Comments on Discussions at Think 20 Summit GLOBAL SOLUTIONS

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Background

The G20 meeting, which consists of G7, Russia, the EU and 11 developing countries, will be hosting Germany this year as the presidency. To make inputs on key policy recommendations there, several expert groups are organized. One of them, a group of Think 20 (T20) consisting of research institute / think-tank experts was coordinated by the Kiel World Economic Institute (IfW) and German Development Institute (DIE). As a meeting of T20, the T20 Summit was held at the end of May. Prior to the conference, from December 2016, one of the sub-groups summarized recommendations on "Climate Policy and Finance" of T20 agenda. "Establishing an Expert Advisory Commission to assist the G20's Energy Transformation Processes" was completed in March[1]. In the drafting process, Yamada deputy director and Tanaka senior researcher contributed from LCS, and were invited to attend the T20 Summit.

This paper comprises constructive comments on the discussion at the Summit related to LCS activities after the attendance.

The overview of T20 Summit[2]

Date and time: May 29 - 30, 2017

Location: European School of Management and Technology Berlin (ESMT)

At the G20, the agenda is set according to the priority of the presidency which changes every year. G20 countries account for two thirds of the world's population, accounting for 85% of total GDP and 80% of global greenhouse gas emissions. Therefore, irrespective of the subject matter setting contents, it is considered that there is a great influence on the cause and solution of the global problem.

This year's G20 Summit of German presidency set "Improving sustainability", "Building resilience", "Assuming responsibility" as the pillar of priority. This shows that the G20 has steadily steered towards sustainable comprehensive growth from the trends focused on measures to stimulate fiscal and finance in response to the financial crisis and the economic crisis so far. However, since T20 is a researcher network, it is said that even at the past summit held so far, concerns about such "sustainable growth" have been disseminated. From this point, this year's T20 summit is considered

[1] http://www.g20-insights.org/policy_briefs/establishing-expert-advisory-commission-assist-g20s-energy-transformation-processes/

[2] https://registration.global-solutions.international/programme

to be even more significant than before.

The T20 provides the G20 with twenty- Global Solutions that have been considered in advance for digital economics, climate policy and finance, immigration and refugees[3]. LCS contributed to one of the recommendations of "Climate Policy and Finance". The T20 Summit was a meeting to introduce these recommendations and deepen the discussion.

Comments to the T20 Summit based on LCS research

At the T20 Summit, it was mentioned in many sessions that the United Nations' Sustainable Development Goals (SDGs) is important, which is a common goal of the international community through 2030. Depending on the country and region geopolitically, such as resources, geographical factors, economic level, industrial structure, etc., the priority of each country in 17 goals listed in SDGs is different. Therefore, even if the same SDG was taken into account, the view changes widely depending on the country. At this meeting there was no deeply discussed discussion or concrete examination to achieve the goals, but in reality we should have made the utmost use of this occasion where many countries gathered and diverse values collide with each other.

Hereafter, it is important to consider realizing a low-carbon society in LCS from the standpoint of SDGs. For example, we classify values and priorities of countries and regions according to SDGs by research on LCS quantitative technology scenario study and low-carbon society system construction. Then it would be possible to show the path of future introduction and the direction of industrial promotion based on the cost evaluations for the preferred technical system package.

In addition, opinions on the following three specific issues are summarized below.

Importance of infrastructure investment and cost/ process engineering

The common keyword of discussion in most of sessions was "infrastructure investment". Discussions, especially taking into consideration the development of developing countries, stood out, for example, at sessions of carbon pricing, policy and finance and urban problems. Regarding infrastructure investment, we think it important to advance concrete measures in a broad view without relying on carbon pricing, and for that purpose LCS research is useful.

For example, in the LCS quantitative technical scenario study, we have clarified: costs when integrating individual technologies in combination with various technologies; and costs when socialization is introduced. It is a technology evaluation method by cost and process engineering that includes social, environmental and economic aspects. By using this method, we can quantitatively predict future technological innovation, and provide necessary information for the development of a low-carbon sustainable society and infrastructure investment. In particular, it becomes possible to clarify when the technology is available and how long the cost payback period is, for the effective investment. The market scale would change with the times due to the transformation of social

[3] http://www.t20germany.org/wp-content/uploads/2017/05/20_Solutions_for-the_G20.pdf

systems and institutions. The market scale at present is not same as one in future. The technology R&D and production facilities should be effectively invested in based on prospects of future range of technology use, which can be provided by the cost and process engineering method. Also, through the specification of processes, raw materials and fundamental technologies necessary for manufacturing, the points that should be proposed and promoted in the future will be clarified.

Example: LCS silicon solar cell

When we evaluated them in 1991 for the annual production capacity of from 10MW to 100GW, the minimum economic annual production rate was calculated to be around 1GW, and the cost was around 4 dollars per W in 1991. It was calculated to be less than 1 dollar per W by future technology development. Actually it has become almost same as our estimated price at present. According to our prediction based on technology evaluation, it will become less than 40 cents in 2030. These results are useful for determining investment timing and scale and also market size. For example, there are various production processes depending on the type of technology. Changes of the technology in the manufacturing process will also require equipment renewal before the payback period. In the LCS calculation, since the cost is evaluated in detail from the manufacturing process level, it becomes clear what kind of new and/or additional manufacturing process is required when new technology development is carried out. If existing equipment and facility can be used and additional investment is a few, the barrier to technological change will be low. On the other hand, if the market size is estimated to be small, large-scale investment accompanying a significant change in production line will be avoided.

Promotion of international technology transfer

At the session of Climate Policy and Finance, "the use of technology in developing countries as a necessity of rapid response" is mentioned and there is an opinion that "the framework of return on investment incorporating integrated value of sustainability is necessary". There are two main types of technology use in developing countries. One is basic infrastructure that supports daily life, such as water and gas. This will certainly contribute to the development of the region, and it is necessary even for a long investment payback time. The second is the application of technology to the society where the infrastructure has been developed and development has progressed. The utilization of technology for low carbonization is relevant. This is a technology that is hard to introduce without an explicit reason such as economic merit rather than essential technology.

There are ODA and private loans to invest in technology, while loan period of ODA is long, usually several decades while for private loans the depreciation period is short, usually about 5 years. With this gap, public technology transfer and cooperation are becoming the mainstream of international technology transfer rather than private loans. Although ODA is also suitable for basic infrastructure technology, short-term payback will be necessary for the introduction of advanced technologies such

as the above-mentioned low-carbon technologies, as well as the introduction benefits for private loans. Quantitative evaluation method by cost engineering conducted by LCS can give solution how to fill this gap.

In general, before the technology is widely introduced, there are many cases where much initial investment is necessary as compared with the conventional technology, and possibly payback period will be over a long term. In that respect, it is firstly necessary to lower the introduction barrier by using public loans, prepare the infrastructure for technology use, and prepare a widely used environment first. As the next step, what is necessary to widely penetrate economically? It is to provide information on high investment efficiency and optimal depreciation to the private sector from the viewpoint of technology development and market expansion. Instead of making judgments based on current market size alone, it is important to invest overseas mainly in developing countries from information on reliable forecast market size based on detailed technical evaluation. By doing so, it can go beyond simple aid framework and be a sustainable scheme for donor developed countries. In addition, if the needs of the country and region for each "purpose" for SDGs are clarified, the required technical system can be shown and efficient technology transfer will be possible.

Creation of a new low-carbon type city

In T20, strengthening of the city became an agenda for solving global problems. There were multiple opinions that urbanization caused GDP to rise, but it is not so simple. The important point in the future is how to raise the living level of those who are not benefiting when urbanization progresses and people and capital concentrate. When building a city, it is necessary to consider what direction to guide and how to respond to the goals as listed in the SDGs.

The meeting focused on the future urbanization of developing countries in particular. In Japan, from the time of the Meiji Restoration (late 19 C) to the reconstruction period after the Second World War, urban development had progressed by making the nucleus of the city taking into account the traffic infrastructure and flow lines, from the perspective of the whole. For example, the Yamanote Line in Tokyo, which initially opened in 1872 as a public railroad, became a circular line with a distance of more than 30 km in 1925. This circle size was consequently adequate, and it had a great influence on Tokyo metropolitan area development. The existence and the size of this Yamanote line has urged the development of Tokyo leading to the present after 100 years. Railroad branch lines radially expanded from the circle and efficiently grew into the current metropolitan area. Furthermore, in Japan we had continued to address regional environmental problems such as air pollution and water pollution in the mid-20th century and global environmental problems in recent years. The experience and the methodology of working from such complex and comprehensive aspects has made a city that is high in world ranking of city evaluation. Those can be utilized first in urban development in the developing country region at the dawn of urbanization, specifically, regarding the prospects for design and planning and effectiveness, fund procurement and operation. If aid for urban development is not

necessarily based on such an overall picture, it will become a city that is ununiformed and difficult to develop.

In Japan, the aging society and the decrease of labor population are severe problems. In response to these problems, there is a movement that municipalities are working on from a comprehensive perspective. In the future societies, especially in developed countries and also in some developing countries now the labor population will decrease sooner or later. Therefore, it is important to overcome of the problem of aging society and provide places for active elderly people in those countries. There are advantages such as becoming healthy by working, reducing burden of watching over, increasing social productivity.

In addition, in the T20 summit, it was discussed that the multi-partner approach, that is, working together with countries and private sectors is important too for the urban development. We think key is for private and public and also academic to how to cooperate. As an example of research institutions and universities providing knowledge and supporting for specific city development, Kashiwa City, Chiba Prefecture, has been doing various attempts. An extension campus of the University of Tokyo was established and take a role of a “center of knowledge and innovation” for urban development, in cooperation with citizens, area developer and real estate agents. There the retired people was trained to, for example, become plant/botanical doctor and to obtain the certificates. In an aging district, elderly people have flexible ways of working through agriculture, and furthermore they can provide the agri-products to the community in which younger generation including children co-exist. Around this activity, a lot of senior people gather and bring their strong talents, where new businesses have been generated. For example, some offer consulting business that undertakes accounting management for farmers, and others open private schools and provide younger generation including small children with lectures based on their various skills such as English conversation and computer programing. It is important to create new value by utilizing such changes in social structure.

In the LCS low carbon society construction research, we do not only predict social appearance and social needs in the future but also create and propose new value for sustainable society. For instance, by referring to the examples as mentioned above, and we are studying how the low-carbon society should be, through analysis of energy supply and demand, CO2 emissions, and industrial structure together with possible use of future technology.