

Urgent Messages on COP21 Negotiations and Related Domestic Measures

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Expectations are high that a post-Kyoto international framework on countering climate change will be agreed upon at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21). Participating countries are expected to seriously consider their contributions and endeavor to build consensus based on the spirit of mutual assistance and concession acknowledging that global warming is a common challenge to be jointly addressed by all countries. However, in the actual UN negotiations, countries are pursuing their national interests amid complicatedly intertwined political and economic interests.

These urgent messages aim to explore Japan's most appropriate international contribution and domestic measures taking into account different nature of the new framework from the Kyoto Protocol.

We hope this proposal will contribute to policy discussions before and after COP21 on international negotiations and domestic measures.

I. Develop negotiation strategies aiming at agreement at COP21 with a clear understanding of the essence of climate negotiations

Message 1

- **The strategic target of post-2020 framework negotiations in Paris is to confirm the participation of developing countries such as China and India in the new international agreement for mitigating GHG emissions. While the Kyoto Protocol had top-down and stringent structure, it failed to effectively resolve global warming issues since developing countries were exempted from mitigation obligations. It is a shared view that, even though the new agreement is bottom-up and flexible, it must ensure participation by all countries.**
- **However, there still remain such arguments as the inclusion of legally-binding quantitative targets and the dichotomous framework differentiating obligations between developed and developing countries. Such anachronistic factors deriving from the Kyoto Protocol would only result in the withdrawal of the US and China and will do more harm than good.**
- **It is crucial that the new agreement will be respected and implemented by the next US administration to be launched in 2017. If the framework determined at COP21 takes the form of a treaty or protocol that requires parliamentary approval for ratification, Japan should commence deliberations for ratification after confirming the position of the next US administration.**
- **At the time of the ratification of the Kyoto Protocol, there was an argument that “an agreement is better than nothing even though it is ineffective without the participation of major economies”. This should never be repeated since it will only drive the world away from the true resolution of global warming issues.**

- The United Nations Framework Convention on Climate Change (UNFCCC), adopted in 1992, bears great importance as a basic law regarding international measures to prevent global warming. However, it embedded the principle of “common but differentiated responsibilities” and the dichotomy between Annex I countries (developed countries) and non-Annex I countries (developing countries), categorized based on the economic strength of each country at that time.
- The Kyoto Protocol, adopted in 1997, took this dichotomy further and established a framework obliging only Annex I countries to reduce GHG emissions and allocating emissions allowances among them on top-down basis. However, this resulted in the withdrawal of the US on the ground that the Protocol did not mandate commitments for developing countries and would result in serious harm to the US economy. Therefore, the Protocol had embraced a critical defect from its very beginning.
- Furthermore, with the rapid increase in emissions from China and other developing countries after 2000, developed countries with the obligation under the Kyoto Protocol have come to account for less than one-fourth of global emissions. As indicated in the IPCC AR5, it was apparent that the Kyoto Protocol would contribute little to the global GHG emissions reduction well before its entry into force.
- At COP13 in 2007, the Bali Action Plan was agreed upon to launch negotiations on a new framework to follow the first commitment period of the Kyoto Protocol ending in 2012. Based on the acknowledgement that the current economic growth of developing countries will become the main contributing factor to future increases in GHG emissions, the negotiations were intended to design a new framework with the participation of all major emitters including the US and China. However, developing countries strongly insisted on the establishment of the second commitment period under the Kyoto Protocol. This is because the Kyoto Protocol was a convenient “sacred text” based on the dichotomy exempting them from

emission reduction efforts and symbolizing the “historical responsibility” of developed countries.

- Japan announced its intentions not to sign onto the second commitment period of the Kyoto Protocol on the first day of COP16 (Cancun, Mexico) in 2010 for the reason that “the Kyoto Protocol under which the US and China do not bear mitigation obligations will not lead to a fair and effective framework with the participation of all major economies”. Despite strong criticism from developing countries and environmental NGOs, Japan persistently maintained its position up to the end, which consequently functioned as a kind of shock therapy and contributed “to settle an issue that had been haunting these talks for a decade: the standoff between those who want to hold onto the protocol’s crude division of the world between developed and developing countries and those who want to move to a framework that may be more in line with the reality of solving the problem”¹
- The Cancun Agreements, which were adopted at COP16, provide for a bottom-up framework under which both developed and developing countries voluntarily pledge mitigation targets/actions that will be measured, reported and verified (MRV). With the aim of fixing the flaws of the Kyoto Protocol, the Cancun Agreements are based on completely different ideas from those of the Protocol. There is no doubt that the post-2020 framework to be agreed upon in Paris will basically be in line with the same concept of the Cancun Agreement.
- However, many disrupting factors remain towards COP21. The EU and small island states are seeking agreement similar to the Kyoto Protocol with legally-binding mitigation targets. A group of developing countries including China and India advocate that the principle of “common but differentiated

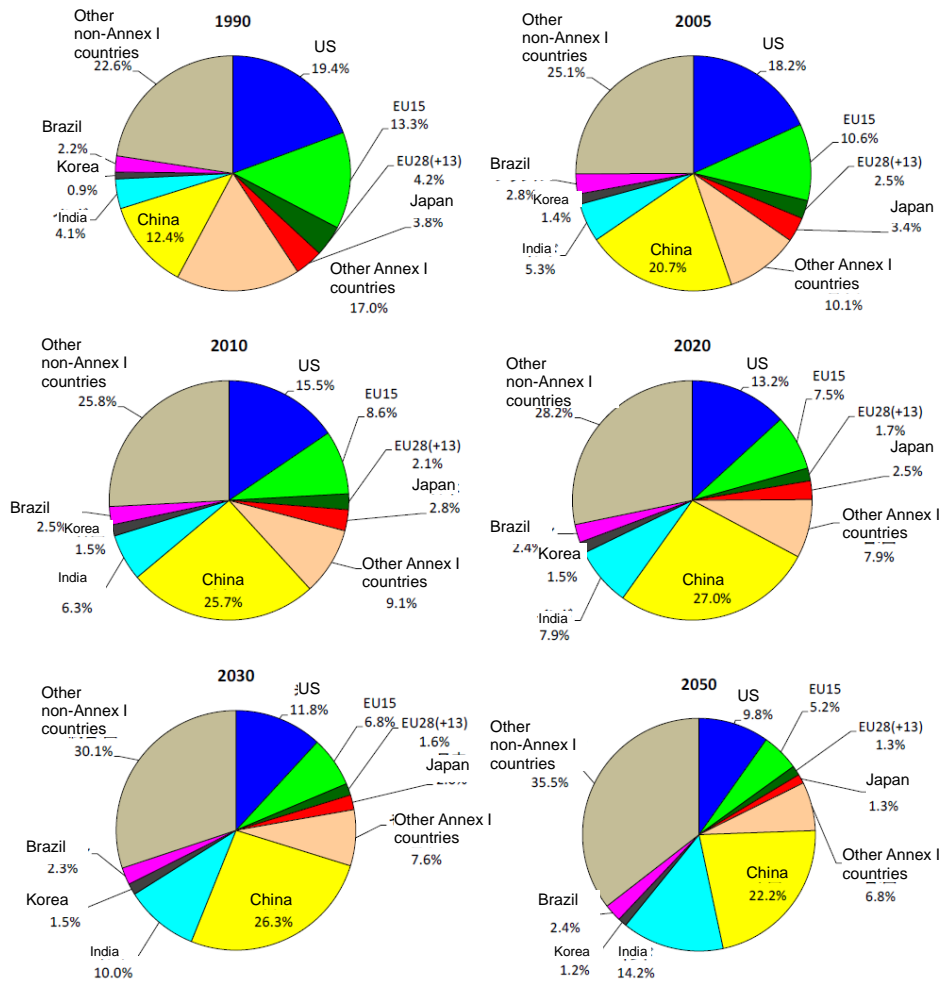
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<https://www.americanprogress.org/issues/green/news/2010/12/08/8733/has-japan-killed-the-kyoto-protocol/>

responsibilities” should not only be reflected in the differentiation of pledges but also be made explicit in the framework as a whole. Both groups seek to maintain “the essences of the Kyoto Protocol” in the new framework. However, the former crosses the red line of the US and China’s red line, and the latter goes beyond that of the US. In other words, persisting “the essence of the Kyoto Protocol” is none other than a “recipe for failure” that will lead to the withdrawal of the US and China.

- US situation deserves close watching. The Obama administration is focused on global warming issues and is expected to play an active role in fostering agreement at COP21, which should be welcomed. At the same time, it is essential that the agreement continues to be respected and implemented under the new US administration to be launched in 2017.
- There are still uncertainties regarding the form and contents of agreement to be formulated at COP21. Nevertheless, if an agreement is reached in the form of a treaty or protocol, which requires parliamentary approval for ratification, Japan should commence its deliberation only after confirming the position of the next US administration.
 - However robust and environmentally stringent, a framework without the participation of the US and China, which collectively account for around 40 percent of global GHG emissions, bear no significance from the perspective of countering global warming. At the time of the ratification of the Kyoto Protocol, there was an argument that “an agreement is better than nothing even without the participation of major economies”. We should never be caught in such trap again.

Figure 1: GHG emission shares by country and future forecasts



(Source: RITE)

Message 2

- Climate change negotiations are an “economic war without weapons”. In the negotiations, each country strategically aims to avoid shouldering burdens by making various efforts to make its pledge appear ambitious and thus gaining a political and diplomatic advantage. Japan must engage in negotiations with clear strategy bearing its national interests in mind.
- A bottom-up agreement can only be sustainable when countries mutually verify that they are faithfully implementing their pledges, and mutual trust is fostered through no cheating. Without such mutual trust, it would be impossible to negotiate further strengthening of measures and thus difficult to gain domestic support on consequent increase of national burden.
- The utmost priority should be given to sound and effective implementation of measures rather than achievement of the quantitative targets, which are influenced by various variables and external factors. Under a target centric framework such as the Kyoto Protocol, countries will present easily achievable targets and may withdraw when they are likely to fail their targets. This will simply provoke mutual distrust among countries and induce lower levels of ambition.
- Discussions obsessed with comparisons of target numbers among developed countries are based on the anachronistic mind-set at the time of the Kyoto Protocol and are completely irrelevant to current negotiations. What matters is comparability of efforts, not percentage numbers. It should strictly be avoided to raise a target without solid basis or stick to the target even though its underlying assumptions have changed.

<Climate negotiation is an economic war without weapons>

- Global warming is one of the largest “external diseconomies” in which daily individual and corporate economic activities cause adverse effects on the global environment. While the benefit of preventing global warming is enjoyed at a world level, the costs of GHG emissions reduction measures are incurred in individual countries. This structure inevitably creates “free-riders” putting the burden upon other countries while enjoying the benefits. That is why negotiating countries are calculating their national interests in a cool-headed manner. While trying to present their targets as ambitious by employing convenient base year, developed countries are carefully ensuring that they are not left with comparatively disadvantageous economic burdens. Developing countries are trying to put as much mitigation burden as possible on the shoulders of developed countries while trying to gain the largest possible amount of financial and technological assistance.
- In contrast, such debate as “Japan should present high targets to build momentum in negotiations” is too naïve without due regard to the reality of climate change negotiation. Some might argue that Japan would gain an internationally honorable position or intangible national interest by doing so. However, a framework imposing heavier burdens than competitors would result in damaging Japan’s national strength and losing support from general public. Such approach is politically and economically unsustainable.
- Climate change negotiations address long-term targets for the years 2030 and 2050 and will continue further into the future. While the UN negotiations are excessively focused on national targets, Japan should argue that truly effective global warming countermeasures are transfer and dissemination of advanced clean and energy efficient technologies and development of innovative technologies. Japan should take the initiative in these fields and invite other countries to join.

<Negotiations towards agreement in Paris>

- An important agenda at COP21 is to establish a sustainable pledge and review scheme under which countries will mutually verify their national efforts incorporated in the INDCs and foster mutual trust through confirming the sound implementation of policies for achieving their targets. The scheme would be premised upon the data reliability. However, the official data regarding GHG emission in China and India lag a decade behind. China's emission data, in particular, have proved to contain massive errors and omissions of over 200 million tons per year due to corrections of its coal statistics², which amounts to half of Japan's annual emissions in just three years. It is crucial to develop a system where all major emitters collect and disclose precise data. Basic infrastructure for MRV (measurement, reporting, and verification), most notably, accurate statistics, is prerequisite for building an effective pledge and review scheme. In this context, sectoral approaches compiling data and identifying effective and efficient emission reductions potential are should seriously be considered.
- What matters in a pledge and review scheme is that measures are faithfully implemented and implemented measures are effectively reducing emissions. The achievement of percentage reduction targets from base year is not important as such since they are affected by various variables such as economic growth rates and energy prices as well as external circumstances. Under a target centric framework such as the Kyoto Protocol, countries failing their targets would withdraw (like Canada at the time of the first commitment period) and if the targets are obligatory, countries would choose to announce low and easily

² "China's CO2 emissions to peak at a higher level than conventional assumptions and discussions on early peak out considered premature." [Nobuhiro Horii](http://ieei.or.jp/2015/03/opinion150331/), Associate Professor, Graduate School of Economics, Kyushu University
<http://ieei.or.jp/2015/03/opinion150331/>

achievable targets, which would result in lower level of ambition.

- It is also anachronistic to be obsessed with the comparison of target numbers. When Japan's 2030 target was considered, it was often argued that "Japan cannot withstand in the forthcoming negotiation without presenting comparable targets with those of the US and EU" or that "Japan should lead international negotiations by setting an ambitious target". Such ideas are based on the mind set at the time of the Kyoto Protocol negotiation just focusing on the target numbers. Japan should, of course, pursue "comparable reduction efforts with those of the US and EU." However, this does not imply that "reduction target need to be the same level as those of the US and EU". When the mid-term target for 2020 was deliberated under the Aso administration early 2009, "fairness and comparability of efforts" was fully taken into account due to bitter experiences from the Kyoto Protocol negotiations³. It would only be regressive to seek "comparable target numbers with those of the US and EU."
- Japan's INDC target of 26% reduction by 2030 compared to 2013 was formulated by delicately balancing the calls for energy security, energy cost reduction and global warming prevention and carefully compiling individual policies, measures and technologies in a bottom-up basis. It is a highly demanding target premised to 20-22% share of nuclear and 22-24% share of renewable out of total power generation and 17% reduction of power consumption below BAU levels, which is equivalent to energy saving levels at the time of the oil crises.
- In contrast, the US target of reducing 26-28% by 2025 compared to 2005 has not been based on such bottom-up compilations and the underlying policy measures are yet to be revealed⁴. Furthermore, this

³ The equalization of marginal abatement costs had been proposed as an index to measure the "fairness of efforts" among countries.

⁴ U.S. Chamber of Commerce Institute for 21st Century Energy has reported an analysis

target is exposed to criticism from the Republican Party that it is “too much of a compromise to China”. The EU’s target of reducing 40% by 2030 compared to 1990 includes LULUCF of 4%. Given that 32% reduction is envisaged on the basis of current policies, EU can reduce emissions up to 36% without taking additional measures⁵. Furthermore, if past targets are “overachieved” and reductions are carried over beyond 2020, the hurdle will be even lower.

- Since Japan has already achieved a high energy efficiency level, the marginal abatement cost of its target is significantly larger than that of

that tallying all announced programs, including regulations on coal-fired thermal power plants and vehicle fuel efficiency regulations, will not amount to reductions by 26%. “Mind the Gap: The Obama Administration’s International Climate Pledge Doesn’t Add Up” Institute for 21st Century Energy(2015.5)

<http://www.energyxxi.org/mind-gap-obama-administrations-international-climate-pledge-doesnt-add>)

⁵ The INDC submitted to the UNFCCC Secretariat by the EU includes land use and forest sinks, which European environmental think-tank Ecofys has estimated to contribute to reductions of 4% below 1990 levels. The working paper compiled by the European Commission upon proposing the 40% target estimates that emission will be reduced by 32% relative to 1990 levels on the basis of current policies.

<http://www4.unfccc.int/submissions/INDC/Published%20Documents/Latvia/1/LV-03-06-EU%20INDC.pdf#search='eu+intended+nationally+determined+contribution'>

<http://www.ecofys.com/en/publications/climate-action-tracker-policy-brief-february-2015/>

<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014DC0015&from=EN>

Also, “Has the EU Commission weakened its climate proposal? Possibly” co-written by Ecofys, the Potsdam Institute for Climate Impact Research (PIK), et al. is critical of the inclusion of removals by the LULUCF sector in the target.

<http://climateactiontracker.org/news/187/Has-the-EU-Commission-weakened-its-climate-proposal-Possibly.html>

the US and EU. According to an analysis conducted by the Research Institute of Innovative Technology for the Earth (RITE), as shown in Table 1, the marginal abatement cost of 26% target is 380 US dollars per ton, which substantially surpasses those for the EU (160 US dollars) and US (60-70 US dollars). Japan’s target is by far a more ambitious target than those of the US and the EU rather than comparable with them. Japan could take pride in its INDC internationally, in terms of both the meticulous process of formulating its target and the high level of ambition.

Table 1: Emission reduction targets and marginal abatement costs in major economies

	Marginal abatement costs (\$/tCO ₂ eq)	
	Low	High
Japan: -26% relative to 2013 (2030)	approximately 380* <small>(approximately 280 when target is limited to CO₂ emissions of energy origin)</small>	
US: -26-28% relative to 2005 (2025)	57	76
EU28: -40% relative to 1990 (2030)	168	
Russia: -25-30% relative to 1990 (2030)	0	12
China: peak out of CO ₂ emissions in 2030 (15-16GtCO ₂ -eq based on RITE emission projections)	0	9

* The absorption of 2.6% through sink activities is not included in costs as forest sink measures but calculated among measures to reduce energy-related CO₂ emissions and other GHG emissions. The same applies for other countries.

(Source: RITE)

- The argument that “Japan can lead international negotiations by setting an ambitious target” is not valid either. While Hatoyama administration

presented 25% reduction target by 2020 compared to 1990 levels and received applause at the time, this did not at all change the dynamics of international negotiations. Even with the Aso administration's target of 15% reduction compared to 2005, negotiations would undoubtedly have followed the same path. It is unconceivable that the fate of the COP 21 will be affected by the scale of pledges made by each country.

Message 3

- **Japan's industry sector has been achieving significant GHG emissions reduction and energy efficiency improvement through pledge and review approach, namely, the Voluntary Action Plan on the Environment and the Commitment to a Low Carbon Society. Now that a similar bottom-up approach is likely to be agreed upon as an international framework, Japan should provide know-how and information towards the successful implementation of the new framework, drawing upon its successful experiences pursuing the PDCA cycle.**
- **An important factor of success is to allow flexible reviews of targets in accordance with circumstantial changes. Hurdle should be lowered to secure wide and continuous participation by all countries.**
- **Japan's contribution to the fundamental resolution of global warming issues should be centered on its strong technological capabilities through dissemination of low-carbon technologies and development of innovative technologies.**

<Japan's contributions (1): Leading the successful implementation of a bottom-up framework>

- An effective pledge and review system requires establishment of a mechanism to follow a PDCA cycle in implementing INDCs.
- A confrontational, accusatory and punitive process searching for flaws and criticizing other countries' target levels and their progress would only raise the hurdle of the new framework and consequently impair the full participation of all major emitters, which is the goal of ongoing negotiations. In order to ensure workability and virtuous cycle, the process should be cooperative and facilitative where countries explicitly describe the contents of their targets and the measures to be taken towards achievement and engage in mutual learning and

encouragement based on best practices.

- In Japan, industries have pledged targets under the Voluntary Action Plan on the Environment and the Commitment to a Low Carbon Society. These targets have continuously been evaluated and validated as well as reviewed for their implementation in government committees and across industries. Facilitative, not punitive process has encouraged continuous enhancement of measures through PDCA cycle⁶. This process bears strong similarity with the basic structure of the new international framework based on pledge and review of INDCs. Japan should contribute to the designing of such international framework by providing input regarding its experience and knowledge.
- It is also important not to preclude options to review targets. The EU and small island countries are insisting on “no backsliding” which allows only upward revision of targets to more ambitious levels on grounds that the targets are insufficient in achieving the 2°C target. Needless to say, countries should aim at more ambitious GHG reduction in the medium to long term through technology innovation. However, this should be distinguished from short-term emission reduction pathways that tend to fluctuate in accordance with various unpredictable economic and natural conditions while the impact of innovation cannot yet be expected. If revisions are not allowed except for upward ones once INDCs have been submitted, the targets will, in effect, constitute legally binding minimum level. This will not only stymie the submission of targets by developing countries but also drive countries into pledging only modest targets. It will also limit the policy options of future administrations elected democratically. Moreover, it will undermine the sustainability of the

⁶ Under the Keidanren Voluntary Action Plan on the Environment, which was implemented during the first commitment period of the Kyoto Protocol, 29 industries and 41 companies voluntarily renewed their target to higher targets in accordance with their target achievement levels.

framework itself by increasing “dropout” countries abandoning reduction efforts and eventually withdrawing from future negotiation. The INDC framework aims to let each country submit targets in accordance with national circumstances, and should therefore allow flexible revisions.

<Japan’s contributions (2): Disseminating low-carbon technologies and developing innovative technologies >

- Climate change is a global challenge where domestic reductions in Japan and overseas reductions have equal value from the perspective of global warming prevention. Therefore, Japan should centre its contribution to the global GHG emissions reduction on its strong technological capabilities. “ACE: Actions for Cool Earth,” announced by Prime Minister Abe in November 2013, has three-pillars: 1) “innovation” through the acceleration of innovative technology development; 2) the global “application” of Japan’s outstanding low-carbon technologies ; and 3) “partnership” to assist vulnerable countries and to build a win-win relationship between Japan and developing countries. This strategy is suitable for Japan’s unique strength in technology and should vigorously be promoted. There is an estimate that 1.3 giga tons, which is equivalent to Japan’s total emissions, could be reduced by replacing coal-fired thermal power plants in the US, China and India with Japan’s state-of-the-art coal-fired thermal combustion technologies.
- Technology mechanisms, including the Technology Executive Committee (TEC) and the Climate Technology Centre & Network (CTCN), which are under development within the UN framework, should also be fully utilized for the dissemination of Japan’s advanced environmental technologies. To this end, Japan’s proactive participation, including the provision of human resources and knowledge, is called for. Since technology transfer needs to be backed up by finance, it is crucial to secure strong linkage between technology mechanism and financial mechanisms including

Green Climate Fund (GCF). The TEC and CTCN could compile a list of Best Available Technologies (BATs) required by developing countries so that the GCF may use them as criteria in selecting projects to be financed.

- The Joint Crediting Mechanism (JCM) is another important initiative that will accelerate the overseas diffusion of Japan's excellent environmental technologies and quantify their contributions in reducing emissions in developing countries. In the current negotiation, the Japanese government is seeking acknowledgement of quantified emissions reduction under the JCM, its division between Japan and the host country and its inclusion for Japan's emissions reduction. However, there is no guarantee that emission offsets under the JCM will be allowed in the new framework. In addition, developing countries with their own mitigation targets under the new framework may be reluctant about international offset, or transferring a portion of their domestic reductions to another country since they may prefer to keep reductions as their own domestic reductions⁷.
- Therefore, Japan could explore a scheme where JCM partner countries submit status reports to the UN on their GHG emission reductions including those from JCM projects with clear reference that JCM-related reductions are "contributions made by Japanese technologies". Japan then could refer to such reductions as "Japan's international contribution" in its report to the UN. Mitigation at global level could be accelerated if developed countries could come to compete over contribution to GHG emissions reductions in developing countries through transfer of

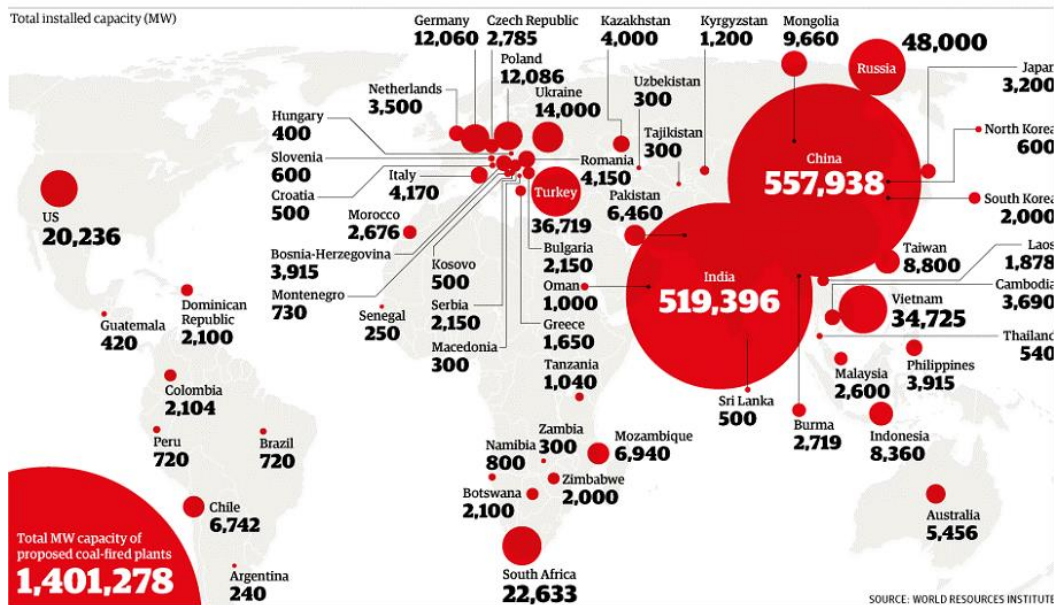
⁷ UN negotiations require partner countries of bilateral cooperation schemes such as the JCM to avoid the double-counting of emission reductions between the host country and implementing country. Therefore, the host country is required to add the emission reductions counted among the implementing country's reductions to its actual emissions when reporting its domestic emissions to the UN.

technology and know-how, rather than merely competing over their domestic emission reductions targets.

- A pragmatic approach should be taken in the diffusion of low-carbon technologies in response to the actual needs of developing countries. In June 2013, US President Obama announced the Climate Action Plan setting up carbon pollution standards for new and existing thermal power plants and suspending the provision of financial support for the construction of new coal-fired thermal power plants in other countries. Furthermore, the US and some EU countries are advocating that the multilateral development banks (MDBs) should be prohibited from financing coal-fired thermal power projects regardless of their efficiency unless carbon capture and storage (CCS) technologies are installed. This is intended to “prevent lock in large amounts of CO₂ emissions from new coal-fired thermal power plants”. Given that CCS technology is still expensive and only one commercial plant is operating worldwide under especially favorable conditions worldwide, making its installation as financing conditionality is equal to prohibition of financing for high-efficiency coal-fired thermal power plants. However, even though MDBs ban public financing for high-efficiency coal-fired thermal technologies, coal-fired thermal power generation will definitely continue to grow in developing countries due to rapid growth of power demand and existence of abundant, inexpensive and globally distributed coal resources.

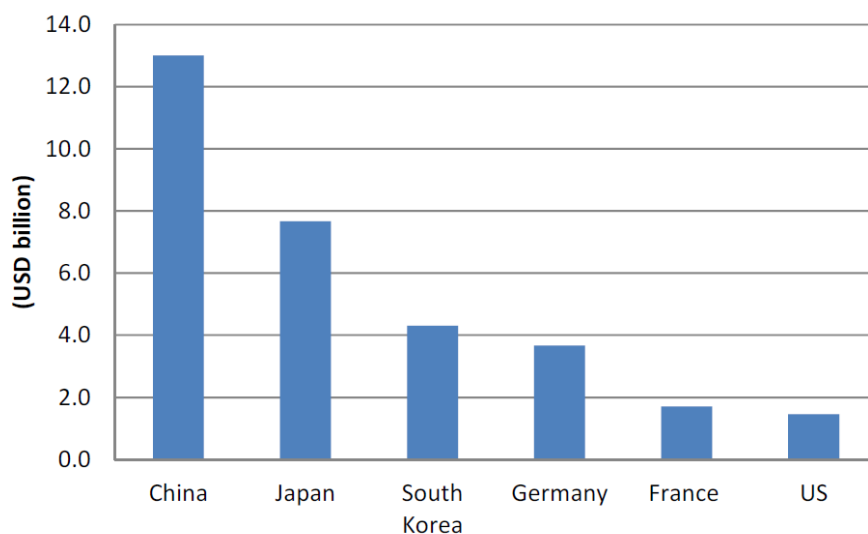
Figure 2: Proposed coal-fired plants

Proposed coal-fired plants



- Under such circumstances, the suspension of financing from MDBs for high-efficiency coal-fired thermal power plants will simply result in a construction boom for low-efficiency power plants using Chinese coal-fired power generation technology, financed by Asian Infrastructure Investment Bank (AIIB) or the New Development Bank BRICS. As exhibited in Figure 3, China provides substantial amounts of public finance for overseas coal-fired power plants. Most of the coal-fired power generation technologies exported from China to other Asian countries have lower efficiency levels. For example, whereas supercritical (SC) and ultra supercritical (USC) technologies account for 43% of coal-fired power plant exports from China to India, they account for 100% of Japanese exports. Japan should present such realities and lead a more pragmatic approach for ensuring both economic growth and emissions reduction in developing countries through its world-leading high-efficiency coal-fired power generation technologies.

Figure 3: Public financing for overseas coal-fired power plants in 2007-2013



(Source: Takahiro Ueno, Miki Yanagi, and Jane Nakano "Quantifying Chinese Public Financing for Foreign Coal Power Plants" GraSPP Working Paper Series, Graduate School of Public Policy, University of Tokyo <http://www.pp.u-tokyo.ac.jp/research/dp/documents/GraSPP-DP-E-14-003.pdf>)

- Climate change is a long-term issue and cannot be resolved merely through the diffusion of existing environmental technologies. Since existing technology systems cannot achieve drastic reductions of 40-70% in 2050, development of innovative technologies is decisively needed to change the shape of the long-term emissions reduction path. Innovative technologies requiring R&D range from CCS, fuel cells, next-generation nuclear reactors, ultimately to space solar power and artificial photosynthesis.
- Government R&D investment is indispensable in facilitating development of innovative technologies with high investment risk. However, energy area currently represents only around 4% of total government R&D expenditures worldwide compared to an 11% share in the 1980s. This trend must be reversed. Japan should advocate international initiative such as identifying high priority technologies, securing R&D budget, formulating technology roadmaps and international collaborative R&D.
- Japan established the Innovation for Cool Earth Forum (ICEF) as a "Davos Meeting for energy and environmental technology issues", and

hosted the first meeting with 800 participants representing governments, companies, academia and international institutions from 80 countries and organizations in Tokyo in October 2014. ICEF meetings are to be held annually as a platform of industrial, academic and governmental wisdom and knowledge gathering from worldwide. There are high expectations for the second meeting of ICEF which will be held in October this year. France's Special Representative for the 2015 Paris Climate Conference has expressed her strong expectation to the ICEF for raising momentum to COP21⁸. ICEF would be an ideal forum for Japan and such countries as the US and the UK to put out on the table their ideas for international efforts to resolve global warming issues by innovative technologies and to refine them into a concrete initiative. In June this year, Sir David King, UK Foreign Secretary's Special Representative for Climate Change proposed the Global Apollo Program, which calls for participating countries to allocate 0.02% of GDP in 2016-2025 to R&D for renewable energy, storage and transport. This idea is also in line with the concept of ICEF. ICEF should serve as a forum where various measures/initiatives are considered including awards for technologies that have contributed or will contribute the most to the resolution of global warming and a joint initiative among developed countries to provide research funds for technology development or subsidies for commercialization. As the ICEF host country, Japan should exercise leadership through such projects/initiatives. In addition, taking advantage of its chairmanship of the G7 summit in 2016, Japan should send a strong message that developed countries should take the initiative in facilitating the R&D of energy and environmental technologies at the G7 Summit and Energy Ministers Meeting.

⁸ <http://www.ambafrance-jp.org/article8521>

Message 4

The United Nations is not the only forum for resolving global warming issues. The implementation of various efforts at diverse fora will lead to real contributions.

- UN is not the only forum for preventing global warming. Engaging over 190 countries, the UN process is, needless to say, legitimate in terms of full participation of all stakeholders. On the other hand, the process entails many drawbacks. Consensus-based decision-making is time-consuming and lacks flexibility. The whole process could easily be impaired by complicated bureaucracy. Deliberations are often blocked by a handful of countries.
- International efforts to prevent global warming should evolve from a UN-based single-layered regime as the “Rio-Kyoto regime” to a multi-layered framework encompassing various inter-regional, bilateral, industrial, or inter-city initiatives in addition to the post-Kyoto framework currently under negotiation. Efforts outside the UN can often be more effective. Competition between UN and other fora in their contribution to the resolution of global warming issues could also be an effective stimulus for creating better policies.
- For example, Japan proposed JCM from the perspective that GHG reductions outside the UN framework also deserve to be acknowledged. While the UN-based Clean Development Mechanism (CDM) covers a limited range of technologies and requires complicated procedures, bilateral JCM is designed for prompt and flexible implementation. The Japanese government is currently negotiating in the UN so that the post Kyoto framework would acknowledge the JCM. However, if meticulous procedures and various constraints are imposed for getting acknowledgement from the UN and JCM’s advantage in efficiency is

impaired, JCM could be better placed out of the UN initiatives.

- Bilateral initiatives are characterized by the advantage of gaining momentum in summit meetings. Prime Minister Shinzo Abe's "diplomacy that takes a panoramic perspective of the terrestrial globe" will enable a wide range of cooperation including human resource development and sharing policy-related knowledge. JCM is a part of such cooperation. For example, Japan should extend multidimensional support and advice to India to decouple its strong economic growth with dramatic increase of GHG emissions.
- UN is not a suitable forum for discussing development of innovative technologies as only a limited number of countries possess the capacities and resources to do so. It would be far more productive and constructive to discuss how to promote efficient and effective technology development among such countries.
- International public and private partnerships in specific sectors can also play important role. For example, under the International Maritime Organization (IMO) and International Civil Aviation Organization (ICAO), the maritime and airline transport industries in both developed and developing countries engage in reducing GHG emissions from international maritime and aviation and transport. Sectoral approaches are especially instrumental outside the UN framework. International industrial organizations are leading collaborative initiatives in such sectors as iron and steel and cement. The Japanese business community has made proactive contributions in formulating lists of BATs and developing sector-specific indices under the Asia-Pacific Partnership on Clean Development and Climate (APP). APP activities are currently being pursued under the Clean Energy Ministerial (CEM). With a wealth of experiences with sectoral approaches both in Japan and overseas, Japan should call for their re-evaluation and reinforcement. A wider range of countries beyond the Asia-Pacific region covered by the APP could also be

invited to participate in such activities.

- Japan has also engaged in efforts under the Law Concerning the Recovery and Destruction of Fluorocarbons, adopted in 2001 based on the Montreal Protocol. While the global warming potential of fluorocarbons and HFCs are larger than that of CO₂ by thousands or tens of thousands, their recovery is not a technologically complicated task. Therefore, it will be important to provide knowhow on designing institutional frameworks that add incentive to the recovery of fluorocarbons. It would be worth considering Japan's contribution to highly cost-efficiency global warming countermeasures for non-CO₂ gases by sharing its experiences with other countries.
- France is endeavoring to compile various non-UN initiatives into the Agenda for Solutions, as an outcome of COP21. From the viewpoint of seeking a stringent framework under the UN as "the world government", a multilayered regime containing a diversity of efforts within and outside of the UN may appear fragmented and not attractive. However, it should be recognized that harnessing non-UN frameworks, which are flexible and therefore promise to be successful, will prove to contribute greatly to preventing global warming in the end. .

Message 5

Embrace the uncertainties of science. The IPCC does not and is not allowed to recommend specific policies or scenarios. The 2°C target is merely a political target. Pathways to achieve it are diversified depending on how climate sensitivity is assumed.

- International debate on global warming is dominated by the “2 °C target” which aims to limit temperature increase after the Industrial Revolution below 2 °C. Some countries are seeking to turn this indicative non-binding target into a politically binding one. Such argument compares aggregated pledges from countries with the emissions reduction path required to stabilize GHG concentration at 450 ppm, which is deemed necessary for achieving 2 °C target. This leads to a claim that countries must raise their level of ambition since their pledges are billions of tons short in order to achieve the necessary trajectory. When the UNFCCC Secretariat releases the synthesis report on the aggregate effect of the submitted INDCs in November, such “gigaton gap” argument will be further heated. This approach will give most countries a failing mark for “lack of ambition”, lower their morale and leave no exits for climate change negotiations.
- Given the uncertainties of science and the future development of innovative technologies, there could be diverse paths leading to the achievement of long-term targets for 2050 or 2100. None of them would follow a straight line. While some criticize that 2025 or 2030 targets are not sufficiently ambitious on the ground that they are not on the linear emission reduction path towards 2050 target, it is a complete misunderstanding of the “un-linear” nature of innovation.
- 2°C target is widely believed as the “IPCC recommendation”. In reality, the IPCC’s mission is to report an unbiased compilation of scientific

knowledge on climate change to the UN and it is prohibited to recommend certain policies or scenarios. Therefore, the IPCC reports do not indicate anywhere that stabilization at 2°C is required. There are still many uncertainties with regard to the damages when temperature increases surpass 2°C as well as the costs of policies limiting warming below 2°C. It is not a scientific approach to make 2°C target “sacred and inviolable”.

- Even if 2°C target were to be adopted, climate sensitivity estimates are provided in ranges (the recent IPCC AR5 assessed that it is likely to be in the range of 1.5°C - 4.5°C, but could not provide an agreed best estimate), and thus the aggregate of pledged targets may or may not be on the path leading to the 2°C target depending on climate sensitivity assumption. If a climate sensitivity of 3°C (3°C temperature increase following a doubling of the atmospheric GHG concentration) were to be employed, the amount of necessary reductions would be magnified and the gap between reality would annually widen. However, a climate sensitivity of 2.5°C (= a 2.5°C temperature increase following a doubling of the atmospheric GHG concentration) would allow atmospheric concentration threshold of 580ppm. This could draw far more realistic emissions pathway.
- Given such uncertainties in the correlation between GHG concentration levels and temperature increase, it is counterproductive to calculate “gigaton gap” and urge countries to raise their level of ambition. Such negotiation will go nowhere even after years. Rather than insisting on more ambitious targets which cannot be achieved with current technologies, there should be brave shift of resources to the development of innovative technologies which could enable a discontinuous (drastic) emissions reduction pathway.
- Since the 2°C target has been included in COP documents and in various Communiqués, including the Leaders’ Declaration adopted at the

Schloss Elmau Summit, it has become a taboo for governments to discuss alternative options when the 2 °C cannot be met. It is not a scientific attitude to wallow in an Apocalyptic argument that “the Earth is doomed if 2 °C target was not attained”. We should calmly address the following questions: What is the estimated range of future temperature increase corresponding to the estimated climate sensitivity range? What would be our alternative plan if the 2 °C target is unlikely to be met? How should we balance mitigation and adaptation? While political leaders are tempted to show their leadership by presenting clear solution, in the area of global warming, we need to humbly embrace uncertainties of climate science.

II. Develop flexible domestic measures that can accommodate changes in international agreements and circumstances

Message 6

- **Under a new bottom-up framework centered on voluntary targets, domestic measures should allow less government intervention compared to legally-binding top-down policy measures adopted under the Kyoto Protocol. They should be based on the fundamental principle of “encouraging voluntary and proactive efforts to reduce GHG in the private sector”.**
- **Major global warming countermeasures are presented below in the order of the level of government intervention involved, from low to high:**
 - 1) **Government-led campaigns, provision of information and subsidies (so-called “public campaigns”) for activities to reduce GHG emissions**
 - 2) **Objective evaluation of private sector-led proactive efforts such as the Keidanren Commitment to a Low Carbon Society and the sound implementation of the PDCA cycle as a follow-up process.**
 - 3) **Efforts to promote the reduction of energy demand by applying the Law Concerning the Rational Use of Energy (Energy Conservation Law)**
 - 4) **Carbon-oriented tax measures such as the Global Warming Countermeasures Tax and the Feed-In-Tariff scheme for renewable energy**
 - 5) **Application of Law Concerning Promotion of Non-Fossil Fuel and Rational Use of Fossil Fuel by Energy Suppliers (Energy Supply Structure Sophistication Law)**
 - 6) **Government allocation of CO₂ allowances (≒energy consumption)**

and emission trading

- **Only measures 1)-4) were adopted even under the plan for achieving the target of legally-binding Kyoto Protocol, and thus the policy measures to be implemented under the new framework should be confined to measures 1)-3), with less extent of government intervention.**
- **Furthermore, in order to establish industry-led bottom-up voluntary approaches, including the Voluntary Action Plan on the Environment and Commitment to a Low Carbon Society, as global standards in the new international framework, knowhow on implementing the PDCA cycle should also be internationally transferred.**

- The new international framework will shift to a bottom-up framework correcting the shortcomings of the Kyoto Protocol based on a top-down approach. However, this change is not yet widely recognized in Japan and there still remains domestic debate haunted by the top-down approach under the Kyoto Protocol. These include demands that the national government should directly manage energy consumption and GHG emissions of private companies and general public.
- However, GHG are generated in accordance with national livelihoods and economic activity. It would only be illusionary to believe that the government could take a top-down approach to manage all emissions because the government does not have the power to control macro- and micro-economic behavior nor does it have the right to intervene in the lifestyles of each citizen. If GHG emissions are to be directly managed, it will require the allocation of energy consumption amounts, which would in effect mean shifting from a free economy to a planned economy.

<Voluntary approaches work>

- With these issues in mind, when Japan ratified the Kyoto Protocol, it

avoided policy measures that would allow strong government intervention and focused to the maximum extent possible on measures that would depend on private sector-led voluntary approaches. As a result, significant emissions reduction was achieved in the industrial sector. In this process, industries voluntarily pledged targets, which would be reviewed in government councils and in the business community for continuous evaluation, verification and implementation. Given uncertainties regarding future technologies and economic activity, voluntary approaches utilizing industrial knowledge and embedding a flexible process open to review worked very effectively by encouraging proactive action.

- Academia and think-tanks should make systematic compilations of the factors that led to the success of voluntary approaches and the rationales behind the behavior of participating actors as well as the know-how regarding their actual mechanism. They should then be communicated as best practices along with the practical knowledge and know-how possessed by Keidanren and individual industries to other countries around the world and to the UN⁹. By doing so, Japan's private sector should contribute to the establishment of an MRV process (measurement, reporting and verification) for the status of measures adopted by each country under the next framework. The government should also support such contributions.
- In the transportation and residential/commercial sectors, central measure was the Top-Runner standard, introduced by the Law Concerning the Rational Use of Energy (Energy Conservation Law). It is estimated to have reduced emissions by 21 million t-CO₂ through

⁹ Factors of the success of the Keidanren Voluntary Action Plan on the Environment, implemented during the first commitment period under the Kyoto Protocol are analyzed in the "Keidanren Voluntary Action Plan Evaluation Report Fiscal 2013"
<http://www.keidanren.or.jp/policy/2014/024.pdf>

improving fuel efficiency of automobiles and 29 million t-CO₂ through improving efficiency of various appliances¹⁰. These results, which are highly evaluated by foreign researchers, derive from diffusion of high-efficiency products through facilitative cooperation between stakeholders and policy makers and among relevant industries as well as effective labeling scheme¹¹.

- The transportation sector's CO₂ emission reductions were achieved by not only fuel efficiency improvement in individual vehicles but also an "integrated approach" combining incentives and information disclosure through a green tax, improvements in traffic flow and the encouragement of "eco-drive". It has become globally acknowledged that the organic collaboration of various measures related to entire systems is required for effective GHG mitigation in the transportation sector.
- While the business community surpassed their original targets through voluntary approaches, the residential/commercial sector has dramatically increased its emissions. While the efficiency level of individual appliances significantly improved by the Energy Conservation Law, resulting emissions reduction was surpassed by emissions increase due to higher living standard.

<Taxes have limited effect on emission reductions>

- In the tax reforms implemented in fiscal 2012, Japan established the Global Warming Tax. It is a special purpose tax whose revenue can be used only for the enhancement of renewable energy, energy saving and other measures to reduce energy related CO₂ emissions.
- It may be correct in economic theory that the Global Warming Tax will raise fossil fuel prices and thus constrain demand or energy-related CO₂ emissions. However, in the actual taxation, this impact is expected only

¹⁰ <http://www.meti.go.jp/committee/materials/downloadfiles/g70305a05j.pdf>

¹¹ Evaluation of Japan's Top Runner Programme : Joakim Nordqvist(2006.7)
<http://www.ecofys.com/files/files/aid-ee-2006-evaluation-top-runner-japan.pdf>

as an ancillary benefit. Since the existing Petroleum and Coal Tax is imposed on all fossil fuels, an increase in fuel prices - for example 1.5 yen/liter for gasoline - induced by Global Warming Tax is not likely to discourage energy consumption. In order to drastically reduce the use of energy, of which price elasticity is low, the level of tax must be set substantially high. However, this would constitute a "man-made oil crisis" increasing economic burden of general public and impairing international competitiveness, which would not be politically and economically feasible.

- Under the Energy Supply Structures Sophistication Law, the government could request the electric power industry to maintain a certain share of low-carbon power sources, namely, nuclear power and renewable. While the current application of this law is basically inductive, the government retains the authority to make higher level of intervention through "recommendation." This implies that the law allows a high level of government intervention. The use of this "recommendation" should be prudently discussed in light of such elements as the status of the restarting of nuclear power plants and the increase of public burden for introducing renewable energy.

<Emissions trading is a product of the Kyoto-type regime>

- Emissions trading schemes that control GHG emissions through direct government intervention are in effect "allocation and trading of emission allowance" schemes under which the government determines caps for GHG emissions from companies and offices, allocates these allowances, and allows companies to adjust their surpluses and deficiencies through trade. This method ensures that emissions from corporate activities are kept under the cap, but if the total number of allowances is not tight enough, companies will consequently have surplus allowances and the price of allowances will drop. In this case, the scheme will fail to drive

companies to select low-carbon technologies in the market, thus undermining the original purpose of the scheme. In contrast, if the overall cap is too tight, a high price can be maintained for allowances but companies will be left with no choice but to purchase expensive allowance in order to continue business activities, which may impair its international competitiveness, or otherwise they will be forced to move production bases abroad. This would simply cause carbon leakage, as CO₂ emissions would occur overseas and global total emissions would not be reduced.

- Table 1 exhibits large discrepancies among the marginal abatement cost of each country. Under these circumstances, production bases may be moved from countries with stringent reduction targets with high marginal abatement costs to countries with softer reduction targets with lower marginal abatement costs. This will only lead to the transfer of wealth and not global emission reductions. If the same carbon price could be adopted worldwide, then marginal abatement costs would be leveled and such issues could be avoided. However, with diverse political, economic, social and cultural structures and different levels of economic development, countries are unlikely to agree on a common carbon price, just as a “world’s common language” or “world’s common currency” cannot be introduced.
- Furthermore, the largest challenge faced by cap and trade schemes is whether the initial allocation of emission allowances can be performed in a rational and fair manner. In reality, it is extremely difficult to do so to every company and office. Therefore, although marginal abatement costs are leveled once allowances are traded and efficient resource allocation is made possible, the initial “income allocation” induces a sense of unfairness.
- If emission allowances are grandfathered, specific industries may enjoy windfall profits as a result of government’s direct intervention into

income distribution among industries. It is widely known that during the Phase 1 (2005-2007) of the EU-ETS, the electric power industry and energy-intensive industries that were grandfathered excessive allowances enjoyed windfall profits. The IPCC AR5 also points out that the EU ETS was not as successful as had been intended, and that the recent persistent stagnation of carbon credit prices have failed to provide incentives for additional emission reductions.

- If emission allowances were auctioned in order to avoid the difficulties of initial allocations, target sectors would have to shoulder additional costs, which would invite hollowing out of industries exposed to international competition. Some might argue for an option to auction emission allowances only for the electric power sector, which is not exposed to international competition, following the example of EU-ETS. However, Japan would suffer surging carbon prices and significant rises in power generation costs due to its extremely high marginal abatement cost. This would contradict one of the three policy aims – lowering electric power costs below current levels - raised in discussions on the future energy mix, thereby undermining a premise for the INDCs formally submitted to the UNFCCC Secretariat.
- As discussed before, countries are unlikely to bear legally-binding obligations under the post-2020 framework. Major developing countries are opposed to mandatory targets due to their priority on economic growth. The US will not agree to any framework under which it is not on equal terms with China. Emission trading schemes derives from the Kyoto Protocol with legally binding targets for countries and therefore have aspect of penalizing underachievement of targets. In the framework where countries will not establish legally binding targets, the relevance of emissions trading scheme should be fundamentally questioned.

<Accept the reality that global warming countermeasures are costly>

- In discussions on emissions reduction targets, their cost burdens are often overlooked. Europe advocated the idea of “green growth,” that ambitious targets and stringent measures would create new industries and employment. However, European industrial organization BusinessEurope is criticizing the EU’s energy and climate policy stating that “the US is profiting from comparatively low energy prices, mainly due to the extraordinary progress achieved in the exploitation of shale gas and oil, while the European economy is stagnant because of costly policies such as the EU ETS and its renewable energy policy”¹². The UK is reviewing its policy in response to criticism that support measures for renewable energy have raised energy costs of the public and deteriorated “energy poverty”. Germany is also trying to curb cost burden of renewable energy promotion policies by introducing market principle. We must face the reality that global warming countermeasures require long standing efforts and entail costs. Global warming countermeasures would not be sustainable without broad understanding of the public and industry that they could shoulder such costs and the costs are internationally fair.

¹² Business Europe “A Competitive EU Energy and Climate Policy”

<http://www.business europe.eu/content/default.asp?PageID=568&DocID=31830>

Message 7

- **Japan's priority should be to realize the energy mix that served as the basis for its Intended Nationally Determined Contributions (INDC). The electricity portfolio that was illustrated in the assumed energy mix entails many challenges. Japan's international pledge is to steadfastly promote measures to realize the energy mix.**
- **In the event the Basic Energy Plan is revised in accordance with domestic and international situation, the energy mix should be accordingly reconsidered and the international pledges under the INDC should also be flexibly reviewed.**
- **Improving efficiency in fossil fuel use through high-efficiency thermal power generation should be acknowledged as an important pillar of Japan's energy policy and its international contributions.**

<Energy mix under liberalized electricity market >

- Japan took a bottom-up approach in formulating its INDC. It set up quantitative targets for each of the 3Es (energy security, economy, environment), drew out its long-term energy supply-demand outlook, formulated an energy mix in conformity with the outlook, and then calculated the emission reduction target for the INDC. This process building on discussions at several related committees would enhance the achievability of the target.
- On the other hand, Japan is to advance electricity system reform, which implies that the newly formulated energy mix will have to be realized in a business environment different from the one where power plant investments were adjusted by the government and electric power utilities. This is a fundamental challenge in realizing the intended energy

mix.

<Improve the business environment for nuclear power>

- Nuclear power accounting for 10-11% of the primary energy supply and 20-22% of the total power generation in 2030 is the most cost-effective way in GHG emission reduction. The most significant challenge at present is prompt and smooth restart of nuclear power plants whose safety has been confirmed. Public opinion on resuming operations at nuclear power plants remain harsh. However, the government, which bears responsibilities regarding economic management and people's life, cannot allow all nuclear power plants to remain suspended since this will persistently impose negative effects upon the Japanese economy, energy security and GHG emissions. Public opinion does not bear any responsibilities for the consequences. It is the role of the government mandated through election to adopt the necessary policies for the long-term prosperity of the nation even though they are unpopular at the time.
- Currently, Japan's nuclear power business is challenged with extremely large uncertainties from political, policy and regulatory perspectives¹³. Since the nuclear power business entails various complexities, including the management of nuclear materials and energy security, it must be considered in the context of comprehensive national policy and be conducted under strong involvement, guidance and support from the government. However, under the current circumstances where discussion of the framework for nuclear business itself entails political risk, there has not been concrete discussion on securing an adequate amount of power from nuclear.
- Under the electricity system reform, institutional frameworks which have been ensuring investment recovery will be abolished, including price

regulations based on fully distributed cost (FDC) pricing. Therefore, it has become uncertain whether or not financing would be available to launch new nuclear businesses or complete backend businesses. Business risks have been enlarged by the need to address new regulatory standards under the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (Nuclear Reactor Regulation Act) and by the unlimited liability stipulated in the Act on the Compensation of Nuclear Damages (Nuclear Compensation Act).

- In 2030, Japan's total power generation is projected to be 1,065 billion kWh, of which nuclear power is expected to represent 20-22% (approximately 220-230 billion kWh). This is based on the assumption that nuclear power plants with a collective capacity of approximately 33 million kW will maintain an operation rate of 80%. However, as of July 2015, the total number of nuclear power plants applying for permission to operate is 24 units including 3 units for which construction permits have already been granted, collectively amounting to a total capacity of only 24 million kW. 23 units, or approximately 21 million kW, will have reached their 40 years of licensed life in 2030. Therefore, in order to realize the targeted energy mix, 20 years extension needs to be approved subject to safety check by the Nuclear Regulation Authority (NRA) in addition to the 40-year operating limit stipulated under the Nuclear Reactor Regulation Act. If Japan is to maintain nuclear technologies and human resources to the future, the government will have to decide sooner or later whether or not it is going to proceed with the new construction and replacement of nuclear power plants.
- If Japan is to maintain nuclear power as an important option in its energy policy and electricity portfolio, then it should closely discuss the risk allocation among the public and private sectors in the aforementioned nuclear business environment. Then, it should seek improvements in the nuclear business environment through considerations of the

administrative structure, policy implementation system and measures to cover business risks.

<Urgent need to reduce costs for supporting renewable energy >

- Cost reduction efforts must be maximized for renewable energy, which is expected to account for 13-14% of primary energy supply and 22-24% of the total power generation in 2030. Although renewable energy is characterized by no fuel costs, its introduction needs policy support due to its high fixed costs which cannot be recovered through market profits. In July 2013, Japan adopted the Feed-In-Tariff scheme in order to promote the diffusion of renewable energy through surcharge to be shouldered by consumers.
- While the FIT scheme invited an unprecedented solar power bubble, it is imposing massive cost burdens. In fiscal 2015, just three years after its introduction, the general public is projected to shoulder a total of 1.32 trillion yen for renewable energy surcharges. The government has presented official estimate that the total surcharge will reach an annual total of 2.7 trillion yen if all facilities approved as of June 2014 were all to operate¹⁴. Furthermore, several think-tanks are warning immense increase of consumer burdens in the future¹⁵. With emerging evidence of enormous costs in the German FIT, it could have easily been predicted that setting even more favorable prices compared to those of Germany would invite current situation. Therefore, Japan's policy design would inevitably be exposed to criticism that it had not learned from the mistakes of its

¹⁵ For example the Institute of Energy Economics Japan (IEEJ) has estimated that, if all 99GW (80GW solar power) of renewable energy facilities licensed as of the end of February 2015 operated, then the cumulative consumer burden across twenty years would amount to 50 trillion yen.

<https://eneken.ieej.or.jp/press/press150709d.pdf>

predecessors. In any case, uncontrollable rise of FIT costs cannot be countenanced. Other countries like Germany have reviewed their schemes by introducing competition/market principles in renewable energy promotion policies in order to ensure cost-effectiveness¹⁶. Japan must urgently conduct a root and branch review of its renewable energy promotion policy and promptly shift to a more balanced policy for reducing consumers' burden. Furthermore, certain regulations need to be established to prevent the destruction and pollution of ecosystems and living environments caused by the installation of renewable energy facilities.

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<Improve the investment climate for energy efficiency by households or small and medium-sized enterprises>

- Discussions on the energy mix have been focused on whether nuclear energy or renewable energy would have a larger share. However, there is much to be discussed regarding energy efficiency. Figure 4 exhibits the electric power demand and electricity portfolio in 2030, as indicated by the Long-term Energy Supply and Demand Outlook Subcommittee¹⁷. Future forecasts were calculated based on the premise that the annual economic growth rate would be 1.7% and that the GDP would grow by 34% from 531 trillion yen in 2013 to 711 trillion yen in 2030. However, it

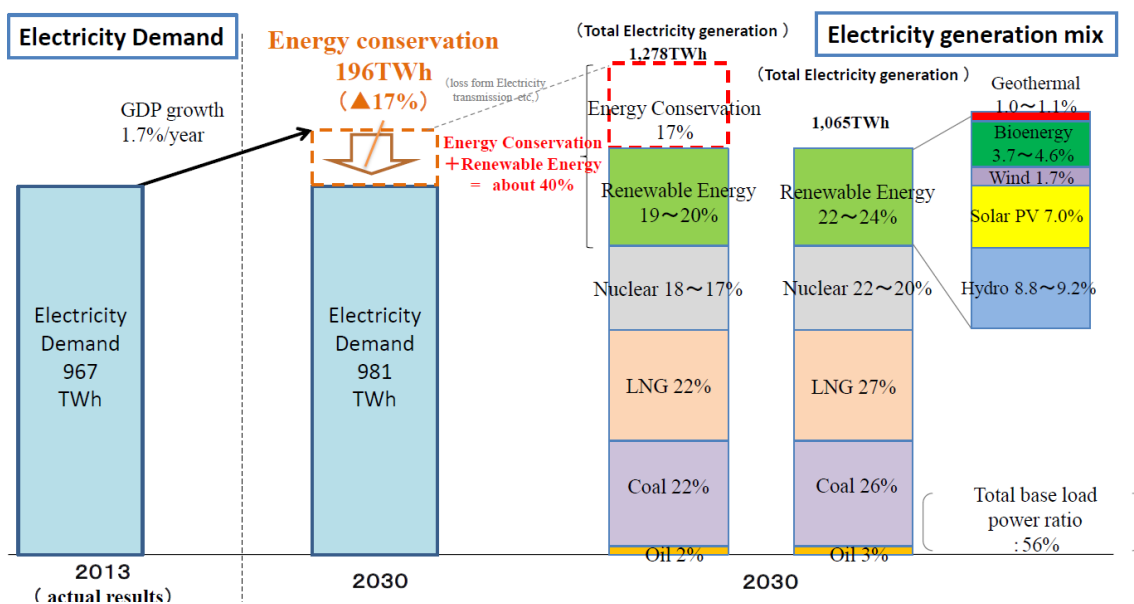
¹⁶ In Germany, the FIT scheme has been, in effect, revised so that the purchase price is highly correlated with the market price. Also the UK, where the Conservative Party won the general election held this spring, is challenged with excessive public burden induced by subsidies for renewable energy and has launched a policy review, beginning with ending subsidies for land wind turbines, abolishing other various subsidies and introducing the principle of competition among renewable energy businesses.

¹⁷

http://www.enecho.meti.go.jp/committee/council/basic_policy_subcommittee/mitoshi/011/pdf/011_05.pdf

is also assumed that amid such economic expansion, electric power demand could be reduced by 17% as a result of devoted energy-saving practices. This means that the GDP elasticity of electricity demand is estimated to be only 0.05. Given that the GDP elasticity stood at around 1 prior to the Great East Japan Earthquake, even if post-earthquake energy-saving trends were taken into account, this energy efficiency improvement target is a highly tall order. Some argues that this would require electricity prices to double.

Figure 4. Electric power demand and electricity portfolio in 2030



Source: Long-term Energy Supply and Demand Outlook Subcommittee (Eleventh meeting) "Long-term Energy Supply and Demand Outlook (draft)"

- Energy efficiency improvements generally require large initial investments and a long period to recover them. This is why there have been limited energy efficiency related investment in household sector and SMEs e where there is larger potential for energy saving.
- For example, thermal insulation improvements in housing are the most

effective energy-saving measure. However, due to high renovation costs, it would be difficult to recover insulation costs within a rational payback period even taking into account their benefits such as the reduction of lighting and heating costs and the improvements in the health conditions of residents. Efficiency improvement of individual appliances in recent years are limiting the relative benefits generated by energy efficiency investments in housing, which is making cost recovery more difficult. Large capital investments involving long payback periods are excessive burdens for SMEs (small and medium-sized enterprises). If the same amount of financial resources are available, they would choose to invest in production facilities directly leading to corporate growth.

- In light of such realities regarding energy efficiency, the government should strengthen measures to support households and SMEs in their energy efficiency investment and to provide information inducing their behavioral changes.

<Revise quantitative targets where necessary>

- The 26% reduction target indicated in Japan's INDC can only be achieved when all the underlying requirements have been fulfilled including the energy mix, policy measures and the introduction of technologies. This correlation should be made explicit in various documents to be formulated in relation to the INDC, with a view to ensuring that the quantitative target does not take its own course, independent of its context. In other words, efforts should be focused on implementing the energy mix and measures and on introducing the required technologies, not on the resulting "26%" target itself. This is because the core measures, namely, increasing the share of nuclear and renewable energy and promoting energy savings, are highly challenging. In the event that the restart of nuclear power plants are substantially delayed and the nuclear power drastically fails to contribute to a 20-22% share of total

electric power generation, if the 26% reduction target is interpreted as binding to be achieved at all cost, then the percentage underachieved by nuclear power will have to be covered by renewable energy or energy savings. Without considerable reductions in renewable energy or energy efficiency costs through revolutionary technological innovations, such alternative measures will inevitably lead to drastic cost increases compared to the original plan.

- The quantitative targets under the framework to be agreed upon in Paris are not expected to be legally-binding. Therefore, if any of the three requirements supporting the 26% reduction target cannot be achieved, it would be a logical conclusion to formulate a new energy mix and to establish new reduction targets. In addition, we should keep in mind that drastic changes accompanying the electric power market reform may cause various unpredictable impacts. Japan should strictly avoid the situation where a target set up based on a bottom-up approach will come to bind it in international negotiations even though its underlying assumptions are not fulfilled.

<The importance of coal-fired thermal power in energy policy>

- While the role of low-carbon technologies, including renewable energy, nuclear energy and thermal power with CCS, is played up in debates on global warming, coal is often vilified due to its high carbon contents. However, with developing countries seeking inexpensive, stable and mature power generation technologies to support their future economic growth, consumption of coal, which is abundant, inexpensive and found worldwide, will inevitably grow in developing countries. According to the New Policies Scenario in the IEA World Energy Outlook 2014, coal-fired thermal power generation capacity in non-OECD countries in 2040 will have doubled from 2012 levels. Therefore, once an inefficient unit is installed, massive amounts of GHG will be emitted for 30 to 40 years due

to lock-in effect. In order to avoid such consequences, the best available technologies (BAT) must be selected.

- Japan has the potential to play an important role in this area. Japan has been a world leader in highly-efficient coal-fired thermal power generation technologies such as Ultra Supercritical (USC), Integrated Coal Gasification Combined Cycle (IGCC) and Integrated Coal Gasification Fuel Cell Combined Cycle (IGFC). USC technologies were first developed twenty years ago and China has already gained licenses from Japanese manufacturers to domestically manufacture USC units and possesses tenfold of Japan's total installed capacity of USC and ten times in manufacturing capacity¹⁸. However, as for IGCC technologies, only Japanese manufacturers can manufacture major equipment and make turnkey deliveries. Plant efficiency levels range between 46-48% (transmission end), which is the world's highest level, and gas emissions (NO_x, SO_x, and dust) are comparable with those from natural gas. In Japan, demonstration equipment had been employed to conduct operational tests in Nakoso in Iwaki City, Fukushima Prefecture since 2007, and commercial operations were initiated in April 2013, since when it has been continuously running for 3917 consecutive hours.
- Due to uncertainties about the use of nuclear power as a base load power source as well as prospects of electric power market reform, a number of plans are emerging to construct new and price competitive coal-fired thermal power plants. There is an argument to restrict the construction of new coal-fired thermal power plants on the ground that they would contradict global warming countermeasures. However, it cannot be eliminated from options from the perspectives of energy security and

¹⁸ Prof. Shozo Kaneko, Collaborative Research Centre for Energy Engineering 14th AECE Technology Forum

http://www.kaneko-lab.iis.u-tokyo.ac.jp/event/20150424/event_20150424.html

reducing energy costs. As shown in Table 2¹⁹, presented at the eleventh meeting of the Long-term Energy Supply and Demand Outlook Subcommittee, if 1% of the electricity portfolio were to be switched from natural gas to coal, it would save 64 billion yen. 1% switch from renewable energy to coal would save 180 billion yen.

- There are negative views regarding plans to construct new coal-fired thermal power plants even though they employ more efficient technologies compared to conventional plants on the ground that they are inconsistent with Japan's CO2 emission reduction target and future energy mix. However such arguments entail risks of impairing improvements in coal-fired thermal power technologies as a whole. Ensuring conformity to emission reduction targets and the energy mix should be considered as one of the many factors for voluntary rule-making in a deregulated market resulting from electric power system reform. It should be born in mind that Japan's continuous contribution to the world in the field of high-efficiency coal-fired thermal power generation technologies requires accumulation of domestic experiences in operating relevant plants.

Table 2. Impacts of changes in the electricity portfolio

	Coal -1%	LNG -1%	Nuclear -1%	Renewables -1%
Coal +1%		+4.4 mil t-CO2 -64 billion yen	+8.4 mil t-CO2 +34 billion yen	+8.4 mil t-CO2 -180 billion yen
LNG +1%	14.4 mil t-CO2 +64 billion yen		+4.0 mil t-CO2 -100 billion yen	+4.0 mil t-CO2 -120 billion yen
Nuclear +1%	-8.4 mil t-CO2 -34 billion yen	-4.0 mil t-CO2 +100 billion yen		±0 mil t-CO2 -220 billion yen
Renewables +1%	-8.4 mil t-CO2 +180 billion yen	-4.0 mil t-CO2 +120 billion yen	±0 mil t-CO2 +220 billion yen	

¹⁹http://www.enecho.meti.go.jp/committee/council/basic_policy_subcommittee/mitoshi/008/pdf/008_09.pdf

Source: Long-term Energy Supply and Demand Outlook Subcommittee "Material related to the Long-term Energy Supply and Demand Outlook"

Message 8

Review the balance between subsidies for existing technologies and investment in research and development of innovative technologies that enable the fundamental GHG emissions reduction.

- As indicated in the Fifth Assessment Report of the IPCC, “drastic and continued emission reductions are required”²⁰ in order to prevent the advancement of global warming. However, an extension of existing technologies and current efforts cannot achieve the substantial reductions to realize “the upper end of the latest IPCC recommendation of 40 to 70% reductions by 2050 compared to 2010,” as provided in the Leaders’ Declaration of the G7 Summit meeting at Schloss Elmau. That is why the development and diffusion of innovative technologies are imperative. In order to enable large emission reductions in the future, we must begin investing much of our resources towards this goal. For example, Toyota Motor Corporation had initiated the development of its fuel-cell-powered vehicle, which was released in February 2014, more than a quarter of a century ago in 1992²¹. This proves that the development of innovative technologies requires a significant amount of time and investment.
- The problem is that, given the limitation of resources, a trade-off may occur between the resources input into innovative technology development and the resources used in the diffusion and expansion of existing technologies²².

²⁰ Based on the translation in the Basic Energy Plan (page 7).

<http://www.meti.go.jp/press/2014/04/20140411001/20140411001-1.pdf>

²¹ <http://www.toyota.co.jp/jpn/tech/environment/fcv/>

²² In “The Carbon Crunch – How We’re Getting Climate Change Wrong - and How to Fix it”(2012) <http://www.dieterhelm.co.uk/node/1339>

- Currently, huge amount of financial resources are devoted to the FIT scheme for promoting renewable energy. In fiscal 2015, indirect subsidies of 1.3 trillion have been paid in the form of surcharges. In contrast, only 60.7 billion yen has been allocated for renewable technology development out of the total 200.1 billion yen of the renewable energy-related budget of various ministries such as METI, MOE, MAFF and MEXT. The FIT scheme is only a supportive measure for the diffusion of existing technologies and has little effect in promoting the development of new technologies or technologies contributing to cost reduction. The continued promotion of costly renewable energy dependent on subsidies is not a sustainable solution. It would be even more unrealistic for developing countries with financial constraints to continuously provide subsidies to renewable energy with the hope of substitution from fossil fuels. Energy demand is bound to increase dramatically in these developing countries. The fundamental resolution of global warming issues requires non-emitting clean energy technologies at a comparable costs with those of fossil fuels. Human beings have yet to discover such solutions.²³
- In order to ensure self-sustained diffusion of renewable energy technologies without subsidies, their costs must be lower than fossil fuel technologies. This will call for policies to incentivize the development of technologies that will reduce costs. Better balance should be pursued between support measures for the development of technologies in the research and demonstration stage and those for the diffusion of

²³"The Vital Spark: Innovating Clean and Affordable Energy for All" (July 2013) London School of Economics MacKinder Programme)

[http://eprints.lse.ac.uk/51077/1/__libfile_repository_Content_Prins,%20G_Hartwell%20Paper%20documents_13_0587%20The%20Vital%20Spark.pdf%20\(LSERO\).pdf#search='vital+spark+hartwell'](http://eprints.lse.ac.uk/51077/1/__libfile_repository_Content_Prins,%20G_Hartwell%20Paper%20documents_13_0587%20The%20Vital%20Spark.pdf%20(LSERO).pdf#search='vital+spark+hartwell')<http://eneken.ieej.or.jp/data/5107.pdf>

technologies at commercial stage. Integrating market mechanism for cost reduction is indispensable at the commercial stage.

- Innovative technology development for drastic GHG reductions can be pursued not only in renewable energy but also in other energy fields. Nuclear power, a low-carbon energy that does not emit GHGs during power generation, faces many challenges to overcome before it can be massively introduced. There are high expectations for nuclear power generation technologies that do not dispose radioactive waste and transmutation technologies for nuclear waste. Other next-generation renewable technologies such as artificial photosynthesis and space solar power systems are highly expected. The development and commercialization of such technologies not only require a great amount of time and money but also entail large risk for private companies to promote alone. Therefore, strategic government R&D investment is indispensable. For example, drastic measures such as allocating a certain percentage of GDP towards innovative energy R&D are called for. Shifting the priority of Global Warming Tax revenue allocation from “support for the introduction of existing technologies” to “R&D investment for innovative technology development” could be an option. Japan should take the initiative in innovative technology development not only as a domestic measure but also at a global level, through international cooperation initiative. This field holds many possibilities for Japan, as a means of international contribution, in addition to its activities in ICEF. Given the long-term and global features of global warming issues, resources should be re-balanced, shifting investment from unlimited support for existing technologies to the development of future technologies.

Conclusion

Vocal slogans provoking a sense of crisis and demanding ambitious efforts were predominant in both international negotiations and domestic debates regarding global warming issues.

Such trends have been effective to a certain extent in promoting wide acknowledgement of the existence of global warming issues and in establishing the global warming agenda as a critical issue both domestically and internationally.

However, it is also undeniable that this has widened discrepancies between expectations in international negotiations and realities, thus inviting the proposal of policies without due regard to their costs.

Global warming issues involve the entire Earth and require long-term efforts. Therefore, international and domestic measures must be sustainable securing support from both developed and developing countries, the citizens of each country, and the business community.

The sound and long-standing implementation of realistic measures will be important, rather than vocal slogans. Global warming issues can no longer be represented by "slogans". "Pragmatism" is the key to future domestic and international global warming countermeasures.