"The Mid- to Long-Term Global Vision for Challenges against Global Warming"
Date: October 27, 2009
Location: Shin-Marunouchi Building
The Canon Institute for Global Studies (CIGS)

<Keynote Speech>
Dr. Koki Maruyama, Visiting Professor, the University of Tokyo
"Policy Implication of Z520, Z650 emissions pathways"

As we plan to discuss about the policies and technologies for reduction of green house gases in the following sessions, I would think it necessary to bridge such discussions with policy implication of reduction scenarios presented by both Sir Hoskins and Dr. Matsuno. So, what I would like to present here to you is the bridging talk between these two parts.

(Slide 1) The title of my presentation is "Policy Implication of Z520 and Z650 Emissions Pathways." What I am going to talk is at first the dangerous impacts and non-CO_2 GHGs reduction, and secondly the climate targets and per capita emissions.

(Slide 2) I hope that you will relax looking at this video. This is a footage that I have taken myself. It is Ilulissat in Greenland, one of the world heritages. Here is where Ilulissat is, and from this point the ice sheet, a glacier is sliding down into the sea. These pieces of ice are floating on the sea surface, or rather their bottoms are touching the sea floor, and they cannot move. When the sea water temperature will increase in the future, these pieces of ice will start to melt. As you see in the top right of the slide, the IPCC AR4 report pointed out such dangerous situation in the following manner: if the global temperature rise in the range of 1.9 to 4.6 degrees Celsius were sustained for a millennia, then the whole Greenland Ice Sheet will melt down and it will result in about 7 meter sea level rise. That is the dangerous impact we would like to avoid.

(Slide 3) This slide is just a review of the result of Dr. Matsuno's presentation. Horizontal axis is stretching all the way to the year 3000. If you follow Z520 line (a red line), the temperature rise will not go beyond 2 degrees Celsius even though taking effects of multi-gases into account. In the case of CO_2 only, the temperature rise will start to decline after reaching 1.6 degrees Celsius (a dotted line in red). The difference in temperatures rise between these two lines is about 0.5 degrees Celsius. This is the important point that we need to pay attention to.

Other lines (black lines) concern Z650 emissions scenarios. In the case of multi-gases (a black line), the temperature rise will go over 2 degrees Celsius, but over the long term it will come down to the level of the threshold temperature range of 1.9 to 4.6 degrees Celsius as pointed out in the IPCC AR4 report. Therefore, from our standpoint, we believe that a reduction of non-CO_2 GHGs emissions is very important.

(Slide 4) The information in this slide is based on the projections made by US EPA regarding an increase of non-CO_2 GHGs emissions from 1990 to 2020. These are methane, N_2O, HFC, CFC and SF_6. As you see in this graph, the emissions of these gases are projected to increase by 1.4 times between 1990 and 2020. It is also said that it will continue to go up. In order to prevent global warming, it is of course important to reduce CO_2 emissions, but that will not be sufficient. We must largely reduce emissions of GHGs, and we need to pay more attention for non-CO_2 GHG emissions as well.

(Slide 5) In this slide, I am presenting a summarized comparison between Dr. Matsuno's results and some foreign researches. Dr. Allen's result, which was introduced by Sir Hoskins in his presentation, is shown in the special issue titled "The Coming Climate Crunch" in "Nature." According to Dr. Allen's result, when the total cumulative emissions of CO_2 are about 1,000 Gt-C, the concentration of CO_2 in the atmosphere will go up to about 450 ppm and the temperature rise will go up beyond 2 degrees Celsius. In the upper part of this slide, the result of research conducted by Dr. Matsuno and us is presented. In the Z650 and Z520 scenarios, the total cumulative CO_2 emissions are about 1,000 Gt-C. We divide the cumulative CO_2 emissions into different three periods; the period from the pre-industrial revolution to the year 2000, the period of 21st century and the period beyond the 21st century. In the case of Z650 scenario, the cumulative CO_2 emissions in the period of 21st century are about 650 Gt-C. This is why we call this scenario Z650. The research by Dr. Allen was done independent of us, but the results are very similar in terms of total cumulative CO_2 emissions in all periods including the period beyond 21st century, i.e. 1,000 Gt-C. It seems to me that scientific results might start to converge.

(Slide 6) Dr. Matsuno has discussed this graph in his presentation and let me do a quick review. This pink band is a range of Category I scenarios according to IPCC. When the government officials in Japan and G8 leaders talk about 50% reduction, I suppose that they are talking about this range of Category I, which is called an ambitious scenario by them. RCP2.6 scenario that Dr. Matsuno talked about previously is indicated by this red line, which is mentioned in Box 13.7 of the WG3 report in IPCC AR4 According to this scenario, Annex I countries have to

reduce the GHGs emissions by 25% in 2020 and by 80% in 2050. Compared to these two scenarios of IPCC and Z520 scenario, if we just only look at emissions of CO_2, Z520 scenario allows larger CO_2 emissions in the world.

(Slide 7) We try to allocate emissions between Annex I countries (developed countries) and Non-Annex I countries (developing countries) in accordance with the emissions of Z520 scenario. According to the published data, levels of total emissions in 2005 are the same in Annex I countries and Non-Annex I countries. Taking this as a starting point, an allocation can easily be made between Non-Annex I and Annex I countries as indicated in this graph. If Annex I countries will reduce by 80% in 2050, it goes straight down to the value of 0.2 in 2050, which is a ratio of emissions in 2050 compared to 2005 level. When Annex I countries will reduce by 80%, the reduction of emissions by Non-Annex I countries should come to this range (inside the blue line), i.e. developing countries should reduce their emissions by 20% to 40% in 2050. This is a lot, and may be difficult for these countries.

(Slide 8) This slide shows the reduction of emissions per capita in accordance with the reduction of emissions presented in the previous slide. On the left hand side, you see the projection of population of the world. World population in Non-Annex I countries will grow by 1.5 times in 2050 compared to 2005. As we know an increase of population in Annex I countries and Non-Annex I countries respectively, we can easily calculate per capita emissions in these countries. If Annex I countries will reduce the emissions by 80% (as indicated by the red line with square dots) and if Non-Annex I countries will reduce the emissions as required by the above allocation (as indicated by the red line with triangle dots), these two lines will not converge as you see in the graph in the right hand side. So, people in developed and developing countries will not have the same per capita emissions by 2050.

(Slide 9) Now, we slightly relax the requirement of temperature rise under 2 degrees Celsius, i.e. we base on the emissions pathway of Z650 scenario. We have done the same calculation. In this case, developing countries should reduce emissions in 2050 down to about the current level. The maximum value at the peak level of emissions is going to be about 1.5 or 1.6 compared to 2005.

(Slide 10) As we expect a detail presentation from Dr. Zhou later, this is the result of research conducted in China and published by Reuters. According to the enhanced low carbon scenario indicated in this slide, the CO_2 emissions in 2050 will come down to about 2005 level. So, the

research conducted in China looks very similar to the result provided by our Z650 scenario as shown in Slide 10.

(Slide 11) In this slide, per capita emissions are shown on the basis of Z650 scenario. As you see in the right graph, the red lines for Annex I countries and Non-Annex I countries will converge in 2050 at the level of 2.5 tons CO_2 (this is not carbon equivalent but CO_2 equivalent). This means that levels of per capita emissions of developed and developing countries will converge in 2050.

(Slide 12) This is my conclusion, as well as Dr. Matsuno's. If you really want to keep the temperature rise less than 2 degrees Celsius, there is no convergence of per capita emissions by 2050. But, if we slightly relax 2 degrees climate target constraint and the countries in the world will follow and achieve Z650 emissions pathway, then per capita emissions will converge at 2.5 tons of CO_2 by 2050. This is the policy implication of the scientific research. I would like to propose this Z650 scenario as Plan A for the future vision. But, if you do not want to accept this or if you reject this vision, then what is going to be Plan B and what is it going to look like? I would suppose that in the following presentations, different views may be presented. With this, I would like to conclude my presentation. Thank you.