrality by 2060, and India by 2070, at the latest. If all of these goals are realized, it is expected that the temperature rise would be limited to about 1.8°C. COP26 has made the international community come the closest to the 1.5°C goal in a decade by bringing out many countries’ pledges.

The reason for being evaluated as a “failure” is that the level of emission reductions in 2030 does not meet the level necessary to achieve the long-term goal, even though the long-term goal of achieving climate neutrality by around 2050 has been firmly pledged and confirmed by countries. I think this is the reason for attracting the harsh criticism, especially from the younger generation.

Kudo: Some 121 countries had committed to carbon neutrality by the end of COP25, but other than the EU countries, most were small, so the commitments added up to only 17.9% of total global CO₂ emissions. But this time around, the lead-up to COP26 was characterized by growing enthusiasm for ambitious targets, with Japan, China, and the United States announcing national targets. By

the end of COP26, more than 150 countries including all G20 members had adopted carbon neutrality with fixed deadlines. This was a very significant outcome. In all, 154 countries accounting for 88.2% of global CO₂ emissions had announced targets of carbon neutrality by no later than 2070.

In a world that is increasingly politically and economically divided over ideology and human rights, the significance of adopting a common global target cannot be overstated. At the same time, as Prof. Takamura pointed out, so many countries acknowledged 1.5°C as the target, but there is no clear roadmap to reach it, and much disagreement among them. That is a problem.

Given the energy-profile and other differences among countries, timelines and the means to achieve targets require flexibility. Otherwise, the economic impact will differ according to existing circumstances, and some emerging economies could see the economic gap grow. The Paris Agreement takes a bottom-up approach in contrast to the top-down approach under the Kyoto Protocol, which is important.

Terazawa: Speaking as a former government official engaged for many years in international negotiations at the Ministry of Economy, Trade and Industry, I think it was a huge success just to reach an agreement among so many countries. It was hard enough when I had a hand in forging a consensus among the 20 participating countries at the G20 Summit in Osaka in 2019.

This being the case, a wide variety of countries from emerging economies like India to energy producers such as Saudi Arabia made pledges on long-term targets. It was an epoch-making event where so many countries beyond all expectations made pledges. But as successful as it was, issues remain unresolved. In particular, the gap between developed and developing countries in their positions and mindsets became evident, as could be seen in the dispute near the end over whether coal-fired thermal power should be subject to “phase out” or “phase down.”

In the end, the different perspectives of developed countries, which want to achieve carbon neutrality as quickly as possible, and emerging economies that face urgent realities including the need for economic development, became obvious.

Causes of Soaring Energy Prices

Toyoda: The second issue on our agenda is the following. COP26 coincided with rising crude oil prices. Spot prices for natural gas had

also soared. Even the price of coal is rising. And electricity rates have been rising as well in some countries. Could the recent spike in energy costs – crude oil (Brent oil) is now more than US\$90 per barrel – be connected to climate change? Given the timing, coinciding with COP26, how should we assess the causes of soaring energy prices?

Terazawa: It is difficult to cover all the factors because there are so many of them, but I would broadly divide them into four categories. First, the corona crisis is still with us, but I am certain that the recovery of economic activities in many countries has nonetheless been more robust than expected and has led to the growth in energy demand that we have been seeing. And because this was unexpected, demand has grown without the appropriate rails in place, including inventory.

Second, I’m not sure if it can be attributed to climate change, but the weather has certainly been a factor. Many countries have been going through a colder winter than usual, causing greater energy consumption, while others have seen milder winds, leading to less renewable energy being supplied.

Third is the effect of the debate and measures taken regarding climate change. Many countries are adopting the conversion from coal to natural gas as a major element of their decarbonization strategies. Demand for natural gas has grown enormously as a result, causing gas prices, LNG prices, to jump.

Fourth is the negative impact on supply caused by the growing reluctance over upstream investment in fossil fuels as part of the decarbonization trend, particularly among Western players, who are vulnerable to market pressure. In the past, when prices went up, so did supply. This time it is not happening as much, and it is my view that the debate over the global environment is affecting supply. In that sense, we may be talking about 2050, but we are already being affected now in various ways.

Toyoda: Ms. Kudo, I’d like to put the same question to you. OPEC+ oil producers appear to be fulfilling their production quotas in the face of soaring prices, but I’m hearing that there is still not enough production to meet demand. Meanwhile, developed countries, particularly some consumer countries, are making releases from their strategic reserves. What do you make of this situation?

Kudo: The OPEC+ countries are maintaining a higher production level, but they are wary of further raising output because they want

to avoid excess supply causing prices to weaken in an eventual economic downturn, while demand has been recovering more quickly than OPEC+ had assumed. I think this is the explanation.

Some consumer countries have rolled out releases from their strategic reserves, but the amounts have been limited and have not had much effect on prices.

In the past, I assume that there would have been businesses and governments beginning to make investments with an eye on the long term even if it would result in oversupply in the near term. But now they are very much afraid of ending up with “stranded assets”, so are more likely to want to limit their exposure to future risks.

Accelerating decarbonization and stabilizing crude oil prices simultaneously is a daunting task. It is very important in this respect to consider how we are going to maintain the energy supply system including the role of other fossil fuels and nuclear power as well as the shift to hydrogen and ammonia. It is essential that we clearly indicate how much fossil fuel we will need for the future and sustain investment accordingly.

Toyoda: Achieving a balance between economic stability and decarbonization will test the capability of national governments. Prof. Takamura, I have a question for you here. Featured prominently in the debate on this point is the reevaluation of the role of nuclear power, particularly in Europe. France had been cautious for years but has now begun discussing the resumption of constructing new nuclear power plants. The EU talks on taxonomy never seemed to be far from reaching a conclusion, but there now seems to be more willingness to include nuclear power and/or gas-fired thermal power in environmentally sustainable economic activities during the transitional phase.

Takamura: I think that the current surge in energy prices is a very typical recent event that raises the question of how to manage the transition to carbon neutrality and how to address the challenge of climate change while maintaining the stability of energy supply and prices. Given the global nature of the energy market, we need to manage it well on an international level, but it goes without saying this is much easier said than done since the international community has no centralized global authority. I think this poses a really difficult challenge as to how to do this.

Recent discussions on EU taxonomy yield a typical example of the reevaluation of nuclear power. If you look at the European Commission’s proposal for the EU taxonomy, there is a very strong

sense of urgency about climate change, and therefore, in its words, it may be necessary to give a certain role, at least during the transitional phase, to nuclear power – which does not produce CO₂ emissions in its operation – or gas-fired power, rather than continuing to use thermal power with high CO₂ emissions.

In this sense, it can be said that this would reflect one of the directions of the transition to an energy supply that can both solve the problem of climate change and stabilize energy prices, as I mentioned earlier, by trying to secure energy diversity in financing. Of course, not all nuclear power is automatically considered as “green” in the taxonomy. As the European Commission document also notes, it must satisfy the relevant standards for nuclear waste and safety. And I understand that gas-fired plants must also satisfy a maximum emission intensity threshold. In all cases, I think this is a typical example that raises the question of how to manage the transition to carbon neutrality and how to address the challenge of climate change while maintaining the stability of energy supply and prices.

Assessment of Japan’s Sixth Strategic Energy Plan

Toyoda: Let’s turn our attention to Japan’s Sixth Strategic Energy Plan. The plan has two milestone years, 2030 and 2050. We’ll begin with the assessment of the challenges for Japan for 2030 with COP26 as the backdrop. I’d like to take up coal-fired power first. This year’s G7 summit will be hosted by Germany, which is a vocal advocate of eliminating coal-fired power. But Japan will still be using coal-fired power in 2030. How can Japan justify its position in the face of German demands? Or could it be that Japan’s 46% reduction of greenhouse gas emissions by 2030 is not enough? The EU projects a 55% reduction over the same period, the US 50-52%. Japan may be criticized for not doing enough. What are your views on this, Ms. Kudo?

Kudo: It is our responsibility as a developed country to clearly demonstrate how we will achieve our 2030 target. We may be pushed to raise our target, but the 46% reduction itself will not be easy for Japan. It is more important to demonstrate how we will steadfastly work towards this objective.

As you are aware, the Japanese government has set the target for renewable energy in the power supply composition for 2030 at 36-38%. However, even with the ambitious assumptions put

together by ministries and agencies added up, there remains a 37 billion kWh deficit, so the renewable energy plans through 2050 must be moved up. Here, there's hope that there is room for expanding solar and wind power. Offshore wind power has great potential in Japan, but it will be difficult to secure a significant amount by 2030, given all the necessary assessments and the construction period. So the extent to which the targets for the installment of solar panels on new housing and other sites can be met will be crucial.

But bridging the 37 billion kWh gap with solar power requires 30GW in capacity, which in turn requires a 76 trillion-yen investment. There are hurdles ahead as we fulfill our responsibility as a developed country to achieve the 2030 target. I fear that even this will be difficult to achieve unless the public and private sectors work closely together.

In response to possible demands that we phase out coal-fired power, we face the same issue that all countries do. Specifically, it is necessary to achieve the 2030 target while sustaining economic growth, not to mention stable electricity supply. So we should identify the conditions that would make a phaseout possible, then figure out how to satisfy those conditions.

Toyoda: Let me ask you, Mr. Terazawa. The International Energy Agency (IEA) presents a rosy scenario in which the response to climate change produces economic growth and there is a net benefit. What are your views on this point?

Terazawa: The IEA's analysis takes a simplified approach in which it essentially makes assumptions on the amount of investment in solar power, wind power, and the like to achieve carbon neutrality and applies a multiplier to the amount to calculate the effect on GDP. This is too simple in my view. Let me give three reasons.

First, rising energy prices are inevitable in the approach to carbon neutrality, but the IEA's analysis does not take into account the effect of the higher prices. This is a significant omission.

Second, money is not unlimited, so investment in renewables and the like means that funds that would have been directed elsewhere are being diverted to that purpose. There's a need to analyze the net effect of the positive effects of the hypothetical investment that would have been made absent the investment in renewables and the positive effect of the investment in renewables. It's not there.

Third, the IEA analyses the global impact, so more renewables mean more investment in solar panels, which is a positive for the

economy and employment. But think about where the solar panels are being made. Countries that do not manufacture solar panels or manufacture them but are seeing their shares decline, such as Japan, will not see domestic production and employment grow just because domestic demand for solar panels grows. The economic impact of carbon neutrality will be very different depending on whether your national economy produces the necessary resources or solar panels, or merely consumes them.

Unfortunately, Japan does not produce a wide variety of critical minerals and imports a high proportion of its solar panels. The impact of carbon neutrality on our country must be examined in greater detail.

Toyoda: Prof. Takamura, what is your assessment of the overall 2030 energy mix? Renewables more or less represent a twofold increase, while 27 nuclear reactors have to be operated at 80% capacity but only 10 reactors are in operation now. Meanwhile, hydrogen and ammonia have just been rolled out and only have a small share. What is your assessment of the feasibility of the 2030 target?

Takamura: I also think that the IEA's simulation analysis, as pointed out by Mr. Terazawa, does indeed have some limitations. On the other hand, if we look at it another way, the challenge is how we can elaborate and implement climate policies to stimulate economic growth and to create employment or at least to avoid a negative effect on it.

I believe that none of the goals for the 2030 energy mix is easy to achieve. This time, in particular, Japan's 2030 climate target and the 2030 energy mix that supports it were decided so that they would be consistent with the 2050 climate neutrality goal. This means that the 2030 energy mix is a target towards which policies are to be mobilized to enhance energy transition. In that sense, the nature and function of the energy mix may be different from the one in the previous strategic energy plans.

As for renewable energy, I do think that it will not be easy to achieve. On the other hand, the 2030 renewable energy target in the 2030 energy mix does not sufficiently reflect some assumptions likely to be realized in the future. One is the cost reduction potential of renewable energy. For example, the cost of offshore wind power was not yet known on a commercial basis at the time, so the potential for reducing the cost of offshore wind power generation has been estimated rather conservatively.

The other thing is that the targets for renewable energy were

elaborated based on the amount of renewable energy expected to be introduced under government policies and subsidies, starting with the feed-in tariff scheme. Meanwhile, business efforts to switch energy use to renewables to achieve their own climate targets are gaining momentum. Some of these businesses use the feed-in tariffs or receive government subsidies, but others do not. It is difficult to quantitatively assess the prospects for expanding renewable energy which companies do on their own without government support, and I understand that it is not fully factored into the renewable target in the energy mix.

In this sense, the renewable energy target is not easy to achieve, but I believe that it has a good chance of being achieved. The challenge is to reduce the cost of renewable energy, and I think it is important from the perspective of reducing the cost that the existing power system and its relevant rules, including the power grid and power market, should be transformed to make them compatible with the power system that allows and enhances the shift to renewable energy as the main power source.

In addition, expansion of renewable energy will only be possible where it is accepted by local communities where it occurs, so I think that how to introduce renewable energy through local initiatives and in symbiosis with local communities is a critical issue for renewable energy policy.

In my view, it would be very difficult to achieve the target for nuclear power. The reason for this is that policy alone would not be able to bring more reactors into operation since the consent of the local communities is required in addition to meeting safety standards. The difficulty here is that rolling out policy measures alone will not lead to immediate change because there are determinant factors other than policy in play.

Lastly, as for new energy sources such as hydrogen and ammonia, they are included in the 2030 energy mix in order to provide support and incentives for the expansion of these new energy sources. I think the challenge for hydrogen and ammonia in 2030 will be how far we can develop the infrastructure for their introduction, including the supply chain, and at the same time to reduce their costs through various measures.

Terazawa: Achieving the 2030 targets for renewable energy requires the acceleration of the introduction of renewable energy beyond the speed with which mainly solar power rapidly expanded over the last five years under the feed-in tariff system.

Now, the feed-in tariffs are going to be replaced by a new system

of feed-in premiums, and this is creating uncertainty. And solar power in particular is facing increasing friction with local communities. Japan has a huge lead over the rest of the world in the ratio of solar panels to level ground unit. Golf courses and other unused land had made the going easy under the feed-in tariff regime. But going forward, it will be necessary to install solar panels where more reconciliation with local communities is required. This must take place while the system is transitioning from feed-in tariffs to feed-in premiums, making the acceleration even more difficult. Acceptance from local communities will be even more important for renewable energy going forward.

The target for nuclear power will be very difficult to achieve if the current speed of safety examinations prevails. Of the 27 reactors that must be in operation to achieve the 2030 target, 10 are currently in operation and seven more have been approved, but the other 10 are still under examination. Of these 10, applications were submitted for three of them in 2013 and four in 2014, so their examinations have already taken seven, eight years. There are nine more reactors that are not being decommissioned that are waiting their turn to be examined. All this means that unless the safety examination system is reinforced and the examinations are conducted smoothly and optimally while upholding safety as the absolute objective, it will be extremely difficult to bring all 27 reactors back to operation by 2030.

As for hydrogen and ammonia, cost reduction is necessary, but they will inevitably be more expensive than other fuels. How can the more expensive hydrogen and ammonia be deployed? The government is doing research and development including demonstration tests, but the path to actual deployment is a task for the future.

Kudo: I see the energy mix in the new plan as a milestone on the road to carbon neutrality. A clear roadmap must be given to make sure that it is reached. Using hydrogen, ammonia, and other fuels and how we integrate digital transformation are the keys here.

The Green Innovation Fund provides support up to the demonstration test stage, but the subsequent commercialization phase requires massive funds. There is an urgent need for discussion on how the public and private sectors should work together on this.

Where digital transformation is concerned, there is a need to take up the challenge of creating new business models and energy management systems by developing and deploying technologies for improving power generation efficiency and power storage while

pursuing optimization and controlling demand using sensors and artificial intelligence. If we do this, we should be able to achieve the 2030 target.

Toyoda: The Sixth Strategic Energy Plan also addresses 2050. What is your assessment of the fact that it presents multiple scenarios for the 2050 target?

Kudo: The results of the multi-scenario simulation including cost structures for 2050 yielded many useful insights. If decarbonization aimed at carbon neutrality is pursued without securing social and economic buy-in, there will be an inevitable backlash, making the efforts unsustainable. That is why a virtuous circle between the environment and the economy and strategies to achieve this compatibility are essential.

Climate change policy is a constraint that raises costs, so the key is the balance between cost and growth: specifically, how do we secure economic growth while absorbing those costs? It is also necessary to consider securing the public's consent to introduce measures such as the waiver of levies on industries, like Germany does, and the priority distribution of environmental values to exporters.

On top of this, it is essential to secure wide acceptance of Japanese technologies that contribute to decarbonizing heat, chemicals, and transportation such as hydrogen and carbon capture, usage, and storage, the so-called CCUS. The technology race is already under way. Support from our government on rulemaking is essential.

In this area, it is necessary to find ways to facilitate the flow of funds to innovation. As a financial institution, we are prepared to be aggressive in assuming risk, and the private sector can provide the funds for the introduction and deployment of established technologies such as renewables. But massive funds will be necessary in the initial stages for R&D and social implementation, while banks are under the obligation to protect depositors, so there's a limit to the extent to which we can satisfy the need here. We want to consider a combination of public- and private-sector funds where public institutions provide some risk capital that can be leveraged to mobilize massive private-sector funds.

Takamura: This was probably the first time that we did a thorough study of 2050 based on multiple scenarios. The insights obtained from this are significant. In this sense, multiple-scenario studies

should continue to be necessary in the future as well. This time, the 2050 energy/power mix was introduced as one of the reference scenarios for scenario analysis, and the composition of power sources and energy sources in the scenario does not necessarily reflect the outlook for costs. If the outlook for costs changes, the 2050 energy mix considered as economically rational will also change. It is important to continue analysis based on multiple scenarios with this understanding of the current scenario analysis firmly in mind.

On the other hand, what was commonly recognized as important through the scenario analysis is that we need to take a proactive approach to the challenge of how to reduce the system integration cost when renewables take up a larger share of the power supply, for instance, induced by its declining costs due to further progress in technologies. I think this is a point that everyone thought was very important through this scenario analysis. In order to reduce system costs, it is necessary to consider measures on the demand side, such as use of distributed energy resources including EVs and measures to induce energy consuming companies to locations with rich renewable energies, as well as maintenance and expansion of the grid. This was a very important study in the sense that it clearly identified these issues.

Terazawa: Broadly speaking, it was very useful to discuss multiple scenarios for 2050. I'm being told that the discussions focused on a choice between renewable energy and nuclear energy with the result that many other important issues were not sufficiently discussed.

Specifically, electrification led by renewables is expected to top out at about half of the total energy consumption. So what about the other half? Hydrogen appears to hold the most promise, but what are we going to do for decarbonization of the non-electricity sector? Since that is actually where the strength of Japan's industries is concentrated, it's very unfortunate that there was not much debate on what accounts for half of Japan's decarbonization needs and will determine the future of Japanese industry. If you care about economic growth in the future, this is where we should focus.

Second, other countries are putting a lot of effort into negative emissions. China, the US, and European countries all include significant amounts of negative emissions. It's very unfortunate that there is very little debate in Japan on this point.

Japan is blessed with an abundance of forests. Japan is surrounded by the ocean. But this is not being featured at all in the discussions; the argument is as if we are giving up on setting up

much more solar power because level ground is limited here. Making effective use of our forests and ocean to generate more negative emissions should figure more prominently in the overall debate.

As for nuclear power, extending the operation life span of nuclear power plants will grow in importance as a challenge with the passing of time. It should be extended from the initial 40 years to 60. But this approach has its limitations. The number of nuclear power plants will decline in a business-as-usual scenario even with the extension to 60 years. A conclusion was unable to be reached on the role of nuclear power on this occasion. There is a serious need for debate in depth on this issue.

Here, I am particularly concerned about hydrogen. Hydrogen is given a major role in the industrial sector, but where is the massive amount of hydrogen necessary going to come from? Imported hydrogen will be very expensive because the transportation costs will be high. Hydrogen produced domestically from renewable energy will also be expensive. A third option is to produce it with nuclear power, which is what France is working on. In fact, this is a major reason for France's turnaround on nuclear power policy.

Protecting Japanese industries and jobs requires inexpensive and abundant hydrogen, but hydrogen that is imported or produced from domestic renewables is expensive. We can't help losing out in the international competition in that case. If businesses cannot secure cheap, abundant hydrogen, they will locate elsewhere. The debate on nuclear power should be conducted more reasonably, including the matter of how we will produce the hydrogen to protect our industries and employment.

Assessment of Carbon Pricing & Border Tax Adjustment

Toyoda: I would like to go back to the global stage for our final major issue. Carbon pricing is one of the two systems being promoted as measures necessary to achieve carbon neutrality. There is an ongoing debate in Japan around two options for this – carbon tax and emissions trading – and consensus is hard to come by.

The other is border tax adjustment, where the issue is the carbon leakage from developed countries as a result of factories fleeing to developing countries. I would like to hear the views of our panelists on these two systems.

Terazawa: We should reduce costs drastically in order to deploy technologies that contribute to decarbonization, be they for

hydrogen, ammonia, or whatever. As a practical matter, it is very likely that they will remain expensive. Since it is unlikely that more expensive technologies will be adopted as a matter of course, intervention through policy measures is inevitable. But carbon pricing is one of many means of policy intervention, which include regulation, subsidies, and price differential compensation. Carbon pricing should be considered as one option among a range of policy interventions. Given the pros and cons of each measure, selecting the optimal options for the respective circumstances will be crucial.

The other point is to encourage the switch from environmentally undesirable technologies to desirable technologies through carbon pricing. This is predicated on the existence of desirable options. That's when carbon pricing could promote the switch from one to the other. Many decarbonization technologies are not actually available yet. Carbon pricing should be considered as one among a variety of options for policy engagement, keeping in mind the timeline for the more desirable technologies becoming available as practical options.

Businesses look to the future. It is essential for the government to provide predictability by showing how such policies and systems are going to take shape in the future instead of suddenly bringing them up at a future date for discussion.

As for border tax adjustment, I do have sympathy for the notion that assuming an extra burden, regardless of what others are doing, puts your industries at a disadvantage in international competition. But if you adopt this approach across the board, you might end up advocating the extreme position of making border adjustments for all imported products that give rise to CO₂ emissions.

The international trade regime under GATT and the WTO has been a key driver of economic growth since World War II. The reduction of tariffs under free trade agreements also helps the global economy. There is a risk that this successful set of policies could be seriously undermined depending on how aggressively border tax management is pursued. I have sympathy for the desire to introduce border tax adjustment. But if it is to be adopted, it must be limited to extreme cases as a last resort. Otherwise, it will cause great harm to the global economy, so the system must be designed with the utmost care.

Takamura: I think we need to seriously consider some kind of carbon pricing to make the value of carbon reduction, or in other words, the cost of emitting carbon, more visible, while the choice between carbon tax and emissions trading depends on the design or nature of the scheme.

If the value of new decarbonization technologies is not made visible in the long term, there will be no corporate action to invest in their development and to commit resources to it. In addition to new decarbonization technologies, carbon pricing is also necessary as a signal from the policy side that will help companies respond to a decarbonizing market and society by shifting their business portfolios.

Of course, a carbon tax could be part of the debate as means to secure revenue for supporting the transition to a decarbonized society, and how the scheme should be designed will have implications on allocation of costs. From these perspectives, it is very important to consider carbon pricing. However, the most important is how to give a clear signal about predictability that the value of emissions reduction will definitely increase in the future.

My second point is that under the Japanese system, businesses make a variety of payments on and around energy, but it is difficult to see from the outside that they are paying the cost of carbon emissions. There are many policies and measures existing in parallel, with the result that the overall system is not designed to make businesses pay in proportion to their carbon emissions. In this sense, it is inevitable to re-examine the existing system when discussing carbon pricing.

Finally, my view on border tax adjustment. Now, not only EU but also Democratic members of the US Congress have also introduced a proposal on border tax adjustment. This is what we must keep an eye on. The effectiveness of climate policy is one of the strongest reasons behind this. We, especially developed countries, import a lot of goods to run our economy and society, so we need to reduce our emissions not only within our jurisdiction but also on a consumption basis. There is also an ethical basis behind the call for border tax adjustment. From the business perspective, it is important for businesses to firmly grasp and reduce the life-cycle emissions of their products and services so that they will be well-prepared if and when border tax adjustment is introduced.

Kudo: In principle, I support the use of carbon pricing to reduce emissions, in as much as it is intended to internalize an externality; in practice, there are issues. We cannot achieve an optimal solution unless safety, energy security, and other externalities are internalized, not just emissions reduction.

It is necessary to maintain basic industries in Japan from a national security perspective. We should not discard an industry solely for its CO₂ emission factor. It is my understanding that our

government also believes that we should first consider voluntary mechanisms such as the “GX League” and aggressively promote technology innovation to reduce CO₂ emission factors while maintaining vital industries and employment.

As for emission rights, if we leave the matter to market forces, too much supply will diminish the policy effect, while soaring prices will reduce economic growth. There’s also the possibility that unsustainable technologies may be used, so the system must be designed with care. Businesses also pay a variety of taxes that are not linked to emissions. Automobiles, for example, are charged with a variety of taxes that add up to a very heavy burden. The time has come to reconsider the overall tax system, its justifications, and how the revenue is spent.

Meanwhile, in response to border tax adjustment as well as national commitments and regulations, businesses are beginning to identify the volume of their own emissions in order to maintain international competitiveness. Looking to the future, as emissions are tracked with greater precision under a life-cycle assessment approach, more policy options should become available. But first, the important thing is to consider helping businesses identify the volume of their respective emissions and providing incentives to reduce those emissions.

As a financial institution, we are often asked if we could provide financing with carbon credits as a revenue source for repayment. It is difficult to provide support for carbon credits unless there is sufficient predictability in their volume and price. In addition to measures to invigorate the market, it would be easier to consider providing finance if there were a system for their purchase by our government, like other countries are doing. The Japanese government should not hesitate to express its views on border tax adjustment. At the same time, it must be resolute in making sure that our export industries are duly protected.

Toyota: I think we have a consensus here that some form of carbon pricing is necessary but that existing regimes need to be revisited. As for border tax adjustment, it must be approached with caution since we worry that it could link up with protectionism in developed countries and generate a new North-South problem.

Thank you very much. This has been a great discussion.

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Written by Naoyuki Haraoka, editor-in-chief of *Japan SPOTLIGHT*, with the assistance of TapeRewrite Corporation.