Climate Change Measures in China after Paris Agreement

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This paper intends to outline China's intended nationally determined contributions (INDC) and discuss China's domestic initiatives and international cooperation for climate change measures after the Paris Agreement.

1. Outline of China's INDC

China submitted its INDC to the United Nations on June 30, 2015 (Table 1). Attention-attracting points in China's INDC can be summarized as follows:

First, the INDC clarified that tacking climate change is the intrinsic requirement of China's sustainable development as well as the international obligation of a responsible major country. Second, the INDC offered to reduce CO_2 emissions per unit of GDP, or the CO_2-GDP intensity, by 60-65% from 2005, to raise the share of non-fossil fuels in primary energy consumption to around 20% by 2030 and to achieve the peaking of CO_2 emissions around 2030 and make best efforts to peak as early as possible. Third, the INDC presented 15 policy measures including the introduction of an emissions trading market and area-by-area numerical targets with full considerations given to their feasibility. Although the Energy Development Strategy Action Plan 2014-2020, released by the State Council in November 2014, called for boosting power generation capacity to 350 million kilowatts for hydro, 200 million kW for wind power and 100 kW for solar power, for example, the INDC fell short of specifying numerical targets for highly uncertain hydro and nuclear power generation.

Various arguments have been made about the ambitiousness of the INDC. In this respect, international comparison may not be ignorable. China's cumulative investments to realize the INDC between 2016 and 2030 are estimated at 30 trillion yuan ($4.62 trillion), equivalent to 44% of GDP in 2015 (67.7 trillion yuan) [1]. To achieve the target, China will have to cut the CO_2-GDP intensity by an annual average of 3.4% to 4.1% for 25 years. If the entire Organization for Economic Cooperation and Development were to maintain an annual average growth rate of 1.18% between 2005 and 2013 until 2030 and reduce the CO_2-GDP intensity as much as China, emissions would be cut by 46-53% from 2005. No one can unconditionally conclude that a country's INDC is not ambitious because the country does not make as much effort as China or because its total emissions increase despite emission-reduction effort. This is because the development stage as seen from the income level, per capita emissions and per capita cumulative emissions, responsibility for

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[1] Remark by Xie Zhenhua, China's special representative for climate change affairs at the United Nations Headquarters on April 2016. See http://www.china5e.com/news/news-941497-1.html

emissions, capability to take emission reduction measures and national conditions differ from country to country. After the Paris Agreement, it may be important for each country to realize its own INDC by "living up to its word", respectively, and keep working to increase ambition over time, respectively, and make some successful models and best practices as early as possible.

Table 1 Outline of China's INDC: Enhanced Actions on Climate Change (June 30, 2015)

Targets after 2020	Overall targets	・Achieving the peaking of CO_2 emissions around 2030 and making best efforts to peak as early as possible ・Reducing the CO_2-GDP intensity in 2030 by 60-65% from 2005 (reducing the 2020 intensity by 40-45% after cutting the 2015 intensity by 37.1% actually)
	Individual targets	・Raising the share of non-fossil energy in primary energy consumption to around 20% (against the actual share of 11.2% in 2015 and the target of 15% for 2020) ・Increasing forest CO_2 storage in 2030 by 4.5 billion m^3 from 2005 (actual storage in 2015 at 15.137 billion m^3, up 2.681 billion m^3 from 2005) ・Creating arrangements and capacity to effectively mitigate climate change risks in agriculture, forestry, water resources and other priority areas, urban regions, coastal regions and regions with vulnerable ecological environments, and developing forecasting, warning and disaster prevention/reduction systems steadily
Policy measurs for accomplishing targets	1. Proactive implementation of national strategy for preventing climate change	・Enhancing the development of climate change prevention laws ・Incorporating behavior objectives into national economic and social development plans to create a long-term low-carbon development strategy and a roadmap ・Breaking down targets and missions (by region, major industry, priority enterprise, etc.) to improve the system for holding specific parties responsible for accomplishing targets
	2. Improving regional climate change prevention strategies. Setting targets, missions and paths for reducing gaps and adapting to climate change based on regional characteristics	
	3. Attempting to decarbonize energy mix	・Coal: Attempting to implement the total amount control on coal consumption, enhance clean coal use and raise the share of concentrated and highly-efficient electricity generation from coal. Cutting the sending-end intensity to around 300 gce/kWh for new coal power plants (raising the thermal efficiency to around 40.95%) ・Gas: Expanding natural gas use to raise natural gas's share in primary energy consumption to 10% or more in 2020 and increasing coal-bed methane output to 30 billion m^3 ・Hydro power generation: Proactively promoting the development of hydro power, on the premise of ecological and environmental protection and inhabitant resettlement ・Nuclear power generation: Developing nuclear power generation in a safe and efficient manner ・Wind power generation: Promoting wind power generation development powerfully to expand the installed capacity to 200 million kW in 2020 (against 12,900 kW in grid-linked capacity in 2015 ・Solar energy: Accelerating solar photovoltaics and thermal power generation development to expand solar power generation capacity to 100 million kW in 2020 (against 43.18 million kW in actual capacity in 2015) ・Geothermal energy and others: Developing geothermal, biomass and marine energy proactively. Expanding geothermal energy use to 50 million tce in 2020. ・Promoting distributed energy development powerfully and enhancing smart grid construction
	4. Building an energy-saving, low-carbon industry system 5. Reducing emissions in building and transportation sectors 6. Attempting to increase carbon sinks	
	7. Developing low-carbon lifestyles 8. Attempting to generally improve climate change adaptation capacity 9. Creating low-carbon development models	
	10. Enhancing support in terms of low-carbon technology development 11. Enhancing financial and policy support 12.Promoting carbon emission trading market	
	13.Improving statistical and accounting system for GHG emissions	・Improving statistical GHG emission data quality continuously by attempting to develop GHG emission statistics and statistical indicator systems and enhance human resources development ・Enhancing GHG inventory creation projects to regularly prepare national and provincial emission inventories, establishing GHG calculation standards for priority industries and enterprises, introducing a system for GHG emission reports by priority enterprises
	14. Improving social participation systems	
	15. Promoting international cooperation proactively	・Maintaining the principles of common but differentiated responsibilities,equity and respective responsibility, encouraging developed countries to substantially reduce emissions and fulfill obligations to provide developing countries with financial, technical and capacity-building assistance, winning fair opportunities for sustainable development and more financial, technical and capacity-building assistance for developing countries, promoting north-south cooperation ・China will take on international commitments that match its national circumstances, current development stage and actual capabilities by enhancing mitigation and adaptation actions and further strengthening south-south cooperation on climate change ・China will establish the Fund for South-South Cooperation on Climate Change, providing assistance and support, within its means, to other developing countries including the small island developing countries, the least developed countries and African countries to address climate change ・Attempting to expand international dialogue and exchange, to enhance policy cooperation and working-level cooperation, to share positive experiences and good practice and to diffuse low-carbon and adaptation technologies

Source: Prepared by Li based on official releases by the National Bureau of Statistics, and China's INDCE: Enhanced Actions on Climate Change, as compiled by National Development and Reform Commission

2. Present Domestic Initiatives and Outlook after Paris Agreement

In late January 2010, China submitted to the United Nations its voluntary action targets including a 40-45% cut in 2020 CO_2-GDP intensity from 2005 in accordance with the Copenhagen Agreement at COP15. While developing a low-carbon system where people benefit from low-carbon activities and lose without such activities, China has strategically promoted three major initiatives: (1) energy conservation and expansion of non-fossil energy use, (2) stable energy supply and (3) development of low-carbon industries. The Xi Jinping and Li Keqiang leadership, inaugurated in 2013, has enhanced these initiatives by switching to the so-called New Normal strategy giving priority to economic growth quality and efficiency, promoting an energy revolution (involving consumption, supply, technology, and management arrangements) and strengthening international cooperation.

These initiatives have made a great progress. China reduced the CO_2-GDP intensity in 2015 by 37.1% from 2005, attaining 92.8% of the minimum target and 82.4% of the maximum target. The share of non-fossil energy in energy consumption rose by 4.5 percentage points to 12%, accomplishing 60% (4.5/7.5) of the target of raising the share by 7.5 points from 2005 to 15% in 2020.

In the "13th Five-Year Plan on National Economic and Social Development", as released in March 2016, China set a binding target of reducing the energy-GDP intensity in 2020 by 15% from 2015 and the CO_2-GDP intensity by 18% (Table 2). Although no total emission target has been clarified, the new CO_2-GDP intensity reduction target represents a cut of some 48% from 2005, exceeding the voluntary action target. In order to accomplish the maximum target of cutting the intensity in 2030 by 65%, China will have to reduce the CO_2-GDP intensity at an annual rate of 3.8% from 2021 to 2030. Attracting attention in the future will be how to allocate energy consumption quotas to regions, whether to put an emissions target into a global warming prevention plan and how to design energy consumption quotas and the emissions trading system.

Table 2 13th Five-Year Plan and Roadmap towards Targets for 2020 and 2030

	Level					Cumulative change rate				Rate of change from 2005		
	2005[a]	2010[a]	2015[a]	Targets for 2020[a,b]	Targets for 2030[c]	10/05	15/10	20/15	30/20	2015	2020	2030
Energy-GDP intensity	100.0	80.9	66.2	56.3		-19.1%	-18.2%	-15.0%		-33.8%	-43.7%	
Share of non-fossil fuels in total primary energy consumption	7.5%	8.3%	12.0%	15.0%	20.0%							
CO_2-GDP intensity	**100.0**	**80.2**	**62.9**	**51.6**	**35.0**	**-19.8%**	**-21.6%**	**-18.0%**	**-32.1%**	**-37.1%**	**-48.4%**	**-65.0%**

Notes: a) Figures for 2015and earlier years are actual, based on official releases, and figures for 2020 are targets set in the 13th Five-Year Plan. b) Targets for 2020 set in China's voluntary action plan submitted to the UN in 2010 is to reduce the CO_2-GDP intensity by 40-45% from 2015 level. Fulfilling the target in the 13th Five-Year Plan will result in a 48.4% reduction of the CO_2-GDP intensity, exceeding the target submitted ot the UN. c) Even the target in the 13th Five-Year Plan has been reached, an average annual reduction of 3.8% , or a cumulative reduction of 32% between 2020 and 2030, is needed for reducing emissions by 65% in 2030 from the level of 2005, which has been set as the upper limit of reduction targets in China's INDC.

Sources: Compiled by Li Zhidong.

3. Enhancing International Cooperation after Paris Agreement

China made great contributions to producing the Paris Agreement in cooperation with the international community[2]. In the future, China is expected to enhance international cooperation in three aspects.

First, China may promote efforts to put the agreement into force as early as possible. Vice Premier Zhang Gaoli attended a Paris Agreement signing ceremony on April 22, 2016, and said China would complete domestic procedures to approve the agreement before hosting a summit of Group of 20 major countries in Hangzhou in September. The Standing Committee of the National People's Congress is expected to ratify the agreement at its meeting in late August[3].

Next, China will enhance assistance to developing countries. In the course of Paris Agreement negotiations, China voluntarily created the Fund for South-South Cooperation on Climate Change worth about $3.1 billion to support small island countries and least less-developed countries in Africa. It then offered to implement 10 model projects for low-carbon society development, 100 climate change mitigation and adaptation projects and train 1,000 people in developing countries from 2016. China also vowed to help developing countries to improve their fundraising capacity[4].

Lastly, China will expand low-carbon and energy cooperation under the One Belt and One Road initiative. The "Visions and Actions on Jointly Building Silk Road Economic Belt and 21st-century Maritime Silk Road" stated that China would proactively cooperate in securing oil and gas pipeline safety, constructing cross-border power transmission networks and developing regional power transmission networks and enhance cooperation in developing non-fossil energy sources as well as traditional resources such as oil and gas, and localize energy industry chains.

Traditionally, international cooperation has centered on technology transfer and technical assistance accompanying financial aid from developed countries to developing countries. At present, however, developed countries have been losing technological advantages. In solar power generation, hydro power generation and many other areas, China has high international competitiveness. According to Yanagi & Ueno (2015), Chinese companies accounted for 52 gigawatts of total capacity for overseas coal power plants launching operation between 2015 and 2017, some 2.2 times as much as 25 GW for Japanese companies, although Japanese provide more plants with higher thermal conversion efficiency than Chinese[5]. China has taken the initiative in establishing the $100 billion Asia Infrastructure Investment Bank and created the $40 billion Silk Road Fund, the $46 billion China Insurance Investment Fund and the $10 billion China-Africa Production Capacity Cooperation Fund, rivaling developed countries in fundraising capacity. The promotion of low-carbon and energy cooperation under the One Belt and One Road initiative involving many developing countries is likely to contribute much to preventing global warming. A

[2] See Li Zhidong, "U.S. and Chinese Leadership Seen in the 4th U.S.-China Joint Statement on Climate Change," IEEJ Website, October 6, 2015, etc.

[3] The 22nd session of the Standing Committee of the 12th National People's Congress is likely to open on August 25.

[4] President Xi Jinping's speech at the COP21 opening ceremony (see http://www.ccchina.gov.cn/nDetail.aspx?newsId=57226&TId=61

[5] M. Yanagi & T. Ueno, "Comparing efficiency of coal power plants supplied overseas by Japanese and Chines enterprises," working paper May 2015 for University of Tokyo Graduate School of Public Policy

“One Belt and One Road” low-carbon and energy community could be formed progressively in the future. We would like to pay attention to the future trends.

In this way, China is enhancing climate change measures in both aspects of domestic initiatives and international cooperation after the Paris Agreement. By making good on its promise and taking global leadership, it aims to lead global efforts to build a low-carbon society.

Writer’s Profile

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Prior to this position, he worked as a professional economist at the IEEJ, Associate professor at the Nagaoka University of Technology, Japan. He was also a visiting researcher at National Development and Reform Commission, Energy Research Institute, China, and Fellow at Asashi Shimbun Asia Network. He is an expert in energy economics, environmental economics, econometrics.