

Recent Movements of Reducing Greenhouse Gas Emissions and Implications

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Background

U.S. Environmental Protection Agency (EPA) recently proposed the “Clean Power Plan”, under President Obama's Climate Action Plan, to reduce Greenhouse Gas (GHG)¹ emissions from power plants by 30 percent from 2005 levels by 2030. China is redirecting the country's economic growth strategy with increasing awareness of challenges posed by severe climate change and EU, the world's 3rd largest emitter has con-

tinuously implemented policy measures to reduce emissions. In this context, major economies' recent efforts to cut GHG emissions can be explained as a way for not only addressing climate change but also changing energy mix and expanding trade of environmental goods.

Emissions Trends and Mitigation Efforts: U.S.

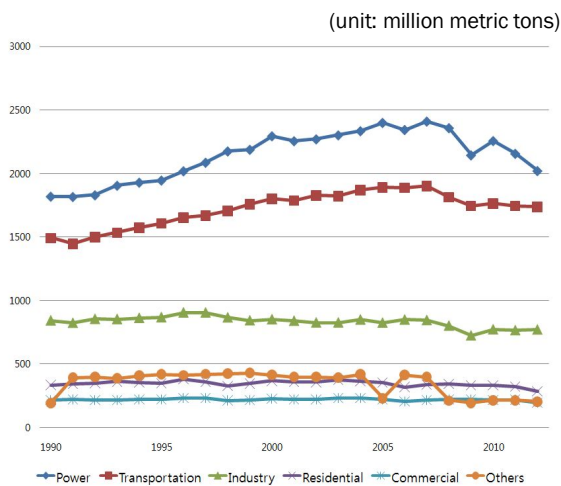
Emissions Trends

U.S. was the world's largest GHG emitter until the mid-2000s, but recent trends sho-

1 Greenhouse Gas (GHG) includes Carbon Dioxide (CO₂), Methane (CH₄), Nitrous Oxide (N₂O), and HFCs/PFCs/SF₆.

ws that it has continued to cut GHG emissions.. In 2012, U.S. GHG emission totaled 6,526 million metric tons of CO₂ equivalents, jumping 4.7 percent from 1990 levels but falling 10.9 percent from the historic high when it emitted 7,325 million tons in 2007. The emission of carbon dioxide (CO₂), which is mainly generated by fossil fuel combustion and accounts for 80 percent of U.S. GHG, increased by 5 percent in 2012 from 1990 levels, but when compared to 2007 levels it fell 12.1 percent.

Figure 1. U.S. Carbon Emissions by Sector



Source: U.S. EPA(2014), Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012.

For last two decades, 38 percent of CO₂ was generated by the energy sector while transportation and industry were responsible for 30 percent and 15 percent of the total CO₂ emissions in U.S., respectively (Figure 1). Of various energy sources, coal generates 40 percent of the total U.S. electricity, but produces most of CO₂ emitted by the entire power sector.²

² Between 2008 and 2012, the share of coal in power generation was only 43 percent while coal alone was the culprit for over 80 percent of carbon emissions from power sector.

Previous Efforts to Mitigate Emissions

U.S. Supreme Court ruled in ‘Massachusetts v. EPA’ case in 2007 that GHG emissions including CO₂ are regarded as pollutants under the existing Climate Air Act, giving EPA a full authority to regulate these heat-trapping gases. After this decision, Obama administration accelerated its efforts to introduce federal level regulations and institutions to effectively control the emissions.

In June 2013, President Obama announced the “Climate Action Plan” with objectives to cut carbon pollution in America, prepare for the impacts of climate change and lead international efforts to fight climate change.³ In September 2013, EPA announced its first step called the “Carbon Pollution Standard” under the Climate Action Plan to limit carbon pollution from newly installed power plants, in particular new fossil fuel-fired electric utility generating units with over 25 megawatts(MW) capacity. It was the first time in U.S. that the federal government set the national limits on the amount of carbon pollution from future power plants.

Clean Power Plan

In June 2014, EPA proposed the “Clean Power Plan”, under the Climate Action Plan, to cut carbon emissions from the U.S. power sector by 30 percent from 2005 levels by 2030. With the aim of targeting existing power plants, the Clean Power Plan proposal is in line with the Carbon Pollution Standard announced in 2013. According to the EPA's suggestions, states can choose a number of measures to achieve emissions reduction target, such as demand-side

³ Measures suggested by the Climate Action Plan include reducing emissions from power plants, promoting clean energy sources, building climate-resilient infrastructure, encouraging free trade of environmental goods and services, and leading mitigation efforts through UNFCCC.

energy efficiency programs, renewable energy standards, efficiency improvements at power plants, co-firing or switching to natural gas units, investing in energy storage technology, expanding renewables and market-based emission trading programs.

EPA estimates that the Clean Power Plan will reduce 730 million metric tons of carbon pollution which is equal to the annual emissions from more than 150 million cars in U.S. In addition, the Plan is expected to prevent 2,700 to 6,600 premature deaths, 140,000 to 150,000 asthma attacks in children and 340 to 3,300 heart attacks by reducing exposure to greenhouse gas and harmful pollutants. If fully implemented, the Plan will provide public health and climate benefits worth of an estimated amount of USD 55 billion to 93 billion per year by 2030.

EPA also analyzed that the Clean Power Plan will improve energy efficiency of power sector, consequently reducing electricity bills by approximately 8 percent. From a long-term perspective, the Plan will make U.S. economy less reliant on coal-fired power generation and increase the share of cleaner energy sources that emit less or zero pollutants. However, Republicans, coal producers, energy-intensive manufacturers and cities/states where local economy and employment are heavily dependent on coal power plants and coal mining aggressively criticize the Plan for harming stable energy supply, increasing energy bills and unemployment and consequently, weakening the national economy and competitiveness.⁴

Emissions Trends and Mitigation Efforts: EU

EU, the world's 3rd largest GHG emitter following US and China, has remarkably reduced emissions for the last two decades. EU emitted 4,544 million tons of GHG in 2012, the lowest in its history and a 19.2 percent decrease from 1990 levels. In 2012, the power sector accounted for 27 percent of the total GHG emissions in the region while emissions from transportation and, manufacturing & construction attributed to contributed 19.7 percent and 11.7 percent respectively. Contrary to the power sector that achieved 16 percent of emissions reduction target over the last 20 years, international aviation and shipping sector experienced increase of 92 percent and 32 percent respectively.

EU launched a number of mid-long term regional strategies to cut GHG emissions. Introduced in 2009, the "2020 Climate and Energy Package" targets to reduce GHG emissions by 20 percent from 1990 levels by 2020, supply 20 percent of electricity in the region from renewable sources, and improve energy efficiency by 20 percent. "Roadmap for Moving to a Low-carbon Economy in 2050" initiated in 2011 aims to decrease emissions by 80 percent from 1990 levels by 2050 and transform EU as a low carbon economy. Recently, EU leaders agreed the launch of the "2030 Framework for Climate and Energy Policies", a more ambitious version of the "2020 Climate and Energy Package", to reduce emissions by 30 percent by 2030 from 1990 levels, increase the share of renewable sources in power generation to 27 percent, and reform the existing emission trading system (ETS).

In particular, EU-ETS is a vital policy tool to accomplish GHG emissions reduction goals in the region. The 3rd stage of EU-ETS was

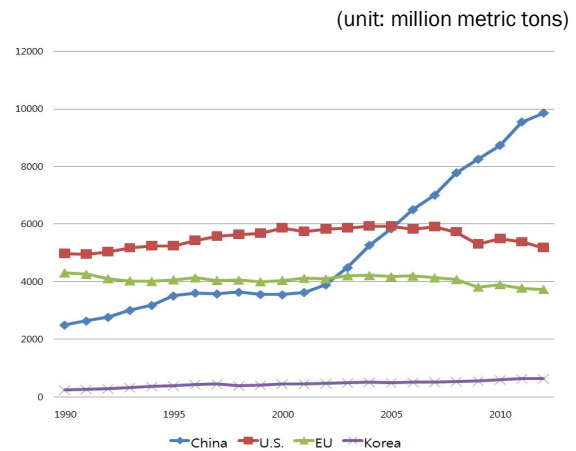
4 Davenport, C. and Baker, P.(2014), "Taking Page From Health Care Act, Obama Climate Plan Relies on States," New York Times. (June 2)

launched in 2013, which aims to cut emissions from diverse sectors covered in ETS by 21 percent from 2005 levels by 2020 and 43 percent by 2030. In 2012, the traded volume of emissions allowances reached 7,900 million tons with a total value of EUR 56 billion. However, the EU-ETS is now regarded as a subject to reform. Recent economic recession depressed the market demand and thus, EU-ETS was oversupplied by 2,100 million tons at the end of 2013. The price of allowances dramatically fell by 70 percent compared to the price at the initial stage of EU-ETS. Thus, the scheme has gained criticism that the original objective of the scheme to lower emissions through market mechanism is diluted.

Emissions Trends and Mitigation Efforts: China

Currently, a third of the world's total carbon emissions are generated by China (Figure 2). In 2012, China emitted carbon pollution of 9.08 billion metric tons while the global total recorded 34.5 billion tons. China's carbon emissions increased by three times for the last 20 years and its accumulative carbon emissions between 2000 and 2012, which is 84 billion tons, far exceeded that of U.S. (74 billion) and EU (52 billion).

Figure 2. Comparison of CO₂ Emissions



Source: PBL Netherlands Environmental Assessment Agency, EC Joint Research Centre (2013), Trends in Global CO₂ Emissions: 2013 Report.

During the period of rapid economic growth, urbanization and industrialization, China's carbon emissions increased by the rate of 15-17 percent. But recent economic slowdown and government's policies to mitigate climate change led to a 3.2 percent increase of carbon emissions in 2012, the lowest in a decade. Emissions in China are mainly generated by coal combustion and coal accounts for roughly 70 percent of the country's total power generation.⁵

Based on mid/long-term strategies, such as the "12th Five-Year Plan (2011-2015)" and the "National Plan for Addressing Climate Change (2013-2020)", the Chinese government aims to lower emissions per unit of GDP (or carbon intensity), change energy mix and expand renewable energy usage. National Development and Reform Commission (NDRC) aims to lower emissions per unit of GDP by 17 percent below 2005 levels by 2015 and 40-45 percent by 2020. In 2012, carbon intensity of

⁵ According to U.S. EIA (May 2014), China's coal production and consumption increased for the 13th consecutive year in 2012. China accounted for 46 percent of global coal production and 49 percent of consumption in 2012.

China fell by 5.02 percent from a year earlier. The government also set the targets to increase the share of non-fossil fuels in power generation by 15 percent by 2020 and decrease the share of fossil fuels by 65 percent by 2017.⁶

China launched a low carbon pilot program in selected cities (1st stage: 13 cities, 2nd stage: 29 cities) to support local government's efforts to reduce emissions from industry and transportation. Hence, a pilot emission trading scheme is now running in 7 selected cities (Beijing, Shanghai, Tianjin, Guangdong, Hubei, Shenzhen, and Chongqing). The Chinese government plans to introduce nationwide emission trading scheme through the "13th Five-Year Plan (2016-2020)".

Implications

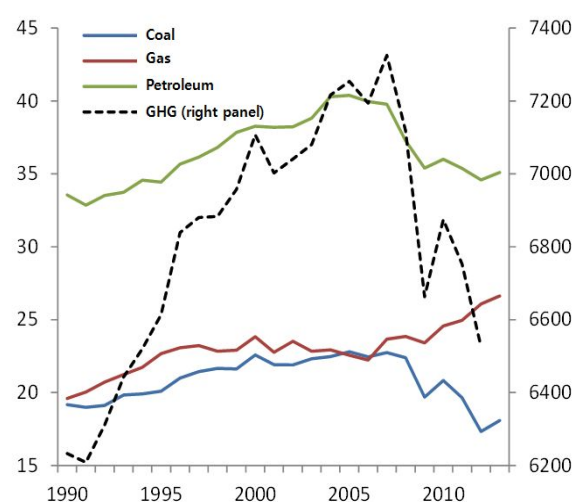
Importance of Natural Gas in Energy Supply and Emissions Reduction

It should be noted that U.S.' efforts to increase natural gas consumption to lower GHG emissions and China's deal with Russia to develop natural gas⁷ indicate the significant role of natural gas in addressing energy source supply as well as climate change. U.S. GHG emissions increased from 6,230 million metric tons in 1990 to 7,320 million tons in 2007. However, emissions in 2012 dropped roughly 11 percent from 2007 levels driven by a sharp contraction in coal and petroleum consumption (Figure 3).⁸ In addition, recent China-

Russia natural gas deal worth about USD 400 billion can be understood as a part of China's strategy to diversify the country's energy sources, reduce its dependency on coal-fired power supply and ultimately respond to worsening impacts of climate change.⁹

Figure 3. U.S. Fossil Fuels Consumption and GHG Emissions

(unit: left panel-1,000 trillion Btu
right panel- million metric tons)



Source: U.S. EIA (2014.6), Monthly Energy Review.

Prospect for Global Climate Change Negotiations

With its intensive efforts to reduce domestic GHG emissions in recent years, U.S is expected to request developing countries and other major emitting countries to more actively contribute to global-wide mitigation efforts. After the UNFCCC COP17 in 2011 where the Parties agreed to establish a new climate change platform comprising all countries by 2015, the Parties have continued relevant negotiations through a subsidiary body called

6 Bloomberg (2014), "China Targets 70Gigawatts of Solar Power to Cut Coal Reliance." (May 16)

7During Russian President Putin's visit to China in May 2014, Russian state-owned gas company Gazprom and China National Petroleum Corp (CNPC) signed a deal in which Russia will supply 38 billion cubic meters of natural gas per year via pipeline for 30 years, beginning 2018.

8U.S. EPA (2014), Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012. (April 15)

9ANISHCHUK, A (2014), "As Putin looks east, China and Russia sign \$400-billion gas deal," Reuters. (May 21)

ADP¹⁰. So far, ADP has mainly focused on how to align each country's 'intended nationally determined contributions' to the new climate change platform. In this context, it is likely that U.S. will emphasize its recent achievements in emissions reduction and initiatives to cut carbon pollutions from power sector to urge other countries to make significant commitments in dealing with climate change.

Hence, U.S. and China, representing developed and developing economies, respectively, agreed in February 2014 to enhance bilateral cooperation for climate change. Thus, recent commitments and actions from major economies to lower emissions will contribute to meaningful progress on a launch of a new climate change platform in COP21 that will be held in 2015, Paris.

Increase of Trade in Environmental Goods

After jointly pledging to launch negotiations to liberalize global trade in environmental goods to address climate change issues at the World Economic Forum in Davos in January 2014, the 14 member countries of WTO¹¹, which account for 86 percent of global trade in environmental goods, launched negotiations for the Environmental Goods Agreement (EGA) in July 2014 to lower tariffs and other trade barriers on environmental goods. Although the definition of environmental goods is yet to be fully agreed on, these countries will proceed with further EGA negotiations on 54 items which APEC leaders agreed on in 2012. As major economies have recently accelerated implementation of a wide variety of emissions reduction measures, the international dialogues on free trade of environmental goods have also been intensified, which will evidently lead to expansion of global markets for environmental goods and services. **KIEP**

10 Ad Hoc Working Group on the Durban Platform for Enhanced Action

11 The 14 countries are U.S., Australia, Canada, China, Costa Rica, EU, Hong Kong, Japan, Korea, New Zealand, Norway, Singapore, Switzerland, and Taiwan.