기후변화법제 연구 16-19-③

The Implementation of Climate Change Mitigation Policy after Paris Agreement

- A Comparative Study on EU, AU, China and Korea -

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Abstract

Ⅰ. Background and Purpose

□ With its clear goal, universal participation and innovative mechanism, Paris Agreement is a major step forward beyond Kyoto Protocol under UNFCCC.

○ As the world largest carbon emitters, the developed countries or fuel fossil exporters, EU, AU, China and Korea are the integral actors in any movement that will stabilize the global climate at conditions suited to sustainable development for Environmental protection and quality of life around the world.

○ For a better understanding of their climate laws and policies as well as a better cooperation among those countries and other countries in the world, a comprehensive study of the evolvement of the chosen 4 countries' climate regime at pre and post-Paris era is of great importance both in theory and in practice.

□ Many countries such as EU, AU, China and Korea have signed the Paris Agreement and have ratified this Agreement.

○ They are going to plan and operate (Intended) Nationally Determined Contributions that are to be implemented between 2020 and 2030.

○ It is very meaningful to understand other NDCs and analyze their implementations for 2030 to find out the application of the most effective ways.

Ⅱ. Major content

□ The European Union and seven Member States have ratified the Paris Agreement.

○ The European Union committed itself to reduce greenhouse gas emissions by 40% below 1990 levels by 2030.

○ The target constitutes a significant strengthening of the emission reduction targets.

○ This chapter reviews the European Union's climate change policy including the EU Emissions Trading System, Fluorinated Gases, Energy efficiency, Renewable energy and transportation and the diverse measures taken or planned by the European legislator.

○ The European Union has already initiated the legislative procedures in the Emissions Trading sector. In the area of the non-covered sector emissions will be reduced through a multitude of measures. The measures here are in a less advanced state. Sometimes they are in the legislative process, other times they are yet to be proposed.

□ Australia has committed to emissions reduction targets under the Kyoto Protocol (1997) and the Paris Agreement (2015).

○ Under the Paris Agreement, Australia has committed to reduce greenhouse gas (GHG) emissions by 26 per cent to 28 per cent below 2005 levels by 2030, which is way below the target (i.e. 45 to 65 per cent below 2005 levels) recommended to the Government by the Australian Government Climate Change Authority.

○ The Government aims to achieve its 2030 target mainly through the implementation of Emissions Reduction Fund (ERF), which is funded by tax payers' money, and its Safeguard Mechanism.

○ However, existing climate policy of Australia is unlikely to meet its 2030 target under the Paris Agreement.

□ Climate Change policy in Australia is the most contentious and divisive issues in Australian politics.

○ The country has witnessed numerous climate change policy designs and the repeal of carbon tax law.

○ Australia will need a stable, comprehensive and committed climate change policy accepted by major political parties to meet its emissions reduction obligations under the Paris Agreement.

○ Therefore, bipartisan support for climate change policy is vital to drive down Australia's emissions and achieve its international obligations under the Paris Agreement.

□ The political responses to climate change in China is a reinforcing process.

○ Due to the comprehensive nature of addressing climate change, China adopted a two-tier structural institutional design. Since 2007, China has adopted a series of policies regarding adjusting industrial structure, increasing energy efficiency, optimizing energy structure, carbon sink, launching emission trading system, and adaptation.

○ China's approach to climate change are characterized by policy-drive, relying on command-and-control, and top-down regime. In China, climate change law is a fragmental system, with several environmental and energy laws that have indirect impacts on climate change and lacking a comprehensive and fundamental climate change law.

□ China impressed the world by making substantial pledges and figure out convincing action plans in the NDC submitted to the Paris Conference.

○ This marked a significant turn of China's climate change policies from a follower to a leader. Technically, China's INDC has some unique features which may attract concerns and criticisms. Considering its huge population, ongoing urbanization, and coal-dominated energy structure, there are enormous challenges and difficulties in achieving China's INDC targets.

○ China is preparing to adopt Environmental Protection Tax and launching a nationwide ETS. A strict and powerful accountability system is promising to ensure the implementation of the climate policies.

○ Although Paris Agreement is a paradigm shift of global climate governance, China still insist the principle of common but differentiated responsibilities and win-win approach to enhance international cooperation.

○ As always, China imbeds the topic of climate change into economic development, and explores with great effort a low-carbon development model which will benefit China and the world.

□ In Korea, there are a variety of discussion for a rational and economical system for execution of the emissions reduction, while preventing the side-effects that can occur by inducing economic rationality under Paris agreement

○ Under the motto of Green Growth, The Framework Act on Low Carbon, Green Growth was enacted as an act integrating the regulations in various fields like environment, energy, and economics, enacted to accomplish different policy purposes, under the comprehensive policy goal of low carbon, green growth as well as ETS.

○ Korean ETS has been operating since 2015 for efficiently reaching the 2020 national greenhouse gas reduction target (30% reduction compared to BAU), and tried to make the carbon market more activated and stabilized.

○ Based on the energy plan and INDC, it is focused on the foundation for invigorating green technology development through investment in facilities and development of new and renewable energy.

Ⅲ. Expected effects

□ This paper presents the evolution of climate change policy in EU, AU, China and Korea.

○ In EU, it is expected that the cost-burden of abatement will differ considerably between the covered and the non-covered sectors as well as among the non-covered sectors, and this gives rise to inefficiencies. Therefore, the costs of meeting the Paris Agreement could be reduced by relying more heavily on the EU ETS sector.

○ In AU, it is expected that Australia has tried to make some policy and legislation amended or enacted considering its past and present climate change policies and legislations, and it is for Australia's INDC and its implementations under the Paris Agreement including carbon market linking opportunities.

○ In China, it offers an insider's understanding and a bird view of climate change law and policy in China on the view of China's political and institutional context to illustrate the dynamics of evolvement with inspiring insights.

○ In Korea, it has considered to make more investment for renewable energy and the improvement of energy efficiency under INDC at Paris agreement, and could be expected to make the carbon market linked with the international market after 2020 or further.

Key Words : INDCs, ETS, Paris Agreement, Emissions Reduction, Climate Change, Renewable Energy, Energy Efficiency, Carbon Market Linkage

목 차

Acronyms and Abbreviations

ACCUs	Australian Carbon Credit Units
AGO	Australian Greenhouse Office
ALP	Australian Labor Party
AUD	Australian Dollar
ANREU	Australian National Registry Emissions Units
CFI	Carbon Farming Initiative
CCA	Climate Change Authority
CDM	Clean Development Mechanism
CER	Clean Energy Regulator
COP	Conference of the Parties
COAG	Council of Australian Governments
CPM	Carbon Pricing Mechanism
CPRS	Carbon Pollution Reduction Scheme
EITE	Emissions Intensive Trade Exposed
ERF	Emissions Reduction Fund
ETS	Emissions Trading Scheme
EU	European Union
EUETS	European Union Emissions Trading Scheme
GHG	Greenhouse Gas
HFCs	Hydrochlorofluorocarbons
INDC	Intended Nationally Determined Contributions
ITMO	International Transfer of Mitigation Outcomes
LULUCF	Land use, land-use change and forestry
MRV	Monitoring, Reporting and Verification
NDC	Nationally Determined Contribution

NEM	National Electricity Market
NEPP	National Energy Productivity Plan
NGERS	National Greenhouse and Energy Reporting Scheme
PA	Paris Agreement
RET	Renewable Energy Target
SDM	Sustainable Development Mechanism
UNFCCC	United Nations Framework Convention on Climate Change
$tCO_{2\text{-}e}$	Tonnes of Carbon Dioxide Equivalent
TJ	Terajoule

Chapter 1

As the danger of various natural disasters has increased with climate change, the entire world is looking for active measures to respond to climate change through various policies and legislations. As a result, nations reached an agreement for specific actions for response and adapatation to climate change for reduction of greenhouse gases by submitting the national contribution plans (NDCs) at the COP in December. Article 2 of the recent Paris Accord prescribes that nations must work to maintain the increase in average temperature under 2°C, and prevent the temperature from increasing by 1.5°C. The specific action plan to reach this goal is based on the response and adaptation to climate change outlined in the NDCs submitted by each nation. This stems from the "principle of common but differentiated responsibilities" selected at the Rio Declaration. Also, nations that did not actively participate in the previous Kyoto Protocol, such as the United states, China, and several developing nations, include in their NDCs specific plans of response based on the establishment and execution of voluntary greenhouse gas reduction targets, as well as the increase in energy demand and proportion of environmentally friendly energy.

In addition, the Paris Accord contains measures to analyze the results of implementation every 5 years, improving on the problem of existing climate change agreements that there was no guarantee of implementation, that is, a legally binding obligation, and is assessed to have increased practicality. Also, it is significant that realistic support system for financial support and transfer of technology to developing nations was consid-

ered for more detailed and efficient measures for response and adaptation to climate change.

Also, Article 6 of the Paris Accord prescribes the use of the international carbon market. The various means of implementation for greenhouse gas reduction proposed by each nation were acknowledged to be able to be used globally through the market mechanism, and was expected that various greenhouse gas reduction credit systems including the emission trading system would be used in the future. Although the emission trading system is being operated in several countries including Korea, transactions in the international carbon market is yet in the preparatory stage. However, the expectation of the various uses of the international carbon market, the stabilization of the emission trading system, and the globalization of the scope of transaction realized through Article 6 of the Paris Accord show that now is the time for a systematic and practical consideration.

Thus, we seek to carry out a comparative legal study between Korea and selected countries that have established and operated various policies and legislations for response to climate change like reduction of greenhouse gases. It is thought that such comparative legal study may provide suggestions for the design and operation of Korea's voluntary reduction execution plan that will be established after the Paris Accord for the purpose of reaching the greenhouse gas reduction target. Accordingly, we seek to carry out a comparative legal study on the climate change-related policies and legislations of the following 3 countries that were selected: the EU, which has operated the emission trading system since 2005 and has pioneered areas like environmentally friendly energy; Australia, which has established and operated policies and systems regarding the carbon

market mechanism and the carbon pricing regulation mechanism, and is now operating active measures for reduction of greenhouse gases and response to climate change through the Carbon Reduction Funds system; and China, which will be operating a government-led emission trading system and an energy tax on fossil fuels starting from 2017. Further, the NDCs, specific action plans, and future prospects of each country will be analyzed. Considering the fact that the 3 selected countries are operating an emission trading system or have done so in the past, the fact that the EU and Australia have prepared and implemented climate change-related policies and legislations since the early stages, and the fact that China is promoting an increasingly active reduction policy in response to strong international demands for reduction due to the significant amount of greenhouse gas emitted and is in close relations with Korea economically and environmentally, it is determined that research on this topic is highly necessary.

Therefore, Chapter 2 EU is written by Professor Stefan Weishaar of Groningen University; Chapter 3 Australia by Advisor Anil Bhatta of the Carbon Market Advisory; Chapter 4 China by Professor Xiaoping Zhang of Central University of Finance of Economics; and Chapter 5 Korea by Dr. Eunjung Kim of the Korea Legislation Research Institute.

Chapter 2 European Union

This chapter of the report addresses the policies of the European Union. In order to do so it first provides a short general background to the European Union (section 1) before examining the EU's past-climate change policy and legislation (section 2). Section 3 of this chapter reviews the EU's key issues in its Intended Nationally Determined Contributions (INDCs). Subsequent sections review the EU's implementation under the Paris agreement regarding environmental effectiveness and economics efficiency as well as linking. The last section of this chapter (section 5) presents recommendations and highlights future plans.

1. Background on the European Union

The European Union consists (at present) of 28 Member States: the Kingdom of Belgium, the Republic of Bulgaria, the Czech Republic, the Kingdom of Denmark, the Federal Republic of Germany, the Republic of Estonia, the Republic of Ireland, the Hellenic Republic, the Kingdom of Spain, the French Republic, the Republic of Croatia, the Italian Republic, the Republic of Cyprus, the Republic of Latvia, the Republic of Lithuania, the Grand Duchy of Luxembourg, the Republic Hungary, the Republic of Malta, the Kingdom of the Netherlands, the Republic of Austria, the Republic of Poland, the Portuguese Republic, the Republic Romania, the Republic of Slovenia, the Slovak Republic, the Republic of Finland, the Kingdom of Sweden, the United Kingdom of Great Britain and Northern Ireland. After a popular referendum in June 2016, the United Kingdom is currently preparing to exit the European Union and is

expected to invoke Article 50 of the European Union Treaty to initiate negotiations about the future of its relationship with the Union.

The European Union is not a unitary state nor a union of states as in the case of the United States of America. It is an ad hoc international entity that consists of sovereign member states that have, upon joining the Union, conferred to it part of their national powers and competences. Cooperation among the Member States is therefore in part inter-governmental (decisions are taken by the governments on the basis of the voting procedures established in the treaties) and in part supranational (decisions are taken by the institutions of the Union and apply upon the member states). Even though at their start the European Communities and the Union was seen as dealing mainly with economic policies, by now the Union operates in almost all areas of law. The only area of law in which the Union has explicitly no competence is national security.

Supranationality of European law has been recognized in 1964 in the famous case Flaminio Costa v ENEL (1964) Case 6/64 where the European Court of Justice held: "*It follows from all these observations that the law stemming from the treaty, an independent source of law, could not, because of its special and original nature, be overridden by domestic legal provisions, however framed, without being deprived of its character as community law and without the legal basis of the community itself being called into question"*. European Union law thus is a special legal order that supersedes Member State law.

The competences that the EU has towards its Member States fall under three categories: exclusive, shared and supportive. The EU Climate change policy is based on the treaty provisions belonging to the environmental law chapter (Title XX) of the Treaty on the functioning of the European

Union (TFEU). Climate change policy is a shared competence. This means that Member States can act alone to the extent that the field has not been occupied by the European Union. Where the European Union has acted Member States are bound by European Law and their duty of loyalty to the European Union. This so-called duty of sincere cooperation is enshrined in Article 4(3) of the Treaty of the European Union (TEU) and prevents the Member States from taking any actions that could undermine or impair the effectiveness of the European Union actions.

2. EU's past-climate change policy and legislation

Since 1991 the European Commission has taken various climate related initiatives to limit greenhouse gas emissions and to improve energy efficiency. Measures include the promotion of electricity from renewable energy sources, voluntary commitments by car makers and proposals on the taxation of energy products. The European Commission proposed a carbon/energy tax at EU level in 1992. This proposal failed because it had to rely upon ex Article 130s EC Treaty (now Article 192 TFEU) prescribing a unanimity requirement in the Council; due to different interests of Member States the carbon tax was unsuccessful.

In order to meet the European Greenhouse Gas reduction goals, as committed to under the 1997 Kyoto Protocol of attaining the committed average annual reduction of 8 percent below 1990 levels during the years 2008 - 2012, the European Commission responded to a request from the EU Council of Environment Ministers in June 2000 by launching the European Climate Change Program (ECCP).[1] Following a report[2] the

1) COM (2000)88.
2) ECCP (2001).

Commission presented a package of three broad measures to tackle climate change as well as an Action Plan to implement the ECCP[3]. These measures embraced the proposal for ratification of the Kyoto Protocol[4], a proposal for regulating fluorinated gases and the proposal to establish an Emissions Trading System[5] as well as a proposal for linking the KP project-based mechanisms (CDM, JI) with the EU ETS[6].

This section of the report is subdivided into several sections treating all of the current's EU climate policy and legal areas: Emissions trading system, Flurinated gases, Energy efficiency, Renewable energy and CO2 limits for cars and vans - each is examined in turn.

2.1. Emissions trading system

The EU ETS, a cap-and-trade system for greenhouse gas emission allowances for energy intensive installations, can rightly be called the cornerstone of the European Union climate change policy. It extends to all the Member States of the EU, as well as Norway, Lichtenstein, Iceland and covers around 45% of the European greenhouse gas emissions. The legal framework was set up in 2003 (Directive 2003/87/EC) obliging around 5.000 operators with more than 11.000 installations to participate in this multi-jurisdictional regulatory system to reduce CO2 emissions from four broad sectors: (1) energy (including electricity producers and oil refineries), (2) ferrous metals (iron and steel), (3) minerals (cement, glass, ceramics), and (4) pulp and paper[7]. In addition, as a fifth sector,

3) COM (2001)580 final.
4) COM (2001) 579 final and Council Decision 2002/358/EC.
5) COM (2003) 492.
6) COM (2001)580 final.
7) See Annex I of Directive 2003/87/EC.

aviation has been added. Gases actively covered include carbon dioxide, nitrous oxide and perfluorocarbons.[8)]

The program is implemented in multiple phases: the first ranging from 2005-2007 and the second one from 2008-2012, which coincides with the Kyoto Protocol first compliance period. The third period lasts from 2013-2020 and coincides with the second Kyoto Commitment period (2013-2020) in which the EU takes part. The fourth ETS period lasts from 2021-2028. It bears mentioning that the EU ETS directive does not have an expiry date. The first trading phase suffered from over-allocation of emission allowances and witnessed a dramatic decline in prices. The second trading phase first appeared to operate smoothly before a strong degree of oversupply due to the economic downturn became apparent. Allocation in phase one and two was strongly based on free allocation (grandfathering, accounting for 95% and 90% respectively), and marginally on auctioning. In the second EU ETS trading period Member States were subject to obligations under the Kyoto Protocol and under the EU Burden Sharing Agreement. From 2013 onwards, the Effort Sharing Decision applies, which means that Member States have to develop national policies (and related regulatory measures) to address greenhouse gas emissions of sources not covered under the EU ETS[9)]. Examples of such non-covered transport and heating.

The Council of the EU[10)] has adopted a climate change action and renewable energy package in April 2009 to achieve a 20 per cent reduc-

8) On the basis of Annex II of Directive 2003/87/EC (as amended).

9) Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020, OJ L 140, 5.6.2009, p. 136 – 148. The effort sharing decision covers all six Kyoto Protocol gases.

10) See Council of the European Union 8434/09 (presse 77) Brussels, 6 April 2009.

tion in greenhouse gases (below 1990 levels) and a 20 per cent share of renewable energy in the total energy consumption by 2020 and to meet its targets of the Europe 2020 Strategy of smart, sustainable and inclusive growth.[11] Based on recent figures the EU has already over complied with its goal of reducing emissions by 20% below 1990 levels by 2020 as it reduced its emissions already by 23% in 2014.[12]

The climate change action and renewable energy legislative package represents a multi-faceted approach supporting the attainment of Europe's strategic objectives[13] and to support each Member State in attaining its respective targets. Renewables and Energy efficiency policies will be presented below.

The current emission cap of the European emission trading system declines over time so that in 2020 the emissions from covered sectors will be 21% lower than in 2005. With the 2020 goals for smart sustainable and inclusive growth, the European Union addresses all areas needed to mitigate global warming: it leads to a reduction of allowances per person (energy efficiency), it addresses the emission intensity of the economy (EU ETS) and the energy production (renewable energy). While addressing all areas contributing to climate change makes intuitive sense, it must be observed that the three policy areas affect each other. More renewable energy means that less energy production takes place within the framework of the EU ETS which reduces the market price for emission allowances. This gives rise to a 'waterbed' effect in which advances in one policy area lead to less pressure in another policy. Similarly, if pri-

11) See COM (2008) 30 final and COM (2010) 2020 final.
12) See European Parliament Research Service, PE 572.787, November 2015, p. 2
13) The EU was not projected to meet its Europe 2020 strategy objective of enhancing national energy efficiency by 20% in 2020 and additional measures were proposed by the Commission; COM (2011) 370 final.

vate homes need less heating, energy demand is lower and hence there will be less demand for emission allowances by energy producers covered under the EU ETS. Since the EU ETS is designed as a cap and trade system it also means that other sectors will have fewer incentives to invest in abatement technology. Reductions in renewable energy and energy efficiency are thus partially outweighed by additional reductions in the industry sector. This interaction effect is, however, not a one way street. It works both ways since higher Emission Allowance prices incentivize investments in energy efficiency and renewable energy.

The third trading phase of the EU ETS came with a series of changes. Unlike the previous trading phases the third one is characterised by a strong degree of harmonization both of free allowance allocations and of allowance auctions. Free allocations are made on the basis of *ex ante* benchmarks based upon the average of the most efficient top 10 per cent of installations in a sector or subsector during the period 2007-2008.[14] Auctions are increasingly phased in as the predominant form of allocation rising from 20 per cent in 2013 to 70 per cent in 2020, while 2027 is the targeted date for full auctioning.[15] In the aviation sector auction will be limited to 15% during the third trading phase. Auctioning is, with some exceptions for Eastern European EU members, the default allocation form for the power sector.[16] While 88 per cent of the total quantity of allowances to be auctioned will be distributed to Member States,[17] 10 per cent will be allocated for the purpose of 'solidarity' and growth

14) Article 10a(2) Directive 2009/29/EC.
15) Article 10a(11), Directive 2009/29/EC.
16) Article 10a(3), Directive 2009/29/EC. It bears mentioning that some Member States were able to secure concessions to compensate for their poorly integrated electricity grid, see Article 10c(1), Directive 2009/28/EC
17) Article 10(2)(a), Directive 2009/29/EC.

within the EU.[18] The remaining two per cent goes to those Member States that were in 2005 at least 20 per cent below their Kyoto Protocol base-year emissions.[19] A large share of auction revenues (50 per cent) should (not shall) be used for emission-mitigation and adaptation measures.[20]

Emitting entities under the EU ETS are obliged to monitor and report their emissions for each calendar year and have their emissions verified by an accredited entity. By the 30th of April of the following year emission allowances must be surrendered to cover all emissions. Failure to do so results in a fine of 100 Euros per tonne of CO2 and the obligation to surrender the missing allowances.

Sectors and sub-sectors exposed to a significant degree of carbon leakage are eligible to receive up to 100 per cent of allowances for free.[21] This can be reviewed when (if) an international climate change agreement is reached.[22] With a view to achieving emission reductions and strengthening long-term regulatory certainty, the overall scarcity of emission allowances in the third trading phase and beyond will be achieved through a linear reduction factor of 1.74 per cent.[23]

In order to reduce the threat of carbon leakage the Commission has adopted rules that permit Member States to take support measures for energy intensive trade exposed sectors that are subject to a significant risk of carbon leakage.[24] Eligible sectors include aluminium, copper, fertil-

18) Article 10(2)(b), Directive 2009/29/EC
19) Article 10(2)(c), Directive 2009/29/EC
20) Article 10(3), Directive 2009/29/EC
21) Article 10a(12) Directive 2009/29/EC
22) Article 10a(1) Directive 2009/29/EC
23) Article 9, Directive 2009/29/EC; it should be reviewed by 2025
24) Communication From The Commission Guidelines on certain State aid measures in the context of the greenhouse gas emission allowance trading scheme post-2012 (SWD (2012) 130 final) OJ C 158/4

isers, steel, paper, cotton, chemicals and plastics. Member States are allowed to grant subsidies of up to 85 per cent of the increase faced by the most efficient companies in the respective sector during the period 2013-2015, 80 per cent during 2016-2018 and up to 75 per cent during the last two years of the third trading period.

Another means to mitigate the high cost burden of emissions trading is offsets. Since offsets are intended to be supplemental there are quantitative restrictions for the use of offsets. These were determined at Member State level in the second period but are now determined at European level.[25] The overall use of credits permissible shall not exceed 50 per cent of the Union-wide reductions below 2005 levels of the existing sectors under the Union scheme over the period from 2008 to 2020, and 50 per cent below the 2005 levels of new sectors and aviation over the period from the date of their inclusion in the Union scheme to 2020. Besides quantitative restrictions there are also qualitative restrictions. Offsets from nuclear facilities and forestry projects (LULUCF) are not permitted. Similarly offsets from large hydroelectric projects are not accepted unless they meet special requirements.[26] As of 1st of January 2013 offsets from projects related to HFC-23 and N2Os from adipic acid production will not be permissible anymore (certain transition rules apply).[27] The use of offsets for the purpose of compliance in the second trading phase has demonstrated a marked increase and the new qualitative restrictions would entail that 80 per cent of the offsets used for compliance in 2010 would not be admissible anymore. The increased use of

25) See Art. 11(a)8 Directive 2009/29/EC
26) See Art. 11(b) of Directive 2004/101/EC
27) See Commission Regulation 550/2011

offsets during the second period has contributed to the significant degree of oversupply that is undermining the emission allowance price in the European Union.

Despite the significant oversupply that was attributable to the economic down the EUA price was still positive at the end of the second trading phase because of the possibility of banking between the second and third trading period. The European Commission proposed several structural reform elements to ease the excess supply. Firstly, the Commission postponed the auctioning of 900 million allowances until 2019-2020 as a short term measure.[28)]

Moreover, the Commission established a market stability reserve as of 2018. This reserve will start operating in January 2019 and reduce the allowances that are freely available on the EUA market.[29)] The Commission also proposed to increase the annual linear reduction factor from 1.74% to 2.2% from 2021 onwards.[30)] This has been endorsed in the Council Conclusions from 23rd and 24th of October 2014.[31)]

These measures should allow the European Union to make progress towards its 2030 energy and climate policy framework to cut emissions by

28) Decision No 1359/2013/EU of the European Parliament and of the Council of 17 December 2013 amending Directive 2003/87/EC clarifying provisions on the timing of auctions of greenhouse gas allowances. See also 25/02/2014 - Commission Regulation EU No 176/2014 amending Regulation (EU) No 1031/2010 in particular to determine the volumes of greenhouse gas emission allowances to be auctioned in 2013-2020

29) Decision (EU) 2015/1814 of the European Parliament and of the Council of 6 October 2015 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and amending Directive 2003/87/EC OJ L 264, 9.10.2015, p. 1 – 5.

30) Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments COM/2015/0337 final, Article 9

31) EUCO169/14 European Council Conclusions (23rd and 24th of October 2014), Brussels, 24th October 2014

at least 80% by 2050[32] and to contribute to the attainment of the objective of the Paris agreement. It is the European Union's ambition under the Paris Agreement to reduce emissions by 40% below 1990 levels by 2030. To achieve this target sectors covered by the EU ETS will reduce their emissions by 43% compared to 2005 while non-ETS sectors will reduce emissions by 30% compared to 2005.

To ease adaptation, funding mechanisms to support economic actors in the power sector and industry for innovation and investments and supplements existing support for demonstration of innovative technologies and extends this to breakthrough innovation in industry are proposed.[33]

2.2. Fluorinated gases

Fluorinated gases are a substitutes for ozone-depleting substances. They do have a substantial global warming potential of 23.000 times that of carbon dioxide (CO2) and their emissions are rising strongly.

The 2006 Regulation[34] was replaced by Regulation 517/2014/EC.[35] This regulation strengthens the existing measures and introduces a number of far-reaching measures in order to reduce emissions by two-thirds compared with 2014 levels by 2030.

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32) European Council agreed in October 2014 the 2030 policy framework for climate and energy

33) COM/2015/0337 final - 2015/0148 (COD)Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments

34) Regulation (EC) No 842/2006 of the European Parliament and of the Council of 17 May 2006 on certain fluorinated greenhouse gases, OJ L 161, 14.6.2006, p. 1 – 11

35) REGULATION (EU) No 517/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006

The new legislation will stimulate innovation and green growth and jobs by encouraging the use of green technologies based on less climate-harmful alternatives.

2.3. Energy efficiency

The energy efficiency elements contained in the 2020 strategy are further targeted by the Energy Efficiency Plan 2011[36] that proposes ways which strengthen European efforts to meet its target of having a 20 per cent energy efficiency improvement below predicted levels by 2020. Under the Energy Efficiency Directive, all EU countries are required to use energy more efficiently at all stages of the energy chain from its production to its final consumption, it thereby addresses energy generation, transformation, distribution and consumption.[37] It *inter alia* seeks to foster a large array of incentives and behavioral changes to stimulate building renovation, to green public procurement rules, to incentivize building improvements, to proliferate best practices and to have more energy audits. Member states have for example to ensure energy savings for consumers and industry alike by taking measures:

- energy distributors or retail energy sales companies have to achieve 1.5% energy savings per year through the implementation of energy efficiency measures

36) COM (2011) 109 final

37) Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC Text with EEA relevance OJ L 315, 14.11.2012, p. 1 – 56

- EU countries can opt to achieve the same level of savings through other means such as improving the efficiency of heating systems, installing double glazed windows or insulating roofs
- the public sector in EU countries should purchase energy efficient buildings, products and services
- every year, EU governments will carry out energy efficient renovations on at least 3% of the buildings they own and occupy by floor area
- empowering energy consumers to better manage consumption. This includes easy and free access to data on consumption through individual metering
- national incentives for SMEs to undergo energy audits
- large companies will make audits of their energy consumption to help them identify ways to reduce it
- monitoring efficiency levels in new energy generation capacities[38)]

The European Council sharpened the energy efficiency target[39)] to 27% of energy efficiency improvements by 2030 compared to projections of future energy consumption based on the current criteria. This objective will be reviewed in 2020 with a view to tightening it to 30%.

2.4. Renewable energy

In its communication of 19 October 2006 entitled 'Action Plan for Energy Efficiency: Realising the Potential' the Commission set a 20% target for renewable energy sources and a 10% target for renewable transport fuels by 2020. In its communication of 10 January 2007 entitled 'Renewable

38) See https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive
39) European Council Conclusions of 23 and 24 October 2014, EUCO169/14

Energy Roadmap - Renewable energies in the 21st century: building a more sustainable future' the Commission outlined that such targets would be feasible and help to reduce the dependence on imported fossil fuels and to boost the use of new energy technologies. The targets were endorsed by the European Council of March 2007, and by the European Parliament in its resolution of 31 January 2008 on that Action Plan.

The European Council endorsed a mandatory target of a 20 % share of energy from renewable sources in overall Community energy consumption by 2020 and a mandatory 10 % minimum target to be achieved by all Member States for the share of biofuels in transport petrol and diesel consumption by 2020. Appropriateness of the biofuel target was subject to various considerations including sustainability of production, commercial viability of second-generation biofuels and that Directive relating to the quality of petrol and diesel fuels being amended to allow for adequate levels of blending (Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998).

The Member States in the EU are very diverse, their amount of renewable energy as well as their potential for renewable energy differ. The 20% target is therefore allocated fairly and adequately taking into account the existing level of energy from renewable sources and the energy mix, their GDP and past efforts into account.

The 10 % target for energy from renewable sources in transport by contrast is uniformly set across all Member States because they are easily traded.

The EU's Renewable energy directive[40] sets a binding target of 20%

40) Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending

final energy consumption from renewable sources by 2020. The renewable energy targets of the Member States can be found in Annex I[41].

Member States in the EU have set national renewable energy action plans are tailored to the respective country's idiosyncrasies as each country differs with regards to their available resources and energy markets. In their national action plans, they explain how they intend to do this. The plans cover:

- individual renewable energy targets for the electricity, heating and cooling, and transport sectors
- the planned mix of different renewable technologies
- policy measures to achieve national targets including cooperation between local, regional, and national authorities
- any planned statistical transfers and/or joint projects with other countries
- national policies to develop biomass resources
- measures to ensure that biofuels used to meet renewable energy targets are in compliance with the EU's sustainability criteria.

Every two years, the EU publishes a renewable energy progress report. The latest report from 2015 shows that most EU member States are on track in meeting or over complying with their targets. For 2013/2014 most Member States are projected to meet their interim renewable energy targets. In 2014, the projected share of renewable energy in the gross final energy consumption is 15.3%.[42]

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and subsequently repealing Directives 2001/77/EC and 2003/30/EC OJ L 140, 5.6.2009, p. 16 – 62

41) See Annex I of Directive 2009/28/EC

42) See COM(2015) 293 final REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL

Also beyond the 2020 goals renewables will continue to play a key role in helping the EU meet its energy needs. EU countries have already agreed on a new renewable energy target of at least 27% of final energy consumption in the EU as a whole by 2030. This target is part of the EU's energy and climate goals for 2030.[43)]

2.5. CO2 limits for cars and vans

Road transport is a significant contributor to the EU's total greenhouse gas emissions; it contributes around 20% to the EU's total carbon dioxide (CO2) emissions. While these emissions fell by 3.3% in 2012, they are still 20.5% higher than in 1990. Transport is the only major sector in the EU where greenhouse gas emissions are still rising.

In 1995 the Commission adopted a Strategy for reducing CO2 emissions from vehicles. The strategy was based on three pillars: 1) voluntary commitments from the car industry to cut emissions, 2) improvements in consumer information and 3) the promotion of fuel-efficient cars by means of fiscal measures.

Voluntary commitments were given by the European Automobile Manufacturers Association in 1998 to reduce the average emissions from new cars sold to 140 g CO2/km by 2008. The Japanese Automobile Manufacturers' Association and the Korean Automobile Manufacturers' Association adopted a similar commitment in 1999 to be achieved by 2009. These voluntary self-restraints were appreciated as helping to reduce emissions[44)] but not fast enough. In its Communications (7th of

COMMITTEE AND THE COMMITTEE OF THE REGIONS Renewable energy progress report, Brussels, 15.6.2015

43) European Council Conclusions of 23 and 24 October 2014, EUCO169/14

44) See Commission Recommendation 1999/125/EC of 5 February 1999 on the reduction of CO2 emissions from passenger cars

February 2007) the European Commission presented the results of the review of the Community Strategy to reduce CO2 emissions from passenger cars and light-commercial vehicles and a Communication on a Competitive Automotive Regulatory Framework for the 21st Century came out. Progress had been made towards the target of 140 g CO2/km by 2008/2009 but the Community objective of 120 g CO2/km would not be met by 2012 unless additional measures were taken.

The 120g CO2/km by 2012 was to come from vehicle improvements and improvements in fuels. Mandatory CO2 emissions reductions of 130 g CO2/km for the average new car fleet were to be attained by means of improved vehicle motor technology. A further reduction of 10 g CO2/km would derive from other technological improvements and by an increased use of sustainable biofuels.

Regulation (EC) No 443/2009 of the European Parliament and of the Council of 23 April 2009 constitutes the required legal framework.[45] It sets CO2 emissions performance requirements for new passenger cars while aiming to ensure the proper functioning of the internal market. This Regulation sets the average CO2 emissions for new passenger cars at 130 g CO2/km, by means of improvement in vehicle motor technology. From 2020 onwards the target value of 95 g CO2/km for the average emissions of the new car fleet is set. For each calendar year the manufacturer of passenger cars shall ensure that their average specific CO2 emissions not exceed those specific CO2 emissions determined for them. The regulation is complemented by additional measures corresponding to

45) See Article 1 Regulation (EC) No 443/2009 of the European Parliament and of the Council of 23 April 2009 setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO2 emissions from light-duty vehicles (OJ L 140, 5.6.2009, p.1)

a reduction of 10 g CO2/km as part of the Community's integrated approach.

Emission performance standards for new passenger cars builds on a measuring and monitoring process for the CO2 emissions of vehicles registered in the Community. Measurements are to be undertaken in accordance with Regulation (EC) No 715/2007 and its implementing measures and innovative technologies. This measuring and monitoring process is a scheme to monitor the average specific emissions of CO2 from new passenger cars and was established in accordance with Decision No 1753/2000/EC of the European Parliament and of the Council of 22 June 2000.

Not only passenger cars but also commercial vehicles contribute to greenhouse gas emissions. Consequently EU legislation also addresses emissions of new light commercial vehicles. Regulation (EU) No 510/2011 of the European Parliament and of the Council of 11 May 2011 setting emission performance standards for new light commercial vehicles as part of the Union's integrated approach to reduce CO 2 emissions from light-duty vehicles sets the average CO2 emissions for new light commercial vehicles at 175 g CO2/km. It does so by incentivizing the improvement of in vehicle technology, as measured in accordance with Regulation (EC) No 715/2007 and its implementing measures, and innovative technologies. From 2020, this Regulation sets a target of 147 g CO2/km for the average emissions of new light commercial vehicles.

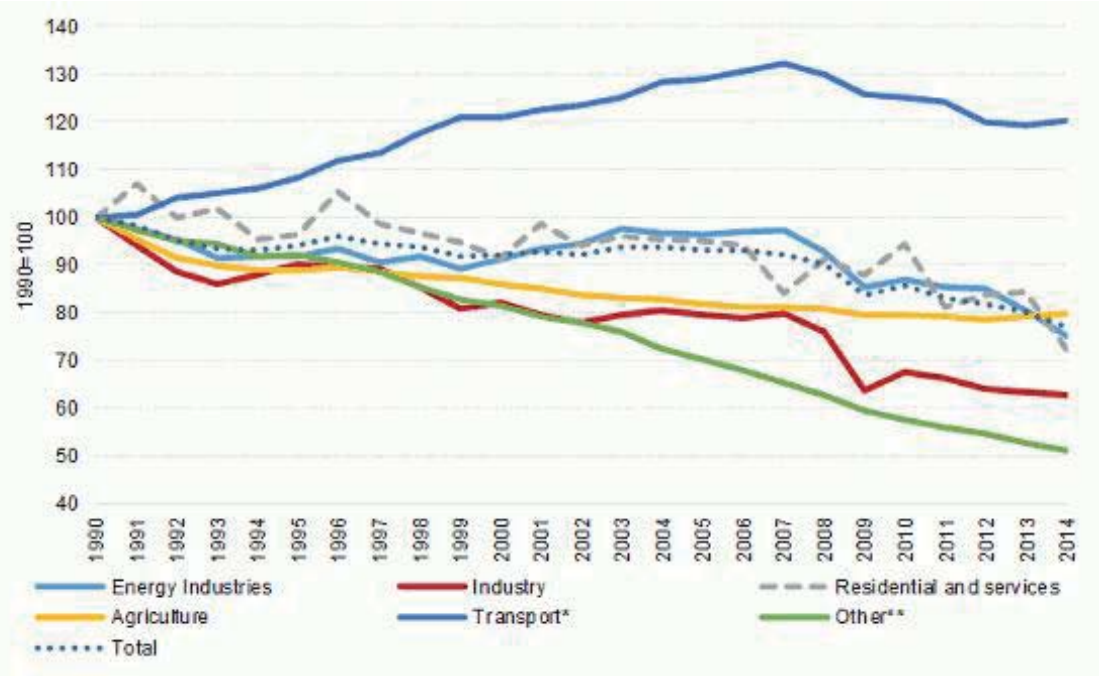
Consultations for the Revision of Regulation (EU) No 443/2009 and Regulation (EU) No 510/2011 setting CO2 emission performance standards for light duty vehicles is currently under way.

2.6. Emission reductions

The European Union's policies have been leading to reductions in the respective areas. The graph below clearly shows that industrial emissions declined quickly. 'Other emissions' from for example fugitive emissions from fuels, waste management and indirect CO2 emissions declined steadily and most rapidly.

The graph also shows that transport emissions have been increasing by 30% till 2007 and since then. They are still 20% above the 1990 levels. Road transport accounts for more than 70% of the transportation emissions.

[Figure 2-1] the Transport Emissions Increase



Note: * Transport includes international aviation but excludes international maritime; ** Other include fugitive emissions from fuels, waste management and indirect CO2 emissions

Source: EEA (via http://ec.europa.eu/clima/policies/transport/index_en.htm).

The table below shows the sectoral share of greenhouse gas emissions for 2013 in the European Union and for its Member States. It shows that the 20% increase of the transport sector is indeed having an important impact upon overall EU emissions.

[Table 2-1] Share of greenhouse gas emissions by economic sector, 2012

(% share of total emissions)	Transport	Manufacturing, industry & construction	Agriculture	Energy	Residential, Commercial & Institutional	Waste	Other
EU28	19,6%	19,0%	12,1%	32,8%	13,2%	3,1%	0,2%
Austria	27,0%	33,5%	10,5%	16,1%	10,8%	2,1%	0,1%
Belgium	21,4%	27,7%	9,8%	20,0%	19,7%	1,3%	0,0%
Bulgaria	13,7%	11,9%	11,5%	54,1%	2,9%	5,9%	0,0%
Croatia	21,6%	22,0%	15,4%	27,8%	9,0%	4,3%	0,0%
Cyprus	22,3%	14,1%	9,7%	38,4%	4,5%	10,8%	0,2%
Czech Republic	12,9%	22,2%	6,3%	46,8%	8,2%	2,9%	0,9%
Denmark	23,7%	12,1%	22,7%	33,1%	6,1%	2,1%	0,2%
Estonia	11,9%	7,6%	8,3%	68,6%	1,9%	1,6%	0,1%
Finland	20,8%	22,6%	11,9%	34,2%	4,5%	3,4%	2,6%
France	27,0%	20,5%	20,5%	11,7%	17,7%	2,6%	0,0%
Germany	16,6%	19,7%	8,1%	40,0%	14,1%	1,4%	0,1%
Greece	14,5%	13,9%	9,1%	50,7%	7,6%	4,3%	0,0%
Hungary	17,5%	13,9%	15,5%	30,3%	17,8%	5,1%	0,0%
Ireland	18,6%	11,6%	32,0%	21,9%	14,2%	1,7%	0,0%
Italy	23,0%	18,4%	9,3%	29,0%	16,8%	3,5%	0,1%
Latvia	25,4%	15,5%	25,5%	17,6%	10,5%	5,5%	0,1%
Lithuania	21,0%	23,0%	23,9%	21,6%	6,0%	4,5%	0,0%
Luxembourg	55,1%	16,1%	6,1%	9,1%	13,2%	0,4%	0,0%
Malta	17,6%	7,9%	3,3%	65,5%	3,7%	2,1%	0,0%
Netherlands	17,7%	18,8%	13,6%	32,4%	15,4%	1,9%	0,2%
Poland	11,7%	14,7%	11,9%	46,5%	11,4%	3,8%	0,0%
Portugal	24,7%	19,0%	12,1%	27,3%	4,9%	11,9%	0,1%

(% share of total emissions)	Transport	Manufacturing, industry & construction	Agriculture	Energy	Residential, Commercial & Institutional	Waste	Other
Romania	12,7%	23,5%	16,3%	34,0%	8,1%	4,9%	0,5%
Slovakia	15,2%	35,7%	7,8%	24,6%	9,2%	5,0%	2,4%
Slovenia	30,5%	14,3%	11,1%	33,5%	7,9%	2,6%	0,0%
Spain	23,7%	20,9%	14,3%	28,3%	9,1%	3,8%	0,0%

Source: COMMISSION STAFF WORKING DOCUMENT Monitoring progress towards the Energy Union objectives - Concept and first analysis of key indicators Accompanying the document COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE, THE COMMITTEE OF THE REGIONS AND THE EUROPEAN INVESTMENT BANK State of the Energy Union SWD/ 2015/0243 final, Figure 42

3. INDC key issues

On 6th of March 2015 the Latvian presidency and the European Commission submit on behalf of the European Union and its Member States the Intended Nationally Determined Contribution that is binding upon the EU and its 28 Member States.[46] This means that the INDCs are jointly binding[47] upon Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, United Kingdom as well as the European Union. In its declaration the EU and its Member States assume a binding target of an at least 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990. It

46) Latvian Presidency of the Council of the European Union, Submission by Latvia and the European Commission on Behalf of the European Union and its Member States

47) See European Council Conclusions (23 and 24 October 2014), EUCO 169/14, Brussels, 24 October 2014

thereby transposes the European Council (23 and 24 October 2014) conclusions endorsed a binding EU target of an at least 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990.[48] The basis for calculating the 40% reductions are all emissions in the European Union. To that end the European Council decided that the target would be delivered collectively by the EU in the most cost-effective manner possible, with the reductions in the ETS and non-ETS sectors amounting to 43% and 30% by 2030 compared to 2005, respectively and that all Member States will participate in this effort, balancing considerations of fairness and solidarity.

The binding target is an economy-wide absolute reduction target and extends to all greenhouse gases not controlled by the Montreal Protocol: Carbon Dioxide (CO2) Methane (CH4), Nitrous Oxide (N2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF6), Nitrogen trifluoride (NF3). It also constitutes net contributions of the EU and its Member States as it does not include any contributions from international credits.

Emissions from the following sectors and sources are covered.

- Energy
  - Fuel Combustion
    - ○ Energy industries
    - ○ Manufacturing industries and construction
    - ○ Transport
    - ○ Other sectors
  - Fugitive emissions from fuels

48) European Council Conclusions (23 and 24 October 2014), EUCO 169/14, Brussels, 24 October 2014

  - ○ Solid fuels
  - ○ Oil and natural gas and other emissions from energy production
  - ○ CO2 transport and storage

- Industrial processes and product use
  - Mineral industry
  - Chemical industry
  - Metal industry
  - Non-energy products from fuels and solvent use
  - Electronic industry
  - Product uses as substitutes for ODS
  - Other product manufacture and use
- Agriculture
  - Enteric fermentation
  - Manure management
  - Rice cultivation
  - Agricultural soils
  - Prescribed burning of savannas
  - Field burning of agricultural residues
  - Liming
  - Urea application
  - Other carbon-containing fertilisers
- Waste
  - Solid waste disposal
  - Biological treatment of solid waste
  - Incineration and open burning of waste
  - Wastewater treatment and discharge

- Land Use, Land-Use Change and Forestry set out in Decision 529/2013/EU
  - Afforestation, reforestation
  - Deforestation
  - Forest management
  - Cropland management
  - Grazing land management
  - Or equivalent land-based accounting using UNFCCC reporting categories
  - Other categories/activities elected by the EU and its Member States as Parties to the Kyoto Protocol and its Doha Amendment

The Paris Agreement target of reducing the European Union's greenhouse gas emissions by 40% below 1990 levels by 2030 constitutes a significant strengthening of its current target of a 20% emission reduction by 2020 compared to 1990. The 2020 target also includes the permission to use offsets while the Paris Agreement target does not include any contributions from international credits. The 2030 target is in line with the objective to reduce its emissions by 80-95% by 2050 compared to 1990 as is proposed by the IPCC as a necessary reduction by the developed countries as a group. The 2030 goal is also consistent with objective to at least half global emissions by 2050 if compared to 1990 emission levels. Up until now the EU and its Member States have reduced their emissions by around 19% on 1990.[49] In terms of average per capita emissions across the EU and its Member States this translates into a significant reduction as well. Per capita emissions have fallen from

49) See Latvian Presidency of the Council of the European Union, Submission by Latvia and the European Commission on Behalf of the European Union and its Member States p. 3.

12 tonnes CO2-eq. in 1990 to 9 tonnes CO2-eq. in 2012. Per capita emissions are projected to fall to around 6 tonnes CO2-eq. in 2030.

Given the high degree of scientific uncertainty regarding global warming and international actions, there are a number of way-points included in the Paris Agreement. Due to limited scientific analysis the 5th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) was ambiguous on the specific policy implications of a 1.5°C goal. To address this uncertainty, the IPCC has been requested to prepare a special report in 2018. The EU will provide input to the scientific work. The EU will also participate in the "facilitative dialogue", which will take place in 2018. This dialogue helps participants to make progress in the implementation of the respective commitments and assess the level of the collective ambition.

The EU will also take part in the first global stocktake in 2023. This enables the international community to consider taking of more ambitious action beyond 2030.

By 2020 the EU as well as the other parties involved will be invited to submit their mid-century, long-term low greenhouse gas emission development strategies.

In lieu of this the Commission will prepare a detailed analysis of the economic and social transformations. The insights gained in the course of this analysis will inform the political debate among European institutions, Member States and stakeholders.

4. Implementations under the Paris agreement regarding environmental effectiveness and economic efficiency including linking

The Paris agreement means nothing less that the global community - and therefore also the EU - strives for a universal clean energy transition. This transition entails fundamental changes in business and investment behaviour and diverse policy initiatives in various areas.

The EU was the first major economy that presented its climate plan (i.e. Intended Nationally Determined Contribution or "INDC") on 6 March 2015. Its plan was based upon the 2030 climate and energy policy framework which was devised by the October 2014 European Council and the European Commission's blueprint for tackling global climate change beyond 2020. The EU has set an ambitious economy-wide domestic target of at least 40% greenhouse gas emission reduction for 2030 below 1990 levels. The target is based on global projections that are in line with the medium term ambition of the Paris Agreement.

The EU took a very active role in the negotiations leading up to the Paris Agreement. It actively worked to build a broad coalition of developed and developing countries that had the highest level of ambitious goals to prevent irreversible climate change. This high level of ambition was important in fostering the positive dynamics of the actual negotiations and in bringing large emitters on board.

In order to achieve its ambitious goals it is important that the EU works towards remaining a positive force in international fora. The EU will therefore continue to strive for international leadership in its climate change ambitions and continue to pursue its climate change policy and to

support the implementing elements of the Paris agreement. Elements of this include transparency and accountability, sustainability development mechanisms and technology mechanisms.

Also domestically important action must be undertaken to implement the Paris agreement. The European commission has therefore taken or is planning to take a number of concrete actions to fostering the enabling environment for low carbon transition.

In order to examine the implementation issues within the European Union it is important to first examine the ratification process in detail. Subsequently the implementation issues of the Paris Agreement are examined in turn.

4.1. Ratification process and competences

The obligations assumed under the Paris agreement will be binding upon the European Union and Member States during the period 1st of January 2021 to 31st December 2030 as the Paris agreement was ratified on the 4th of October 2016 by the European Parliament.[50)]

With the conclusion of this process the requirements for entering into force of the Paris agreement have been satisfied, especially after the recent ratification of both of China and the US on 3rd of September 2016, and India's ratification on the 2nd of October 2016. The Paris agreement will therefore enter into force on 4th of November 2016.

The ratification in the European Parliament took place in the presence of European Commission President Jean-Claude Juncker, the United

50) IP/16/3284, European Union Press Release, 'Paris Agreement to enter into force as EU agrees ratification', Strasbourg, 4 October 2016 'The European Parliament has approved the ratification of the Paris Agreement by the European Union today'.

Nation's Secretary General Ban Ki-moon and the President of COP 21 Ségolène Royal. The political process for the European Union to ratify the Agreement is concluded and the Council can formally adopt the Decision. In parallel the EU Member States will ratify the Paris Agreements in accordance with their national parliamentary processes. Seven Member States of the European Union have already concluded the ratification process and were able to submit their ratification documents to the UNFCCC on the 5th of October 2016. These countries are: Austria, France, Germany, Hungary, Malta, Portugal, and Slovakia.[51)]

As is apparent from the preceding, not all Member States have ratified the Paris Agreement thus far. It is also not entirely clear if they all will accede the Agreement. Poland - a country that is actively stressing its 'right' to a coal-based economic development - is not embracing the Agreement. Also behind the scenes Italy has been reportedly resisting the Paris Agreement. Italy is a country that is normally pursuing a more favourable stance towards climate change.[52)]

This therefore beckons the question about the distribution of competences between the European Union and Member States and the implications of Member State resistance. As already presented above, the European Union is not a unitary state. One possibility that would normally be feasible is that specific Member States could introduce reservations to the international treaty and thereby limit the scope of their obligations. This is, however, not permitted under Article 27 of the Paris Agreement which expressly excludes any reservations.

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51) See http://unfccc.int/paris_agreement/items/9444.php.

52) The Italian Insider, 'Italy uncharacteristic opposition to Paris Climate deal', 5th October 2016, available at: http://www.italianinsider.it/?q=node/4414, viewed on 09/10/2016

Clarifying declarations are of course permissible. Poland has included a declaration to the Paris Agreement:

> 'The Government of the Republic of Poland recognizes that under Article 9 paragraph 1 of the Paris Agreement developed country Parties shall provide financial resources to assist developing country Parties with respect to both mitigation and adaptation in continuation of their existing obligations under the Convention. In this context the Government of the Republic of Poland notes that Poland is a Party to the United Nations Framework Convention on Climate Change not included in Annex II'[53)].

This declaration is a mere clarification rather than a limitation of Poland's obligations under the Paris Agreement once ratified.

Also the European Union made a declaration to the Paris Agreement:

> 'The European Union declares that, in accordance with the Treaty on the Functioning of the European Union, and in particular Article 191 and Article 192(1) thereof, it is competent to enter into international agreements, and to implement the obligations resulting therefrom, which contribute to the pursuit of the following objectives:
> - preserving, protecting and improving the quality of the environment;
> - protecting human health;
> - prudent and rational utilisation of natural resources;
> - promoting measures at international level to deal with regional or worldwide environmental problems, and in particular combating climate change.

53) See https://verdragenbank.overheid.nl/en/Treaty/Details/013136_b#Poland, accessed on 05.10.2016

[…]

The European Union will continue to provide information, on a regular basis on any substantial modifications in the extent of its competence, in accordance with Article 20(3) of the Agreement.'[54)]

The declaration of the EU points towards the legal basis of its Climate action and for its ability to engage in international agreements. International agreements are legal acts which are concluded by the European Union acting alone or jointly with Member States. This depends on the particular treaty article upon which the policy area is based.

Since the entry into force of the Lisbon Treaty the European Union acquired legal personality. The European Union can therefore engage in international negotiations and conclude international agreements on its own behalf as it is subject to international law. These international agreements have legal effects in the European law and are binding upon the European Union and its Member States. International agreements become part of the *'acquis communautaire'* (i.e. the body of European law) once they enter into force.

The treaties of the EU lay down the procedures by which the EU can conclude international agreements. Legally, international agreements are to be considered hierarchically as secondary sources of law (conventions and agreements) and must therefore comply with the treaties. However, they have greater value than secondary EU legislations. Thus they are above acts adopted by EU institutions such as regulations, directives or decisions.

54) https://verdragenbank.overheid.nl/en/Treaty/Details/013136_b#EU%20(European%20Union), accessed on 05.10.2016

The external competences of the EU are defined in Article 216 of the Treaty on the Functioning of the EU. Article 216 reads:

1. The Union may conclude an agreement with one or more third countries or international organisations where the Treaties so provide or where the conclusion of an agreement is necessary in order to achieve, within the framework of the Union's policies, one of the objectives referred to in the Treaties, or is provided for in a legally binding Union act or is likely to affect common rules or alter their scope.
2. Agreements concluded by the Union are binding upon the institutions of the Union and on its Member States.

Thus, where the EU has adopted common rules for the implementation of a policy, Member States are no longer entitled to enter into obligations with third countries affecting those rules. The division of competences between the EU and Member States is also reflected at international level. Where the EU negotiates and concludes an international agreement, it has either exclusive competence or competence which is shared with Member States.

Where the EU has exclusive competence, the EU alone has the power to negotiate and conclude the agreement. Article 3 of the Treaty on the Functioning of the EU specifies the areas in which the EU has exclusive competence to conclude international agreements. These are customs union; the establishing of the competition rules necessary for the functioning of the internal market; monetary policy for the Member States whose currency is the euro; the conservation of marine biological resources under the common fisheries policy and the common commercial policy.

Where its competence is shared between the European Union and the Member States, the agreement is concluded both by the EU and by the Member States. It is referred to as a 'mixed agreement'. Member States therefore must ratify these agreements. The areas in which competences are shared are defined in Article 4 of the Treaty on the Functioning of the EU and include the following principal areas: internal market; social policy, for the aspects defined in this Treaty; economic, social and territorial cohesion; agriculture and fisheries, excluding the conservation of marine biological resources; environment; consumer protection; transport; trans-European networks; energy; area of freedom, security and justice; common safety concerns in public health matters.

The important element to notice here is that the area of the environment is a shared competence of the European Union and its Member States. This means that the Paris Agreement is a 'mixed agreement' entailing that both Member States as well as the European Union have to ratify it.

At the time of writing only a few Member States have ratified the Paris Agreement and two Member States seem to be critical. What is normally done is that each provision of the international treaty is assessed to examine to which extend it falls under the competence of the European Union or under the competence of the Member State. To the extent that it falls under the EU competence it will be binding upon the Member State. Only provisions that are not falling under the competence of the EU can be affected by a Member States refusal to ratify the agreement. In several aspects the Paris Agreement is a framework agreement where the assessment of competences will be co-determined by the way they are concretely filled in, rendering an assessment at this stage challenging.

In practice the policy objectives associated with the Paris Agreement have already been determined prior to the COP21 and have thus already been translated into EU policy objectives and are therefore binding upon Poland and Italy. Also the legislation is largely already in place and the Member States are obliged to implement them. The key policy objectives presented in this chapter are all falling within the framework of the European Union's competences and therefore also affect Poland and Italy. A refusal to ratify the Paris Agreement by either country as such does not mean that these countries are not bound EU measures.

It is, however, conceivable that additional EU policy measures justified on the basis of the fulfilment of the Paris agreement will be implemented in the future. Then the question of ratification becomes relevant. To the extent that the policy domain is occupied by the European Union the Member States will be obliged to follow and implement the measures. To the extent that future policy measures or targets are implemented in the form of a burden- or effort sharing decision the situation could be different. If targets are set for the European Union as a whole and it is then distributed across the Member States it is possible that Poland and Italy will not assume the new target. This entails that the other Member States must reduce their emission allowances relatively more to make up for these states. The imagined situation would in a way parallel the situation of Malta and Cyprus as shown in their first and second National Allocation plans of 2004 and 2006. Both countries had to participate in the EU ETS but have their emission allowance allocation calculated on the basis of business as usual predictions. The reason was that unlike the other new Member States which entered the Union in 2004, both Malta and Cyprus were qualified as 'developing countries' within the meaning

of the UNFCCC and therefore did not have any qualified greenhouse gas emission reduction targets. They never the less had to take part in the EU ETS as this was part of the 'acquis communautaire'.[55] In the case of Malta and Cyprus other Member States had to assume higher emission reduction targets to realize the Community's emission reduction target.

Given the overall size of Cyprus and Malta for other Member States to cover their emissions was not perceived as a big challenge. This would be fundamentally different in the case of Italy and Poland of course.

4.2. Implementation issues of the Paris Agreement

This section of the chapter will review both the policy dimension and the legal dimension regarding the Paris Agreement and contrast the policy ambition to the current status and developments.

The European Union's ambition for the Paris Agreement constitutes a significant stepping up of its current climate policy objectives until 2030 entailing that a multi-faceted domestic approach to climate change is required to bring the European Union from a -20% below 1990 by 2020 to a -40% below 1990 by 2030. Even though Member States are at the forefront of implementing measures to achieve the 2030 climate change targets, the mobilization of non-state actors is essential to achieve them. By 2030 sectors falling under the EU ETS will reduce emissions by 43%, non-covered sectors will reduce their emissions by 30% below 2005.

Both the EU ETS sector as well as the sector not covered by the EU ETS must make a meaningful contribution to realizing the objective under the Paris Agreement. Each is taken in turn.

55) See Weishaar, (2009) Towards Auctioning: The Transformation of the European Greenhouse Gas Emissions Trading System: Present and Future Challenges to Competition Law, Kluwer and references contained therein.

4.3. EU ETS sector: 43% reduction

The Council Conclusions from 23rd and 24th of October 2014 has increased the annual reduction factor of the EU ETS from 1.74% to 2.2% from 2021 onwards. This brings the EU ETS in line with the European Union's INDC submission. The European Commission has already made a legislative proposal for the amendment of the EU ETS.[56] The Commission also proposes to strengthen the carbon leakage safeguards.

Under the Commission proposal there will be more frequent alignments of the free allocation to the production data. This will enable the directing of support to growing companies and sectors. Benchmarks will also be updated to calculate the free allocation. The benchmarks will reflect industries' technological capacities and progress over the previous decade. The list of sectors receiving the highest share of free allocation will be more targeted to those most exposed to the potential risk of carbon leakage. The legislative proposal is currently before the Council and has not yet had any readings in the European Parliament. It will therefore still take time before it enters into force.

4.4. Non-trading sector: 30% reduction

The INDC of the European Union translates into a 30% emission reduction stemming from sectors that are not covered by the EU ETS. Measures falling under this category are very diverse and multifaceted. They range from low-emission mobility to fertilizers. This reflects the European Commission's dedication towards creating an environment for a

56) Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments, COM/2015/0337 final

low carbon transition. This transition requires a lot and detailed management since each Member State is different and consequently has a different energy mix and different economic structures.

In several areas the European Commission has already issued declarations that it will undertake action or is already working on legislative proposals.

Since greenhouse gas emissions from the transport sector have been increasing in the European Union while emissions in all other sectors have declined, the Commission has issued a communication on low emission mobility[57] and alternative fuels.

In the area of construction and demolition waste the European Commission will issue a voluntary recycling protocol later this year.[58] The proposed Waste Management Framework Directive[59] and the Landfill Directive[60] are expected to contribute significantly to the reduction of emissions. The two Directives are still in the legislative process and have not yet had their first reading at the European Parliament indicating that it will still take a while.

The European Commission will propose legislative improvements for the energy efficiency framework of buildings which also extend to fostering financing.[61]

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57) COM(2016)501/F1 COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS A European Strategy for Low-Emission Mobility, 20/07/2016

58) COM(2016)500 final, Accelerating Europe's transition to a low-carbon economy, Brussels, 20.07.2016

59) Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2008/98/EC on waste COM/2015/0595 final - 2015/0275

60) Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 1999/31/EC on the landfill of waste, COM/2015/0594 final

61) The current core legislation in this area is presently the Energy Performance of

In the area of land-use and forestry the European Commission has made a legislative proposal that will inter-alia incentivize carbon sequestration.[62] It bears mentioning that the existing legislation for land use, land-use change and forestry (EU Decision 529/2013) is based on the accounting rules of the second commitment period of the Kyoto Protocol.

The European Commission is also working on proposals for an Effort-Sharing Decision and on land use, land use change and forestry (LULUCF). The European Commission is also working on improved governance mechanisms and better planning and reporting requirements in the area of the climate and energy regulatory framework.[63]

Various proposals were envisaged to be submitted to the Council and the European Parliament in 2015-2016 on the basis of the general political direction of the European Council but since 2016 is slowly drawing to a close, it is unlikely that the legislative process is going to be completed as quickly as the Lativan presidency anticipated.[64] Nevertheless it is commendable that the European Union has already concrete actions to implement its INDCs in these policy areas.

Buildings Directive (2010/31/EU) and the Energy Efficiency Directive (2012/27/EU)

62) COM(2016) 479 final, Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry into the 2030 climate and energy framework and amending Regulation No 525/2013 of the European Parliament and the Council on a mechanism for monitoring and reporting greenhouse gas emissions and other information relevant to climate change, Brussels, 20.7.2016

63) COM(2016)110 final, The Road from Paris: assessing the implications of the Paris Agreement and accompanying the proposal for a Council decision on the signing, on behalf of the European Union, of the Paris agreement adopted under the United Nations Framework Convention on Climate Change, Brussels, 2.3.2016, p. 9

64) Latvian Presidency of the Council of the European Union, Submission by Latvia and the European Commission on Behalf of the European Union and its Member States, p. 3

Also in the area of energy policy there are many things the European Union wants to achieve, but one example is the area of renewables. As presented above the Council has already agreed upon more ambitious renewable energy targets of a 27% share in 2030.[65]

The renewable energy directive (Directive 2009/28/EC) is, however, still based on the 2020 targets. Article 3 on the Mandatory national overall targets and measures for the use of energy from renewable sources still has a 20% share of renewables to be attained by the Member States in 2020.[66] The Directive will thus need to be updated.

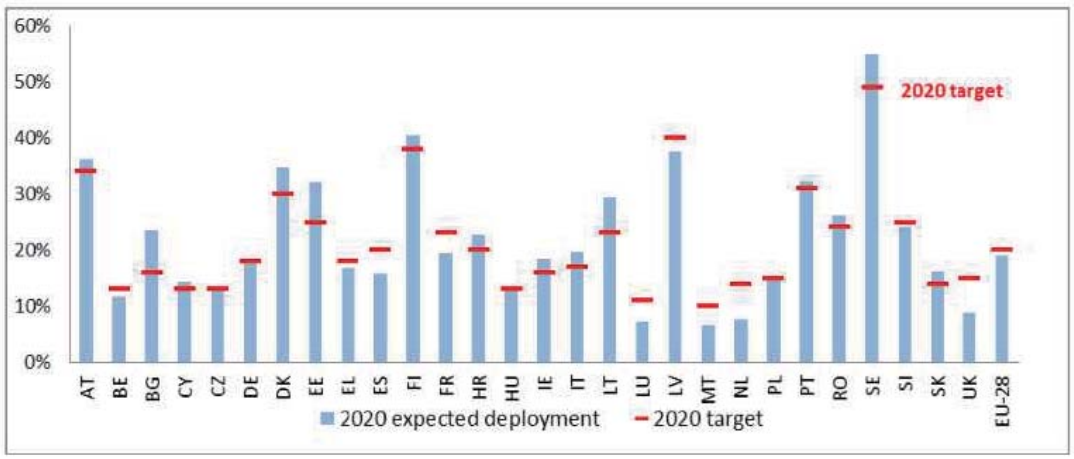
The majority of the Member States are on track to realize their 2020 renewable energy targets as set by the renewable energy directive.[67] The EU-28 as a group needs to reinforce their efforts to attain their objective. In particular countries such as the Netherlands of the United Kingdom need to do more.

65) European Council Conclusions (23 and 24 October 2014), EUCO 169/14, Brussels, 24 October 2014

66) Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, Article 3

67) COM(2015) 293 final, REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Renewable energy progress report, Brussels, 15.6.2015

[Figure2-2] Expected RES development in Member States and 2020 RES targets



Source: European Commission, based on TU Wien (Green-X) projections (2014)

Source: European Commission, based on TU Wien (Green-X) projections (2014); via COM(2015) 293 final

The European Energy Union Project provides the backdrop against which the EU provides the environment for the energy transition. The Energy Union aims at "moving away from an economy driven by fossil fuels, an economy where energy is based on a centralised, supply-side approach and which relies on old technologies and outdated business models, to empower consumers and (...) to move away from a fragmented system characterised by uncoordinated national policies, market barriers and energy-isolated areas[68]."

The Implementation of the European Climate policy is projected to lead to large scale investments (USD 13.5 trillion in energy efficiency and low - carbon technologies from 2015 to 2030). Much more than increasing the amount of investments in climate technologies, it is the objective

68) A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy - COM(2015)80 of 25 February 2015.

of the European Union to redirect them in a more desirable way and as for example away from fossil-fuel power plants towards renewable energy sources and energy efficiency measures.

Also the ‘circular economy’ has implications for the attainment of the European Union’s INDCs as there is a close nexus between raw material used, the energy required in production and greenhouse gas emissions. The circular economy policies of the European Union include comprehensive commitments on eco-design, the development of strategic approaches on plastics and chemicals, a major initiative to fund innovative projects under the umbrella of the EU's Horizon 2020 research programme, and targeted action in areas such as plastics, food waste, construction, critical raw materials, industrial and mining waste, consumption and public procurement. Other legislative proposals on fertilisers and water reuse will follow. The circular economy policy recognizes the importance of innovation and investment. The circular economy has a long list of the envisaged measures.[69)]

4.5. Innovation and competitiveness

Advances in the innovation rate are crucial for the economic transition and for competitiveness. It is therefore not surprising that 20 world leading economies launched the clear and ambitious "Mission Innovation" to reinvigorate public and private clean energy innovation and to develop and deploy breakthrough technologies and achieve cost reductions. The EU envisages to join this initiative. Its own budget for low carbon re-

69) COM(2015) 614 final, COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS, Closing the loop - An EU action plan for the Circular Economy, Brussels, 2.12.2015, ANNEX

lated research under Horizon 2020 has already been doubled for the period 2014 - 2020 and the EU is committed to invest at least 35% of Horizon 2020 into climate-related activities.[70] Important synergy effects between energy, transport, circular economy, industrial and digital innovation are expected to further stimulate research, innovation and competitiveness in the EU and help to attribute a leading role to European low carbon and energy efficiency technologies.

The EU remains the largest source of financing for energy-related research and development (around 36% of global investments in this area in 2014, and 40% of all patents in this area).[71] Europe can improve in the area of clean-energy technologies sand zero-emission vehicles as well as in the way it brings innovations to the market. Europe appears to be loosing ground in the area of renewable energy technologies. In lieu of this the European Commission will present the Energy Union strategy for research innovation and competitiveness later this year.

4.6. Investment and capital markets

Realizing transition towards a low emission and climate resilient economy is not something that can be achieved by regulators alone. Rapidly increasing private investments is essential in this process. It amplifies European funds and helps to avoid the “lock - in” of high emissions infrastructure and assets.

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70) COM(2016)110 final, The Road from Paris: assessing the implications of the Paris Agreement and accompanying the proposal for a Council decision on the signing, on behalf of the European Union, of the Paris agreement adopted under the United Nations Framework Convention on Climate Change, Brussels, 2.3.2016.

71) COM(2016)500 final, Accelerating Europe’s transition to a low-carbon economy, Brussels, 20.07.2016, p.5

European Union funds make a sizable contribution to mobilizing the transition process. The European Commission seeks to ensure that the EU budgetary spending is furthering its climate objectives and to ensure that at least 20% of the Multiannual Financial Budget is explicitly climate related. The European Commission has recently joined the Mission Innovation Initiative. Members of this initiative are committed to double their public funding to clean energy research and development within five years by 2020.

Over the period 2014 to 2020 around 114 billion Euros have been earmarked by the reformed European Structural and Investment Funds (ESIF) for climate-related actions.[72] The amount is amplified by being carried out in cooperation with partnerships with relevant stakeholders. Support can for example be granted for strong regional cooperation, capacity building and technical assistance. In a more recent communication the EFSI is described to be firmly on track to mobilize 315 billion Euros in additional investment in the real economy by mid-2018.[73]

There are of course also other measures for supporting the transition of the economy. Just as the EFSI, the Investment Plan for Europe which focuses on actions to remove barriers to investment in the European Union also promotes emissions reduction and energy efficiency investments in the Single Market.

Moreover, the European Commission has recently launched the European Investment Project Portal (EIPP). This portal attracts investors to invest in

72) See COM(2016)110 final, The Road from Paris: assessing the implications of the Paris Agreement and accompanying the proposal for a Council decision on the signing, on behalf of the European Union, of the Paris agreement adopted under the United Nations Framework Convention on Climate Change, Brussels, 2.3.2016, p. 6

73) COM(2016) 359 Taking Stock of the Investment Plan for Europe and next steps (state of play on 1st of June 2016)

viable and sound investment projects in Europe. Energy stakeholders are encouraged to send their projects to this platform in order to provide a comprehensive overview of their projects for potential investors. The objective of this portal is thus to provide investors with good opportunities to invest in energy efficiency and facilitate better access to capital for national, regional or local energy efficiency platforms and programmes.

Besides offering a platform to showcase projects and to attract funding, the European Commission in collaboration with the European Investment Bank offers expertise and advise. They provide technical and project development assistance in the context of the European Investment Advisory Hub (EIAH) to support public promoters to structure their projects and to promote financing schemes, especially in the area of buildings.

Cross-border capital flows and integrated and sustainable capital markets are also important for the transition towards a low emission and climate resilient economy. The measures facilitating this are already underway in the context of the establishment of a Capital Markets Union.[74)]

Also the revamped European Union Cohesion policy aids transition process towards a low emission and climate resilient economy.[75)] This policy supports energy efficiency measures in public and residential buildings (13.3 billion Euros) and enterprises (3.4 billion Euros). It also supports sustainable urban mobility projects and low-carbon modes of transportation (39.7 billion Euros). Moreover, there are funds (8 billion Euros) available for risk prevention and management. A total of 115 billion Euros of the reformed Common Agricultural Policy are also available to support climate related actions.

74) COM(2015)468 final, Action Plan on Building a Capital Markets Union

75) COM(2016)500 final, Accelerating Europe's transition to a low-carbon economy, Brussels, 20.07.2016

4.7. Appraisal

The legislative package to implement the objectives of the Paris agreement is well under way as far as the reform of the sectors covered by the EU ETS is concerned. Adjusting the linear reduction factor of the EU ETS towards the European Union's 2030 objectives under the Paris Agreement will help the Union to achieve its objective. Given that the EU ETS is based on an emissions cap that does not permit any emissions beyond the number of allowances that are being issued, the environmental effectiveness of the measure is safeguarded.

There are, however, issues regarding the overall level of ambition related to the EU ETS. Due to a strong economic downturn in 2008, the EU ETS is suffering from excess supply. The European Commission has proposed the introduction of the Market Stability Reserve that should create some more scarcity on the market. It does, however, not lead to a fundamental adjustment of the overall allowance price as the allowances that are available on the market are not being taken away. As a consequence, the allowance price level remains too low to incentivise the transition to a low carbon economy. This will entail that the sectors covered by the EU ETS will not have to deliver stronger emission reductions any time soon and may need to have to undergo a quicker adaptation process in later years. If the European Union is serious about climate change, it should have been considering the introduction of reserve price auctioning paired with the cancelling of unsold allowances. This would be a means to reduce allowance at low costs and help to attain allowance prices that are capable of incentivising transition processes in the economy.

Much of the measures regarding the non-covered sectors is still in the legislative process. The measures are very diverse and given that they in part target a large number of economic actors, they are difficult to administer, to control and require the investments of private companies to be successful. But one example of this is renewable energy. Here increased investments are required. The use of renewable energy is, however, already causing severe problems in the energy markets. Security of supply is of paramount importance and utility companies find it not economical to keep conventional capacity at disposition. This requires and overhaul of existing business models giving way to capacity markets or state aid. In any event it implies that electricity costs will increase.

The overall abatement costs across the various policy domains are not aligned and they are likely to differ significantly from each other. This means that from an economic perspective this creates a significant amount of inefficiencies. It consequently might be much more expedient to take advantage of cheap and efficient means to avoid carbon emissions and rely more heavily on the EU ETS.

Putting a price on greenhouse gas emissions is essential in fighting climate change as it incentivises polluters to abate emissions and to invest in green technology. It also has important implications for the linking of different climate change policies. There are many different types of instruments (command and control type of instruments, emissions trading or different fiscal measures/taxes) that can be used to put a price on carbon. Different jurisdictions around the globe are using different approaches to putting a price on carbon. Some jurisdictions use climate change taxes or climate change levies while others use emissions trading. Also here the design options differ strongly. Price floors or ceilings while others or

(partially) managed pricing systems (e.g. via reserve price auctions or a contingency reserve of allowances) are just a few of the design features that can be chosen. The European Union is keenly interested in exploring the Chinese and South Korean Emissions Trading systems. Linkages between a broader range of countries and across economies can help to reduce compliance costs and offer mutually beneficial trading opportunities. The European Union will preserve free allocation beyond 2020 and has strengthened its carbon leakage provisions so as to protect its energy intensive and trade exposed industry at this point in time.

5. EU's recommendations

The European legislator should take the abatement costs in its various activities into account and seek to equalize the marginal abatement costs in the various policy areas to mitigate inefficiencies. The abatement costs under the EU ETS may well be lower than in other sectors.

The EU's INDCs will be attained as far as its target for the Emissions Trading Sector is concerned as the EU ETS is subject to an emissions cap. This is, however, not necessarily the case under the non-covered sector. Here the effective monitoring and enforcement measures must be taken to ensure that the reduction targets are attained. Legislative proposals should be made as planned and they should also contain effective monitoring and enforcement safeguards.

The European Union should explore possibilities of linking of its climate change policy to other jurisdictions even if they have different design features as it may help to access low cost abatement opportunities and help to mitigate competitiveness concerns.

Chapter 3 Australia

1. Overview

Australia's total greenhouse gas (GHG) emissions in 2014-15 were 560 million tonnes of carbon dioxide equivalent (tCO2e). The largest sources of GHG emissions were from electricity generation (33% of total emissions), direct combustion of fuels (16.79% of total emissions) and transport (16.61% of total emissions)[76]. Australia has one of the most emissions-intensive electricity sectors in the world, with more than 85% of electricity generated from fossil fuels of which 61 per cent of electricity generated from coal alone[77].

Australia has committed to emissions reduction targets under the Kyoto Protocol (1997) and the Paris Agreement (2015). Under the second commitment period of Kyoto Protocol, Australia has a target to reduce its emissions by 5% below 2000 level by 2020[78], whereas under the Paris Agreement, it has committed to reduce greenhouse gas (GHG) emissions by 26 per cent to 28 per cent below 2005 levels by 2030[79]. The government aims to achieve its 2020 target as well as 2030 target mainly through the Emissions Reduction Fund (ERF) and its Safeguard Mechanism. Legislation to implement ERF came into effect on 13 December 2014. The legislation facilitates the purchase of domestic carbon abatement by the government through the ERF, and establishes the framework for the Safeguard Mechanism. The Safeguard Mechanism came into effect on 1 July 2016.

76) Commonwealth of Australia 2015b
77) Department of Industry and Science 2015
78) UNFCCC 2011
79) UNFCCC 2016a

Liberal Party of Australia and Australian Labor Party (ALP) are the two major political parties in Australia. The Liberal Party's leader is Malcolm Turnbull, current Prime Minister of Australia. The ALP has been in opposition at federal level since the 2013 federal election. These two major political parties have different visions and distinctive climate policy designs for Australia. The Liberal Party aims to reduce Australia's emissions through its Direct Action Plan. ERF is the centerpiece of the Direct Action Plan that is currently under implementation. In contrast, the ALP aims to introduce Emissions Trading Scheme (ETS) with access to international carbon offsets and potential future links to other cap-and-trade systems. ALP has proposed more ambitious 2030 emissions reduction i.e. 45% emission reduction target by 2030[80] (on 2005 levels) than Coalition[81] (i.e. Liberal-National Party Coalition) Government's 2030 target of 26 per cent to 28 per cent below 2005 levels.

In the past, ALP Government attempted to introduce an Emissions Trading Scheme (i.e. Carbon Pollution Reduction Scheme) that was defeated twice in the Senate. Nevertheless, it was successful in implementing the Carbon Pricing Mechanism (CPM), widely known as Carbon Tax, for two years (from 1 July 2012 to 17 July 2014), which was repealed by Coalition Government on 17 July 2014.

80) Climate Change Action Plan Policy Paper 2016

81) Coalition is the political alliance mainly between the Liberal Party of Australia and the National Party of Australia. Liberal Party is the largest and dominant party in the Coalition.

2. Past-climate change policy and legislation - A convoluted journey

Climate Change policy in Australia is the most contentious and divisive issues in Australian politics. Debate over the introduction of federal legislation to limit Greenhouse Gas (GHG) emissions became intensely toxic from 2009 when the major two parties of Australia - the Australian Labor Party (ALP) and the Liberal-National Party coalition started promoting different climate policies for the country.

In 2008, professor Ross Garnaut in his widely accepted "Garnaut Climate Change Review" considered climate change as a diabolical policy problem in Australia. Garnaut climate change review indicated that a well-designed emissions trading scheme (ETS) has significant advantages over other forms of policies and it could help to decarbonise the Australian economy. Key political debate exploded in Australia when the Australian Labor Party (ALP) government attempted to introduce an Emissions Trading Scheme (ETS) through the Carbon Pollution Reduction Scheme (CPRS) Bill, which was twice defeated in the Senate in 2009. In Australian Parliament system, a bill becomes a law once it is passed by both Houses of the Parliament (i.e. House of Representative and the Senate).

Climate action in Australia is a highly political issue. The interplay between Australian climate change policy & federal politics is intricate. Climate change has been playing a prominent role in Australia in every election campaign since 2007 where climate policies of the two major political parties have differed significantly. However, in 2016 federal election, climate change debate was less toxic as compared to the last few

elections. The country has witnessed numerous climate change policy designs since 2008 and two federal political leaders have also lost their position in part because of their policies on climate change (Malcolm Turnbull as Leader of the Opposition party in 2009 and former Prime Minister Kevin Rudd in 2010)[82].

Australia ratified United Nations Framework Convention on Climate Change (UNFCCC) in 1994. By establishing Australian Greenhouse Office (AGO) in 1998, Australia became the first country to establish a government agency dedicated to reducing greenhouse gas emissions. It's worth to mention that the New South Wales Greenhouse Gas Reduction Scheme (GGAS) that commenced on 1 January 2003 is one of the first mandatory greenhouse gas emissions trading schemes in the world although it was mandated at a state level.

Australia signed the Kyoto Protocol in 1998; it only ratified the protocol in 2007, almost after 9 years of signing, one of the last Annex I countries to ratify. Australian climate change policy history in this sense is bit sporadic; at times Australia has been a leader on climate action but other times it has lagged behind.

The table below summarizes the timeline of Australia's convoluted key climate change policies. At a certain extent, it illustrates the intricate relationship between Australian climate change policy and Australian federal politics. Key international developments are also included to provide global context.

82) Parliament of Australia 2015a

[Table 3-1] Timeline of Australia's key climate change policies

Milestones	Events
March 1994	Australia ratifies United Nations Framework Convention on Climate Change (UNFCCC)
April 1998	The Australian Greenhouse Office (AGO) is established: Australia is the first[83]
April 1998	Australia signs but does not ratify the Kyoto protocol; therefore the Kyoto targets are not legally binding.
July 2007	Prime Minister John Howard from Liberal Party of Australia announces that a carbon-trading scheme will be set up if he wins the 2007 federal election[84]
December 2007	Prime Minister Kevin Rudd ratifies the Kyoto Protocol after Australian Labor Party wins the November 2007 federal election.
December 2008	Labor Government proposes Carbon Pollution Reduction Scheme (CPRS) - a cap-and-trade scheme to limit Australia's GHG emissions.
August 2009	CPRS legislation voted down in the Senate for the first time.
November 2009	The Australian Government revises its CPRS and pursues support from the. Liberal-National Party Coalition to pass it in the parliament.
December 2009	Tony Abbott replaces Malcolm Turnbull (who urged its party's Member of Parliaments to support the revised CPRS) as leader of the opposition party and withdraws its party's support for the CPRS. The CPRS is voted down in Parliament for a second time.
December 2009	Conference of the parties (COP) -15: United Nations talks in Copenhagen fail to achieve a binding commitment to limit global warming
February 2010	Tony Abott unveils opposition party's emissions reduction policy

Milestones	Events
April 2010	Prime Minister Kevin Rudd puts CPRS on hold until at least 2013, due to political difficulty of gaining Senate approval for the scheme[85)]
June 2010	Julia Gillard elected unchallenged as a leader of Labor Party of Australia and replaces Kevin Rudd as prime minister
February 2011	Prime Minister Julia Gillard unveils Clean Energy Future Package; central to this package is Carbon Pricing Mechanism (CPM), commonly referred as "Carbon Tax"
November 2011	The Australian Senate passes Carbon Pricing Mechanism (CPM)
July 2012	Carbon Pricing Mechanism (CPM) comes into effect
August 2012	Australia and the European Union (EU) agree to link Emissions Trading Schemes - initially the link is unilateral allowing the purchase of EU permits within Australia and is intended to become bilateral by mid-2018.
November/ December 2012	Australia signs the second commitment period of the Kyoto Protocol.
June 2013	Kevin Rudd defeats Julia Gillard in Australian Labor Party leadership ballot and becomes the Prime Minister of Australia again.
July 2013	Prime Minister Kevin Rudd announces to terminate the Carbon Tax and move to an emissions trading scheme (ETS) a year ahead than planned (i.e. commencing from July 2014).
September 2013	Coalition party wins the Australian Federal Election and Tony Abbott becomes the new Prime Minister of Australia.
November 2013	Prime Minister Tony Abbott introduces legislation to repeal the Carbon Pricing Mechanism (CPM) into Australian Federal Parliament and the bill to repeal the CPM passes the Lower House of the Parliament.
March 2014	CPM repeal defeated in the Australian Senate Australian Labor Party and the Australian Greens Party combine

Milestones	Events
	to vote against the CPM repeal laws in the Australian Senate
July 2014	Australian Senate once again rejects legislation to scrap the CPM
17 July 2014	Australian Senate repeals the Carbon Pricing Mechanism
October 2014	Australian Senate passes legislation to implement the Emissions Reduction Fund (ERF)
13 December 2014	Legislation to implement the Emissions Reduction Fund comes into effect
April 2016	Australian Labor Party (ALP) announces its Climate Change Action Plan. The plan aims to introduce Emissions Trading Scheme (ETS) with access to international carbon offsets and potential future links to other cap-and-trade systems (if the Labor party wins the July 2016 federal election)
1 July 2016	Safeguard Mechanism comes under effect. The aim of the safeguard mechanism is to ensure that the emission reductions achieved by ERF are not displaced by a rise in emissions above business-as-usual levels elsewhere in the economy.
2 July 2016	Australian public vote to elect members for House of Representatives and the Senate
19 July 2016	Liberal-National Coalition Party wins the federal election; Liberal Party leader Malcolm Turnbull swears in as a Prime Minister of Australia

83) Parliament of Australia 2015a
84) Australian Broadcasting Corporation (ABC) News 2014
85) Australian Broadcasting Corporation (ABC) News 2014

2.1. Past Australian Climate Change Policies and Legislations

a. Carbon Pollution Reduction Scheme (CPRS)

The Carbon Pollution Reduction Scheme (CPRS) was Australia's proposed cap-and-trade emissions trading scheme that failed to get legislated.

In 2008, the Australian government released Carbon Pollution Reduction Scheme (CPRS) green paper outlining the initial framework for the establishment of an Emissions Trading System (ETS) followed by CPRS white paper in December 2010. The Australian parliament introduced the Carbon Pollution Reduction Scheme (CPRS) bill in May 2009, October 2009 and February 2010. Although the House of Representatives passed the first two bills, it was twice defeated in the Senate in 2009. In 2010, CPRS was deferred to at least 2013 due to political difficulty of gaining Senate approval and CPRS was never passed into law.

CPRS in brief

The Carbon Pollution Reduction Scheme (CPRS) proposed to establish a cap and trade scheme. At the end of each financial year, each liable entity that emitted 25,000 tonnes or more of CO2-e at a facility level were required to surrender an eligible emissions unit for every tonne of greenhouse gas emissions that they were responsible for in that year. Eligible emissions units included Australian emissions units issued by the Australian Climate Change Regulatory Authority and eligible international emissions units. Liable entities would have to compete to purchase the number of units that they require, either at auctions arranged by Australian Climate Change Regulatory Authority or on the secondary trading market. From 2012-13 onwards, liable entities would have been able to use eligible Kyoto units to meet

their obligations. Certain categories of entities were eligible to receive an administrative allocation of Australian emissions units as a transitional assistance measure.

b. Carbon Pricing Mechanism (CPM)

The carbon pricing mechanism (CPM) was established under the Clean Energy Act 2011 and covered more than 60% of Australia's emissions. The CPM came into force on 1 July 2012 and operated on a financial year basis. However, CPM was repealed on 17 July 2014 by Liberal-National Coalition government.

CPM was designed as a two-stage approach - fixed price period and emissions trading scheme (ETS). The financial years beginning on 1 July 2012, 1 July 2013 and 1 July 2014 were fixed charge years. From 1 July 2015, the carbon price was supposed to transition to a fully flexible price under an emissions trading scheme, with the price determined by the market.

In a fixed charge year, the government for a fixed charge issued carbon units and in the flexible charge year, carbon units were to be issued through auction. CPM started with a fixed price of AUD 23 per tonne of CO2-e and the price increased at a rate of 2.5% per year in real terms. In the first three years of the flexible price period, carbon floor price of AUD 15 was set that would rise annually by 4 per cent in real terms[86].

Liable entities under the covered sectors paid the carbon price if they emit 25,000 tCO2-e or more annually. The remaining uncovered sectors were subject to an equivalent carbon price or did not face a carbon

86) Commonwealth of Australia 2012

price. Coverage of the carbon pricing mechanism (CPM) is outlined in the table below.

[Table 3-2] Coverage of the carbon pricing mechanism[87)]

Carbon pricing mechanism	Equivalent carbon price	No carbon price
Annual emissions threshold of 25,000 t CO2-e from: • electricity generation • direct combustion* • industrial processes • waste deposited since July 2012 • fugitive emissions * Direct combustion excludes diesel, which is covered by the equivalent carbon price (unless opted in)	Transport fuels used for: • domestic aviation • marine transport • rail transport • business in off-road transport • non-transport business uses. Synthetic greenhouse gases.	Emissions from: • agriculture • Land use, land-use change and forestry (LULUCF) • waste deposited before July 2012 • fugitive emissions from decommissioned mines • conventional road transport • entities in sectors covered by the carbon pricing mechanism that fall below the 25,000 t CO2-e threshold

In order to compensate for any price rise, CPM included transitional assistance for emissions-intensive trade- exposed (EITE) industries and assistance payments were provided to the low-income earners through the tax system.

It is important to note that the sources in the agriculture, land and waste sectors were eligible to create carbon offsets under the Carbon Farming Initiative (CFI). Carbon Farming Initiative (CFI) was a domestic

87) Climate Change Authority 2012

land-based offset programme, which was established under Carbon Credits (Carbon Farming Initiative) Act 2011. Participation in the CFI was voluntary. Australian Carbon Credit Units (ACCUs) issued under CFI could be sold to the liable entities under CPM or to businesses wishing to offset their emissions. In October 2014, the Carbon Farming Initiative Amendment Bill 2014 was passed that automatically transitioned all existing CFI projects to the Emissions Reduction Fund (ERF).

Under the CPM three types of eligible carbon units were allowed:

- Units issued by the Clean Energy Regulator
- Australian Carbon Credit Units (ACCUs) issued under the CFI and
- Eligible international units

Eligible international emissions units were not allowed during the fixed charge years, however, from the commencement of the flexible charge year, the eligible international emissions units were allowed with a limit.

In August 2012, Australian government and European Union (EU) announced their intention to link the Australian ETS (AUETS) with the European Union Emissions Trading Scheme (EUETS). There were 2 stages of linking negotiated between Australia and EU. In the first stage, the linkage was one ‑ way (unilateral) where Australian liability entities under the Australian Carbon Pricing Mechanism (CPM) could purchase EU allowances for compliance purposes starting from 1 July 2015. The second stage, two-way link (bi-lateral), was planned to start on 1 July 2018 that would have made EUETS and Australian allowances interchangeable, given that a total limit of 50 percent of Australian liable entities compliance obligations being met using international units (up to 12.5 % from CERs, ERUs and RMUs)

Australia and EU-ETS linking were established through the passage of Clean Energy Amendment (International Emissions Trading and Other Measures) Bill 2012[88]. The passage of the bill removed the carbon floor price and put a new limit to the use of eligible Kyoto units. The Labor government had a plan to bring forward the floating price ETS by a year, however, Bills to implement this plan were never introduced to the parliament as Labor party was defeated in 2013 federal election and CPM was repealed on 17 July 2014 by the newly elected Liberal- National Coalition Government.

c. Impact of CPM on reducing Australian GHG Emissions

The CPM was in operation for 2 years, from 1 July 2012 to 17 July 2014. Gorman & Jotzo 2014 in its paper "Impact of the carbon price on Australia's electricity demand, supply and emissions" has analysed the impact of CPM on the power sector. It makes sense to analyse the CPM impact on power sector since the power sector is the largest source of emissions (35%[89]) in Australia's emissions profile; and it is also the greatest potential source of emissions reductions. This paper examined the impact of the carbon price on the electricity sector between 1 July 2012 and 30 June 2014. The paper concludes that the CPM was successful in reducing power sector emissions, both on the supply and the demand side.

During the period 1 July 2012 to 30 June 2014, electricity demand in the National Electricity Market (NEM)[90] declined by 3.8 per cent, the

88) Parliament of Australia 2012
89) Commonwealth of Australia 2016a
90) National Electricity Market (NEM) is the wholesale electricity market in every state and territory except Western Australia and the Northern Territory in Australia

emissions intensity of electricity supply declined by 4.6 per cent, and overall emissions by 8.2 per cent, compared to the two-year period before the introduction of the carbon price. In terms of absolute number, approximately 11 to 17 million tonnes of GHG were reduced from the power sector during the period when CPM was in operation[91].

Further, the paper reveals the change in the merit order and dispatch of power stations due to the carbon price, with a number of high emissions plants taken out of operation. During the CPM period, emissions-intensive brown coal and black coal generators reduced output and 4GW of emissions-intensive generation capacity was taken offline due to the introduction of the carbon price.

Based on this work produced by Gorman & Jotzo 2014, it can be concluded that the CPM was effective in reducing GHG emissions in a short term, although it may not have encouraged investment in power generation assets due to policy uncertainty about the continuation of the scheme.

2.2. Existing Australian Climate Change Policies and Legislations

a. Emissions Reduction Fund

Carbon Farming Initiative Amendment Act 2014 provides the necessary legislative framework for the Emissions Reduction Fund (ERF). ERF was legislated on November 2014 and came into effect on 13 December 2014. The legislation facilitates the purchase of domestic carbon abatement by the government through the 'Emissions Reduction Fund' (ERF),

91) O'Gorman, M. and Jotzo, F 2014

and establishes the legislative framework for the 'safeguard mechanism' in the National Greenhouse and Energy Reporting Act 2007. Safeguard mechanism ensures that the emission reductions achieved by ERF are not displaced by a rise in emissions above business-as-usual levels elsewhere in the economy[92].

Under the second commitment period of Kyoto Protocol, Australia has a target to reduce it emissions by 5% below 2000 level by 2020. Both Australian Labor party and the Liberal-National coalition party have supported this target. The government aims to achieve its 2020 target mainly through the implementation of ERF and its Safeguard Mechanism.

Under the ERF, a number of project activities are eligible to earn Australian carbon credit units (ACCUs). One ACCU is equivalent to one tonne of carbon dioxide equivalent (tCO2-e) stored or avoided by a project. ACCUs can be sold to either to the government through a carbon abatement contract, or in the secondary market.

The government can purchase domestic carbon abatement through reverse auctions process, tender or other process. Clean Energy Regulator (CER), which is an independent statutory authority, administers the ERF. Clean Energy Regulator is responsible for registering projects, conducting auctions, managing contracts and issuing ACCUs.

b. Key Elements of Emission Reduction Fund

There are three main elements of ERF:

(a) Crediting emission reduction

Under the ERF, emissions reductions are verified and credited accord-

92) Australian Government 2015c

ing to approved methods. Emissions reduction methods sets out the rules for estimating emissions reduction from different project activities. The project proponent must use an approved method to estimate the GHG emissions reduction of the project in order to register the projects.

There are a number of provisions that must be met for a project to be registered; one of the key requirements is "Newness" requirement. As per the "Newness" requirement project must not have started before it is registered (with some exceptions). Similarly, a project cannot be registered under the ERF if it is mandated by the Australian, state or territory law.

After undertaking the project activity, the project proponent reports their emissions to the Clean Energy Regulator. The Regulator will then verify the report submitted by the project proponent and issue credits into the project proponent's Australian National Registry Emissions Units (ANREU) account. The project reports can be submitted as frequently as every six months as allowed by the method, or more[93].

The ERF credits projects for a single crediting period. The period of time over which a project can create ACCUs is considered as the crediting period. For example, emissions reduction project has crediting period of 7 years and emissions sequestration project has a crediting period of 25 years.

(b) Purchasing emissions reductions

The Clean Energy Regulator conducts competitive reverse auctions to purchase emissions reductions at the lowest available cost and enters into contracts with successful bidders. The contracts guarantee payment in return for delivery of emissions reductions.

93) Commonwealth of Australia (Clean Energy Regulator) 2015b

At the auction, project proponents submit confidential bids via online bidding platform to the Clean Energy Regulator offering to supply a quantity of ACCUs, for a nominated price. The Clean Energy Regulator sets a benchmark (or ceiling) price for the auction, which is not disclosed, to the participants. The Clean Energy regulator accepts the bids that are below the 'benchmark price' and only 80 per cent[94] of the offered volume is brought. If a project proponent is not successful at an auction then it can bid into a subsequent auction for that project.

Successful bids are automatically entered into a carbon abatement contract with the Regulator. The project proponent has an obligation to deliver the bid quantity of emission reductions. The proponent gets paid once emissions reductions are delivered to the Regulator in the form of ACCUs (i.e. after the emissions reduction has taken place and measured and verified), meaning no upfront funds are provided to the project proponents to implement the project. The project proponent can fulfil its delivery obligation by either supplying the emission reductions from its own project, or buying ACCUs from another registered project. However, the Regulator pays the contracted price to the project proponent, whether the emissions reductions are achieved by the contracted projects or another registered projects.

At the timing of writing this report, the Clean Energy Regulator has held 3 auctions to purchase ACCUs from the eligible projects. A summary of the auction results is provided below.

94) Commonwealth of Australia (Clean Energy Regulator) 2015d

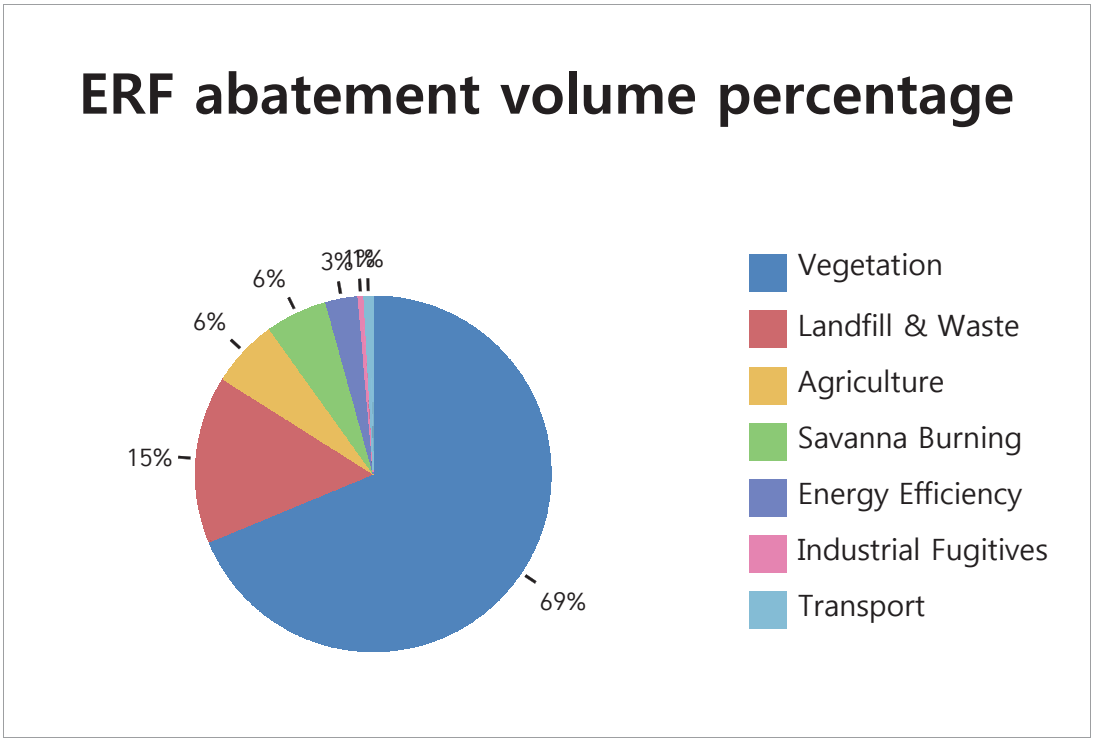
[Table 3-3] ERF Auction Results[95)]

Auction Date	Carbon Abatement Contracts Awarded	Total Abatement (tCO2-e)	Total value of contracts awarded (AUD)	Average price per tonne of abatement (AUD)
15th & 16th April 2015	107	47,333,140	660,471,500.00	13.95
4th & 5th November 2015	129	45,451,010	556,875,549	12.25
27th & 28th April 2016.	73	50,471,310	516,177,598	10.23
Total	309	143,255,460.00	1,733,524,647.00	12.14

ERF is funded through the public fund and participation in ERF is voluntary. The ERF is budgeted to cost AUD 2.55 billion over four years, commencing from April 2015. So far, the government has spent AUD 1.73 billion to purchase 143 million tons of domestic carbon abatement with an average price of AUD 12.14 per tonne of abatement. At the time of writing the report, the government hasn't announced the date for the fourth auction.

95) Commonwealth of Australia (Clean Energy Regulator) 2016a

[Figure 3-1] Cumulative ERF abatement volume percentage by project type[96)]



As outlined in Figure 1, majority of the ERF abatements have been awarded to Vegetation projects (98.5 million tons) followed by Landfill & Waste (21.8 million tonnes), Agriculture (8.8 million tonnes) and Savanna Burning (8 million tonnes). Energy Efficiency, Industrial Fugitives and Transport projects have been awarded 4.2 million tonnes, 0.77 million tonnes and 1.2 million tonnes respectively. The auction result indicates the inclination of ERF towards land management and carbon sequestration projects.

96) Commonwealth of Australia (Clean Energy Regulator) 2016a: Chart created based on cumulative auction result data

(c) The Safeguard Mechanism

The safeguard mechanism came into effect on 1 July 2016. The objective of the Safeguard mechanism is to ensure that the emission reductions achieved by ERF are not displaced by a rise in emissions above business-as-usual levels elsewhere in the economy[97]. Under the safeguard mechanism, covered facilities are required to keep their emissions at or below a baseline level.

c. Coverage

The safeguard mechanism applies to only direct emissions arising from the facilities. The facilities with direct emissions of more than 100,000 tCO2-e, from the range of sectors, including power generation, mining (coal & metal ores), oil and gas extraction, gas supply, manufacturing (including metals, cement and limes), transport (air, sea, rail and road), heavy and civil engineering construction and waste are covered under the scheme.

The entity with operational control of the facility is responsible for meeting safeguard requirements including that the facility must keep net emissions at or below baseline emissions levels. Safeguard Mechanism covers approximately half of Australia's emissions and covers approximately 140 businesses[98].

d. Emissions Baselines:

Under the safeguard mechanism, emissions baselines are the reference point against which future emissions are measured. The facilities covered

97) Australian Government 2015c
98) Australian Government 2015c

by the safeguard mechanism are obliged to keep the emissions levels at or below its baseline. There are mainly 4 types of emissions baselines[99)]

- **Reported Baseline**: Reported baseline is based on the historical high point of emissions reported under the National Greenhouse and Energy Reporting Scheme (NGERS) between 2009 -2010 and 2013-2014. National Greenhouse and Energy Reporting Act 2007 mandates the corporations whose energy production, energy consumption or greenhouse gas emission meet certain threshold. For instances, facility that in a year emits 25,000 tonnes or more of greenhouse gas (GHG) emissions (scope 1 and scope 2 emissions) or produces or consumes 100 TJ or more of energy is required to report under the NGER scheme. Similarly, corporate groups that in a year emits 50,000 tonnes or more of GHG emissions or produces or consumes 200 TJ or more of energy are required to report under the scheme[100)].
- **Calculated Baseline**: Calculated baseline is based on production and emissions intensity forecast values provided by the entity covered under the Safeguard Mechanism. The forecast production and emissions intensity figures are required to be independently audited.
- **Benchmark Baseline**: Benchmark baseline is based on benchmark emissions intensities, which is the least emissions intensive standard for production and independently audited forecast of production.
- **Production-adjusted Baseline**: Production adjusted baseline is based on actual production levels and the emissions intensity used to determine the calculated or benchmark baseline previously in effect.

99) Commonwealth of Australia (Clean Energy Regulator) 2016d
100) Commonwealth of Australia (Clean Energy Regulator) 2015

Both calculated baselines and benchmark baselines are determined using forecasts of production, and once they expire, can be replaced with a production-adjusted baseline that reflects actual production from the facility. Therefore, a production-adjusted baseline is determined using actual production.

Aside from these major baselines, sectoral baseline is applied to the electricity generators connected to main five electricity grids in Australia. A sectoral baseline is applied collectively to grid-connected generators until it is exceeded. Once the sectoral baseline is exceeded, individual baselines is applied to each generator. The sectoral baseline is set at 198 million tonnes CO2-e, based on electricity sector's emissions from 2009-10 to 2013-14.[101)]

Safeguard Mechanism only sets limitation on the companies to limit their emissions baseline below a certain level. However, the mechanism doesn't provide any incentives to the facilities for lowering their emissions below the baseline (for example, opportunity to trade the reduced emissions below the baseline). In addition, the GHG emissions threshold at the facility level has been set at 100,000 tonnes, which is much higher than the facility level threshold under the CPM (i.e. 25,000 tonnes). The baselines are based on the historical high point of reported emissions that is argued by Wood et.al. 2016 as not enough to drive down the Australia's emissions. In order to make the Safeguard Mechanism more effective, Wood et.al. 2016 recommends lowering the baseline over time across all covered sector, expanding the coverage of scheme, enforcing baseline more strictly than the current rules, and over time decreasing the baselines to zero and entirely replacing it by permits, all of which is recommended to be auctioned.

101) Commonwealth of Australia (Clean Energy Regulator) 2016e

e. Climate Change Action Plan proposed by the Australian Labor Party (ALP)

On April 2016, Australian Labor Party (ALP) announced its Climate Change Action Plan that aimed to introduce Emissions Trading Scheme (ETS) with access to international carbon offsets and potential future links to other cap-and-trade systems. Although the Australian Labor Party is committed to emissions trading scheme, the re-election of the Coalition Government has pushed the labor's Climate Change Action plan off the table for sometime. This section outlines the key elements of Australian Labor Party's Climate Change Action Plan that aims to drive down Australia's GHG emissions and meet Australia's 2030 target under the Paris Agreement.

The Australian Labor Party has proposed a 45% emission reduction target by 2030 (on 2005 levels) and 50% renewable energy generation (of the nation's total electricity generation) by 2030 and doubling Australia's energy productivity by 2030 (on 2010 levels).[102)]

Notably, the Australian Labor party has proposed to introduce two stage Emissions Trading Scheme (ETS). The first phase of ETS is scheduled to operate from 1 July 2018 until 30 June 2020 (i.e. end of second commitment period of Kyoto Protocol). Facilities emitting more than 25,000 tonnes of CO2-e per year are covered under the ETS. Emissions are capped with an appropriate proportion to achieve Australia's 2020 target under the Kyoto Protocol.

Phase one of the ETS according to the Labor's Climate Change Action Policy Plan 2016 is a "cap and offsets" scheme that blends design ele-

102) Climate Change Action Plan Policy Paper 2016

ments from both 'cap and trade' schemes and 'baseline and credit' schemes. Similar to cap and trade schemes, the Scheme imposes a cap on emissions generated by the liability entities under the scheme and like baseline and credit schemes, the liable entities under the scheme require to offset emissions above their caps by purchasing carbon credits or offsets. No carbon price is imposed on liable companies that have emissions below their caps. Meaning, the liable entities are not required to purchase or receive permits to operate. If a liable entity exceeds its 'cap', it is required to provide with an equivalent amount of carbon offsets for that year. In phase 1 of the ETS, companies are liable for emissions in excess of their pre-determined cap.

The scheme allows all liable entities to have access to international permits. Emissions intensive and trade exposed (EITE) sectors are able to offset their abatement with 100% international permits and the other liability entities under the scheme are able to access a percentage of international permits.

Phase 2 of ETS is scheduled to commence from 1 July 2020, and the emissions are capped and reduced over time in line with Australia's commitments under the Paris Agreement. Possibility of formal linkage of Australian ETS to other emissions trading schemes has been considered under the second phase of ETS.

A separate, ongoing, ETS for electricity sector has been planned to commence from 2018. Each electricity generators are allocated a baseline according to a sector-wide emissions intensity baseline. Under the ETS for electricity sector, the electricity generators are covered by a cap on GHG emissions that reflects a proportional share of the overall emissions reduction task set for the broader ETS.[103)]

103) Climate Change Action Plan Policy Paper 2016

2.3. Intended Nationally Determined Contributions (INDC) key issues

Under the Paris agreement, Australia has committed to reduce green-house gas emissions (GHG) by 26 per cent to 28 per cent below 2005 levels by 2030. The details of Australia's INDC[104] is outlined below:

[Table 3-4] Excerpt from Australian INDC

Target:	26 to 28 per cent below 2005 levels by 2030
Base year	2005
Period covered	2021 – 2030
Scope and Coverage	
Target type	Absolute economy-wide emissions reduction by 2030, to be developed into an emissions budget covering the period 2021-2030
Gases covered	Carbon dioxide (CO2); Methane (CH4); Nitrous Oxide (N2O); Hydrofluorocarbons (HFCs); Perfluorocarbons (PFCs); Sulphur hexafluoride (SF6); Nitrogen trifluoride (NF3)
Sectors covered	Energy; Industrial processes and product use; Agriculture; Land-use, land-use change and forestry; Waste
% of base year emissions covered	100 per cent of greenhouse gas emissions and removals in Australia's national greenhouse gas inventory
Assumptions and methodological approaches for emissions estimates and accounting	
Metrics	Australia intends to apply 100 year Global Warming Potentials (GWPs) as contained in inventory reporting guidelines, currently IPCC Fourth

104) UNFCCC 2016a

	Assessment Report 100 year GWPs, or as otherwise agreed.
Emissions estimation methodology	Australia intends to apply the IPCC 2006 Guidelines and IPCC 2013 Revised Supplementary Methods, or as otherwise agreed.
Accounting approach	Australia intends to account based on UNFCCC inventory reporting categories using a net-net approach. Australia will apply IPCC guidance for treatment of natural disturbance and variation. Australia's INDC assumes that accounting provisions under the Paris agreement will: - Preserve the integrity of the agreement by ensuring claimed emissions reductions are genuine and are not double counted; and - Recognise emissions reductions from all sectors.
Australia reserves the right to adjust our target and its parameters before it is finalised under a new global agreement should the rules and other underpinning arrangements of the agreement differ in a way that materially impacts the definition of our target.	

Source: UNFCCC 2016a

Although the Government asserts that its 2030 target is a strong, credible and responsible contribution to climate action, it is way below the target recommendation by the government's Climate Change Authority (CCA). Climate Change Authority is an Australian statutory agency established on 1 July 2012. Its role is to review and make recommendation on various climate change policies including country's emissions reduction targets, carbon budgets, and renewable energy target. The Authority conducts and commissions its own independent research and analysis.

In its final report on Australia's future Emissions Reduction Targets, the Climate Change Authority had recommended following targets to the government:

- a 2025 target of a 30 per cent reduction in its emissions below 2000 levels (or a 36 per cent reduction if the Government should choose 2005 as its preferred base year); and
- Further reductions within a range of 40 to 60 per cent below 2000 levels by 2030 (or a range of approximately 45 to 65 per cent below 2005 levels).

The authority confirmed in its report that the target it is recommending is science based and required to limit global warming to less than 2 degrees above pre-industrial levels.

By ignoring the CCA's recommendation, the Coalition Government attracted criticism from local and international climate policy think tanks and experts as well as opposition Australian Labor Party (ALP).

An assessment conducted by Rocha et.al 2015 concludes that Australia's INDC 2030 target to reduce greenhouse gas (GHG) emissions by 26–28% from 2005 levels as "inadequate". The "inadequate" rating indicates that Australia's commitment is not in line with a "fair" approach to reach a 2°C pathway. If most other countries followed the Australian approach, global warming would exceed 3–4°C[105].

In the "Climate Change Action Plan Policy Paper", the opposition Australian Labor Party has committed to a new target i.e. 45% emissions reduction on 2005 levels by 2030 (if it is successful to form the government after 2 July 2016 federal election). The target proposed by the op-

105) Rocha et.al 2015

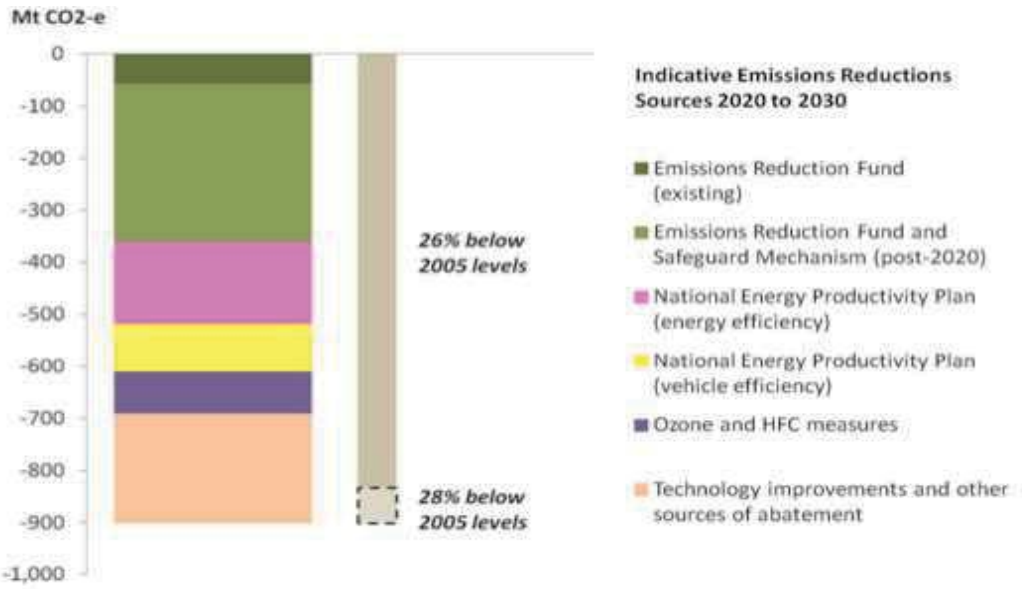
position party is consistent with the advice provided by the Climate Change Authority (CCA) to the Australian government.

3. Implementations under the Paris agreement regarding environmental effectiveness and economic efficiency including linking

Australian Government aims to achieve its 2030 target primarily through the Emissions Reduction Fund and Safeguard mechanism complemented by other policies such as Renewable Energy Target, energy efficiency improvements, phasing out synthetic greenhouse gases, and direct support for investment in low emissions technologies and practices.

The government has charted several indicative emissions reductions sources and its abatement potential. The indicative emissions reduction sources from 2020 to 2030 are shown in figure 2 below.

[Figure 3-2] Indicative Emissions Reduction Sources from 2020 to 2030



(Chart Source: Commonwealth of Australia 2015b)

By reading the numbers from the chart above, the Emissions Reduction Fund and its Safeguard Mechanism are expected to reduce approximately 360 MtCO2e, the National Energy Productivity Plan is expected to reduce approximately155 MtCO2e through energy efficiency and approximately 93 MtCO2e through vehicle efficiency. Similarly, Ozone and HFC measures are expected to reduce 82 MtCO2e and technology improvements and other sources of abatement are expected to contribute approximately 207 MtCO2e of abatement potential. Overall design and review of Australia's 2030 target policy framework is scheduled for 2017 – 2018[106].

Although the government claims that its current planned policies are consistent with its 2030 target, an assessment conducted by Rocha et.al 2015 indicates that Australia needs considerably more policies to meet its 2030 target. According to Rocha et.al 2015, in order to meet its 2030 emissions targets, Australia needs to decrease its emissions by an average annual rate of 2% until 2030; instead, with current policies, emissions are set to increase by an average rate of 1.5% a year[107]. Similarly, Wood et.al 2016 argues that the government's current climate policies requires considerable strengthening in order to achieve Australia's 2030 target.

3.1. Brief overview of complimentary climate policies

a. Renewable Energy Target (RET)

The Renewable Energy Target is a policy designed to reduce emissions of greenhouse gases in the electricity sector and encourage the generation of electricity from renewable sources. The policy ensures that at least 20

106) Commonwealth of Australia 2015c
107) Rocha et.al 2015

per cent of electricity is generated from renewable sources by 2020[108]. The Clean Energy Regulator administers the Renewable Energy Target's two schemes i.e. the Large-scale Renewable Energy Target and the Small-scale Renewable Energy Scheme.

The Large-scale Renewable Energy Target creates a financial incentive by creating large - scale generation certificates to the renewable energy power stations, whereas, the Small-scale Renewable Energy Scheme enables the individuals and small businesses to create small-scale technology certificate by encouraging installing eligible small-scale renewable energy systems.

Under the Renewable Energy Target (RET), liable entities usually electricity retailers must purchase and surrender an amount of large-scale generation certificate and small-scale technology certificate based on the volume of electricity purchased each year to the Clean Energy Regulator. This creates a market, which provides financial incentives to both large-scale renewable energy power stations and the owners of small-scale renewable energy systems.

On June 2015, the Australian Parliament passed the “Renewable Energy (Electricity) Amendment Bill 2015”. The amended bill reduced the Large-scale Renewable Energy Target from 41,000 GWh to 33,000 GWh in 2020. RET ceases in 2020 and no new RET has been specified beyond 2020.

b. NATIONAL ENERGY PRODUCTIVITY PLAN 2015–2030

The Australian government has set a National Energy Productivity Target to improve Australia’s energy productivity by 40 per cent between

108) Parliament of Australia 2015c

2015 and 2030[109]. The National Energy Productivity Plan (NEPP) is developed by the Council of Australian Governments (COAG) Energy Council, which is a Ministerial forum. The implementation of the plan is expected to enhance energy efficiency at the household, business, industrial facility level and transport sector by encouraging improvements in the efficiency of appliances, equipment, buildings and transport. Key examples of household and NEPP measures include, improvement in the residential building energy ratings and disclosure, improvement of the compliance with building energy efficiency regulation. Similarly, key examples of commercial building energy efficiency include: expansion of commercial buildings ratings and disclosure, advancement of the National Construction Code. For transport sector, the government, amongst others, mainly intends to improve the light vehicles energy efficiency. For industries, it is more to help business self-manage energy costs, support voluntary action initiated by the industries, and reduce barriers to finance. The COAG Energy Council is expected to publish its first detailed review of the National Energy Productivity Plan's progress before 2020.

c. Ozone & Hydroflurocarbons (HFCs) measures

The government is currently reviewing Australia's ozone and synthetic greenhouse gas legislation including options to fast track a domestic phase down of HFCs. And it is committed to work with other countries to phase-down the use of hydrofluorocarbons (HFCs) by 85 per cent by 2036[110].

In summary, the Government plans to mainly use Emissions Reduction Fund and its Safeguard mechanism to meet country's 2030 target. Many

109) Commonwealth of Australia 2015e
110) Commonwealth of Australia 2015a

of the policies outlined by the Government (described above) are still under development and not fully matured. The 2017-2018 consultation on emissions reduction policies is expected to bring forth more clarity and options in regards to Australia's long-term emissions reduction policies and actions.

3.2. Linking Markets

In its INDC, the Australian Government hasn't mentioned anything about linking its domestic GHG emissions reduction market with other jurisdictions. However, one of the highlighted policy goals of the Direct Action Plan is to 'develop the ERF in a way that can mesh in with a range of international initiatives to reduce greenhouse gases'. This suggests that international offsets may be used to meet Australia's emissions reduction targets, however, as yet no official decision on use of international offsets has been made. In future, Australia can benefit from market linkage provision under Article 6 of Paris Agreement.

Linking occurs when an Emission Trading Scheme allows using units (allowances or credits) issued under another ETS system as valid unit for compliance under its ETS, with or without restrictions. Linking can lower the aggregate costs of meeting emissions targets as it can benefit from wider abatement opportunities across jurisdictions. It can also improve market liquidity, help address leakage and competitiveness concerns (particularly between Australian trading partner counties such as China and South Korea) and facilitate international cooperation on climate policy.

The Paris Agreement calls for national climate change mitigation and adaptation commitments, the establishment of a new emissions reduction

mechanism and the development of procedures for establishing links between carbons market. Article 6 of the Paris Agreement provides a brief overview of these key changes that will shape the future global carbon market.

Paragraph 6.1: The first paragraph (paragraph 6.1) recognizes the right of Parties to cooperate voluntarily in the implementation of their nationally determined contributions (NDCs). It covers the concept that the Parties may choose, on a voluntary basis, to cooperate in the implementation of their NDC and to promote sustainable development and environmental integrity.

Paragraph 6.2 to 6.3: The international transfer of mitigation outcomes (ITMO) is the focus of paragraphs 2-3, which falls under the definition of international cooperation as stated in paragraph 1. These paragraphs specifically allow for internationally transferred mitigation outcomes to be used towards NDCs. Mitigation outcomes that are transferred internationally will need to demonstrate environmental integrity and transparency, and 'shall apply robust accounting to ensure, inter alia, the avoidance of double counting'. These measures facilitate the development of strong linkages between carbon markets, which will lead to improved liquidity in the carbon sector and provide additional avenues for Parties to meet their NDCs. It should be noted that while a standard unit of measure is likely, the internationally transferred mitigation outcomes have intentionally not been defined as crediting units (e.g. Certified Emission Reduction), and therefore it is unclear as to how these criteria must be met at this stage.

Paragraph 6.4 to 6.7: Paragraphs 4-7 outline a new 'mechanism to contribute to the mitigation of greenhouse gas emissions and support sustain-

able development'. This new mechanism has been unofficially named the Sustainable Development Mechanism (SDM), and is likely to resemble an evolution of the Clean Development Mechanism (CDM). Perhaps the most important aspect of these paragraphs is that there is no distinction between developed and developing Parties, with reference made only to a host Party. The current interpretation of this section is that SDM projects may be hosted in any country, regardless of their development status. This would be a significant change from the CDM, in which only Annex II Parties are eligible for hosting project activities.

The text of paragraphs 4-7 is still very broad given the high level of complexity involved in establishing and operating an emissions reduction mechanism. Paragraph 38(f) of the PA agreement states that the rules, modalities and procedures for this new mechanism will be established on the basis of 'experience gained with and lessons learned from existing mechanisms and approaches adopted under the Convention'. It is therefore reasonable to assume that the extensive institutional knowledge and evolving framework of previous UNFCCC mechanisms (i.e. CDM, Joint Implementation) will be heavily used as guidance in developing the new SDM.

Paragraph 6.8 to 6.9: The final paragraphs of Article 6 refers to non-market mechanisms for Parties to meet their NDCs through mitigation, adaptation, finance, technology transfer and capacity-building activities as appropriate. However, details on non-market framework have not been spelt out.

If a full two-way link, by means of the mutual recognition of carbon units between Australia and its trading partners such as China, South Korea can be established, it can be a significant achievement for both

countries as it would set an example of strong international cooperation on climate change, reduce any leakage concerns between trading partners, lower aggregated compliance cost and will build further momentum towards establishing a robust international carbon market.

However, linking carbon market across two different jurisdictions can be complex and challenging if the underlying principles and fundamentals of best practice Emission Trading Design between linking countries are not adhered to. Linking partners need to consider many issues (few key issues outlined below) before linking.

3.3. Comparability and environmental integrity of the offsets

Internationally transferred mitigation outcomes (ITMOs) referred under Article 6 of the PA will require environmental integrity, transparency and robust accounting measures to prevent double counting. These principles will play a critical role in the development of guidelines and standards for linking international mitigation outcomes. Ensuring the environmental integrity of offsets and their equivalence across emissions reduction mechanisms is a key.

One of the key points to consider while linking Australian national greenhouse gas mitigation mechanisms with the China's national ETS or Korean ETS is ensuring that each party is satisfied with the environmental integrity of carbon offsets under each scheme and that they are comparable. Certified Emissions Reductions issued under domestic CDM projects in Korea may be cancelled in exchange for Korean Carbon Units (KCUs). The additionality criteria for these projects follow the rules prescribed by the CDM, which are typically robust and are often subject to

a thorough investment analysis to demonstrate additionality. However, under the Australian Emissions Reduction Fund (ERF), project activities must adhere to the 'newness' requirement and 'regulatory additionality'. The newness requirement obliges project proponents to provide evidence that the project activity has not commenced prior to registration with the Clean Energy Regulator. The 'regulatory additionality' requirement ensures that project activities mandated under federal or state law (e.g. minimum energy performance standards for energy efficiency) are not eligible under the ERF. The environmental integrity of Australian and Korean carbon offset units and their interchangeability cannot be assumed and is therefore likely to require careful consideration of specific methodologies.

Ensuring the cross-market comparability of carbon offsets with regard to environmental integrity is likely to be a complex process that will require a detailed analysis of multiple factors across different schemes. Further guidance on ITMOs under the Paris Agreement will be available in the near future and may provide further guidance to address such comparibility issues.

3.4. Robust MRV and the fungibility of carbon offsets

The environmental integrity of the system is ensured through requirements for emissions monitoring, reporting and verification (MRV). The methodologies implemented under the Korean or Chinese CDM projects and Australian ERF projects are subject to extensive expert review, with a strong focus on methodology used, the integrity of sampling, formulae and monitoring parameters used to calculate and reporting emissions reductions.

The scope of carbon offsetting project activities implemented under different national schemes may differ considerably dependent upon regional economic and regulatory circumstances. For example, historically the Australian ERF is somewhat predisposed towards land management and carbon sequestration projects, and renewable energy projects implemented in Korea or China under the CDM would not be eligible under the ERF to prevent double counting where Renewable Energy Certificates have been issued. This also raises questions with regards to the eligibility of offsets and leakage where there is disparity in national policies mandated by law. For example, minimum energy performance standards that are mandated by the law of one party (and therefore not an eligible project activity) may provide opportunities for project development by another party that has more relaxed regulations. The environmental integrity and comparability of carbon offsets issued via projects that differ in their scope may require further consideration. For example, calculating the avoidance of greenhouse gas emissions for renewable energy projects is relatively simple and robust in comparison with land management and sequestration activities, which need to consider carbon balances and environmental variability over the medium to long term. While the differences in the project activities between Australia and its linking partners present challenges and will require careful consideration, there may be potential advantages in such a situation. One potential advantage is that disparity in project activities may minimise the impact of overlapping but distinct methodologies and projects.

3.5. Offset supply and demand under each market

As stated in the earlier paragraphs above, one of the highlighted policy goals of the Australian Government's Direct Action Plan is to 'develop the ERF in a way that can mesh in with a range of international initiatives to reduce greenhouse gases'. This suggests that international offsets may be used to meet Australia's emissions reduction targets, however, as yet no official decision on use of international offsets has been made. If Australia allows using international offsets, it would be able to buy CERs from Korean or Chinese CDM projects. In order to manage the supply/demand, it would be important to model the potential price impact of changes in supply and demand in a linked market.

3.6. Linking strategy

In order for Australian to link with other markets, it would be important to set linking objectives (for example linking objective could be to reduce aggregated compliance cost or to increase market liquidity etc.) and develop mutual strategies to attain those objectives. Linking typically requires clear agreement on acceptable levels of GHG reduction ambition in each jurisdiction and stringency on certain key design features. If the market system designs diverge, then it can make subsequent linking more difficult.

3.7. Type of linkage and design alignment

Links between Australia and Korean/China carbon market can be one-way (unilateral) or two-way (bilateral) based on linking objectives of

the partners. The type of linkage is open for discussion. A robust review of the system design would be required in order to ascertain whether the jurisdictions would be benefitted by unilaterally or bilaterally. Based on the international experience, such as the link between the California and Quebec, it is advised to consider linking at the early stage of ETS system design. By doing so both linking partners can agree on key elements of ETS design and align with each other's system. If linked systems are aligned in ETS key characteristics early in the design stages of one or both systems, then the hurdles to successive linking can be reduced.

For example, in August 2012, Australia and the EU ETS had agreed to an initial unilateral and eventual bilateral linkage. It should be noted that the EU ETS and Australia's Carbon Pricing Mechanism (CPM) had not been mutually designed with an expectation of linkage. In order to align with the EU ETS, the Australian carbon floor price had to be removed and use of Kyoto units in Australian market was restricted.

Just to elaborate further more on AU-EU ETS linkage experience, there were 2 stages of linking negotiated between Australian CPM and EU ETS. In the first stage, Australia- EU ETS linkage was one way (unilateral) where Australian liability entities under the Australian Carbon Pricing Mechanism (commonly referred as "Carbon Tax") would have been able to purchase EU allowances for compliance purposes starting from 1 July 2015. The second stage, two way link (bilateral), was planned to start on 1 July 2018 that would have made EU ETS and Australian allowances interchangeable, given that a total limit of 50 percent of Australian liable entities compliance obligations being met using international units (up to 12.5 % from CERs, ERUs and RMUs).

In contrast to Australia-EU ETS experience, California's ETS and Quebec's ETS both adopted the Design Recommendations for the Western Climate Initiative (WCI) Regional Cap-and-Trade Program, to design their ETS systems. This enabled the synchronization of key design features in the two systems more efficiently and linking occurred in 1 year after the market was in operation[111].

3.8. Legal instruments for governing the link

Both Australia and its linking partner/s will need to establish legal instruments for governing the link and the institutions responsible for market oversight and processes for implementing any changes to the link. For instance, both California and Québec (and the RGGI states) have established a single provider for market services and oversight that provides program administration services[112]. These services include administering an allowance tracking system, administering auctions, and monitoring the market for fraud or manipulation. By using a single provider for these services, linked systems are able to create administrative efficiencies and reduce costs[113].

3.9. Registry

To avoid double counting, an offset tracking system is required to be developed by Australia and its linking partner/s. For example, any Australian domestic unit could be assigned a serial number when it is first transferred internationally to Korea or China, which would then

111) ADB 2016
112) PMR & ICAP 2016
113) Kachi et al. 2015 as cited PMR & ICAP 2016

serve for purposes of tracking and avoiding double counting. Development of compatible registry systems can greatly facilitate the transfer and tracking carbon units in a linked market.

At the time of negotiation between Australia and EU ETS on market linkage, these linking partners had analysed the linking of their respective registry systems. The Australian government and the European Commission proposed six principles[114] that any link between their registries should abide by that could be useful for Australia - Korea/China market linkage:

- Ensures the fungibility of allowances;
- Ensures environmental integrity;
- Ensures ease of use;
- Is complementary to the efficient operation of both registries for domestic purposes;
- Provides protected access to allowances; and
- Supports the development of international carbon markets.

In summary, the markets provisions, contained in Article 6 of the Paris Agreement can be seen as a major catalyst to explore the opportunities to link markets between Australia and its trading partners such as China and Korea as it will open up the opportunities for these trading partners to trade emissions units and achieve their emissions reduction targets. There are examples from various parts of the world where carbon market linkages have already been established and valuable experience gained. The lessons learned from these existing ETS links can be useful in exploring and designing a possible carbon market link.

114) PMR & ICAP 2016

4. Recommendations and future plans

The Liberal-National Coalition Government aims to achieve its 2030 target mainly through the implementation of ERF and its Safeguard Mechanism. However, it is evident from the various studies and assessments that the existing climate policy of Australia is not enough to meet its 2030 target under the Paris Agreement and emissions may continue to rise under the current policy as ERF doesn't set any cap to curb emissions.

The opposition party of Australia (i.e. the Labor Party of Australia) has no confidence in the effectiveness of the policy in terms of meeting Australia's international obligations under the Paris Agreement. The continued disagreement on the climate policy between the two major political parties has damaged the investor confidence and the damage is likely to continue if the major political parties do not come to an agreement. Australia will need a stable, comprehensive and committed climate policy accepted by major political parties to meet its emissions reduction obligations under the Paris Agreement, to bring investor confidence back and to drive a clean energy transition. Therefore, moving forward, bipartisan support for climate change policy is going to be vital in achieving Australia's international obligations under the Paris Agreement.

The Coalition Government has a plan to review Australia's 2030 target policy framework in 2017–2018. This is an opportune time for the re-elected Coalition Government to have a wider consultation with the climate policy experts, industry bodies, major political parties and revise the existing climate policy and make it effective so that it can drive down Australia's emissions.

Setting an emission cap in line with Australia's 2030 emissions reduction target; tightening the Safeguard Mechanism baselines over time and creating opportunities for liable entities to trade the reduced emissions below the baseline; allowing the Australian businesses to access international offsets and permits; linking Australian carbon market with other jurisdictions; expanding Safeguard Mechanism to other uncovered sectors; and making ERF self sustaining (i.e. operating ERF without public funds) are some of the key issues that would require careful consideration at the 2017-2018 policy review.

Chapter 4 China

1. Past-climate change policy and legislation

China has been the world largest CO_2 emitter since 2006.[115] In 2012, China was responsible for nearly 25% for global carbon emission.[116] On one hand, Chinese government keeps laying stress on its unique situations and hence the potential difficulties for tackling climate change,[117] on the other hand, China made commitments that its carbon emission will achieve the peak before 2030.[118] These policy statements imply that general idea about China's climate change policy is to address climate change actively while keep its autonomy to a large extent.

1.1. Two-tier Institutional Framework

Climate Change was first introduced to China's policy agenda in 1990, when China established National Coordinating Group of Climate Change under Environment Protection Committee of State Council. The office of

115) "China overtakes U.S. as top CO2 emitter: Dutch agency", http://www.reuters.com/article/us-climate-china-idUSL2080219120070620

116) Zhu Liu. 2015. "China's Carbon Emissions Report 2015." Sustainability Science Program and Energy Technology Innovation Policy research group, Belfer Center Discussion Paper #2015-02. Harvard Kennedy School of Government, Cambridge, MA.

117) "China is the world's largest developing country with a large population. It has an imbalanced regional development and is still in the process of industrialization and urbanization. In 2012, China's per capita gross domestic product (GDP) exceed US$ 6,000, ranking 87th in the world. The current challenges facing China include the task of developing its economy, eradicating poverty and improving the people's livelihoods, as well as effectively tackling climate change". *China's Policies and Actions for Addressing Climate Change* (2013), http://en.ndrc.gov.cn/newsrelease/201311/P020131108611533042884.pdf

118) "China-US Joint Announcement on Climate Change", http://en.ccchina.gov.cn/Detail.aspx?newsId=49296&TId=98

Coordinating Group affiliated to China Meteorological Administration, which highlighting the scientific aspect of climate change. SONG Jian, the Minister of Science and technology, was appointed as the head of the Coordinating Group.

During the negotiation in and after China's adoption of UNFCCC, it was found that climate change was a complexity which need much more knowledge and stronger coordination. As a result, in the nationwide institutional restructuring of 1998, National Leading Group for Climate Change was founded to replace the Coordination Group. ZENG Peiyan, the director of National Development and Reform Commission (NDRC), acted as the group leader.[119)]

In 2007, the leading group was updated as National Leading Group for Climate Change, Energy Conservation and Emission Reduction, under the leadership of then Premier WEN Jiabao. One year later, NDRC created Department of Climate Change, which assume wide responsibilities relating to address climate change, such as:

- asses the impacts of climate change on social and economic development,
- formulate the major strategies, plans, and policies to combat climate change,
- lead the national implementation of UNFCCC,
- take the lead with other authorities in international negotiations,
- carry out international cooperation and capacity building in terms of climate change,

119) YU Hongyuan, "Internalization of International Institution in China" (国际制度在中国的内化－－以中国气候变化协调小组为例), *Fudan International Studies Review,* 2007 (1), p. 248.

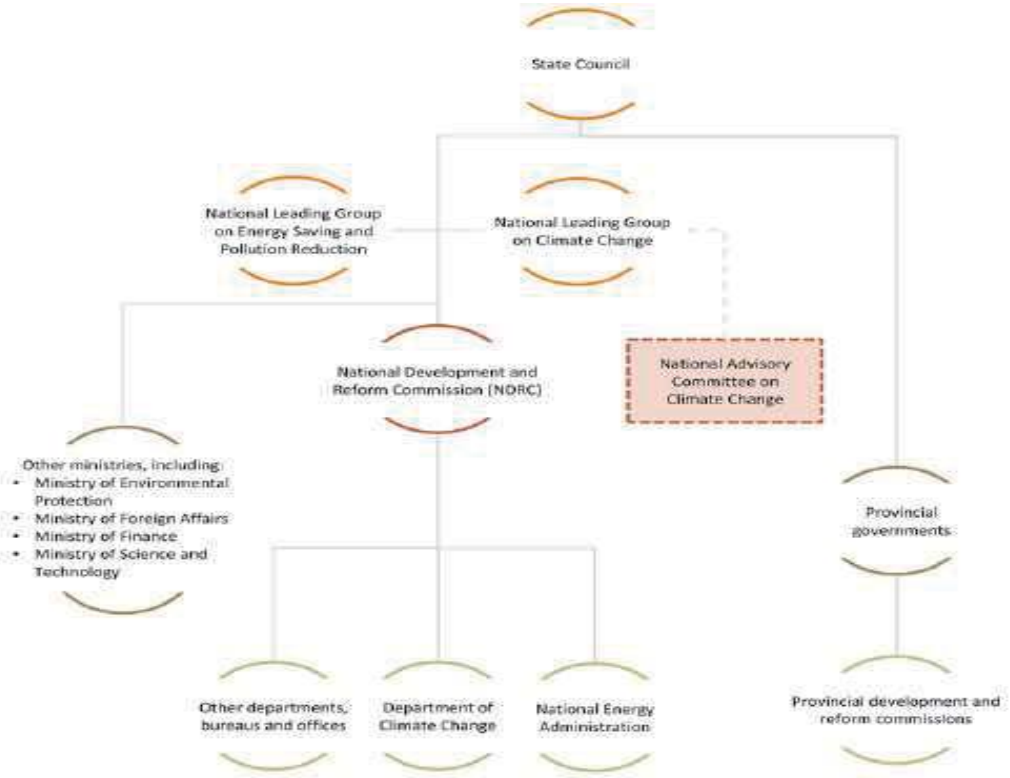
- give approval to CDM projects and organize the ETS in China,
- handle other affairs relating to climate change. [120)]

Generally speaking, institutional framework in charge of climate change has a two-tier structure: the Leading Group under leadership of Premier of the State Council as trans-department coordinating and consulting body, and NDRC (its Department of Climate Change in particular) in charge of administration in the field of climate change, with the cooperation from other ministries, especially Ministry of Foreign Affairs, Ministry of Science and Technology, Ministry of Environmental Protection, and China Meteorological Administration.

Nowadays, as for climate change in China, NDRC is the key player. The power shift to NDRC may illustrate China's standpoint on climate change that "climate change is an environmental issue, but ultimately, it is an issue of development".

120) http://qhs.ndrc.gov.cn/ldzc/

[Figure 4-1] Chinese domestic climate change policymaking: overview



Source: Adapted from Stephan Tsang and Ans Kolk, "The evolution of Chinese policies and governance structures on environment, energy and climate," *Environmental Policy and Governance* 20, no. 3 (2010). Quoted from Lisa Williams, "China's climate change policies: actors and drivers," (July 2014), http://www.lowyinstitute.org/files/chinas-climate-change-policies.pdf

1.2. Policy-drive Approach

China's solution to low-carbon development was achieved by the adopting and implementation of a series of policies. Climate change evolves gradually as a policy priority in China. The year 2007 witnesses China's turn to an active and comprehensive strategy to address climate.[121] Since

121) Xu Nan and Zhang Chun, "What the World is Getting Wrong about China and

then, Chinese government treat climate change as one of the topics that have great impact on the overall and long-term development of the country. Policy arrangements concerning climate change could be found in the 11th, 12th and 13th five-year plans.[122)]

In general, China's climate change program is design to address the primary sources of greenhouse gas emissions: fuel combustion and, to a lesser extent, industrial processes and land use changes. The program attempts to address these sources primarily through (1) reduced reliance on energy-intensive heavy industry; (2) greater energy efficiency and conservation; (3) increased use of non-fossil energy and less carbon-intensive fossil fuels; and (4) expansion of carbon sinks. [123)]

a. Target-setting

In 2005, China set the first binding target for energy consumption in 11th five-year plan, to reduce the energy consumption of per unit GDP

Climate Change",
https://www.chinadialogue.net/article/show/single/en/5711-What-the-world-is-getting-wrong-about-China-and-climate-change

122) The Five-Year Plan, or the Five-Year Plan for National Economic and Social Development, is a very important mechanism of governance tool in China to arrange national key construction projects, manage the distribution of productive forces and individual sectors contributions to the national economy. Five-Year Plans are drafted over course of several years in consultation with corporate stakeholders and ministries, and tend to intertwine with existing policies, regional plans, and strategic initiatives. These plans constitute the Chinese government's vision for future reforms and communicate this to other parts of the bureaucracy, industry players, and citizens. Time span of five-year plans: 11th (2006-2010), 12th (2011-2015), and 13th (2016-2020).

123) Alex L. Wang, "Climate Change Policy and Law in China",
http://ssrn.stanford.edu/delivery.php?ID=067118073027019002009087101069031099001011031068070039103005006106103088095091093086033011100024126055116029007109005081000074037001060054001026114070001105069003112072010046064108073095004072084085093096029105068027005090005001003081029099084065111067&EXT=pdf

by 20 percent. [124] This target was nearly accomplished with a final result of 19.1 percent.[125] In 2009, China pledge before Copenhagen Conference that the country aimed to cut the amount of carbon dioxide it emitted per unit of gross domestic product by 40 to 45 percent from 2005 levels by 2020.[126] Although Copenhagen Conference was not successful as expected, Chinese government honored its commitment by setting an ambitious target in the 12th five-year plan next year. "Non-fossil fuel resources will rise to 11.4% of primary energy consumption. Energy consumption per unit of GDP will decrease 16% and CO2 emissions per unit of GDP will decrease 17%". [127] Five years later, climate change gained a more prominent position. The 13th five-year plan contains a separate chapter on "addressing global climate change", also the targets to raise non-fossil fuel resources to 15% of primary energy consumption, to decrease energy consumption per unit of GDP by 15%, and to decrease CO2 emission per unit of GDP by 18%.[128] The target was a little bit lower than 12th five-year plan, in recognition of the fact that additional efficiency gains will be more difficult over time.[129]

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124) "Guidelines of the Eleventh Five-Year Plan for National Economic and Social Development", (国民经济和社会发展第十一个五年规划纲要), http://www.gov.cn/ztzl/2006-03/16/content_228841_2.htm

125) "Guidelines of the Twelfth Five-Year Plan for National Economic and Social Development", (国民经济和社会发展第十二个五年规划纲要), http://www.gov.cn/2011lh/content_1825838_2.htm

126) "China vows intensified efforts in tackling climate change next year", http://www.china.org.cn/environment/Copenhagen/2009-11/27/content_18967483.htm

127) "Guidelines of the Twelfth Five-Year Plan for National Economic and Social Development", (国民经济和社会发展第十二个五年规划纲要), http://www.gov.cn/2011lh/content_1825838_2.htm

128) "Guidelines of the Thirteenth Five-Year Plan for National Economic and Social Development", (国民经济和社会发展第十三个五年规划纲要), http://sh.xinhuanet.com/2016-03/18/c_135200400.htm

129) Michal Meidan, "China's 13th Five-Year Plan: Implications for Oil Markets", p. 7.

China's energy saving and emission reduction targets are so-called "intensity index" or "relative index". Unlike absolute index, relative index keeps the possibility that the gross energy consumption and emission could still increase during industrialization and continuous economic growth. The target-setting attracted some worries and criticism.[130] Fortunately, China's commitment of achieving the emission peak before 2030 alleviate such concerns.

[Table 4-1] China's key policy targets on climate change in post-2015

	Targets	2015	2020	2030
general	CO2 emission per unit of GDP	decrease by 17%	decrease by 40-45% compared with 2005	decrease by 60-65% compared with 2005
	CO2 emission			reach the peak
energy	non-fossil energy consumption, share of energy in total (%)	11.4	15	20
	consumption of primary energy (billion tce)	4.0	4.8	
	non-fossil energy, share of electricity generation (%)	30		
	natural gas, share of primary energy consumption (%)	7.5	>10	
	coal, share of primary energy consumption (%)	65	62	
	coal consumption (billion ton)	/	42	
	installed capacity of conventional hydropower (mkw)	260	350	

https://www.oxfordenergy.org/wpcms/wp-content/uploads/2016/06/Chinas-13th-Five-Year-Plan-Implications-for-Oil-Markets.pdf

130) See for example, Tim Herzog, "China's Carbon Intensity Target", http://www.wri.org/blog/2007/04/chinas-carbon-intensity-target

	Targets	2015	2020	2030
	electricity generate by conventional hydropower station (tkwh)	0.91	1.2	
	installed capacity of nuclear power (mkw)	40	58	
	installed capacity of wind power (mkw)	100	200	
	installed capacity of solar power (mkw)	21	100	
industry	reduction of CO2 intensity per unit of industrial added value compared with 2005 (%)	/	50	
	reduction of energy intensity of value added by large-scale industry within 5 years (%)	21	/	
	value added by strategic emerging industry, share of GDP (%)	8	15	
	value added by service, share of GDP (%)	47	52	
construction	green building, share of new buildings (%)	20	50	
	implementation of energy saving design standard (%)	>95	/	
	reduction of energy consumption of public buildings (%)	10	/	
transportation	public transportation in medium and large cities (%)	/	30	
	CO2 intensity of highway passenger transportation	reduce by 7% compared with 2005	reduce by 5% compared with 2010	
	CO2 intensity of highway cargo transportation	reduce by 13% compared with 2005	reduce by 13% compared with 2010	

	Targets	2015	2020	2030
	CO2 intensity of railway transportation	/	reduce by 15% compared with 2010	
	CO2 intensity of water carriage	reduce by 15% compared with 2005	reduce by 13% compared with 2010	
	CO2 intensity of civil aviation	reduce by >3% compared with 2010	reduce by 11% compared with 2010	
forestry	forest coverage (%)	21.66	/	
	increase of forest area compared with 2005 (m km2)	30	40	
	increase of forest volume (billion m3)	increase 0.6 compared with 2005	increase 1.3 compared with 2005	increase 4.5 compared with 2005

Sources: Synthesized from "China's National Plan on Climate Change (2014-2020) and other plans and initiatives. Quoted from Li Junfeng et al, "China's Climate Change Policies and Market Prospective", *Chinese Energy*, 2016 (1), pp. 10-11.

b. Adjusting Industrial Structure

The CO2 intensity varies in different economic sectors. One of the basic idea of China's strategy on climate change is to adjust industrial structure to encourage low-carbon industries and discourage the high-carbon ones. It is illustrated in some research that if the share of secondary industry declines by 1 per cent and the share of tertiary industry increases by 1 percent correspondently, the energy intensity of GDP will decrease by 1 per percent as a result.[131] Since its economic growth re-

131) He Jiankun, Zhang Xiliang, "Analysis of China's Energy Consumption Intensity

lies on heavy industry and manufacturing business, the adjustment can make China's economy cleaner and more competitive.

- *Transformation and upgrading traditional industries.* Chinese government has raised the entry threshold for certain industries and strictly limited new projects in industries with high energy consumption, high pollutant emissions or excess capacity. The government has stepped up evaluation and examination of energy conservation, environmental impact assessments, and preliminary examination of land used for construction projects. It has also rigorously controlled the export of products with high energy consumption and high pollutant emissions.[132)]
- *Supporting the development of strategic and newly emerging industries.* Strategic and newly emerging industries were part of policy portfolio after financial crisis in 2008. It turns out that among 7 strategic and newly emerging industries, 3 (energy efficient and environmental technologies, new energy, new-energy vehicles) are energy and environmental industries which match the object of addressing climate change. Supporting policies include state funding and other incentives, as well as eliminating the existing market-entry thresholds (*e.g.*, governing registered capital, total investment, and land supply) that had created barriers to private investment.[133)]

Reduction Tendency during the 11th Five-Year-Plan Period". *China Soft Sciences*, 2006(4), pp. 33-38.

132) "China's Policies and Actions for Addressing Climate Change (2012)", p. 3. http://files.ncsc.org.cn/www/201308/20130806105201496.pdf

133) Alex L. Wang, "Climate Change Policy and Law in China", http://ssrn.stanford.edu/delivery.php?ID=067118073027019002009087101069031099001011031068070039103005006106103088095091093086033011100024126055116029007109005081000074037001060054001026114070001105069003112072010046064108073095004072084085093096029105068027005090005001003081029099084065111067&EXT=pdf

- *Developing service industries.* China has formulated a series of policy documents to accelerate the development of the tertiary industry, stating that the development of tertiary industry shall be considered as a strategic initiative to quicken the transformation of the economic development modes and economic restructuring.[134)]
- *Speeding up the elimination of backward production capacity.* China has been making efforts to improve the exit mechanism for obsolete production capacity. For example, in 2011, China shut down small thermal power generating units with a total generating capacity of 8 million kw and eliminated obsolete production capacity in the following industries: iron smelting, 31.92 million tons; steel production, 28.46 million tons; cement (clinker and mill), 155 million tons; coke, 20.06 million tons; plate glass, 30.41 million cases; paper, 8.3 million tons; electrolytic aluminum, 639,000 tons; copper smelting, 425,000 tons; lead smelting, 661,000 tons, and coal production, 48.7 million tons.[135)]

Since 2008, China released annual report on its policies and actions concerning climate change. In order to facilitate a better understand of China's policies on climate change, the author summarizes the policies, plans, and initiatives identified in the reports in the follow tables.

134) "Second National Communication on Climate Change of the People's Republic of China", p. 103. http://unfccc.int/resource/docs/natc/chnnc2e.pdf

135) "China's Policies and Actions for Addressing Climate Change (2012)", p. 5. http://files.ncsc.org.cn/www/201308/20130806105201496.pdf

[Table 4-2] Policies, plans, and initiatives in China's annual policy reports relating to "adjusting industrial structures" (2008-2014)

Adjusting industrial structures				
	transformation and upgrading traditional industries	supporting the development of strategic and newly emerging industries	developing service industries	speeding up the elimination of backward production capacity
2008	Provisions for new construction projects, Market-entry threshold for high energy consumption industries	11th FYP for high-tech, e-commerce, and IT industry	"Some opinions on accelerating the development of tertiary industry"	annual and regional plan for elimination of backward production capacity in 13 relating industries
2009		Plans of Adjusting and revitalizing 10 industries	"Implementation opinions on policy measurement to accelerate the development of tertiary industries"	
2010	revising "Catalogue for Guiding Industry Restructuring"	State Council: "Decision on Speeding up the Cultivation and Development of Strategic and Newly Emerging Industries" "Venture Capital Plan for Newly Emerging Industries"	"Guiding Opinions of the State Council on Development of Family Service"	" Notice of the State Council on further Strengthening the Elimination of Backward Publication Capacities"
2011	formulating and releasing plans for restructuring and rejuvenating ten	"Decision on Accelerating the Fostering and Development of	"Guidelines for Accelerating the Development	

Adjusting industrial structures				
	major industries, including automobiles, and iron and steel. "Opinion on Curbing Overcapacity and Redundant Construction in Some Industries and Guiding the Sound Development of Industries"	Strategic and Newly Emerging Industries" 20 venture capital investment funds	of High-tech Service Industry"	
2012	NDRC: "2011 edition of the Guideline Catalogue for Industrial Restructuring" State Council: "Plan of Industrial Transformation and Upgrading (2011-2015)"	State Council: "the Development Plan for National Strategic Emerging Industries During the 12th Five-Year Plan Period."	nationwide trials of comprehensive reforms in the service sector	"Notice of Issuing the Implementation Plan to Assess the Work of Eliminating Obsolete Production Capacity", "the Opinions on Resettling Workers Laid off due to Elimination of Obsolete Production Capacity and Corporate Merger and Restructuring", "the Catalogue (2nd Batch) of Obsolete Mechanical and Electrical Equipments (Products) Eliminated due to High Energy Consumption."

Adjusting industrial structures				
2013	"the Restructuring Plan on the Old National Industrial Bases (2013-2022)", the National Low Carbon Tech Innovation and Model Industries Projects,	"the Catalogue of Key Products and Services in Strategic Emerging Industries", "he 2012 Strategic Emerging Industries Categories", "Several Opinions on the Work of Enhancing the Intellectual Property Rights of the Strategic Emerging Industries"	"the 12th Five-Year Plan on the Development of the Service Industry",	State Council: "the Instructive Opinions on Solving the Problem of Overcapacity"
2014	"the Instruction Opinions on the Layout Adjustment and Industrial Transfer of Key Industries",	"Notice on Further Promoting the Use of New Energy Automobiles"	State Council: "the Instruction Opinions on Speeding up the Producer Services to Promote the Reform and Upgrading of Industrial Structure"	"Notice on Eliminating Backward Production Capacity in 19 Industries in 2013", "Notice on Eliminating Backward Production Capacity in Coal Industry in 2014", "Notice on Accelerating the Closing of Small, Backward Coal Mines"

Source: Summarized from "China's Policies and Actions for Addressing Climate Change (2009-2014)".

c. Increasing Energy Efficiency

China's energy intensity and carbon intensity are relatively high compared with developing countries, hence energy efficiency is among the central components of China's climate change policy. Central regulators developed new energy efficiency policies in the early 2000s, not to combat climate change, but to address energy shortages and a dramatic rise in inefficient energy use. The sharp increase energy intensity in China between 2002 and 2005, in particular, spurred the inclusion of energy efficiency as a top priority of the 11th five-year plan. [136] A more ambitious energy efficiency target was embedded in the 12th five-year plan, and the linkage between the target and climate change is more direct and closer. [137]

China adopt a series of new regimes to promote energy saving and raise energy efficiency. *Energy Conservation Law of PRC* (adopted in 1997, amended in 2007 and 2016) provides that China shall implement target responsibility system and appraisal and evaluation system of energy conservation. The performance evaluation of the local governments and person-in-charge shall be based on fulfillment of energy conservation targets. The local governments of provinces, autonomous regions and municipalities directly under central government shall report about the fulfillment of energy conservation to the State Council every year. The State

136) Alex L. Wang, "Climate Change Policy and Law in China", http://ssrn.stanford.edu/delivery.php?ID=067118073027019002009087101069031099001011031068070039103005006106103088095091093086033011100024126055116029007109005081000074037001060054001026114070001105069003112072010046064108073095004072084085093096029105068027005090005001003081029099084065111067&EXT=pdf

137) Chen Ying, "Analysis on '12-FYP' Targets for Emission Reduction", in Wang Weiguang, Zheng Guochen (ed.), *Annual Report on Actions to Address Climate Change* (2011), Beijing: Social Science Press, 2011, p. 109.

Council also released guidelines on the statistics, monitoring and appraisal of energy saving and emission reduction. Meanwhile, energy-efficiency labeling and energy-conservations standards were also introduced.[138)]

China also initiated energy conservative projects in key areas. Key energy conservative projects were launched in 2006, during the 11th FYP period, consisting of ten major energy conservation projects, such as renovation of coal-fired industrial boilers waste heat, the waste heat and pressure recovery, project of saving and replacing fossil oil, green lighting project, energy-saving project in government. In 2006, the top 1,000 energy-saving enterprises program was carried out in order to strengthen the management of key energy consumption enterprise. In 2011, the top-10,000 energy-saving and low-carbon enterprises program was started and was expected to save 250 million tons of coal equivalents during the 12th FYP.

China successively formulated and revised Design Standard for Energy-efficient Buildings, Design Standard for Energy-efficient Public Buildings and Construction Quality Acceptance Specification of Energy-efficient projects. China promoted the construction of energy efficient supervision system in government agencies and large-scale public buildings. China formulated and implemented the green action plan and by the end of 2013, 1,446 projects had won identifications of green building assessment, covering more than 160 million square meters of existing buildings. 8.8 billion square meters of energy-saving building had been built in cities and towns, which led to the reduction of 80 million tons of coal equivalent and 210 million tons of carbon dioxide emission.

138) Zhang Huanbo, *Analysis on Climate Policies of China, the United States and the European Union*, Beijing: Social Sciences Academic Press, 2010,pp. 314-322.

Since 2007, China has been making relevant standards and norms on energy conservation of highways and waterways, carrying out actions on emission reduction of a thousand enterprises in travelling ways, developing public transport, selecting pilot city to carry out the demonstration, extension and application of "Ten City, Thousand Vehicles" energy conservation program, building a green-circulating low-carbon transportation system. In 2013, energy equivalent of 6.13 million tons of coal was saved in transportation industry, meaning the reduction of 13.37 million tons of carbon dioxide.

By 2014, China released 6 batches *Catalogue on the Promotion of National Key Energy Saving Technologies,* consisting of 215 energy-saving technologies in total. At present, a huge stock of energy-saving and energy-efficient technologies has been widely applied, including low-temperature cogeneration, new cathode aluminum electrolytic bat, high voltage conversion and rare-earth permanent magnet electric machine.

China carried out national circular economy pilot "city mining" demonstration, promoting key cities to make large-scale recycled and efficient use of discarded electrical equipment, waste household appliances, as well as waste plastics. It proposed carrying out a national circular economy pilot city (township) program in about 100 cities (districts, townships) by 2015.

Chinese government provided financial support to energy service corporations. To speed up the fostering of professional energy service corporations, 5 batches, a total more than 3,210 energy service corporations, have been put on file by the government.

With joint efforts, in the first half of 2014, the energy consumption per unit of GDP decreased by 4.2% compared with 2013, achieving the best record since the beginning of 12th FYP.[139)]

139) He Jiankun (ed.), *Keeping up with the Pace of the World: Record of China's*

d. Optimizing Energy Structure

- *Strictly controlling total coal consumption.* In order to put into practice the *Action Plan on the Prevention and Control of Air Pollution* and control coal consumption, local governments and ministries formulated action plans. In March 2014, the Ministry of Environmental Protection released the *Notice on Regulating the Environmental Entry Threshold to Implement the Action Plan on Prevention and Control of Air Pollution,* which mandates that definite coal reduction plans must form part of the environmental assessment and approval process in areas where there is a total coal consumption cap. In March 2014, the National Development and Reform Commission, the National Energy Administration and the Ministry of Environmental Protection issued the *Work Plan on Enhancing Prevention and Treatment of Air Pollution in Energy Industry,* requiring the energy industry to improve controls on energy consumption, gradually reduce the proportion of coal, and formulate mid-term and long-term targets on the controlling of national coal consumption.[140] Some recent research shows that China may has reached its peak of coal consumption.[141]
- *Continuing to promote the clean use of fossil energy.* The government is vigorously developing natural gas, encouraging the development and utilization of coal-bed methane, shale gas and other unconventional oil and gas resources, and has enacted a number of policies

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Action to Address Climate Change, Hefei: Anhui Science and Technology Press, 2016, pp. 26-29.

140) "China's Policies and Actions for Addressing Climate Change (2014)", pp. 16-18 http://qhs.ndrc.gov.cn/gzdt/201411/W020141126367753719687.pdf

141) Feng Lifei, "China's Coal Consumption may Reaches its Peak" (中国煤炭消费或已达峰值), http://www.cas.cn/kj/201607/t20160727_4569880.shtml

in this regard, such as financial subsidies, preferential taxation, connecting generated power to grid and electricity price subsidies. China has formulated and implemented an overall plan of management and utilization of coal mine methane, and is forcefully pushing forward the clean utilization of coal, guiding and encouraging the utilization of coal mine methane and the development of ground coal-bed methane. [142)]

- Actively developing non-fossil energy. China formulates plans for development of renewable energy, constructing pilot cities (townships) in large-scale use of green energy, renewable energy, and increasing investment and subsidies for renewable. In 2014, the proportion of renewable energy generation increased by 2% on the previous year. Hydropower generation achieved a year-on-year growth of 19%, photovoltaic (pv) power generating capacity of 200%. Biomass power generation reached 41.6 billion kilowatt-hours.[143)]

e. Carbon sink

The Chinese government places great emphasis on the unique role of forest in tackling climate change. It formulated the National Program for Combating Climate Change, the forestry sector also formulated the Action Plan for Combating Climate Change, and identified 22 actions to be taken to mitigate and adapt to climate change. The goal is to breed and cultivate over 5 million hectares of forest per year and upgrade China's forest coverage to 23% by 2020, and by 2050, achieve a net increase of

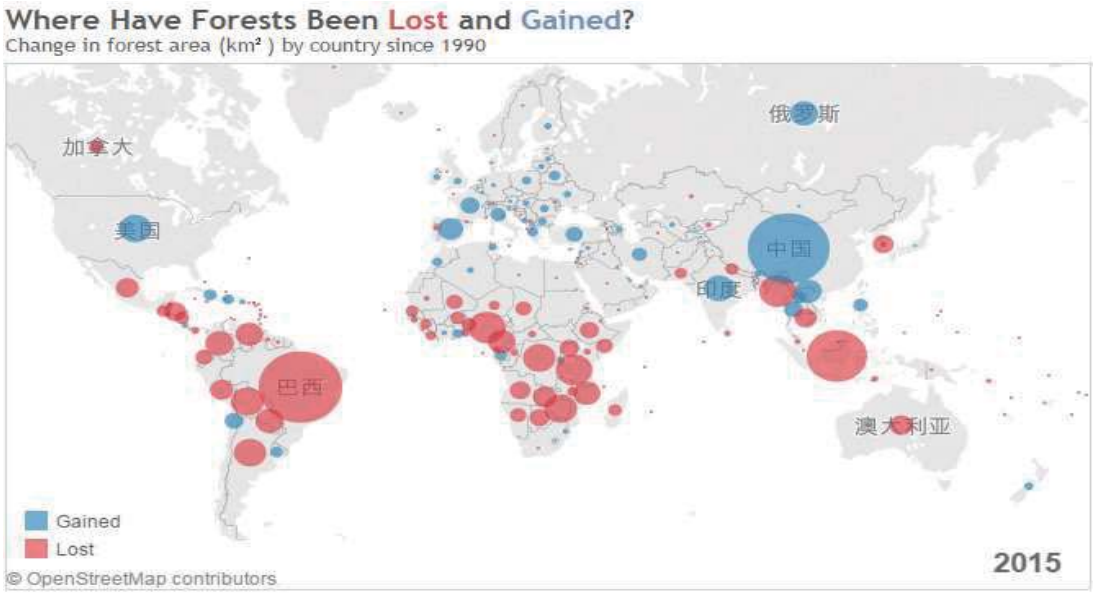
142) "China's Policies and Actions for Addressing Climate Change (2011)", http://english.gov.cn/archive/white_paper/2014/09/09/content_281474986284685.htm

143) He Jiankun (ed.), *Keeping up with the Pace of the World: Record of China's Action to Address Climate Change*, Hefei: Anhui Science and Technology Press, 2016, p. 30.

forest areas of 47 million hectares over 2020 level, stabilize forest coverage at over 26%, and sustain the capacity for forest carbon sink.[144)]

As early as 2003, the State Forestry Administration (SFA) had set up the Forestry Carbon Sink Management Leading Group (Forest Carbon Sink Office), later consolidated in 2007 with the SFA's Combating Climate Change Energy Saving and Emission Reduction Leading Group (Office for Combating Climate Change). It has been mandated by the State Council with the institutional legal responsibility of formulating the forestry sector's working plans for combating climate change, regulating management mechanisms and measures, participating in the implementation of international cooperation projects, and negotiating internationally on climate change in relation to forestry.

[Figure 4-2] Change in Forest Areas by Country Since 1990



Source: http://blogs.worldbank.org/opendata/five-forest-figures-forests-day

144) State Forestry Administration of China, *Forestry in China*, http://english.forestry.gov.cn/index.php/information-services/latest-publication/458-forestry-in-china

China's carbon sink projects also entered CDM market. In November 2006, the Reforestation Project alongside Zhujiang River Watershed in Guangxi Zhuang Autonomous was approved by the World Bank's Executive, becoming the first CDM forest carbon sink project in the world.[145)]

In 2007, the establishment of China Green Carbon Foundation was endorsed by the State Council was endorsed by the State Council and validated by the Ministry of Civil Affairs. The Foundation was initiated by China Natural Petroleum Corporation (CNPC) and, under the authority of the SFA, became the first public foundation targeted primarily at increasing the carbon sink to combat climate change. The mission of the Foundation is to continue the tree planting and forest management started by the government, to reduce deforestation, to raise public awareness, and to mobilize other emissions reductions and actions to increase the carbon sink, as well as to support and perfect China's forestry eco-compensation mechanism. The Foundation has received donation of 0.5 billion RMB up to 2015 and carried out carbon sink projects in more than 20 provinces.[146)]

f. ETS in China

The introduction of the carbon-trading concept in China came with the adoption of the CDM in 2004. Since then, there has been growing interest in carbon markets within the Chinese government, leading to a recent decision by the National Development and Reform Commission (NDRC) to start carbon trading pilots in seven provinces and cities.

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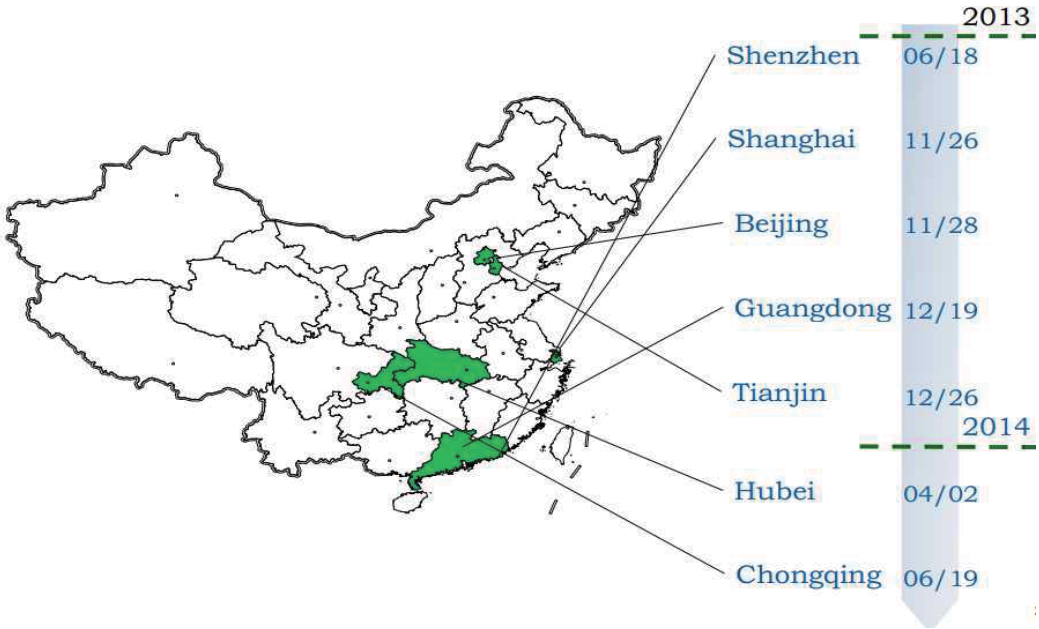
145) Li Nuyun, "The Capacity of Forest Carbon Sequestration to Address Global Climate Change", in Wang Weiguang & Zheng Guoqiang (ed.), *China Climate Change Policies*, Oxon: Routledge, 2012.

146) http://www.thjj.org/about.html

The 12th FYP is the first official government document that explicitly identifies carbon trading markets as one of the major measures for achieving the energy and carbon intensity reduction targets.[147)]

The year 2011 witnessed the turning point of carbon trading in China. On October 29th, the NDRC issued a notice on carbon emissions trading pilots in which Beijing, Chongqing, Guangdong, Hubei, Shanghai, Shenzhen, and Tianjin were assigned as ETS pilots.[148)]

[Figure 4-3] Pilot ETS in China



Source: Duan Maosheng, "Roadmap of ETS Development in China", http://climatestrategies.org/wp-content/uploads/2015/10/Roadmap-of-ETS-Development-in-China-DUAN-Maosheng.pdf

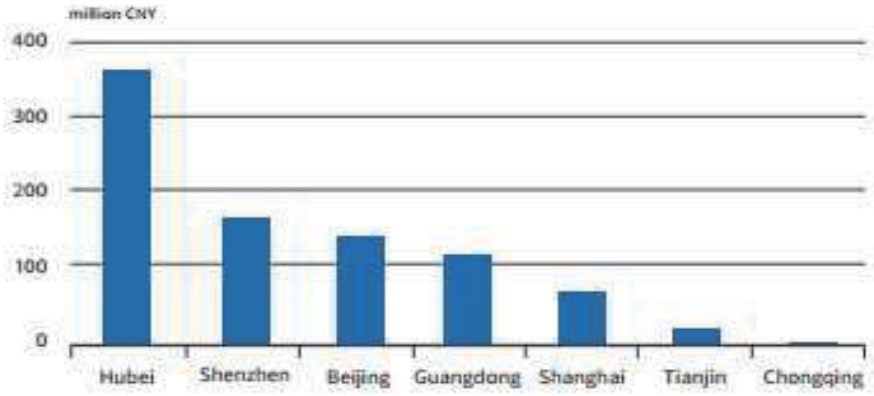
147) Guoyi Han, Marie Olsson, Karl Hallding, & David Lunsford, "China's Carbon Emission Trading: An Overview of Current Development", p. 12, https://www.sei-international.org/mediamanager/documents/Publications/china-cluster/SEI-FORES-2012-China-Carbon-Emissions.pdf

148) http://qhs.ndrc.gov.cn/gzdt/201201/t20120113_456510.html

In June 2013, Shenzhen launched its ETS. In Nov. 2013, Shanghai and Beijing started ETS. In Dec. 2013, Guangdong and Tianjin's ETS were launched. In April 2014, Hubei launched ETS. Two month later, the last ETS was launched in Chongqing.

As of 31 December 2015, the accumulated secondary market trading value of the pilot schemes had reached CNY 1.41 billion, and the accumulated trading volume reached 49.79 MtCO2. The Hubei pilot still has the largest market share, with a trading value of CNY 540 million and a trading volume of 22.54 MtCO2.[149)]

[Figure 4-4] Accumulated trading value in secondary market of various ETS pilots in 2015



Source: ICAP: "Emission Trading Worldwide: Status Report 2016"

[Table 4-3] Summary of major developments in carbon trading in China

Year	Major development
2004	After initial hesitation, China endorses the implementation of CDM in China. The National Development and Reform Commission (NDRC)

149) Qian Guoqiang & Chen Zhibin, "Emissions Trading in China: Progress on the Path Towards a Unified National System", in International Carbon Action Partnership (ICAP), "Emission Trading Worldwide: Status Report 2016", p. 16, https://icapcarbonaction.com/en/?option=com_attach&task=download&id=339

Year	Major development
	issues a white paper with CDM guidelines.
2005	In October 2005, carbon trading under the CDM begins in China, administered at the national level by the NDRC. A CDM management centre to provide technical support is set up at the Energy Research Institute of NDRC. China starts to implement the 11th FYP, in which a 20 per cent energy intensity reduction is set as compulsory target. The policy measure, however, are predominantly administrative and political (i.e. command and control). On the other hand, SO2 emission trading is tested to reduce the total discharge of SO2- another major compulsory environmental target for the 11th FYP.
2007	The NDRC issues China's first National Climate Change Program, laying out policies and actions to cope with climate change. Carbon markets are not highlighted.
2008	Establishment of several environment and carbon exchanges, including the Tianjin Climate Exchange, China Beijing Environment Exchange, and Shanghai Environment and Energy Exchanges.
2009	In the lead-up to COP15, China commits to a 40- to 45 per cent carbon intensity reduction by 2020 compared to 2005 levels.
2010	August: The Chinese government, through the NDRC, initiates low-carbon development pilots in five provinces and eight cities. Carbon trading is encouraged as part of the overall development strategy. October: State Council, in the "Decision for Enhancing the Cultivation and Development of Novel Strategic Industries", mentions for the first time the establishment of carbon trading mechanism. In the same month, the Shenzhen Emission Exchange is established. October: China hosts, for the first time, a United Nations Framework Convention on Climate Change (UNFCCC) negotiation session in Tianjin. The Chinese government organizes several side events on carbon trading markets. November: The outline of the 12th FYP is made public, listing carbon markets as one of the key measures for reducing carbon and energy intensities and coping with climate change.
2011	April: Officials from the NDRC (Department of Climate Change) announce that pilot carbon trading markets will begin in selected cities

Year	Major development
	and provinces, with the hope that actual trading will start as early as 2013. November: The State Council issues the "Workplan for Controlling Greenhouse Gas Emission during the 12th FYP". The need to establish carbon trading schemes is highlighted. Immediately following the release of the Workplan, in mid-November, the NDRC officially approves carbon trading pilots in seven provinces and cities. The State Council issues its second White Paper on climate change policy and actions prior to COP17 in Durban.
2012/2013	Design phase of the piloting regions; the NDRC reviewed and approved emission limits and allocation, as well as detailed implementation plans from the carbon emission-trading pilot regions.
2013/2014	Pilot region carbon trading came into operation.
2017	National carbon emission trading system to be established in China.

Source: Guoyi Han (et al.) "China's Carbon Emission Trading: An Overview of Current Development", with some details updated by the author of this Chapter.

At the beginning, seven pilot ETS program operate independently under its own rules (local decree adopted by local people's congress or government rules adopted by local government) tailored to regional or local circumstances.

At the end of 2014, based on the experiences from pilot programs, the NDRC released *Interim Measures for the Management of Carbon Emission Trading* with the intention to unify the fundamental aspects of pilot ETS programs and design a national ETS. [150)]

Since then, with more and more policy documents released, a nation-wide regulatory framework has come into being.

150) http://qhs.ndrc.gov.cn/zcfg/201412/t20141212_652007.html

[Table 4-4] Carbon market policy documents at the national level since December 2014

Date	Name	NO.	Institution
12/12/2014	Interim Measures for the management of carbon emissions trading	DRC Order No.17	NDRC
5/5/2015	Opinions of the Central Committee of the Communist Party of China and State Council on accelerating the construction of ecological civilization		State Council
14/5/2015	Notice of the NDRC on the implementation of the relevant work arrangements for the construction of the national carbon emissions trading market	DR Climate (2015) No. 1024	NDRC
30/6/2015	Enhanced Actions on Climate Change: China's Intended Nationally Determined Contributions		State Council
10/8/2015	N NDRC climate implement hearing on the administrative licensing related matters of national carbon emission rights trading management regulations (Draft)		NDRC Climate Change Department
31/8/2015	White book of forestry policy and action on climate change in 2014	Banzaozi (2015) No. 134	SFA Administra tive office
21/9/2015	The CPC Central Committee and the State Council issued "the overall plan for the reform of the system of ecological civilization"		State Council
26/9/2015	Sino-US Joint Presidential Statement on Climate Change		State Council
3/11/2015	Sino-French Joint Presidential Statement on Climate Change		State Council
3/11/2015	CPC Central Committee proposal on the formulation of national economic and social development of the thirteenth five year plan		CPC Central Committee
11/11/2015	Notice of the NDRC Office on issuing the third GHG accounting methods and	DR Office Climate	NDRC

Date	Name	NO.	Institution
	reporting guidelines for enterprises of 10 industries (tentative)	(2015) No. 1722	
16/11/2015	Notice on the release of the registration scheme for GHG inspectors	CCAA II (2015) No. 1722	CCAA
20/11/2015	Announcement on approving "the release of greenhouse gas emissions accounting and reporting rules for industrial enterprises" etc. 11 national standards	National Standard Announcement 2015 No. 36	AQSIQ, SAC
22/12/2015	Announcement on issuing green financial bonds in the inter-bank bond market	PBC Announcement (2015) No.39	People's Bank of China (central bank)
22/1/2016	The NDRC general office notice on earnestly implementing the key work of the national carbon emission trading market	DR Office Climate (2016) No. 57	NDRC

Source: Environomist China Carbon Market Research Report 2016, pp. 21-22

With its strong administrative powers, China completed the design of the registration and transaction systems in less than two years, which contrasts with the more than six years that developed economies spent for the same process. Based on the pilot experience, China will initiate a national carbon market in early 2017. The construction of the national carbon market is divided into three stages: 2015-2016 is the preparatory stage during which work on the carbon market infrastructure should be completed; 2017-2020 is the stage for improving operation, which will see the introduction of carbon emissions trading, and is when the trading system will be adjusted and improved in order to achieve stable market operation; and post-2020 is the stage for deepening the role of ETS when coverage will be further expanded, the rules of the system will be

improved, and international carbon market links should be explored and researched.[151)]

[Figure 4-5] Pathway towards the national carbon market

Source: Tang Renhu 2014, cited from "Environomist China Carbon Market 2016". P. 23

China's national ETS will be designed based on best practices and lessons learned from the seven ETS pilots and other ETS jurisdictions, but it will also be shaped to function in the context of China's socialist market economy and the state-run electricity market. China's national ETS is likely to face many challenges in areas that are critical for the good functioning of ETSs. Those issues include:

151) "Environomist China Carbon Market Research Report 2016", p. 23 http://environomist.com/upload/file/20160223210650_79.pdf

- Enforcement and compliance: Under the ETS pilots, compliance has been enforced at the local - provincial or municipal - level. This has allowed for the operators to negotiate their free allocation relatively easily and to be in constant contact with their regulators. Under a national ETS, there will be less flexibility for local DRCs to negotiate free allocation for operators and enforce compliance in a local context until China's State Council regulation on enforcing the ETS is implemented at both the national and provincial levels. The administrative burden of enforcing compliance will fall on the NDRC and this could pose challenges in the future where the total number of operators is much greater than currently in the ETS pilots. Such challenges largely involve expanding the institutional and staffing arrangements for the NDRC's Climate Change Department which is a smaller department than other more established units at the NDRC.
- Carbon intensity target: China's INDC is to reduce the carbon intensity of its economy by 60 to 65 percent by 2030. This differs from an absolute cap on emissions like the EU or California has imposed. The NDRC will need to strongly enforce the intensity targets in order for the ETS to function effectively, as an intensity target does not discourage companies from decreasing overall production. Allocations under intensity targets are adjusted ex-post, and this could lead to over-allocation or liquidity problems down the road for the national ETS.
- Allocation: Most of the seven ETS pilots have over-allocated emissions permits and done so for free in order to generously compensate operators for their initial participation. The NDRC will have to weigh carefully the merits and risks of over-allocation in the national ETS

in order to avoid a policy outcome similar to what has caused the current surplus of allowances in the EU ETS, for example. The NDRC should consider moving towards auctioning over time as other ETS jurisdictions have done.

- MRV: While China has set up a robust MRV program under the seven ETS pilots, the sheer size of China's national ETS and the number of potential companies and installations that will be included will prove to be a challenge in scaling-up MRV across the country. It could take some time for the MRV process in China to be reliable enough for the government to move away from free allocation to auctioning.
- Low liquidity and trading: Trading in the seven ETS pilots to date has been very low and this has caused liquidity to be abnormally low compared to other cap-and- trade programs. Low liquidity and low trading volumes have made it difficult for the seven ETS pilots to show that they are more than just compliance mechanisms. Liquidity has increased, however, with non-Chinese trading houses being permitted to trade in some of the ETS pilots (Shenzhen, Guangdong, Hubei, and Shanghai). The national ETS will need to be effective in design so as not to over-allocate allowances and to allow for trading to be conducted in both spot and exchange transactions. China will also need to introduce carbon trading options (futures, forwards, etc.) in order for liquidity to be robust, and for the uniformity of its carbon units to be compatible with any jurisdiction it could link with.[152)]

152) Jeff Swartz, "China's National Emissions Trading System", pp. 18-19 https://www.ieta.org/resources/China/Chinas_National_ETS_Implications_for_Carbon_Marke

To prepare for the upcoming nationwide emission trading system, Climate Change Division of NDRC has sponsored research projects relating to national registry, MRV of key industries and enterprises, and merger of pilots programs with nationwide ETS.[153] In 2015, NDRC hosted more than 10 workshops for capacity building, and dispatched delegation groups to UK, Germany, and Japan to get trained.[154] The first batch of textbook for national carbon market capacity building (six volumes) was released in July 2016.[155]

g. Adaptation in a Glimpse

(a) National Actions regarding to Adaptation

China began to assess climate change impacts since its 8th Five Year Science and Technology Plan, when China used atmospheric circulation model to simulate scenarios of doubled CO2. Later, China adopted IS92 series scenarios on gradual increase of greenhouse gas concentrations to conduct impact analysis and then in 2003, introduced PRECIS (Providing Regional Climates for Impacts Studies) to build high-resolution climate scenarios and applied it to agriculture, water resources, eco-systems, grassland animal husbandry, forestry and human health, and conducted adaptation demonstration in typical areas. The demonstration covers the impact assessment spanning over 21st century under the SRES (special report on emissions scenarios) scenarios, including macro assessment at the national and regional levels as well as detailed assessment in some

ts_and_Trade_ICTSD_March2016_Jeff_Swartz.pdf

153) http://www.sdpc.gov.cn/zwfwzx/zxgg/201608/t20160819_815262.html

154) National Center for Climate Change Strategy and International Cooperation, *China Carbon Market Report 2016* （《2016中国碳市场报告》）, Beijing: China Environment Press, 2016, p. 30.

155) http://www.tanpaifang.com/tanguwen/2016/0720/54784.html

areas. It covers the departments and sectors from a macro perspective as well as specific eco-systems and endangered species, with the methodologies changed from climate change in the average state to extreme weather events.

In the fields of agriculture, forests and other natural eco-systems and water resources, as well as other vulnerable costal zones and coastal areas, China has implemented policies and actions to enhance adaptive capacity, including strengthening farmland infrastructure construction, adjusting agricultural production layout, breeding stress-resistant varieties, tackling soil erosion, grassland degradation and desertification and protecting forests and other natural eco-systems. In terms of the rational development and optimal allocation of water resources, China has strengthened water conservancy construction, increased water conservation efforts, constructed flood control systems at major rivers and improved the farmland's drought resilience standards. In addition, China has enhanced marine and costal eco-systems monitoring, conducted response capacity-building against marine disasters, planted coastal shelter trees and improved resistance to marine disasters, planted coastal shelter been made to strengthen monitoring, early warming, forecasting of various extreme weather and climate hazards and their derivatives disasters. Qinghai-Tibet railway is a case in point that shows that China has adapted to climate warming, and the expansion rice cultivation in Northeast China shows that China has adapted to climate change by making use of the advantages of global warming. The projects on returning of farmland to forest, grassland, lakes and wetlands as well as the natural forest protection projects, implemented since 2000, are conducive to adapting to climate change.

Capacity building and raising public awareness are important guarantees that adaptation actions can be implemented. China attaches great importance to education, publicity and public participation in the field of climate change, and uses various means to spread the knowledge on climate change, promote the concepts of the scientific development, harmonious society and sustainable development, raise public awareness and adhere to the harmonious development between man and nature. At present, China has published a large number of related publications and audio-visual works, set up a China Meteorological TV Channel.[156)]

(b) A Comprehensive Adaptation Strategy

There were once the criticisms that China lacked adaptation planning and related policies at the national level.[157)] In November 2013, NDRC, Ministry of Finance, Ministry of Agriculture, China Meteorological Administration and other relevant departments jointly complete China's Strategy of Climate Change Adaptation.[158)] The Strategy lays out clear guidelines and principles for climate change adaptation and proposes some specific adaptation goals. It outlines a wide range of measures to be implemented by 2020 in order to protect water resources, minimize soil erosion and strengthen disaster prevention, such as early-warning detection and information-sharing mechanisms at the national and provincial levels, ocean disaster monitoring system and coastal restoration. To reduce climate impacts in agriculture, the Chinese government plans to develop

156) Department of Social Development of Ministry of Science and Technology, *Studies on National Strategy of Climate Change Adaptation*, Beijing: Science Press, 2012, pp. 15-17.

157) Ibid, p. 17.

158) "China's Strategy of Climate Change Adaptation" (国家适应气候变化战略), http://www.gov.cn/gzdt/att/att/site1/20131209/001e3741a2cc140f6a8701.pdf

new farming practices, including controlling plant-eating pests and improving crop adaptability. The plan also includes weather-based financial instruments such as catastrophe bonds and weather index-based insurance.[159)]

There are still some challenges in implementing the Strategy:

- Figuring out sectional and local adaptation plan. Since China's National Plan on Climate Change (2014-2020) was issued, Meteorological Administration, Ministry of Science and Technology, and State Oceanic Administration have released their climate change plans, but some important sectors (such as energy, water resources, transportation, and health care etc.) fail to issue their concrete climate change plans. Only several provinces have made their climate change plans.
- Specifying the objectives and goals in the Strategy. Main goals in the Strategy are not specified with quantitative indexes, which leave flexible room for future adjustment. Generally, the Strategy is more instructive than binding.
- Innovating top-level design. Since 2007, China established its climate change decision mechanism within which NDRC takes the leading position. How other ministries and agencies coordinate with NDRC need to be clarified. Furthermore, some important ministries in the field of disaster management, such as Ministry of Civil Affairs, Ministry of Health, and National Security Council, are not on board.
- Promoting scientific research. Due to the complexity of climate change and its impacts, the current level of scientific understanding is still insufficient to meet the needs of making adaptation plans. The data integration and resource sharing platforms are less than desirable.[160)]

159) http://www.lse.ac.uk/GranthamInstitute/law/the-national-strategy-for-climate-change-adaptation/
160) Zheng Yan, "Understanding China's Strategy of Climate Change Adaptation", (《国

h. Comments

(a) Governance by policies

Generally speaking, a policy is a document that outlines what a government is going to do and what it can achieve for the society as a whole. It also outlines the methods and principles that the government, for that matter, will use to achieve its directive. On the other hand, a law is a system of rules that set out standards, procedures and principles that must be followed. In the field of climate, due to the complexity of mitigation and adaptation, the general paradigm of encouragement instead of punishment, and the need for government-sponsored actions, it is a natural choice that Chinese government rely heavily on policies to address climate change.

For example, from 2008-2012, State Council and its ministries issued 117 documents regarding adaptation, of which 58 are plans, 28 are policies, and 31 are laws.[161] In the context of Chinese legal system, plans can be treated as policy in its broad sense. In sum, policies are the main part of the documents, and cover nearly every aspects of climate change governance.

(b) Embedding climate change into economic development

As the world largest developing country, China always put economic development as her first priority. At the beginning of China's National

家适应气候变化战略》解读), in Wang Weiguang & Zheng Guoguang (ed.), *Annual Report on Actions to Address Climate Change* (2014), (应对气候变化报告2014), Beijing: Social Science Academic Press, 2014, pp. 267-269.

161) Peng Sizhen (et. al), "China's Climate Change Adaptation Policies: Status Quo, Problems, and Proposals" (中国适应气候变化政策现状、问题和建议), *China Population, Resources and Environment*, vol. 25. No. 9, p. 2.

Climate Change Programme, it says that "Climate change is a major global issue of common concern to the international community. It is an issue involving both environment and development, but it is ultimately an issue of development."[162] This statement is the underlying presumption to understand climate change policies in China.

Mitigation actions are directly related to economic development issues since they require changes in the industrial society, and energy sector, responsible for emission, is strongly related to climate issues. Besides, nearly all the adaptation measures have economic implications. To illustrate, in 2011, China launched the second phase of the Natural Forest Protection Program (2011-2020), with a goal of increasing forest area by 78 million mu, forest stock by 1.1 billion cubic meters and forest carbon sink by 416 million tons by 2020. As a result of the program, water and soil erosion in program areas has reduced significantly, and biodiversity increased markedly. The program has created 648,500 jobs for the forest area, and employed nearly all the resettled workers.[163]

The main reason that NDRC takes leading position in China's climate regulatory regime is NDRC's function in terms of economic development. NDRC is responsible for developing policy and regulations that affect the national economy and guiding economic reform. NDRC is responsible for drafting the national energy development strategy; implementing planning, policies and standards, in the energy and other industrial sectors; developing new energy and promoting energy efficiency; and developing climate change policies. It is responsible for greenhouse gas accounting regu-

162) China's National Climate Change Programme, http://www.ccchina.gov.cn/WebSite/CCChina/UpFile/File188.pdf

163) State Forestry Administration of China, *Forestry in China*, http://english.forestry.gov.cn/index.php/information-services/latest-publication/458-forestry-in-china

lations and leads China's efforts to develop a national carbon market. The NDRC acts for the State Council in reviewing and approving infrastructure projects throughout China. The departments of the NDRC and the National Energy Administration, an independent agency within NDRC, engage in developing climate policy.[164)]

Economic consideration also explained the attitude change of China towards climate change. At the early stage of its climate policy, China worried about that a too stringent emission control target will restrict economic growth that China has experienced for decades. For example, in 2008, China stated very clear that "a large population and a relatively low level of economy determine that China's development task is a formidable one. The population of the mainland of China reached 1.321 billion at the end of 2007, accounting for 20 percent of the world's total. China has a comparatively low level of urbanization, with an urbanization rate of 44.9 percent in 2007, lower than the world's average. The large population also brings huge employment pressure. New urban labor force entrants of 10 million and above need jobs every year; as the urbanization process moves forward, tens of millions of rural laborers transfer to the urban areas every year. Statistics from the International Monetary Fund show that the per-capita GDP (gross domestic product) of China in 2007 was US$2,461, ranking 106th, a low-to-middle place, among 181 countries and regions. China is characterized by unbalanced regional economic development and is still nagged by a large income gap between urban and rural residents. The country is still troubled by poverty, with

164) Craig Hart (et. al), "Mapping China's Climate Policy Formation Process", p.7 http://www.chinacarbon.info/wp-content/uploads/2015/11/Mapping-Chinas-Climate-Policy-Formation-Process.pdf

an impoverished rural population of 14.79 million inadequately fed and clad. Those who just have enough to eat and wear and earn an unstable, low income number 30 million nationwide. Moreover, China has a relatively low level of science and technology and weak capacity of independent innovation. Developing the economy and improving people's lives are imperative tasks currently facing China."[165]

China, by emphasizing its unique national conditions and natural demands for development, justified its conservatism position on climate policies.

With more and more researches on the emission peaks, China has a relatively clear picture of the possible impacts of climate policies on the economic development, thus redirecting its climate policies.[166]

After more than 30 years of rapid development, China has become a middle-income country and, in the process, lifted more than 600 million people out of poverty. Despite this impressive progress, much still needs to be done: around 40 million rural poor still live below the official Chinese poverty line. However, China's traditional input-heavy growth model is no longer sustainable. Constrained by limited resources and environmental pressures, China risks falling into the "middle-income trap". The country is therefore shifting to a "new normal", focusing on the transformation of the industrial sector and reorientation towards domestic demand. This will be delivered by an innovative new path of development which shifts the drivers of growth from a focus on the quantity of inputs to their efficiency; reduces dependence on energy, resources, and environmental inputs; cultivates new growth points and competitive advantages; and allows the country to

165) "China's Policies and Actions on Climate Change 2008", http://www.china-un.org/eng/chinaandun/economicdevelopment/climatechange/t568960.htm

166) Li Junfeng (et. al), "China's Policies on Climate Change: Retrospect and Prospect", (中国应对气候变化政策回顾与展望), *Chinese Energy*, 2014(2), pp. 7-10.

adopt a low-carbon, efficiency-focused path of development.[167] With the change of economic strategy, China are turning to a more positive attitude towards climate change. In other words, when the advantages of traditional low-cost development model are weakening, by implementing active climate policies, China embeds climate change into economic transition, thus economic development, in a new manner.

(c) command-control and market-based instruments

A comparative study in 2010 shows that "US and EU are similar in using the tools of climate policy, and both try to dominant the policy based on market mechanism. …The most important tool in emission reduction for China during the 11th FYP is target responsibility system and accountability system. Firstly, the emission reduction targets are assigned for all the provinces. Secondly, 1000-business plan is carried out for key energy-consuming enterprises….”[168] In China, the Central government plays a key role in shaping policy and issuing directives that are then implemented by local governments. Local government officials respond to the directives to address climate change, reduce energy consumption and improve energy efficiency because these directives are translated into mandatory targets that determine their career paths, salaries and political prospects.[169]

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167) Zou Ji (et. al), "Pursuing an Innovative Development Pathway: Understanding China's INDC (Discussion Draft)", p. 3. https://www.thepmr.org/system/files/documents/Technical%20summary-Understanding%20China%20INDC-Nov%2030-print.pdf

168) Zhang Huanbo, *Analysis on Climate Policies of China, the United States and the European Union*, Beijing: Social Science Academic Press, 2010, p. 364.

169) Jolene Lin, "Climate governance in China: using the 'iron hand'", in Benjamin J. Richardson (ed.), *Local Climate Chang Law: Environmental Regulation in Cities and Other Localities*, Cheltenham: Edward Elgar, 2012, p. 323.

It is true that "China's regulatory approach relies heavily on top-down, command-and-control regulation, built around bureaucratic targets and controls for local officials and state-owned enterprise leaders. This top-down control is nonetheless coupled with extensive leeway for local experimentation and flexibility in implementation. More recently, leaders have pressed for greater utilization of market measures and, to a more modest extent, transparency and public supervision."[170)]

In recent years, many market-based instruments have been designed and adopted to curb high emission in some sectors such as power generation, iron and steel, and cement. Besides the ETS discussed above, there are also other market-based instruments becoming more and more popular.

Chinese government offers subsidies to manufacturers of more efficient products and wind turbines, as well as to consumers. These subsidies aim to encourage: vehicles with low-fuel consumption, hybrid and electric vehicles; energy-efficient appliances; solar photovoltaic power projects and the production of wind turbines.

Other market-based instruments, including preferential financing, tax incentives, and differential electricity pricing, are also introduced.[171)]

Command-and-control and market-based instruments both have pros and cons. They are supposed to supplement each other not contradict each other. It's hard to reach the conclusion that China will rely on market-based instruments more in the future. It's fair to say that a smart of

170) Alex L. Wang, "Climate Change Policy and Law in China", http://ssrn.stanford.edu/delivery.php?ID=067118073027019002009087101069031099001011031068070039103005006106103088095091093086033011100024126055116029007109005081000074037001060054001026114070001105069003112072010046064108073095004072084085093096029105068027005090005001003081029099084065111067&EXT=pdf

171) Sara Moarif & Namrata Patodia Rastogi, "Market-based Climate Mitigation Policies in Emerging Economies", pp. 11-14, http://www.c2es.org/docUploads/market-based-climate-mitigation-policies-emerging-economies.pdf

two are highly needed while the legitimacy and transparency of command-and-control and design of market-based instruments should be improved. Cost-benefit analysis and performance assessment will be crucial to the policy instruments choice.

(d) Top-down regime: strength and weakness

China's overwhelming emissions are responsible for serious and growing domestic ecological, economic, and health consequences. China's political leadership now recognizes that dealing with climate change, both in terms of mitigation and adaptation, constitutes a core challenge facing the country and the Communist Party, and that alleviating GHG emissions is of central relevance to additional national goals such as energy security and sustainable development.[172)]

China's climate change governance system is a traditional centralized top-down climate governance system, with the nation-state still the key actor in implementing most climate policy and activities. This centralized top-down governance system is very consistent with China's long history of central planning and vertically hierarchical governance. The centralized governance system has its advantages such as high efficiency and clearly defined and distinct political and administrative responsibilities. However the top-down approach also has disadvantages. A centralized top-down governance and policy approach may discourage the development of innovative policies at local levels and cannot gain the experimental benefits of local expertise and experience in enforcing programs and policies or in testing new policies.[173)]

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172) Peter H. Koehn, *China Confronts Climate Change: A Bottom-up Perspective*, London: Routledge, 2016.

173) Jimin Zhao, "Climate Change Mitigation in Beijing, China",

However, in recent years, by all kinds of low carbon pilot projects, local governments have been proactive in participating in national climate policies.[174] Meanwhile, NGOs and promoting are playing an increasing role in climate governance.

(e) Mitigation and adaptation: an imbalanced pair

China claims to place equal emphasis on both mitigation and adaptation. "Mitigation and adaptation are integral components of the strategy to cope with climate change. For developing countries, mitigation is a long and arduous challenge while adaptation to climate change is a more present and imminent task. China will strengthen its policy guidance for energy conservation and energy structure optimization to make efforts to control its greenhouse gas emissions. Meanwhile, China will take practical measures to enhance its capacity to adapt to climate change via key projects for ecosystem protection, disaster prevention and reduction and other key infrastructure construction."[175]

In practice, the targets of mitigation always come with qualitative indexes and concrete measures. By contrast, the targets of adaptation are always followed by descriptive requirements and lack of implementation mechanisms.[176]

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http://unhabitat.org/wp-content/uploads/2012/06/GRHS2011CaseStudyChapter05Beijing.pdf

174) Jun Li, "China's Transition to Low Carbon Society: Dirvers and Implementation Strategies", in Geert Van Calser, Wim Vandenberhe & Leonie Reins (ed.), *Research Handbook on Climate Change Mitigation Law*, Cheltenham: Edward Elgar Publishing Limited, 2015.

175) "China's National Climate Change Program", http://www.china.org.cn/english/environment/213624.htm#12

176) Peng Sizhen (et. al), "China's Climate Change Adaptation Policies: Status Quo, Problems, and Proposals" (中国适应气候变化政策现状、问题和建议), *China Population, Resources and Environment*, vol. 25. No. 9, p. 4.

It is also worthy to point out the potential conflicts of mitigation and adaptation. Some adaptation measures, such as installing air-conditioners in buildings, may consume more energy and cause more GHS emission.[177)]

1.3. Fragmental Legislation

At present, China hasn't promulgated laws specifically for climate change. But what shall not be ignored is that some laws of China have exerted actual effects responding to climate change.

a. Electric Power Law and Climate Change

The main purpose of Electric Power Law of PRC (amended 2015) is "to guarantee and promote the development of the electric power industry, to safeguard the lawful rights and interests of those who invest in, manage or consume electric power and to guarantee the safe operation of electric power." GenerallytheprovisionsofElectric Power Law have no direct connections with climate change, but Electric Power Law is the foundation for Renewable Energy Law, Law Promoting Clean Production, and Circular Economy Promotion Law, and some institutions provided in the Electric Power Law contained implications in terms of the addressing climate change.

- Electric power development plan. Power construction projects shall conform to the electric power development plan as well as the State policies regarding the power industry. No power facilities or technol-

177) Liao Jiankai, On Climate Change Legislation of China: From the Paths of Mitigation, Adaptation and Their Synthesis, (我国气候变化立法研究：以减缓、适应及其综合为路径), Beijing: China Procuratorate Press, 2012, p. 30.

ogy announced obsolete by formal decree of the State shall be used in power construction projects.[178]

- Electricity rates. The State institutes two systems for fixing electricity rates: one is to set the rates according to different kinds of consumers; the other is to set the rates according to the different period of time that electricity is used. The criterion for classifying the consumers and the method for dividing the period of time shall be determined by the State Council.[179]
- Efficient consumption of electricity power. The State applies the administrative principles of safe, economical and planned supply and use of electric power.[180]

b. Coal Law and Climate Change

China is the largest producer and consumer of coal in the world and is the largest user of coal-derived electricity, generating an estimated 70% of domestic electricity production from coal. Article 30 of Coal Law says that "the State shall encourage and support coal mining enterprises and other enterprises to produce both coal and electricity, coking coal, coal chemicals and building materials made of coal and engage in deep and fine processing of coal. The State shall encourage coal mining enterprises to develop coal washing and processing as well as comprehensive exploitation and utilization of coal bed methane, gangue, coal slime, stone coal and peat." Apparently this provision aims at raising the overall efficiency of coal-exploring and thus contribute to addressing climate change.

178) Art. 14 of Electric Power Law of PRC.
179) Art. 41 of Electric Power Law of PRC.
180) Art. 25 of Electric Power Law of PRC.

c. Energy Conservation Law and Climate Change

- Energy conservation standard system. The standardization administrative department and other departments concerned under the State Council shall organize the formulation and real-time revision of relevant national standards and industrial standards for energy conservation, so as to establish and improve the energy conservation standard system.

The standardization administrative department under the State Council shall, jointly with the energy conservation administrative department and other departments concerned under the State Council, formulate compulsory standards for energy consuming products' and equipment's energy efficiency standards as well as the energy consumption quota per unit of product for the products that consume much energy during the production process.

The State encourages enterprises to set down energy conservation standards stricter than national standards and industrial standards.[181)]

- Elimination system of outmoded highly energy-consuming products, equipment and productive techniques. The State implements an elimination system of outmoded highly energy-consuming products, equipment and productive techniques. The catalogue and implementing measures for elimination of highly energy-consuming products, equipment and productive techniques shall be formulated and promulgated by the energy conservation administrative department under the State Council together with other departments concerned under the State Council.

181) Art. 13 of Energy Conservation Law of PRC.

Manufacturers of highly energy consuming products during the production process shall implement the quota for energy consumption per unit product. If a manufacturer consumes energy in excess of the quota for energy consumption per unit product, the energy conservation administrative department shall order it to make rectification within a time limit according to the limit of power as prescribed by the State Council.

With respect to highly energy-consuming special equipment, the energy conservation examination and supervision shall be carried out according to the provisions prescribed by the State Council.[182)]

- The energy conservation target responsibility system and the energy conservation examination system. The State implements the energy conservation target responsibility system and the energy conservation examination system, and takes the completion of energy conservation targets as an item to assess and evaluate the performance of the local people's government and the persons in charge thereof. The people's government of each province, autonomous region or municipality directly under the Central Government shall report its fulfillment of energy conservation target responsibility to the State Council every year.[183)]

d. Renewable Energy Law and Climate Change

- Full amount purchasing.

The energy department of the State Council shall, together with the State Electricity Regulatory Commission and the public finance department of the State Council, and according to the national plan for the de-

182) Art. 16 of Energy Conservation Law of PRC.
183) Art. 6 of Energy Conservation Law of PRC.

velopment and utilization of renewable energy resources, determine the target proportion, which shall be realized in the planning period, between the electricity generated by using regenerable energy resources.[184)]

Power grid enterprises shall strengthen the power grid construction, expand the scope of areas where electricity generated by using renewable energy resources is provided, develop and apply intelligent power grid and energy storage technologies, improve the operation and management of power grids, improve the ability for absorbing electricity generated by using renewable energy resources, and provide services for bringing electricity generated by using renewable energy resources on grid.[185)]

- Feed-in tariff. The on-grid electricity prices for projects of electricity generation by using renewable energy shall be determined by the administrative department of price of the State Council in light of the conditions of different areas and the characteristics of electricity generation by using renewable energies of different types, and according to the principle of helping promote the development and utilization of regenerable energies and the principles of economy and rationality, and be adjusted in a timely manner by the same department in light of the development of the renewable energy resource utilization technology. On-grid electricity prices shall be published.

If the cost arising from the purchase by a power grid enterprise of electricity generated by using regenerable energy resources at an on-grid price is higher than the cost as calculated according to the average on-grid electricity price for electricity generated by using conventional en-

184) Art. 8 of Renewable Energy Law of PRC.
185) Art. 14 of Renewable Energy Law of PRC.

ergy resources, the difference shall be covered by collecting additional charges to the price of electricity generated by using renewable energy resources in the sale of electricity around the whole nation.[186]

Access cost and other relevant expenses reasonably incurred to an electricity grid enterprise due to its purchase of electricity generated by using renewable energy may be reckoned in its electricity transmission cost and be recoverable from the selling price of electricity.[187]

- Renewable energy fund. A renewable energy development fund shall be set up by the national finance, and the sources of funds shall include the annual special-purpose funds arranged by the national finance, the additional income to the price of electricity generated by using renewable energy resources as collected according to law, etc.

The renewable energy development fund shall be used compensate the gap between the purchasing and selling of renewable energy-derived electricity and to support:

1. the scientific and technological research in, the formulation of the standards for and the demonstration projects for the development and utilization of renewable energy resources;
2. the renewable energy utilization projects in rural and pastoral areas;
3. the construction of the independent electricity generation systems using renewable energy resources in remote areas and islands;
4. the prospecting and assessment of renewable energy resources and the construction of relevant information systems; and

186) Art. 29 of Renewable Energy Law of PRC.
187) Art. 19-21 of Renewable Energy Law of PRC

5. the promotion of the localized production of equipment for the development and utilization of renewable energy resources.[188)]

e. Clean Production Promotion Law and Climate Change

Clean production means "reducing pollution at the source, raising the efficiency of utilization of resources, and reducing or avoiding the generation and discharge of pollutants during production, service, and use of products by continuously taking measures such as improving designs, using clean energy and raw materials, adopting advanced processes, technologies, and equipment, improving management, and conducting comprehensive utilization to mitigate or eliminate harm to human health and environment."[189)] Under the Clean Production Promotion Law of PRC, the state applies an elimination system to outdated production technologies, processes, equipment, and products that waste resources or cause serious environmental pollution; approves the creation of energy conservation, water conservation, recycled waste, and other environmental and resource protection signs for products and formulate corresponding standards according to the relevant provisions of the state; gives priority to in its procurement products facilitating the protection of environment and resources, such as energy conservation, water conservation, and recycled waste products; and provides financial support to cleaner production research, demonstration, and training and for implementation of key national technical improvement projects.

188) Art. 24 of Renewable Energy Law of PRC.
189) Art. 2 of Clean Production Promotion Law of PRC.

f. Circular Economy Promotion Law and Climate Change

Circular economy is a generic term for the reducing, reusing and recycling activities conducted in the process of production, circulation and consumption. The term “reducing” as mentioned in these Measures refers to reducing the consumption of resources and the production of wastes in the process of production, circulation and consumption. The term “recycling” as mentioned in these Measures refers to using wastes as raw materials directly or after regeneration.[190]

A local people's government at or above the county level shall plan and adjust the industrial structure of this administrative region according to the indicators on the discharge of major pollutants, the land used for construction and the total volume of water consumption as assigned by the people's government at the next higher level so as to promote the development of circular economy.

Construction projects shall be built, rebuilt or enlarged in accordance with the requirements of the indicators on the discharge of major pollutants, the land used for construction and the total volume of water consumption of this administrative region.[191]

The state encourages enterprises to use highly efficient and oil-saving products. Enterprises in such industries as electric power, oil processing, chemical industry, steel, non-ferrous metal and building materials must replace fuel oil with clean energy, e.g., clean coal, petroleum coke, natural gas, etc. within the scope and time limit prescribed by the state, and must stop using fuel generator sets and oil boilers that fail to satisfy the

190) Art. 2 of Circular Economy Promotion Law of PRC.
191) Art. 13 of Circular Economy Promotion Law of PRC.

relevant state provisions. Enterprises manufacturing combustion engines and motor vehicles shall, in accordance with the fuel economy standards of the state for combustion engines and motor vehicles, use oil-saving technologies to reduce the consumption of petroleum products.[192]

g. Atmospheric Pollution Prevention and Control Law and Climate Change

China's quick and large scale industrial revolution has resulted in unprecedented air pollution.[193] Especially in recent years, smog in big cities has become a very hot public opinion. In fact, the smog problem has now become so bad, and so public, that the central government sees it as a threat to social stability and, ultimately, the government's legitimacy.[194] Technically greenhouse gases are not air pollutants, hence some scholars argues that climate change should not be the concern Air Pollution Prevention and Control Law in China, since greenhouse gases and air pollutants need different control mechanisms.[195] Meanwhile, since coal is also the major contributor to China's carbon emissions - meaning that China's attempts to tackle its crippling air pollution problem could also have the added benefit of curbing climate change.[196] It is stated in ar-

192) Art. 21 of Circular Economy Promotion Law of PRC.

193) Isabel Hilton, "Addressing the Gap between Rhetoric and Reality in China's Air Pollution Control: Why Civil Society is Essential", http://www.nbr.org/downloads/pdfs/cha/ChinaAirPollutionRoundtable_04282014.pdf

194) Lisa William, "China's Climate Change Policies: Actors and Drivers", p. 16 http://www.lowyinstitute.org/files/chinas-climate-change-policies.pdf

195) Li Yanfang & Zhang Zhongli, "Legal Status of CO2 and Legislative Choices on Controlling Approaches" (二氧化碳的法律定位及其排放规制立法路径选择), in Social Science Study, 2015 (2), pp. 30-34.

196) Peter Lehner, "China's New Tools to Battle Air Pollution Can also Help Fight Climate Change", http://www.huffingtonpost.com/peter-lehner/chinas-new-tools-to-battl_b_6074556.html

ticle 2 of newly amended Air Pollution Prevention and Control Law (2015) that "atmospheric pollution prevention and control shall strengthen the prevention and control of atmospheric pollution from coal, industry, motor-driven vehicles and vessels, dust, and agriculture, promote joint prevention and control of regional atmospheric pollution, and conduct co-operative control of atmospheric pollutants and greenhouse gas such as particles, sulfur dioxide, nitrogen oxide, volatile organic compounds, and ammonia, etc."[197] This is so-called "co-control and climate-friendly air pollution prevention strategies".[198]

A strict target responsibility system was adopted: "The environmental protection administrative department under the State Council shall, jointly with other relevant departments under the State Council, evaluate the provinces, autonomous regions and municipalities directly under the Central Government regarding the achievement of goals of improving the quality of atmospheric environment and the completion of key atmospheric pollution prevention and control tasks. The people's governments of each province, autonomous region and municipality directly under the Central Government shall evaluate the achievement of goals of improving the quality of atmospheric environment and the completion of key atmospheric pollution prevention and control task within their respective administrative regions. The evaluation results shall be made available to the general public."[199]

To implement the target responsibility system, Chapter II of Air Pollution Prevention and Control Law provides in detail for atmospheric

197) Art. 2 of Air Pollution Prevention and Control Law of PRC.
198) Barbara Finamore, "Cleaning China's Smoggy Skies: China Released Draft Air Pollution Law Amendments for Public Comment", https://www.nrdc.org/experts/barbara-finamore/cleaning-chinas-smoggy-skies-china-released-draft-air-pollution-law
199) Art. 4 of Air Pollution Prevention and Control Law of PRC.

pollution prevention and control standards and plans for reaching standards within the prescribed time.

The state exercises total volume control over the discharge of key atmospheric pollutants. The total volume control targets for the discharge of key atmospheric pollutants shall be reported by the environmental protection administrative department under the State Council, after soliciting the opinions of relevant departments under the State Council and the people's governments of all provinces, autonomous regions, and municipalities directly under the Central Government, together with the general administrative department of economics under the State Council to the State Council for approval before being assigned for implementation.[200)]

The state will apply an elimination system to the techniques, equipment, and products that cause serious pollution to the atmospheric environment.[201)]

Relevant departments under the State Council and local people's governments at all levels shall take measures to revamp the energy structure, promote the production and use of clean energy, optimize the use of coal, promote the clean and efficient utilization of coal, gradually reduce the proportion of coal in primary energy consumption, and reduce the discharge of atmospheric pollutants in the production, use, and transformation of coal.[202)]

The state advocates, through fiscal, tax, governmental procurement and other measures, low-carbon and environment-friendly transportation, reasonably control the quantity of oil-fueled motor vehicles according to urban planning, develop public transportation in urban areas, and increase the proportion of public transportation.

200) Art. 21 of Air Pollution Prevention and Control Law of PRC.
201) Art 27 of Air Pollution Prevention and Control Law of PRC.
202) Art. 32 of Atmosphere Pollution Prevention and Control Law of PRC.

The state will establish a joint atmospheric pollution prevention and control mechanism for the key areas and make overall arrangements for atmospheric pollution prevention and control in the key areas. The people's governments of the provinces, autonomous regions, and municipalities directly under the Central Government in the key areas shall determine the leading local people's governments, convene joint meetings on a regular basis, and conduct joint atmospheric pollution prevention and control and fulfill the objectives of atmospheric pollution prevention and control according to the requirements of unified planning, unified standards, unified monitoring, and unified prevention and control measures.[203)]

h. Comments

(a) An Indirect Legal System

As we can see from the above description, many provisions in environmental law, energy law, and natural resources law can contribute to addressing climate change, but do not target climate change directly. To be accurate, addressing climate change is just a by-product, although a frequent one, of these legislations. Some areas, such as greenhouse gas in LULUCF, are ignored.[204)] That might justify the arguments of some scholars that China lacks of a legal system on climate change in a real sense and call for strengthening and speeding the legislative process in the relating areas.[205)]

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203) Art. 86 of Atmosphere Pollution Prevention and Control Law of PRC.

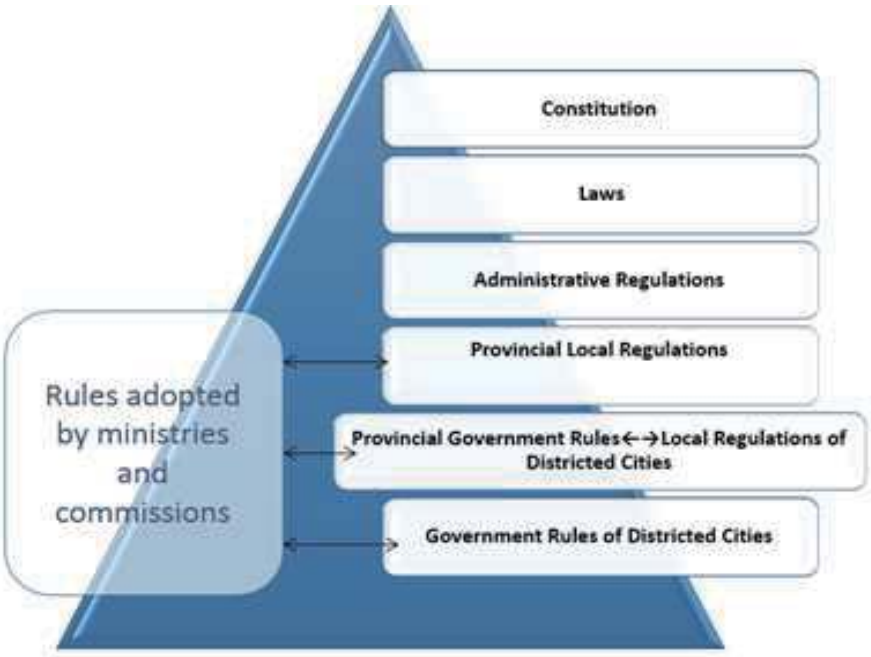
204) Li Yanfang, Zhang Zhongli and Li Cheng, " Some Reflections on Climate Change Legislation in China"(我国应对气候变化立法的若干思考), in Journal of Shanghai University (Social Science), 2016 (1), p. 3.

205) Hu Bo & Jiang Xiaojie "Status Quo and Suggestions on Climate Change Law in China" (我国应对气候变化立法现状与完善建议), in Ludong University Journal (Philosophy and Social Sciences Edition), 2012 (4), pp. 84-85.

(b) Rule of Administrative Regulation and Ministerial Rule

Under Constitution of PRC and Legislation Law of PRC, In the context of Chinese legal system, formal sources of law in PRC include laws (adopted by National People's Congress and Standing Committee of National People's Congress), administrative regulations (adopted by the State Council), local regulations (adopted by local people's congress of provinces and districted cities), autonomous regulations and separate regulations (adopted by people's congress of autonomous region, autonomous prefecture, or autonomous county), ministerial rules (adopted by ministries and commissions of the State Council), local rules (adopted by local governments of provinces and districted cities).

[Figure 4-6] Hierarchy of Sources of Law in China



Source: by author

As discussed before, an indirect and rudimentary legal system exists in the area of climate change. Most rules contained in these laws are vague. On the other hand, rules adopted by ministries and commissions, such as rules adopted by NDRC (so-called "normative documents in China), mixed with policies, offer main regulatory framework addressing climate change. Thus we may say to a very large extent, that climate change in China is "rule of rules adopted by ministries and commissions" rather than "rule of laws".

Rules adopted by ministries and commissions are very similar to statutory instruments in UK.[206] They are more efficient, easier to be amended, and more professional considering the technical requirement of addressing climate change. On the other hand, they lack legitimacy due to their relatively low positions in the hierarchy of sources of law in PRC.

(c) Prospects of a Comprehensive Climate Change Law

In August, 2009, Standing Committee of the National People's Congress adopted "Resolution of the Standing Committee of the National People's Congress on Making Active Responses to Climate Change". Although this is a declaratory legislation without clear rules setting rights and obligations, it provides for the main principles and guidelines for future law-and-policy-making. It states in section IV that:

"We should take the legislation on strengthening the responses to climate change as an important task for forming and improving the socialist legal system with Chinese characteristics and incorporate it into the agenda of legislation. We should revise and improve the laws on the re-

206) The ministries and commissions of the State Council have intrinsic legislative power under Legislation Law of PRC.

sponses to climate change and on the protection of environment in good time, timely promulgate supporting regulations and formulate new laws and regulations in light of the actualities so as to provide a stronger legal guarantee for responding to climate change. We should, under the overall requirement for making active responses to climate change, strictly implement the Energy Conservation Law, the Law on Renewable Energy, the Circular Economy Promotion Law, Clean Production Promotion Law, Forest Law, Grassland Law and other relevant laws and regulations so as to push forward the work on responding to climate change. We should take the relevant work on responding to climate change as one of the focuses of supervision by the people's congresses and strengthen the supervision and inspection of the implementation of relevant laws so as to ensure the effective implementation of relevant laws and regulations."

"It was announced in 2010 at the GLOBE International legislators' forum in Tianjin that China would begin work on legislation. A first formal draft of the law is expected to be produced in early 2014, after which a comprehensive formal consultation will begin with government ministries, industry and other stakeholders, with passage likely by 2015".[207] China's official report of 2013 also mentioned that "The National Development and Reform Commission, the Environment Protection and Resources Conservation Committee of the National People's Congress (NPC), the Law Committee of the NPC, the Legislative Affairs Office of the State Council, together with relevant departments, have set up a leading group for drafting laws on addressing climate change in a bid to

207) Michal Nachmany (et. al), "The GLOBE Climate Legislation Study: A Review of Climate Change Legislation in 66 Countries", p. 104, http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2014/03/Globe2014.pdf

quicken the law drafting process and have established a basic legislative framework".[208]

The Climate Change Division of NDRC, with the support of National Center for Climate Change Strategy and International Cooperation (NCSC) and China University of Political Science and Law (CUPL), are working on the first draft of Climate Change Law, and held conferences in May 2015 and September 2015 to solicit opinions from local Development and Reform Commissions, scholars, lawyers and enterprises.[209] Some resources men said the draft was a simple and sketchy one. Meanwhile, scholars from Chinese Academy of Social Science (CASS), together with top climate change scholars from universities, in a collaborative effort with the Swiss Agency for Development and Cooperation, proposed their academic draft of Climate Change Law.[210] The academic version, taking an idealistic approach, contained 115 articles.[211]

It is very clear that China need a comprehensive Climate Change Law to integrate its fragmental laws, regulations, and policies; but it is hard to predict how soon this will happen. The prospect of a unified Climate Change Law depends on political wills, maturity of regulatory framework, the codification of existing laws and policies, and other related elements.

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208) "China's Policies and Actions for Addressing Climate Change (2013)", pp. 3-9, http://qhs.ndrc.gov.cn/zcfg/201311/W020131107533601343247.pdf

209) http://www.sdpc.gov.cn/gzdt/201505/t20150525_693287.html, http://www.ndrc.gov.cn/gzdt/201509/t20150915_750917.html; http://fgs.ndrc.gov.cn/gzdtn/201509/t20150923_751877.html

210) "Notice on the Proposed Draft of Climate Change Law" (关于《气候变化应对法》（建议稿）的说明), http://www.china.com.cn/news/txt/2012-03/18/content_24923468_2.htm

211) "The Act of the People's Republic of China Addressing Climate Change (the Draft Proposal)", China Legal Science, 2014(1), pp. 122-159.

2. INDC key issues

2.1. Introduction and Context of INDC

a. Paradigm Shift of International Climate Governance

UNFCCC and Kyoto Protocol are cornerstones of international climate governance. For a very long period, they have been taken a so-called "top-down burden sharing", which was not as effective as had been expected. Parties agreed at the 19th session of the Conference of the Parties (COP 19) in Warsaw to "initiate or intensify domestic preparations for their intended nationally determined contributions" so that they can be submitted well in advance of the Meeting of Parties to the UNFCCC in Paris; by March 2015 for Parties ready to do so (UNFCCC 2013).[212)]

The most relevant developments concerning the INDCs took place at the 20th Conference of theParties (COP20) of the UNFCCC hel in Lima in December 2014. There were discussions on the nature, scope and framework of the INDCs. Eventually the COP adopted a decision (1/CP20) which containing a set of paragraphs relating to the INDCs.[213)]

INDCs are supposed to be the foundation of Paris Conference, and realize significant domestic and international benefits such as getting on

212) Niklas Höhne, Christian Ellermann & Hanna Fekete, "Process Guidance for Intended Nationally Determined Contributions (INDCs)", p. 1, https://mitigationpartnership.net/sites/default/files/ipmm_2014_process_guidance_for_intended_nationally_determined_contributions_indcs.pdf

213) South Centre, "Policy Brief on Intended Nationally Determined Contributions (INDCs)", pp. 1-2, https://www.southcentre.int/wp-content/uploads/2015/05/CPB17_Intended-Nationally-Determined-Contributions_EN.pdf

track toward the 2 degrees Celsius goal, demonstration of a political commitment, realization of non-climate benefits associated with mitigating climate change, strengthening institutional and technical capacity, policy integration, informing key stakeholders, and communicating resource needs.[214]

To date, 162 INDCs submitted by 189 countries. The INDCs have the capability of limiting the forecast temperature rise around 2.7 degrees Celsius by 2100.[215]

The core of the international climate governance regime is principle of common but differentiated responsibilities and principle of equity, which combining the historical responsibilities and financial and technical advantages of developed countries with the needs of developing countries, thus fostering the collective actions. Under this asymmetric "double-track" system, developed countries should take action first and provide finance and technical assistances to developing countries. The commitments and actions accordingly should have different binding force.

In bottom-up paradigm characterized by INDCs, "double-track" approach has transformed into same-track or uni-track, in which both developed countries and developing countries propose their commitments and actions independently with no particular orders. This is a profound shift that erodes the principle of common but differentiated responsibilities to a very large extent.[216]

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214) Kelly Levin et al, "Designing and Preparing Intended Nationally Determined Contributions (INDCs)", pp. 14-15, http://www.wri.org/sites/default/files/designing-preparing-indcs-report.pdf

215) https://spappssecext.worldbank.org/sites/indc/Pages/FAQ.aspx

216) Gao Xiang & Deng Liangchun, "Impact of INDCs on International Climate Governance Regime" (国家自主贡献对全球治理机制的影响), in Wang Weiguang & Zheng Guoguang (ed.), Annual Report on Actions to Address Climate Change (2015) (应对气候变化报告（2015）), Beijing: Social Sciences Academic Press, 2015, pp. 36-37.

b. Basic Considerations of China’s INDC

Even though China has become the largest carbon emitter and the second-largest economy in the world, its main development indicators and the ongoing bifurcation of rural and urban economic structures demonstrate the fact that China is still a developing country. This implies significant differences between China and developed countries in terms of their respective stages of development, development needs, historical responsibilities, and over capacity. China’s foremost strategic priorities continues to focus on poverty alleviation, increasing incomes, bolstering social security, expanding coverage of public services (including infrastructure), and generally raising the standard of living. Meanwhile, China's traditional input-heavy growth model is no longer sustainable. Constrained by limited resources and environmental pressures, China risks falling into the “middle-income trap.” China must therefore seek an innovative new path of development and upgrade its growth model to a “new normal”: shifting the drivers of growth from the quantity of input to the efficiency of input; reducing dependence on energy, resources, and environmental inputs; cultivating new growth points and competitive advantages; and adopting a low-carbon, efficiency-focused path of development.

The system of indicators underlying China’s INDCs reflects the need for transformation and innovation in China's model of development; these indicators include an intended time target for peak emissions and quantitative indicators designed to evaluate carbon efficiency (including targets for carbon intensity, share of non-fossil fuels, and carbon sinks). China is committed to changing its path of development; exploring innovative, sustainable and low-carbon models that differ from the traditional develop-

ment pathways of both the US and the EU; and creating the technological, financial, and other conditions necessary to achieve this transformation.[217]

2.2. Main Content of China's INDC

On 30 June 2015, the Chinese government submitted its Intended Nationally Determined Contribution (INDC), detailing its commitment to climate change mitigation and adaptation for the post-2020 period.

a. Commitments

By 2020, China will lower carbon dioxide emissions per unit of GDP by 40% to 45% from the 2005 level, increase the share of non-fossil fuels in primary energy consumption to about 15% and increase the forested area by 40 million hectares and the forest stock volume by 1.3 billion cubic meters compared to the 2005 levels.

Based on its national circumstances, development stage, sustainable development strategy and international responsibility, China has nationally determined its actions by 2030 as follows:

- To achieve the peaking of carbon dioxide emissions around 2030 and making best efforts to peak early;
- To lower carbon dioxide emissions per unit of GDP by 60% to 65% from the 2005 level;
- To increase the share of non-fossil fuels in primary energy consumption to around 20%; and

217) Fu Sha, Zou Ji & Liu Linwei, "An Analysis of China's INDC", pp. 3-4, http://www.iccgov.org/wp-content/uploads/2015/07/An-analysis-of-Chinas-INDC_July-23.pdf

- To increase the forest stock volume by around 4.5 billion cubic meters on the 2005 level.[218)]

b. Policies and Measures to Implement Enhanced Actions on Climate Change

To achieve the nationally determined action objectives on climate change by 2030, China plan to make a sustained effort in further implementing related policies and measures, including:

- Implementing proactive National Strategies on Climate Change;
- Improving regional strategies on climate change;
- Building low-carbon energy system;
- Building energy efficient and low-carbon industrial system;
- Controlling emissions from building and transportation sectors;
- Increasing carbon sinks;
- Promoting the low-carbon way of life;
- Enhancing overall climate resilience;
- Innovating low-carbon development growth pattern;
- Enhancing support in terms science and technology;
- Increasing financial and polity support;
- Promoting carbon emission trading market;
- Improving statistical and accounting system for GHG emissions;
- Broad participation of stakeholders; and
- Promoting international cooperation on climate change.[219)]

218) "Enhanced Actions on Climate Change: China's Intended Nationally Determined Contributions", http://www.china.org.cn/chinese/2015-07/01/content_35953590.htm
219) Ibid.

2.3. Praises and Criticisms

a. Praises

Some comments argues that "China's newly released Intended Nationally Determined Contribution (INDC) represents an important contribution by this major economy and carbon emitter to the UN process to come to an agreement on global climate targets. China's INDC is in line with the country's prior policy announcements and commitments for carbon reduction, which are significant."[220]

A synthetical research based on analysis by some of the world's leading energy institutes shows that "China's INDC represents a significant undertaking beyond business-as-usual and will help slow the rise in global greenhouse gas emissions. According to the U. S. Energy Information Administration (EIA), International Energy Agency (IEA), Massachusetts Institute of Technology (MIT) and Tsinghua University, peaking carbon dioxide emissions around 2030 would reduce China's dioxide emissions by at least 1.7 Gt or 14 percent from the most optimistic business-as-usual (BAU) scenario."[221]

China's holistic approach and comprehensive policies and measures for achieving the commitments are well noticed. "… (T)heir presence in the INDC gives them a higher profile and demonstrates China's comprehensive plan to deliver on commitments….(T)he INDC indicates that China is serious about moving towards a comprehensive framework for addressing GHG emissions, continuing to build on significant gains that

220) "Dialogue: Is China's INDC any Good?" http://carbon-pulse.com/5759/
221) "China's Contribution to the Paris Climate Agreement" (http://www.c2es.org/docUploads/chinas-contributions-paris-climate-agreement.pdf)

have already been made. This can increase the international community's confidence in China's ability to meet or even exceed its targets."[222]

b. Concerns and Criticisms

(a) Limited and Vague Coverage

China has not yet implemented sufficient policies addressing non-CO2 GHG emissions (methane, nitrous oxide, HFCs etc.). This indicates a need for further action in this area, and it is encouraging that the INDC acknowledges that addressing these gases is important.[223]

It is not clear whether the CO2 peaking target includes emissions from land-use change and forestry, shipping fuels and non-energy related CO2 emissions, such as those from cement production.[224]

(b) Statistical System

The current statistical system has been improved significantly, but still has important weaknesses. The Chinese Statistical Bureau recently advised that it had revised upwards China's energy consumption by about 15% for the past years, amounting to about an extra 1 Gt of CO2 emissions. This should not affect the achievement of China's 2020 and 2030 targets, but it will impact the level of the Chinese emissions peak. It does highlight the importance of continuous improvement in the capacity, transparency and precision of the Chinese statistical system.[225]

222) Taryn Fransen et al, "A Closer Look at China's New Climate Plan (INDC)", http://www.wri.org/blog/2015/07/closer-look-chinas-new-climate-plan-indc

223) http://www.climateactiontracker.org/countries/china.html

224) Taryn Fransen (et al.), "A Closer Look at China's New Climate Plan (INDC)", http://www.wri.org/blog/2015/07/closer-look-chinas-new-climate-plan-indc

225) Thomas Spencer & Xin Wang, "China's INDC: a First Analysis", http://blog.iddri.org/en/2015/06/30/chinas-indc-a-first-analysis-2/

(c) Conservative Targets?

Since more and more researches illustrate that China's CO2 peak will be earlier than many predicts[226], some hold the opinions that China can set a shorter time span or a more ambitious target.[227]

2.4. Comparison with Other INDCs

a. Comparative Study by Chinese Scholars

Two Chinese scholars, Gao Xiang from Energy Research Institute of NDRC and Deng Liangchun from WWF Beijing Office, compared INDCs from 38 parties, among which 11 are annex I parties and 28 are of annex II. Some of their findings are quite impressive.

First, as for the target setting, all annex I parties set their targets by absolute reduction of GHG. Most annex II parties set their targets by "reduction below BAU". China sets its target by carbon intensity and peak year, which several other countries also adopted.

Second, as for the coverage of the INDCs, it could refer to both the economic sectors and GHG. Most parties specify in their INDCs that all economic sectors will be covered, and some mention that energy, waste, agriculture, transportation, etc., but China does not clarify that point in the INDC. As for the GHG, most INDCs cover 7 or 6 GHG gases, and

226) Jake Schmidt, "China's New 2030 Climate Target will Contribute to a Lower and Earlier Emissions Peak for China and the World", https://www.nrdc.org/experts/jake-schmidt/chinas-new-2030-climate-target-will-contribute-lower-and-earlier-emissions-peak

227) See, for example, Taryn Fransen (et al.), "A Closer Look at China's New Climate Plan (INDC)", http://www.wri.org/blog/2015/07/closer-look-chinas-new-climate-plan-indc Stephen D. Eule, "China's INDC: Significant Effort or Business as Usual", http://www.energyxxi.org/china%E2%80%99s-indc-significant-effort-or-business-usual

some cover 3 gases, meanwhile China only covers CO2. A few counties, such as Macedonia, also only cover CO2.

Third, there is variety in terms of the nature of the target. In most annex I parties, the target is a legislative of administrative one. In most annex II parties, the nature of target is administrative of unclear. In China's INDC, the nature of target is unclear.[228]

It is true that all these distinct characters are understandable and explainable, but it will be better if China clarify these details in the INDC. After all, China, as the world largest emitter at the moment, attracts increasing attention from the world.

b. Rating by Climate Action Tracker

An independent organization, Climate Action Tracker (climateactiontracker.org) provides assessments and ratings of submitted INDCs based on the impact of INDSs or other commitments on emissions in 2020, 2025 and 2030 and beyond, effect of current policies on emissions, fair share, emission reduction potential and decarbonisation needed at national and sectoral to limit warming below 2°C. Climate Action Tracker has complete assessment of 32 INDCs reflecting 59 countries. According to its grading system, the USA is rated "medium" for its commitment, China is rated as "medium with inadequate carbon intensity target", and the European Union is also rated as "medium". The Climate Action tracker has rated as "inadequate" the commitments of a long list of countries including Russia, Japan, Australia, New Zealand, Canada, Argentina, South Africa, Chile, and Turkey.[229]

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228) Gao Xiang & Deng Liangchun, "Impact of INDCs on International Climate Governance Regime" (国家自主贡献对全球治理机制的影响), in Wang Weiguang & Zheng Guoguang (ed.), Annual Report on Actions to Address Climate Change (2015) (应对气候变化报告（2015）), Beijing: Social Sciences Academic Press, 2015, pp. 38-49.

229) http://climateactiontracker.org/indcs.html

2.5. Difficulties and Challenges in Achieving INDC Targets

(1) Access to natural resources is a key risk factor in the achievement of China's INDC. Abundant sources of natural gas and other clean energies, for example, will be necessary to replace coal consumption. Securing access to a sufficient and reliable supply of resources and ensuring national energy security while controlling costs will be a major challenge as China seeks to achieve its INDC targets.

(2) As China is still in the process of industrialization and urbanization, heavy industry sectors such as steel, petrochemicals, construction materials, and equipment manufacturing continue to represent a large portion of the economy. This economic makeup, combined with the scaling up of infrastructure development that comes alongside rapid urbanization, is likely to result in increased energy consumption and carbon emissions. While the Chinese government has committed to rebalancing the economy, the fact remains that industrial restructuring cannot be accomplished overnight, and downward pressure on the economy presents serious challenges to transition.

(3) As a rising proportion of the Chinese population enters the middle class, increasing emissions from transportation and building are likely to surpass emissions from manufacturing over the medium- to long-term. In order to achieve the targets set out in the INDC, the younger generation must be educated to adopt low-carbon lifestyles and consumption habits.

(4) The relative reliability and uncertainty of technology is another major challenge China faces in achieving its INDC objectives. For example, China needs to address issues surrounding renewable energy generation

and the reliability of power grids, environmental impacts from hydropower, the safety of nuclear power, and the uncertainty of carbon capture and storage (CCS) technology.

(5) As a developing economy, China lags in terms of overall technological sophistication, with limited R&D capacity in certain key technologies, especially in low-carbon and adaptation technology. Effective international cooperation to secure access to technology will be an important factor in the successful implementation of the INDC targets.

(6) Achieving the mitigation and adaptation targets will require enormous investment and construction costs. While some of these are incremental investments that will generate economic returns, a greater majority of these - such as the application of CCS technology - will engender economic costs. In addition to these economic costs, China may face social costs in the process of transitioning, such as structural unemployment caused by the closure of outdated production facilities. Additional measures will be necessary to mitigate these social impacts.

(7) Capacity among key stakeholders remains limited, and there is an urgent need to raise social awareness and improving institutional and social mechanisms dealing with climate change. China lacks the macro-management capabilities to address climate change and its legislative and policy systems remain underdeveloped. China still lacks a sound statistical and accounting system for GHG emissions and is comparatively weak in the monitoring and calculation of GHG emissions, as well as in regulation and enforcement. All of these shortcomings represent challenges for China as it seeks to realize its INDC targets.[230)]

230) Fu Sha, Zou Ji & Liu Linwei, “An Analysis of China’s INDC”, pp. 10-11, http://www.iccgov.org/wp-content/uploads/2015/07/An-analysis-of-Chinas-INDC_July-23.pdf

3. Implementation under the Paris agreement regarding environmental effectiveness and economic efficiency including linking

On April 22, 2016, China, among 175 countries, signed Paris Agreement on Climate Change at UN headquarters. On September 3, just before G20 Hangzhou Summit, the Standing Committee of Chinese National People's Congress ratified the Paris Agreement, which will enter into force on November 4.[231)]

3.1. Blueprint for Implementation the Paris Agreement

Chinese Vice Premier Zhang Gaoli, as the special envoy of Chinese President Xi Jinping, addressed in the signing ceremony:

"China will strive to reduce the domestic emission of greenhouse gas. China has clarified a series of action plans including peaking its carbon dioxide emissions around 2030 and making efforts to peak early. It will also incorporate the action plans into the national development agenda. China also stipulated in its outline of the '13th Five-Year Plan' that the carbon dioxide emissions per unit of GDP will drop by 18 percent in the next five years. China will introduce a system controlling both the total aggregate and intensity of energy consumption, develop near zero carbon emission demonstration areas, launch a national emission trade market, and substantially increase forest carbon sink, so as to lay a solid foundation to China's intended nationally determined contributions. China will put in place a complete regulation system on ecological civilization, adopt

231) http://unfccc.int/2860.php

a strict accountability system for environmental protection and enhance supervision on environment, so as to ensure the implementation of all targets."[232]

Before the Paris Conference, on November 2, 2015, it is said in China and France Joint Presidential Statement on Climate Change that:

"The two sides will strengthen their exchanges in particular on low-carbon infrastructure, carbon capture and storage technologies, renewable energy, energy efficiency, low-carbon transportation, low-carbon urbanization, circular economy, adaptation and carbon market. China and France emphasize the importance of carbon pricing which can take different forms and consider in this respect that the development of a national carbon market in China is an important milestone and a strong and encouraging signal."[233]

Also on September 25, 2015, China-U.S. Joint Presidential Statement on Climate Change pointed out that:

"China is making great efforts to advance ecological civilization and promote green, low-carbon, climate resilient and sustainable development through accelerating institutional innovation and enhancing policies and actions. China will lower carbon dioxide emissions per unit of GDP by 60% to 65% from the 2005 level by 2030 and increase the forest stock volume by around 4.5 billion cubic meters on the 2005 level by 2030. China will promote green power dispatch, giving priority, in distribution and dispatching, to renewable power generation and fossil fuel power gen-

232) "Zhang Gaoli Attends High-level Signing Ceremony of the Paris Agreement on Climate Change", http://losangeles.china-consulate.org/eng/topnews/t1358486.htm

233) "China and France Joint Presidential Statement on Climate Change", http://www.diplomatie.gouv.fr/en/french-foreign-policy/climate/2015-paris-climate-conference-cop21/article/china-and-france-joint-presidential-statement-on-climate-change-beijing-02-11

eration of higher efficiency and lower emission levels. China also plans to start in 2017 its national emission trading system, covering key industry sectors such as iron and steel, power generation, chemicals, building materials, paper-making, and nonferrous metals. China commits to promote low-carbon buildings and transportation, with the share of green buildings reaching 50% in newly built buildings in cities and towns by 2020 and the share of public transport in motorized travel reaching 30% in big- and medium-sized cities by 2020. It will finalize next-stage fuel efficiency standards for heavy-duty vehicles in 2016 and implement them in 2019. Actions on HFCs continue to be supported and accelerated, including effectively controlling HFC-23 emissions by 2020."[234)]

China has not adopted a domestic legislation or comprehensive plan to implement the Paris Agreement yet. Considering the continuity of policy-making and policy-implementing, the information contained in these three documents could be treated as policy guidelines or blueprint of action plans for China to implement the Paris Agreement. Based on the information here and policies and laws regarding climate change summarized in this chapter, we can make a list with great certainty of the possible actions that China may take to implement the Agreement, such as:

- to imbed the performance of the obligation under the five-year-plan;
- to adjust energy sector;
- to control the emissions from crucial sectors such as building and transportation;
- to increase carbon sink, especially by forestry;
- to offer financial aid to low-carbon demonstrative projects;

234) "China-U.S. Joint Presidential Statement on Climate Change", http://qhs.ndrc.gov.cn/gzdt/201509/t20150929_753171.html

- to foster technical innovation; and
- to rely on command-and-control style accountability system in administrative branch meanwhile utilizing market based instruments such as a proposed nationwide emission trading system.

3.2. China's Next Move in the Foreseeable Future

a. A Credible Description

Barbara Finamore, an expert of Chinese climate policy from the Natural Resources Defense Council (NRDC) issued an article to describe the next steps of China's implementing the Paris Agreement, which is, judged from our information and insights, a generally reliable record.

"Incorporate the agreement into national and local Five Year Plans: China's Five Year Plans are the government's major development blueprints for long-term social and economic policies. The 13th Five-Year Plan, which will cover the 2016-2020 time period, was adopted in March 2016, to be followed by five-year plans for specific sectors and local governments. These plans will be an important vehicle for China to implement and operationalize its climate commitments. The government has already announced that 'Green Development' will be one of the five major principles underpinning the policies for China's long term growth.

Cap coal consumption: Putting a lid on coal is the single most important step China can take to protect the climate, since coal is responsible for 80% of China's CO2 emissions. A national cap on coal consumption would not only cut carbon, but also clean up China's choking air pollution, save thousands of lives and create more clean energy jobs

than would be lost in the traditional coal sector. It would also help address the proliferation of new coal-fired plants, which local governments continue to approve despite existing coal-fired plant overcapacity a continuing drop in electricity demand.

Develop a priority dispatch policy for renewable power: In the September 2015 US-China agreement, China committed to adopting a clean electricity dispatch system that will prioritize power generation from renewable sources. This is critically important because, even though China now leads the world in wind and solar energy, its current electricity system still continues to give precedence to coal-fired power plants, operating these plants in order to meet minimum contracted hours, rather than operating lower-emitting renewable power plants.

Scale up green buildings: China pledged in the September US-China agreement to ensure that 50 percent of all new urban buildings will meet China's green building standards by 2020. This is a critical building block for China's climate efforts, since buildings account for about one-quarter of China's energy use, and the number of new buildings is expected to triple by 2030. Meeting this target will require an enormous effort, since only 2 percent of new urban buildings were green buildings in 2012, and the previous goal was 20 percent by 2015, set by the State Council in the 2013 Green Building Action Plan.

Clean up transportation: China pledged to ensure that the share of public transit in all motorized urban transport reaches 30% by 2020 - presenting the potential for more huge reductions in CO2 emissions. This will require the growing number of medium-sized cities in China to make major investments in subways, buses and other public transport. China also announced that it will finalize next-stage fuel efficiency standards for

heavy-duty vehicles in 2016 and implement them in 2019. This is critically important because China now has the world's second largest vehicle population after the U.S.

Continue to work to reduce highly potent short-lived climate pollutants like HFCs and black carbon. Under the U.S.-China September 2015 agreement, China has pledged to accelerate its efforts to control super greenhouse gas HFCs, including "effectively controlling HFC-23 emissions by 2020". China will also cooperate with the U.S. to reduce HFCs, which are widely used in air conditioning and refrigeration, but for which companies have already found and are continuing to develop climate-friendly replacements.

China’s Ministry of Transportation has also just released a roadmap for controlling air pollution and greenhouse gas emissions from shipping, one of the fastest growing sources of transport greenhouse gas emissions. Shipping is currently responsible for almost 3 percent of global CO2 emissions and over 2 percent of global black carbon emissions, the second most potent climate pollutant behind CO2.

Continue to Strengthen China's GHG Monitoring and Reporting System: The new Paris Agreement contains strong provisions for all countries to regularly report their emissions and progress made towards achieving their emission reduction targets. China will need to continue to develop and strengthen its domestic rules for monitoring and reporting GHG emissions, including finalizing the mandatory GHG reporting system for all key industrial sectors that it began in 2014.

Avoid high carbon investments overseas: China made another important commitment in the September 2015 U.S.-China climate agreement: to ‘strengthen green and low-carbon policies and regulations with a view to

strictly controlling public investment flowing into projects with high pollution and carbon emissions both domestically and internationally'. This commitment is very significant, especially given the existing trend for China to finance fossil fuel investments in other countries…It will be very important to for China to exercise its leadership in the BRICS New Development Bank, the Asian Infrastructure Investment Bank, and the Silk Road Fund to ensure that all public investments meet strong low-carbon guidelines."[235]

b. A Few More Things Highlighted

(a) Accountability of Party and Government Leaders for Damage to the Ecological Environment: A Precedent for Emission Reduction Accountability

Through its central committee and local committees at various level, Chinese Communist Party (CCP) exercise the leadership over the governments at the same level, and thus run the whole country. The most effective accountability system, in the context of Chinses political institutions, is the system which cover both party and government leaders. Considering the severe and painful environmental issues which jeopardize the economic sustainability, public health and legitimacy of the governments, the Central Committee of CPC and the State Council jointly issuedMeasures for the Accountability of Party and Government Leaders for Damage to the Ecological Environment (for Trial Implementation) on August 17, 2015, which established the principles of "holding party and government leaders equally accountable for eco-environmental protection".

235) Barbara Finamore, "Paris Climate Agreement Explained: Next Steps of China", https://www.nrdc.org/experts/barbara-finamore/paris-climate-agreement-explained-next-steps-china

Art. 5-8 of the Measure listed the situations where the party and government leaders shall be held accountable. The situations can be classified into four categories: 1) the decisions or approvals of the relevant leaders are irrational or even against the laws and regulations; 2) the relevant leaders are irresponsible or commits nonfeasance, causing serious consequences; 3) the relevant leaders violates laws and regulations deliberately such as instigates or incites the department under his or her charge to approve (confirm), build, or put into operation (use) of the construction project not conforming to the positioning of the main functional areas and policies, laws, and regulations relating to the ecological environment and resources; and 4) the relevant leaders intervene law enforcement and judicial adjudication. The liabilities of the party and government leaders for their damage to the ecological environment shall be investigated in such forms as admonishing and ordering a public apology; actions taken by party committees, including shifting from the position, taking blame and resigning, ordering the resignation, displacement, and demotion; and disciplinary actions taken according to the discipline of the Communist Party and government.[236] Furthermore, the mechanism of lifetime accountability for damage to the ecological environment shall be implemented. Where the person in charge violates the requirements for scientific development, causing severe damage to the ecological environment and resources, the liabilities of the person in charge must be strictly investigated, no matter whether he or she has been removed, promoted, or has retired.[237] In one word, the accountability system mentioned above

236) Art. 10 of Measures for the Accountability of Party and Government Leaders for Damage to the Ecological Environment (for Trial Implementation).

237) Art. 12 of Measures for the Accountability of Party and Government Leaders for Damage to the Ecological Environment (for Trial Implementation).

has very strong impact upon the careers of the party and government leaders and could be very powerful in achieving eco-environmental targets.

The main drafter of Measures for the Accountability of Party and Government Leaders for Damage to the Ecological Environment (for Trial Implementation) is Ministry of Environmental Protection. This accountability system applies to environmental-related, not climate-related, behaviors of relevant leaders, no matter we take the literal approach or purposive approach to interpret the articles.

On the other hand, with the ascending of the priority of climate change, the accountability system was established in energy conservation and emission reduction. For example, in the State Council's Work Plan on Energy Conservation, Emission Reduction and Low-Carbon Development (2014-2015), it was provided that if the provincial governments' leaders did not fulfill the target of controlling energy intensity and carbon intensity per GDP, the State Council would hold them accountable and they could not be promoted in the next year.[238] If the Central Committee of CCP and the State Council later want to strengthen target implementation of climate change, the accountability system regarding eco-environmental issues offer a mature sample or precedent. The central government can mobilize the bureaucratic system in the most effective manner.

(b) Environmental Protection Tax and ETS

China is going to replace the "pollutant discharge fee" with "environmental protection tax" in order to improve the effectiveness and efficiency

238) "The State Council's Work Plan on Energy Conservation, Emission Reduction and Low-Carbon Development (2014-2015)" (2014-2015年节能减排低碳发展行动方案), http://www.gov.cn/zhengce/content/2014-05/26/content_8824.htm

of environmental governance. As early as in June 2015, the Environmental Protection Tax (EPT) Law (the "Discussion Draft" or the "First Draft") jointly developed by three ministries, i.e., the Ministry of Finance (MOF), the State Administration of Taxation (SAT) and the Ministry of Environmental Protection (MEP) was published by the State Council on its official website for public consultation. In September 2016, National People's Congress published a further revised EPT Discussion Draft for public consideration (the Second Draft).

According to the Draft, the taxable pollutants are atmospheric pollutants, water pollutants, solid wastes, construction site noise, industrial noise, and other pollutants. Hence in China, environmental protection tax governs pollutants and emission trading system governs GHG.[239]

One of the new developments in China's ETS is linking. First, some non-pilot areas, such as Baotou, Inner Mongolia, linked their ETS with pilot areas, such as Shenzhen.[240] Second, the NDRC is busy with preparing for nationwide ETS in 2017. Many enquiries on linking have been carried out.[241] Third, China is exploring the possibilities of linking its ETS with overseas ETS. In December 2015, China and Korea working on the possibility to link their ETS.[242] EU, with the largest ETS to date, helps China in capacity building of ETS. Both sides keep the possibility of future linking open.[243]

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239) This combination is complicated by the situation that although China does not levy carbon tax, the resource taxes on coal, oil and natural gas may have the impact equivalent to carbon tax.

240) "Cross-region Emission Trading between Shenzhen and Baotou Initiated" (深圳包头启动跨区域碳排放权交易), http://www.toutiao.com/i6300702276952523266/

241) "Chinese Carbon Market: From Local Pilots to National Unification"(中国碳市场：从区域试点走向全国统一), http://finance.huanqiu.com/roll/2016-07/9209615.html

242) "China's Xie touts prospect of China-Korea ETS link", http://carbon-pulse.com/12922/

243) "China-EU Cooperate Fruitfully before the Initiation of China's Nationwide ETS"

(c) Green Finance after G20 Hangzhou Summit

In 2015, Green Finance Task Force, co-sponsored by Research Bureau of People's Bank of China (PBOC) and UNEP, released the final report "Establishing China's Green Financial System", in which the recommendation of green financial instruments were proposed.[244] In 2016, under the presidency of China, the G20 Green Finance Study Group released G20 Green Finance Synthesis Report, which explains the importance of green finance in sustainable development, explores challenges for increasing green financial flows, and lays out seven policy recommendations for countries to create enabling environments for green finance.

Prior to and separate from the release of the Synthesis Report, on August 31, 2016, the People's Bank of China, along with six other government agencies and commissions, released a set of Guidelines for Establishing the Green Financial System, with the goals of establishing a sound green financial system in China in order to "mobilize and incentivize more private capital to invest in green industries, and more effectively control investments in polluting projects."

China, taking G20 as a big opportunity, raised priority of green finance to a new level both domestically and internationally.

Green finance, as defined in G20 synthesis Report, is "financing of investments that deliver environmental benefits in the broader context of environmentally sustainable development. These environmental benefits include, for example, reductions in air, water and land pollution, reductions

(中国碳排放交易市场启动在即 中欧碳交易合作成果丰硕), http://www.financialnews.com.cn/hq/yw/201610/t20161022_106347.html

244) "Establishing China's Green Financial System", https://www.cbd.int/financial/privatesector/china-Green%20Task%20Force%20Report.pdf

in greenhouse gas emissions, improved energy efficiency while utilizing natural resources, as well as mitigation of and adaption to climate change and their co-benefits".[245] In fact, this definition combines environmental finance with climate finance.

The Chinese government has been taking other steps to help build green finance into the country's financial infrastructure. On September 2, 2016, the state-owned China Central Depository & Clearing Co. Ltd. (CCDC) partnered with the Climate Bonds Initiative (CBI) and CECEP Consulting to announce the launch of the China Bond China Climate-Aligned Bond Index. As the first climate-aligned bond index in the world, the bond index works to identify a list of bonds that support low-carbon and climate resilient projects. The definition for low-carbon and climate resilient projects will be determined by the Climate Bonds Taxonomy and the China Green Bond Endorsed Project Catalogue. The purpose of the bond index is to create an enabling environment for investors seeking exposure to green investments in China. In creating this new bond index, China is trying to align its green standards with international standards to benefit from environmental, social, and governance investment flows.

In addition to governmental action, China's financial institutions are also increasing their work on green finance. Some of these institutions have begun to make efforts to track the environmental performance of businesses. For example, the Industrial and Commercial Bank of China (ICBC) established a database that measures the environmental performance of businesses. It bases its measurement criteria on Chinese national environmental legislation, thus creating "an accountability system for envi-

245) "G20 Green Finance Synthesis Report", p. 26, http://g20.org/English/Documents/Current/201608/P020160815359441639994.pdf

ronmental compliance." With increasing awareness of the importance of real-time environmental data disclosure, we anticipate that even more third parties and financial institutions will opt-in to contribute to a more robust environmental data reporting system.

In highlighting the importance of environmental protection in the country's development strategy, as well as creating the baseline guidelines for green finance, China has taken a critical step towards bolstering its green finance sector. PBOC's guidelines reflect the country's steady commitment to sustainable economic development through green finance. While the guidelines are an important step in the right direction, strong implementation will be the key to the success of the green finance sector in China.[246)]

3.3. China's Long March towards inter Transitions

The year 2016 marked the 80th anniversary of the victory of the Long March. In post-Paris era, China is facing another Long March－the Long March towards three transitions.

a. Growth Transition

China's industrialization can trace back to Westernization Movement in late Qing Dynasty and skyrocket in the last three decades. High-speed economic growth was achieved at the cost of high consumption on natural resources and relying on fossil energies, coal in particular. In 2015, China's GDP covered 12% of the world, while consuming 25% of global

246) Barbara Finamore & Yan Wang, "Green Finance Approaches and Criteria: The G20 and China", https://www.nrdc.org/experts/barbara-finamore/green-finance-approaches-and-criteria-g20-and-china

fossil energies, among which the coal consumption reached 50% of the world. It is fair to say that Chinese economic growth is a carbon-intensive one. We should not only keep a steady growth, but a low-carbon growth and growth with quality.

b. Low-carbon Transition of Energy System

Approximately 90% of energy consumption is satisfied by fossil energies, and nearly 70% is from coal. The current energy structure is one of the main reasons of some environmental problems which developed countries has already solved in 1970s, such as haze and fog.

In the U.S, Clean Power Plan halters the electricity from coal. In Germany, the government pledged to cut the coal-based power. UK will turn off all the coal power plant before 2025. The energy system is experiencing a low carbon transition globally.

China accounts for about 30% of global CO2 emission. To achieve the peaking of CO2 before 2030, China need to achieve the peaking of coal consumption as early as possible, then oil and gas. Developing low-carbon energies is imperative.

c. Low-carbon Transition of Consumption

Investment and export used to be the main drive forces of economic growth in China. For example, drive forces of a ten-year high speed growth during 10th five-year-plan and 11th five-year-plan are huge investment in steel and iron, cement and infrastructures, as well as the increase in export. The situation has changed nowadays. It hard to find one or several pillar industries which can prop up the economic growth we once experienced. It’s time to turn to rely on expanding and upgrading the

overall consumption. Among the driving forces for growth, consumption demand has the largest scale and the closest bearing on people's livelihood. A low-carbon consumption structure and lifestyle is an inevitable choice for China's low-carbon economic development.[247)]

4. Recommendations and future plans

4.1. China's Positions on Global Climate Governance

On November 30, 2015, Chinese President Xi Jinping addressed at the opening ceremony of the Paris Conference of Climate Change, in which he expressed very clearly China's positions on global climate governance:

- **We should create a future of win-win cooperation, with each country making contribution to the best of its ability.**

For global issues like climate change, a take-more-give-less approach based on expediency is in nobody's interest. The Paris Conference should reject the narrow-minded mentality of "zero sum game" and call on all countries, the developed counties in particular, to assume more shared responsibilities for win-win outcomes.

- **We should create a future of the rule of law, fairness and justice.**

It is imperative to enhance the standing and role of international law in global governance, ensure effective observance and implementation of international rules, uphold democracy, equity and justice, and build international rule of law. Given the difference between developed and developing

247) Kuang Chunfeng, "China's Action in Post-Paris Era: an Interview with Director Li Junfeng of NCSC" (后巴黎时代的中国行动－－访国家应对气候变化战略研究和国际合作中心主任李俊峰), in Chinese Environment, 2016 (2), pp. 26-27.

countries in historical responsibility, development stage and coping capability, the principle of common but differentiated responsibilities, instead of being obsolete, must continue to be adhered to.

- **We should create a future of inclusiveness, mutual learning and common development.**

Facing global challenges, countries need to increase dialogue and exchange best practices. We should draw on each other's strengths to achieve common development through mutual learning, and deliver benefits to all our people. At the same time, we should be prepared to accept harmony without uniformity, allowing individual countries to seek their own solutions that best suit their respective national conditions.[248)]

4.2. Low-carbon Development: a Chinese Solution

The concept of low carbon development has its roots in the UNFCCC adopted in Rio in 1992. In the context of this convention, low carbon development is now generally expressed using the term low-emission development strategies (LEDS - also known as low-carbon development strategies, or low-carbon growth plans). Though no formally agreed definition exists, LEDS are generally used to describe forward-looking national economic development plans or strategies that encompass low-emission and/or climate-resilient economic growth.[249)]

As mentioned before, one of the main characters of China's climate change policy is to imbed climate change into economic development. As

248) "Work Together to Build a Win-Win, Equitable and Balanced Governance Mechanism on Climate Change", http://www.fmprc.gov.cn/mfa_eng/wjdt_665385/zyjh_665391/t1321560.shtml
249) "Low Carbon Development", https://sustainabledevelopment.un.org/index.php?menu=1448

the world largest economy, China not only embrace the idea of low-carbon development, but implement it seriously.

As a second-mover developing economy, China has the potential to transition to a less carbon-intensive mode of development, causing emissions to peak lower and earlier than more developed countries. Historical CO2 emissions trajectories of major economies form a Kuznets curve (an inverted 'U' curve) relative to economic development, i.e., as GDP per capita increases, CO2 emissions per capita rise to a peak point and then drop. Although the height of that peak varies from country to country, all economies appear to conform to this trend of an emissions "rise before a fall."

Most major developed countries' per capita CO2 emissions peaked at 10-22 tons when per capita GDP reached 20,000-25,000 USD (in 2010 price levels). Yet according to China's INDC targets, per capita CO2 emissions could peak at approximately 8 tons at a time when China's per capita GDP will likely be only 14,000 USD. This could be a major highlight of China's status as a second-mover developing economy. Considering China's position as the "world's factory" and its abundance of coal resources, it is likely that the peak values of consumption-based emissions and energy use will be lower than those of developed countries.[250)]

China can create new global comparative advantages in low-carbon technology and avoid lock-in. The innovative development pathway can give rise to new capabilities that have the potential to create comparative advantages in international trade. If China can bolster its capabilities, some of the most attractive opportunities are likely to be in energy con-

250) Fu Sha, Zou Ji & Liu Linwei, "An Analysis of China's INDC", p.7, http://www.iccgov.org/wp-content/uploads/2015/07/An-analysis-of-Chinas-INDC_July-23.pdf

servation, environmental protection, new energy, and energy-efficient vehicles. Policies to support these emerging industries have the potential to create new path dependencies that redirect R&D efforts towards these new technologies, creating a virtuous circle between deployment and R&D. This can help the country avoid the lock-in of carbon-intensive infrastructure.

China's rapid growth already serves as a model for many other developing countries. In its transition to the innovative development pathway, China has the opportunity to demonstrate a sustainable framework for development to these countries, supported by active South-South cooperation. By sharing China's experiences, other developing countries can avoid reliance on traditional high-carbon growth models and pursue more efficient and innovative paths that result in less pollution and lower emissions. China's move to the innovative development pathway could therefore promote a global transition to low-carbon development models.[251)]

251) Zou Ji et al, "Pursuing an Innovative Development Pathway: Understanding China's INDC"(DiscussionDraft),p.19,https://www.thepmr.org/system/files/documents/Technical%20summary-Understanding%20China%20INDC-Nov%2030-print.pdf

Chapter 5 Korea

1. Past-climate change policy and legislation

1.1. Green Growth

The concept of green growth was first perceived among member nations of the UN Economics and social Commission for Asia and Pacific as a response to climate change. For nations in the Asia-Pacific region, which are behind European nations in terms of economic growth, the concept is used to achieve the two goals of economic growth and environmental conservation. Korea, placed top 10 in the world in greenhouse gas emission and 17th in per capital greenhouse emission among members of OECD since 2006, is assessed as one of the main culprits of climate change.

In response, former President Lee Myung-bak proposed the motto of low-carbon, green growth as a new paradigm of national development, and enacted the Framework Act on Low Carbon, Green Growth in order to seek response measures to climate change more actively. The above act defines[252] the term “green growth” as “growth achieved by saving and using energy and resources efficiently to reduce climate change and damage to the environment, securing new growth engines through research and development of green technology, creating new job opportunities, and achieving harmony between the economy and environment.” That is, green growth is about preparing for the consequence of climate change by preserving the environment by perceptibly reducing greenhouse

252) Framework Act on Low Carbon, Green Growth, Article 2 Paragraph 2

gases. expanding clean energy sources, and increasing energy efficiency, thereby creating a new growth engine. For this purpose. the Framework Act on Low Carbon, Green Growth outlines specific measures for reducing greenhouse gases and plans to expand use of clean energy and improve energy efficiency, as well as provisions for the acquisition and use of funds, as follows.

"The Government shall establish medium and long-term targets and the goals attached to each particular phase for the following matters and seek for measures necessary for accomplishing the targets in order to cope with the global reduction of greenhouse gases actively and to promote low carbon, green growth efficiently and systematically:

1. Targets for the reduction of greenhouse gases;
2. Targets for energy saving and targets for efficiency in the use of energy;
3. Targets for self-sufficiency in energy;
4. Targets for the supply of new and renewable energy."[253)]

1.2. Framework Act on Low Carbon, Green Growth

The Framework Act on Low Carbon, Green Growth is an act integrating the regulations in various fields like environment, energy, and economics, enacted to accomplish different policy purposes, under the comprehensive policy goal of low carbon, green growth. The purpose of this Act is "to promote the development of the national economy by laying down the foundation necessary for low carbon, green growth and by utilizing green technology and green industries as new engines for growth,

253) Framework Act on Low Carbon, Green Growth, Article 42

so as to pursue the harmonized development of the economy and environment and to contribute to the improvement of the quality of life of every citizen and the take-off to a mature, top-class, advanced country that shall fulfill its responsibility in international society through the realization of a low-carbon society".[254]

As a result of this framework act, this Act takes precedence over other Acts[255]; the State endeavors to enable the basic principles for low carbon, green growth to be reflected in every aspect of state affairs, political, economic, social, educational, and cultural[256]; each local government is given the obligation to fully cooperate in the State's measures for realizing low carbon, green growth[257]; each business entity is mandated to expand investment and employment in green industries to fulfill its social and ethical responsibilities for the environment[258]; and every citizen is encouraged to actively practice green life in his/her home, school, workplace, and any other place[259].

Also, the Presidential Committee on Green Growth has been instituted in order to deliberate on the policies needed for green growth[260], establishing medium and long-term targets and plans for green growth[261]. Legal support was prepared for establishing a system for trading emissions of greenhouse gases,[262] and the State was given the duty to realize the fostering of and support for green economy, green industries, and

254) Framework Act on Low Carbon, Green Growth, Article 1
255) Framework Act on Low Carbon, Green Growth, Article 8
256) Framework Act on Low Carbon, Green Growth, Article 4
257) Framework Act on Low Carbon, Green Growth, Article 5
258) Framework Act on Low Carbon, Green Growth, Article 6
259) Framework Act on Low Carbon, Green Growth, Article 7
260) Framework Act on Low Carbon, Green Growth, Article 14
261) Framework Act on Low Carbon, Green Growth, Articles 40, 41, 42, 44, 45
262) Framework Act on Low Carbon, Green Growth, Article 46

green homeland[263]. While execution of plans related to climate change in Korea has been facilitated through the Framework Act on Low Carbon, Green Growth, the fact that an act on green growth was led by the government rather than through a social agreement, and the establishment of relationship with the Sustainable Development Act and complicated energy-related regulations. are areas requiring further inspection.

1.3. Legislation on the Allocation and Trading of Greenhouse Gas Emission

In order to prepare an effective system for reducing greenhouse gases, Korea has planned and executed the operation of a greenhouse gas emission trading system. The Emission Trading Act was enacted in 2012, and the greenhouse gas emission trading system has been operating since 2015. When the above Act was being enacted, opposing views urging a delay in the date of implementation continued, for the reasons that the emission trading system could be a burden to industries, which could weaken domestic corporations' global competitiveness, and that Korea does not yet have the obligation to reduce greenhouse gases under the Kyoto Protocol. However. this Act was enacted for the purpose of pioneering a leading position in the Asia-Pacific region based on the international trend of greenhouse gas reduction, and of establishing a foundation for new growth engines. But for alleviation of the burden on the industries and for the stability of the system. standards for allocation of emission rights, proportion of gratuitous allocation for each planning period and standards for industries with 100 percent gratuitous allocation, scope of recognition of reduction records, and standards for recognition

263) Framework Act on Low Carbon, Green Growth, Articles 22, 23, 29, 51, 53, 54, 57, 59

of offsets were flexibly prescribed in the ordinance.

Through this greenhouse gas emission trading system. the system for efficiently reaching the 2020 national greenhouse gas reduction target (30% reduction compared to BAU) and the foundation for invigorating green technology development through investment in facilities and development of new and renewable energy based on the trading revenues have been established.

1.4. Energy Act and Other Acts

Prior to the enactment of the aforementioned Framework Act on Low Carbon, Green Growth, the Framework Act on Energy handled every matter such as the basic plan for energy in Korea. The enactment of a framework act supervising energy policy was required as the existing system for energy law was consisted of individual energy resource laws, lacking in unity and consistency of the regulations. Thus, the Framework Act on Energy was enacted in 2006 and operated, but was revised into the Energy Act after the Framework Act on Low Carbon, Green Growth was enacted in 2010.

The purpose of the Energy Act is to contribute to the sustainable development of the national economy and enhancement of the welfare of citizens by providing for basic matters concerning the formulation and implementation of energy policies and energy-related plans to realize a stable, efficient and environmentally friendly energy supply and demand structure.[264] The State and each local government has the duty to execute policies taking into account the purpose of this Act, and every energy supplier, energy user, and citizen has the duty to use energy in a

264) Energy Act, Article 1

rational and environmentally friendly manner.[265] Practical effect of this Act is secured through regulations on energy-related plans and on the organization, operation, and roles of the Energy Committee.[266]

The Energy Use Rationalization Act is an Act enacted for the purpose of contributing to the sound development of the national economy, the promotion of national welfare and international efforts to minimize global warming by realizing stability in the supply of and demand for energy, increasing the rational and efficient use of energy, and reducing environmental damage caused by the consumption of energy.[267] This Act gives the government the responsibility to establish and enforce a fundamental and comprehensive policy aimed at reducing greenhouse gas emissions through the stable demand and supply of energy and the rational and efficient use of energy, and urges local governments and energy users and suppliers to proactively participate and cooperate.[268] This Act, laying out systematic and realistic regulations for the rationalization of energy use and control of greenhouse gas emission, can be said to be an energy-related law that contributes to green growth.

The Integrated Energy Supply Act is an Act enacted for the purpose of actively coping with the United Nations Framework Convention on Climate Change and contributing to energy conservation and enhancement of the convenience in the life of the people by expanding the integrated energy supply, operating the integrated energy supply reasonably, and prescribing the matters concerning the construction, operation and safety of integrated energy facilities.[269] Targeted at integrated energy, supplied to a

265) Energy Act, Article 4
266) Energy Act, Article 9, 10
267) Energy Use Rationalization Act, Article 1
268) Energy Use Rationalization Act, Articles 9, 10
269) Integrated Energy Supply Act, Article 1

number of users, this Act was introduced and implemented as a response to green growth and climate change. According to this Act, the Minister of Trade, Industry and Energy must develop a master plan for integrated energy supply every five years including "targets for reduction in the amount of emission of air pollutants,"[270] and the State or a local government may give priority to a business entity who uses new and renewable energy, which is environmentally friendly and can lead to a reduction in greenhouse gas emission, when providing subsidies to a business entity in order to expand integrated energy supply.[271]

Further, in the areas of accounting, finance, and budget, the Act on the Special Accounts for Energy and Resources-Related Projects is an Act enacted for the purpose of installing a Special Accounts for Energy and Resources-Related Projects to stabilize the energy supply and price and to effectively promote energy and resources-related projects, and prescribing the regulations for its operation. The Traffic, Energy and Environment Tax Act is being operated for the purpose of securing the funds for projects related to the expansion of traffic facilities like roads and metros and promotion of public transportation, energy and resources-related projects, and projects for environmental conservation and reform.

In the area of new and renewable energy, the Act on the Promotion of the Development, Use and Diffusion of New and Renewable Energy is in operation. This Act was enacted for the purpose of promoting an environmentally friendly conversion of the energy structure and reducing greenhouse gas emissions through vitalizations of the new and renewable energy industries.[272] This Act seeks to contribute to the reduction of

270) Integrated Energy Supply Act, Article 3 Paragraph 2 Subparagraph 3
271) Integrated Energy Supply Act, Article 8 Paragraph 3
272) Act on the Promotion of the Development, Use and Diffusion of New and

greenhouse gases through development, production, use, and distribution of new and renewable energy.

It contains measures to promote diversification[273] of energy sources through the development, production, use, and distribution of new and renewable energy as environmentally friendly sources of energy. As part of the policy for green growth, the Renewable Portfolio Standard (RPS), obligating entities with supply duty, such as business entities in the power generation business, to supply a predetermined amount of the generated energy using new and renewable energy, was implemented.[274]

2. INDC key issues

In accordance with decisions 1/CP.19 and 1/CP.20, the Republic of Korea hereby communicates its Intended Nationally Determined Contribution (INDC) towards achieving the objective of the United Nations Framework Convention on Climate Change as set out in its Article 2, as well as accompanying information to facilitate clarity, transparency, and understanding of its INDC.[275]

a. Korea's Mitigation Target

Korea plans to reduce its greenhouse gas emissions by 37% from the-business-as-usual (BAU, 850.6MtCO2eq) level by 2030across all economic sectors.

Renewable Energy, Article 1

273) Framework Act on Low Carbon, Green Growth, Article 39 Paragraph 3

274) Act on the Promotion of the Development, Use and Diffusion of New and Renewable Energy, Article 2 Paragraph 5

275) Korea's INDC (http://www4.unfccc.int/submissions/INDC/Published%20Documents/Republic%20of%20Korea/1/INDC%20Submission%20by%20the%20Republic%20of%20Korea%-20on%20June%2030.pdf)

In accordance with the Framework Act on Low Carbon, Green Growth, Korea has made continued efforts to address climate change across all economic sectors and will strengthen its efforts to achieve the 2030 mitigation target.[276)]

[Table 5-1] 2030 Mitigation Target in Korea

Year	2020	2025	2030
BAU (MtCO2eq)	782.5	809.7	850.6

This scenario is announced on the BAU projection of KEEI-EGMS (the Korea Energy Economics Institute Energy and GHG Modeling System), considering the several substantial issues for key economic variables, including population, GDP, industrial structure and oil price.[277)] On this target, it contains some sectors such as Energy, Industrial processes and product use, agriculture and waste.

Inventory Methodology is as follows:[278)]

- Consistent with methodologies used in Korea's Biennial Update Report (BUR) submitted in December 2014
- 1996 IPCC Guidelines used in general to calculate greenhouse gas emissions and sinks

276) Korea's INDC (http://www4.unfccc.int/submissions/INDC/Published%20Documents/Republic%20of%20Korea/1/INDC%20Submission%20by%20the%20Republic%20of%20Korea%20on%20June%2030.pdf)
277) Korea's INDC (http://www4.unfccc.int/submissions/INDC/Published%20Documents/Republic%20of%20Korea/1/INDC%20Submission%20by%20the%20Republic%20of%20Korea%20on%20June%2030.pdf)
278) Korea's INDC (http://www4.unfccc.int/submissions/INDC/Published%20Documents/Republic%20of%20Korea/1/INDC%20Submission%20by%20the%20Republic%20of%20Korea%20on%20June%2030.pdf)

- 2006 IPCC Guidelines used to calculate greenhouse gas emissions from rice cultivation in agriculture (4C) and other waste (6D)

On overseas credits and offsets, Korea have already admitted the credits from CDM and plans to activate the international credit market considering the 2030 reduction targets. Furthermore, Korea should be applied for the assessment procedures under Paris agreement every 5 years.

b. Planning process

(a) Planning Process for the 2030 mitigation target

To establish Korean INDC, Korea government got together and cooperate with ministries such as the Ministry of Environment (MOE) and the Ministry of Trade, Industry and Energy (MOTIE), chaired by the Prime Minister's Office, because it is related with complicated works for each ministry.

A technical analysis of the 2030 reduction target was decided by a Joint Working Group of national research institutions with the Greenhouse Gas Inventory & Research Center of Korea (GIR) and the Korea Energy Economics Institute (KEEI) and the decision was reviewed by each stakeholders and civil society to get some agreement as well as the public hearings and a feedback from a forum of the National Assembly.

Finally, the 2030 reduction target was looked through by the Green Growth Committee, and chosen according to the national authorization procedures.

(b) Sectoral measures for mitigation

In 2009, Korea made its reduction target ‑30% from the business-as-usual (BAU) level by 2020, it was voluntary decision. Accordingly, the govern-

ment needed to make the mandatory implimentation, which was the enactment of the Framework Act on Low Carbon, Green Growth in April 2010.

According to that legislation, the Korean government had tried to make the effective actions such as the ETS and the national Energy Plan for Climate Change, and finally it was announced the National Greenhouse Gas Emissions Reduction Road map in January 2014 as well as the final agreement of sectoral and annual targets in July 2011.

In 2012, Korea had begun the GHG and Energy Target Management System (TMS) on for the industrial sector as one of the precurser for ETS. The GHGs reduction through the TMS have applied to its industrial sectoral target as one of the mitigation for climate change. The Act on the Allocation and Trading of Greenhouse Gas Emission Permits in 2012 which is the ETS based on the market mechanism, was operated from 2015 including Korean carbon market. It is covered 525 business entities, and it occupies amounted to 67.7% of national greenhouse gas emissions.

Korea has another vision to activate the power generators by using the renewable energy sources, and has tried to increased the uses of renewable energy as for one of the methods to reduce emissions from fuel.

In the building sector, the Korean government is seeking to manage energy efficiency from the design stage to the operation stage by means such as establishing the Green Building Standards Code and a system for the Performance Evaluation of Eco-friendly Homes.[279)]

In the transport sector, the Korean government is continuing to expand infrastructure for environment-friendly public transportation, while in-

279) Korea's INDC (http://www4.unfccc.int/submissions/INDC/Published%20Documents/Republic%20of%20Korea/1/INDC%20Submission%20by%20the%20Republic%20of%20Korea%20on%20June%2030.pdf)

troducing low-carbon standards for fuel efficiency and emissions produced from automobiles.[280] The Korean government has decided to strengthen the average emission standard from 140g/km in 2015 to 97g/km in 2020. For the effective operation and activation, the Korean government suggests some incentives such as tax reduction for eco-friendly vehicles.

From 2011 since TMS, Korea has operated the measurement, reporting, and verification (MRV) system to monitor large emissions of entities in the industry, power generation and building including transport sectors.

(c) next procedures for the implementation of the 2030 mitigation target

The Korean government has researched to make the implementation for INDC with specific guidelines and planned to make a consultation with relevant stakeholders. The experts for climate change has hoped and made an efforts that Korea could achieve the mitigation target made by the international level. It seems to take advantage of it well since Korea has already MRV system thorough TMS and ETS.

c. Adaptation

Even though Korean government had launched to make the implementation of the mitigation for climate change from 2009, also they have tried to find out the ways for the adaptation with recognition of the the urgent need and its adverse effects. Accordingly, Korea made and continuously developed the National Climate Change Adaptation Plan in 2010, which is currently being operated.

280) Korea's INDC (http://www4.unfccc.int/submissions/INDC/Published%20Documents/Republic%20of%20Korea/1/INDC%20Submission%20by%20the%20Republic%20of%20Korea%20on%20June%2030.pdf)

It is the international trend for climage change after the Paris agreement, because the adaptation is the substantial roles for regional environmental effects and vulnerable groups.

At the national level, Korea is developing guidance and tools to support the assessment of vulnerability and risks, and is implementing projects on research and development for comprehensive and quantitative analysis of climate change impacts.[281)]

In order to promote a Climate Friendly and Safe Society, Korea aims to strengthen its capacity for climate change adaptation by implementing the following strategic actions:[282)]

- Strengthening infrastructure for climate change monitoring, forecasting and analysis;
- Developing a management system for disaster prevention and stable-water supply;
- Developing a climate-resilient ecosystem;
- Making a systemic transition to a climate-resilient social and economic structure; and
- Enhancing the system for the management of negative impacts of climate change on health

d. Fairness and Ambition

Korea could be said to amount to approximately 1.4% of global greenhouse gas emissions (including LULUCF, according to the WRI CAIT

281) Korea's INDC (http://www4.unfccc.int/submissions/INDC/Published%20Documents/Republic%20of%20Korea/1/INDC%20Submission%20by%20the%20Republic%20of%20Korea%20on%20June%2030.pdf)

282) Korea's INDC (http://www4.unfccc.int/submissions/INDC/Published%20Documents/Republic%20of%20Korea/1/INDC%20Submission%20by%20the%20Republic%20of%20Korea%20on%20June%2030.pdf)

3.0), but Korea has tried to continuously make efforts to reduce the emissions.

Korea's mitigation potential is limited due to its industrial structure with a large share of manufacturing (32% as of 2012) and the high energy efficiency of major industries.[283] Considering the decreased level of public recognition on the nuclear power energy in Germany and Japan such as the Fukushima accident, Korea should make the limitation to use of the nuclear energy, but Korea should find out the substitutional solution for energy mix and renewable energy.

Despite the challenges, Korea has set a target for 2030, which is expected to be in line with the recommendations of the IPCC Fifth Assessment Report to reduce global greenhouse gas emissions by 40-70% from 2010 levels by 2050.[284]

For the objective of UNFCCC to hold the increase the global average temperature below 2°C above pre-industrial levels, Korea also is going to achieve the reduction target by using various methods such as ETS and the renewable energy uses according to the recommendations of the IPCC Fifth Assessment Report.

283) Korea's INDC (http://www4.unfccc.int/submissions/INDC/Published%20Documents/Republic%20of%20Korea/1/INDC%20Submission%20by%20the%20Republic%20of%20Korea%20on%20June%2030.pdf)

284) Korea's INDC (http://www4.unfccc.int/submissions/INDC/Published%20Documents/Republic%20of%20Korea/1/INDC%20Submission%20by%20the%20Republic%20of%20Korea%20on%20June%2030.pdf)

3. Implementations under the Paris agreement regarding environmental effectiveness and economic efficiency including linking

3.1 Use of Overseas Reduced Amount

In 2009, Korea announced a medium-term national greenhouse gas reduction target stating that it will actively respond to climate change based on green growth by reducing greenhouse gas emissions by 30% compared to BAU by 2020. In the INDC (Intended Nationally Determined Contribution) presented at the Paris Climate Accord in 2015, a target of a 37% reduction compared to BAU (850.6 million C02eq) by 2030 was proposed, as aforementioned. This 37% reduction target is the selected scheme of the 3 scenarios proposed by the government in June 2015, and is a sum of 25.7% of domestic reduced amount and 11.3% of overseas reduced amount. That is, it is a plan to use the overseas reduced amount using the International Market Mechanism (IMM). This is intended to ease the direct burden placed on the industry in achieving the greenhouse gas reduction target, and measures to develop greenhouse gas reduction technology for buildings and transportation and to increase support for reduction means are under consideration. The range of the overseas reduced amount is expected to be determined depending on circumstances in the foreign and domestic carbon markets, possibility of greenhouse gas reduction, and price of emission rights. The practical effect of this system will be secured if the operation of the domestic emission trading market, appropriate prices, and price prospects operate elastically according to market mechanism. For the stable operation of the emission

trading market and elasticity, improvement of systematic limitations or problems that are limiting active transactions in the current emission trading system will have to precede. The activation of the market reserve system and the auction system must be considered in order to ease the systematic restrictions within the current system on the banking, borrowing, and offset systems, and the of connection with the international carbon market, as well as to determine the price of emission rights. On the fact that transactional bodies in the carbon market are currently only limited to allocated businesses, consideration of expansion of participation to third-parties and activation of derivative products targeting emission rights is needed.

3.2. Activation of New and Renewable Energy

In the "First National Energy Master Plan" announced in 2008, there is a plan to increase the proportion of new and renewable energy to up to 11% by 2030.[285] Thus, the vision to promote the stable supply of energy and export of the energy industry, using the expansion of supply of new and renewable energy as the growth engine for new industry, was proposed. Specific measures for implementation included the expansion of environmentally friendly energy sources that can eliminate or reduce greenhouse gas emission, and heightened energy efficiency. As a system mandating the supply of new and renewable energy, the Renewable Portfolio Standard (RPS) was implemented in 2012.[286]

285) Ministry of Knowledge Economy, article from August 27, 2008 "Establishment of 'National Energy Framework Plan,' the stepping stone for 'green growth'"

286) Korea Environment Institute, "Study on preparation of future social vision for transition of policy paradigm for response to climate change and energy", 2013.2, at 8.

Further, on July 30, 2013, the revision of the Act on the Promotion of the Development, Use and Diffusion of New and Renewable Energy in paragraphs 2 to 6 of Article 23 prepared the legal support for enforcing mandatory mixing of new and renewable energy fuel. Particularly, the plan to secure related funds and support for technology development for extended diffusion of new and renewble energy was specified, and a plan to strengthen the range of support centering on the most effective energy sources was prepared. The new and renewable energy diffusion target of reaching a proportion of new and renewable energy compared to primary energy of 4.3% ('15), 6.1 % ('20), and 11.0% ('30) was proposed, and the target of equalizing the generation cost of new and renewable energy to that of fossil fuels before 2020 through concentrated effort was established.[287)]

For such expansion of new and renewable energy, active support from the government and expansion of private investment must be accompanied. In the case of new and renewable energy, considering the current situation of the energy market and the level of technology, it is true that it is difficult to encourage corporations to invest and focus on founding new businesses and growth in related fields, even if the funding and tax benefits are taken into account. Therefore, in order to guarantee strengthened competitiveness and expanded technology for new and renewable energy through the mechanism of the energy market, more specific energy-related policies, systems, and proactive support will have to be prepared.

287) Ministry of Knowledge Economy, “3rd Framework Plan for Development, Use and Distribution of New and Renewable Energy Technology”, December 2012.

3.3. Discussion on the Implementation of a Carbon Tax

As discussed earlier, for the energy tax system on current energy sources excepting oil, such as coal and electricity, improvement of limited tax system based on policy judgment is needed, and one alternative may be the implementation of a carbon tax, which reflects external environmental factors. However, this issue must be considered carefully, as there is an emission trading system currently in place in Korea, which could impose a double burden on the targeted businesses.

Looking at cases of carbon tax in countries like the U.K. and Germany, the tax rate is applied differently depending not only on the source of energy but also on industry area and type of usage, applying a high tax rate for household, building, and transportation fuels, while varying tax rates are applied for industry usage (low carbon tax rate for energy-intensive industries, high carbon tax rate for non-energy-intensive industries).[288] To implement the carbon tax, we must consider designating businesses that are not subjects of the emission trading system as subjects of the carbon tax in order to prevent the problem of double-application, and discussion on imposing the tax based on the externally emitted amount of carbon in consideration of external environmental factors is necessary as well. However, in this case, there is the concern that a majority of ordinary citizens may bear a higher burden, as there is a high probability that the subjects of the carbon tax will be mostly household and transporation fuels. Thus, clear definition of the appropriate tax rate and the usage of the collected taxes will be needed prior to implementing the carbon tax.

288) Shin, S.C., Kim, Y.G., Han, J.H., Park, H.Y., "Ways to implement carbon tax in response to climate change", Korea Environment Institute, 2010, at 78

4. Recommendations and future plans

The greenhouse gas emission trading system is a system based on market mechanism in which the amount of greenhouse gas emission is calculated as a form of unit and an emission target is set for each subject business, where if the target is exceeded, the exceeded amount is converted into a price to be charged as a fine or to be purchased by the exceeded amount from other companies in order to avoid a fine. That is, under the serious global goal of greenhouse gas reduction, the core of the system is the operation of a rational and economical system for execution of the reduction obligation, while preventing the side-effects that can occur by inducing economic rationality. Hence, in the case of the emission trading system, if an international carbon market is formed replacing domestic emission trading systems to expand the subjects and scope of transactions, the emission trading system's original purpose of decreasing the burden of greenhouse gas reduction through transactions may be bolstered. However, regarding the emission trading system, each country's reduction target and trading system are different, and the problem of whether it is appropriate to set the value of each country's emission rights as being equal may be raised. Therefore, prior the establishment and activation of an international carbon market, an international standard that guarantees uniformity between each system will have to be established first. In the case of Korea, which has a high proportion of the industry sector, imports most of the main energy sources, and has natural difficulties in activation of environmentally friendly energy sources, the connection of the emission rights market may be an alternative.

Thus, we seek to discuss the guidelines for the formation of an international carbon market below.

4.1. The way to activate the carbon market

The Guide has been produced to facilitate linking of market-based instruments (MBIs) through the exchange of tradable emission allowances or emission credits.[289] This includes:

Emissions trading schemes (ETSs) that are usually based on a cap-and-trade design. These require certain obligated participants to hold or surrender emission allowances to cover their emissions, with total emissions from all participants being limited by the number of allowances made available. Emission allowances are initially introduced to the market by the government (usually by auction or free gift to the obligated parties), but the possibility of subsequent trading of allowances means that emissions can be reduced at least cost.

Baseline and credit schemes operate through one group of participants having an obligation to hold or surrender emission allowances or credits, and another group creating these credits by undertaking emission reduction activities. Credits are only created when a verified emission reduction has occurred.

These MBIs are introduced to enable the achievement of emission limitation goals at least cost. Participants with high costs of emission reductions purchase emission allowances or credits from those with lower costs. Linking between schemes increases the number of potential buyers and sellers and introduces the possibility for further cost savings in achieving

289) It has referred the documents based on the Asia-Pacific Roundtable hosted by New Zealand Ministry for Environment from 2012 to 2016

emission limitation objectives. Linking also has the potential to showcase a global solution to climate change in contrast to fragmented policy responses.

For simplicity in this Guide the term “emission units” or “units” is used to signify either an emission allowance or an emission credit.

a. Environmental Integrity

The common feature of these MBIs that the Guide is addressing is that an emission unit can be transferred from one jurisdiction to another. If this transfer allows additional emissions in one jurisdiction (the buyer), environmental integrity requires that this is balanced by emission reductions in the other jurisdiction (the seller) that are at least as large.

Environmental integrity is achieved when linking of schemes does not result in higher total emissions than without linking.

Environmental integrity is important to all who are concerned about the emission objectives being achieved. It is also important for market participants requiring the assurance that what they buy or sell is exactly as described, i.e. that a tonne really is a tonne. Without this assurance, there is a risk that an emission unit would later be found to represent less than what it was meant to and that they would face additional costs to be compliant. Without such integrity, the prices of emission units would be lower reflecting this default risk, potential sellers of emission units would be less likely to reduce emissions and buyers will be more likely to reduce emissions themselves rather than purchase units. The trading scheme will no longer be providing incentives for emissions reductions at least cost, and the total costs of limiting emissions will be higher for all participants.

b. The Requirements for Integrity

Environmental integrity requires that linking does not result in an increase in emissions. The minimum requirements for environmental integrity differ with the approach to policy and the type of policy instrument. Environmental integrity can be established at the most aggregate level from which there is the potential for miscalculation (whether deliberate or not) to lead to an increase in emissions, but it does not need to be established at every level.

To illustrate this we use two examples, an MBI within a country with a national emission limitation commitment and one without.

c. With National Commitment

Where a country has a national commitment to limit its emissions, environmental integrity can be established for the country as a whole by ensuring that emissions are measured accurately relative to that commitment. The accuracy with which emissions are measured at the sub-national level, e.g. for a domestic ETS, does not affect environmental integrity as the effect of inaccuracy is limited to who reduces emissions and the associated costs, but it does not affect total emissions.

For example, a country might have a commitment to limit emissions and a system to measure total emissions accurately relative to this commitment. It might establish a domestic emissions trading system covering the electricity sector only but using an emissions measurement system that under-estimates emissions leading to a surplus of units that are sold internationally. This outcome does not reduce the overall environmental integrity of the country's compliance with its commitments, provided that:

when the emission units are sold internationally, the country's national emission commitment is adjusted by the same amount; and there is an accurate measurement of all emissions at the national level and measures are taken to ensure national commitments are met.

The impacts of this situation will be that, at the national level, there will now be fewer emission units available and additional measures will need to be made to reduce emissions, at some cost, and the electricity generator will have additional profit. The impacts are financial rather than environmental; the country as a whole is worse off (it will cost more to be compliant), although the generator is better off.

On the buying side, if the purchased emissions units are used to increase total emissions, environmental integrity is maintained so long as emissions increase by no more than the number of emission units purchased.

d. No National Commitment

Where a country does not have a national commitment, environmental integrity requires that project or industry-level estimates of emissions (or emission reductions) are accurate because it will affect the total level of emissions from the country or region as a whole. Environmental integrity requires that emission units are only transferred when emissions are reduced below what they would have been without these specific units. The number of units transferred must be no more than the emission reductions achieved.

This applies both to baseline-and-credit systems in which emission reductions are measured, and to sub-national (sector- or industry-specific) cap and trade schemes for which the cap must be set at a level at

which there is excess demand for units. In all cases there is a requirement for accuracy of measurement and for reductions to be demonstrated.

4.2. Integrity of MRV

Measurement, Reporting and Verification (MRV) - ensuring that there is accurate measurement of emissions, absorption by sinks and emission reductions; Integrity of Units (Project-based Mechanisms) - additional requirements for mechanisms that create credits where these are not within an overall emissions cap. This includes mechanisms to ensure additionality of emission reductions, relative to a baseline, and the permanence of absorption by sinks; Integrity of Units (All Mechanisms) including mechanisms that might reduce the risk of emissions leakage and registries that ensure against double-counting of emission reductions or trades.

a. Measurement, Reporting and Verification (MRV)

Measurement, reporting and verification (MRV) systems ensure that emissions, changes in emissions and absorption by sinks, are calculated accurately and consistently. This includes:

- Measurement - the methodologies used to estimate emissions from sources and absorption by sinks, including the emission factors and activity data used and/or the direct measurement of emissions;
- Reporting - the content and format of reports that record the emissions data in a way that is transparent, consistent and verifiable; and
- Verification - the approaches used to provide assurance that the measurement and reporting of emissions is accurate.

Accurate measurement of emissions and absorption by sinks is necessary for environmental integrity. It is the basis for identifying whether a nation or an individual entity (e.g. an industrial plant) has emitted more or less than it is entitled to, based on a national or regional commitment, or the holding of emission units. It also provides the basis for measuring emission reductions accurately as a component of a baseline and credit scheme. Consistent measurement provides certainty to market participants that the actions that they take to reduce (or increase) emissions will be accurately reflected in emission estimates and the requirements for holding units. Combined with price expectations, this allows firms to make economically rational decisions about their emission management, e.g. how much to spend on emission reduction actions. In the absence of such confidence, emission units will have a lower value in the market. This will change the incentives for emission reduction activities for both buyers and sellers, will reduce overall market efficiency and increase the total costs of limiting emissions.

The reporting and verification components provide the assurance to others that the measurement systems are in place and are being used properly.

b. Linking

The key requirement for linking that protects environmental integrity is that doing so will not lead to an increase in emissions above what would occur in the absence of linking. Environmental integrity requires an assurance that the purchase of an emissions unit from one jurisdiction will be balanced by emission levels in that jurisdiction being lower than they would be otherwise, and by an amount that is at least as great as the number of units sold. This requires accurate measurement of emissions.

As discussed above, the level at which an emission commitment is specified defines the level at which the MRV system is required in order to demonstrate environmental integrity. If there is a national or regional commitment to limit emissions, accurate measurement of emissions at the national or regional level is required, but it may not be necessary to measure accurately below this level, provided that any transfers of emission units result in a change in the national or regional emissions cap. For example, a sale of an emissions unit needs to be accompanied by a reduction in the national/regional emission limit.

Where there is no national or regional limit, accurate measurement of emissions is required at a level appropriate to the MBI being introduced. This will be at a level that is at least as aggregate as the level at which the policy instrument is specified. So if there is an ETS for the electricity sector only, for example, environmental integrity can be achieved through MRV systems in place for the electricity sector, for the energy sector as a whole or at the national level. If there is a baseline and credit system, the MRV might operate to ensure accurate measurement reporting of emission reductions at the facility level.

c. Standards

To be effective, all market participants must have confidence in the MRV system. However, countries adopt different approaches currently, reflecting existing systems that apply in other policy areas. From this starting point it is not clear that all countries need to adopt the same approach or if a number of approaches can be used, provided that they meet a minimum set of agreed criteria. There are several standards[290] or

290) Standards are documents which provide requirements, specifications, guidelines or

guidelines for MRV that operate at different levels.

- The IPCC Guidelines for National Inventories (2006 or 1996 versions)
- Entity-level inventory standards (ISO 14064-1, the GHG Protocol Corporate Standard);
- Project standards (the CDM project standard, ISO 14064-2); and
- Verification and assurance standards (ISO 14064-3, ISAE 3000 and 3410).

The extent to which standards are used varies greatly. All countries have adopted IPCC guidelines for national inventories (RGGI is a sub-national trading scheme, so these do not apply). For New Zealand, these are the only standards used. All other schemes apply standards either to collection of data or to those verifying the data.

[Table 5-2] MRV standards and guidelines for the Asia-Pacific Region

Standards	Australia	Chile	China	Indonesia	Japan	Korea	NZ	RGGI	Singapore	Thailand	CDM Project hosts
National											
2006 IPCC	MRV		MRV	MRV	MRV		MRV				
1996 IPCC		MRV	MRV	MRV		MRV			MRV	MRV	
Organisational											
WRI/WBCSD GHG Protocol	MR										
ISO 14064-1			MR	MR		MR				MR	
ISO 14064-3	V		V	V	V1	V				V	

characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose. Standardisation of processes or procedures can provide a range of benefits, such as compatibility, comparability, quality, consistency, confidence, and ease of coordination, among others.

Standards	Australia	Chile	China	Indonesia	Japan	Korea	NZ	RGGI	Singapore	Thailand	CDM Project hosts
ISAE 3410/3100	V										
US EPA Part 75 Rule								MR			
CDM											V
Project											
ISO 14064-2			MR	MR						MR	
ISO 14064-3	V		V	V	V1	V				V	
ISAE 3410/3100	V										
CDM		MRV							MRV		MRV
Accreditation of Verifiers											
ISO 14065			V	V	V1	V				V	
CDM					V1						V

d. Equivalency

The question of equivalency is whether environmental integrity can be achieved through the adoption of any of the standards noted above. Despite the apparent diversity of approaches across the region, almost all of them draw on a core set of MRV frameworks; and there are relatively few areas of difference for the standards or guidelines applying to the same level or aspect of MRV.[291] This conclusion was based on an assessment of the components of the different standards, including the principles behind them and the important steps or elements.

The principles for three project-level standards (WBCSD/WRI GHG Protocol, ISO 14064-2 and CDM) are:

291) Commonalities and Differences between International MRV Standards and Guidelines. Paper presented at 7th APCMR, Rotorua, March 2014: MRV Work Stream Update: Commonalities and Differences between International MRV Standards and Guidelines.

- Relevance - using appropriate data, methods, criteria and assumptions;
- Completeness - Consider all relevant information;
- Consistency - use data, methods, criteria and assumptions that allow good comparisons;
- Transparency - provide clear and sufficient information for reviewers to assess credibility and reliability of reduction claims.

Two (ISO 14064-2 and CDM) also include principles of accuracy (although this is implied in the GHG protocol) and conservativeness.

The Important steps for measurement (1-13), reporting (14) and verification (15) of project- level schemes are set out in Table 2.

[Table 5-3] Steps in Project-Level MRV

Step	Explanation
1. Identify project type	CDM standard contains general and specific provisions relating to each project type. GHG Project Protocol and ISO 14064- 2 apply same provisions to all types of projects.
2. Define GHG assessment boundary	Both GHG Project Protocol and ISO 14064-2 use different terms to describe leakage. The term 'leakage' has been omitted to ensure standard is programme neutral and compatible with a range of programmes.
3. Select a baseline procedure	GHG Project Protocol clearly outlines two types of procedures (Performance Standards or Project Specific Procedures) to be followed. ISO 14064-2 makes reference to the same procedures but does not limit the choice to those two. CDM project standard and associated documents contain considerable detail explaining how additionality should be considered (c.90 approved methods).
4. Identify	The GHG Project Protocol requires the consideration of possible

Step	Explanation
baseline/candidate scenario	alternative baselines (baseline candidates) before determining a baseline scenario. The other standards do not explicitly require consideration of alternatives. While ISO 14064-2 has a broad requirement for establishing the baseline scenario, the GHG Project Protocol lists detailed requirements, including formulae. The CDM standard requires specific types of national and sectoral policies to be considered when establishing the baseline. The GHG Project Protocol and ISO 14064-2 do not explicitly outline a requirement to consider national or sectoral policies.
5. Estimate baseline emissions	GHG Project Protocol contains prescriptive requirements for estimating baseline emissions based on procedure adopted. However, there are exceptions to these requirements described in the guidance, suggesting the requirements are not as binding as the broader ISO 14064-2 provisions.
6. Quantifying GHG reductions	All the standards provide broad requirements for quantifying GHG reductions recognising that these calculations will be highly varied depending on the specifics of the project type/methodology and the baseline scenario. More detail is provided in the CDM methodologies and the GHG Project Protocol guidance. GHG Project Protocol does not explicitly deal with permanence.
7. Monitoring plan	Overall monitoring requirements across standards are similar. Monitoring Plan requirements of all standards include monitoring of data related to baseline assumptions as well as project data.
8. Perform uncertainty analysis	All standards include consideration of data uncertainty.
9. Environmental / Socio Economic Impacts	GHG Project Protocol and ISO 14064-2 do not require impact assessments. Notwithstanding this, there may be programme specific impact assessments required.
10. Local	Given the GHG Project Protocol and ISO 14064-2 are programme

Step	Explanation
stakeholder consultation	neutral consultation not required by standard. Notwithstanding this, there may be programme specific consultation required
11. Approval and authorisation	Given the GHG Project Protocol and ISO 14064-2 are programme neutral, approvals are not required by standard. Notwithstanding this, there may be programme specific approvals that are required.
12. Modalities of communications	Given the GHG Project Protocol and ISO 14064-2 are programme neutral, details of modalities of communication are not required by standard. Notwithstanding this, programmes using these standards may specify similar procedures.
13. Project documentation	Documentation requirements similar across all standards however the CDM standard and associated CDM-PDD form is highly prescriptive.
14. Implementation and ex-post reporting	All standards have requirements to report that the GHG reduction project has been implemented and monitored in accordance with its design including a comparison of actual monitored reductions (ex post) with reductions estimated at the design stage (ex- ante).
15. Validation / Verification of project	The GHG Project Protocol and ISO 14064-2 do not have mandatory requirements for validation and verification of assertions. Notwithstanding this, programmes using the standard may have verification/validation requirements. The CDM project standard contains a number of requirements should the proponent wish to have their Project validated and/or verified. These requirements are expanded on in the CDM Validation and Verification Standard.

e. Levels

The issue of levels is that the requirements for MRV may depend on the level of commitment. As discussed above, the theoretical position is that the environmental integrity of MRV systems can be achieved by en-

suring that all emissions and changes in emissions are subject to the agreed MRV standards. This can occur at the level of the trading activity or entity or at a more aggregate level (so that there is no leakage), but not at a less aggregate level. Applying MRV at the national level only is equivalent to extending the GHG assessment boundary (Step 2 in Table 2) to the national level.

4.3. Integrity of Units (Project-Based Mechanisms)

a. Additionality

Additionality is achieved when an emission reduction action or project results in total emissions being lower than they would be in the absence of the action or project. In cap-and-trade systems, total emissions and the total number of emission units are determined by the size of the cap, and there is no need to understand who reduced emissions and by how much, if the only interest is in whether there is overall compliance (emissions are less than or equal to allowed emissions). In contrast, under project-based mechanisms (baseline and credit schemes) where there is no limit on total emissions, emission reductions (to produce emission credits) are identified by comparing emissions (usually at facility level) relative to an identified baseline representing what would happen in the absence of the policy or project.

Assessing additionality is a vital component of all baseline and credit schemes. An additionality test assesses whether a project or activity that results in emissions reductions, would have occurred in the absence of the credit scheme. This is an important element because, otherwise, tradable credits might be produced on the basis of activity that would have

happened anyway. This might be used to enable a firm elsewhere to increase emissions such that total emissions are higher with the baseline and credit scheme than without.

b. Requirements

There are a number of different methods for identifying additionality that are set out in the CDM Tool for the demonstration and assessment of additionality:[292]

- There must be project alternatives, otherwise the project that is credited cannot be different from the baseline;
- The project cannot be financially the best option;
- There may be other (non-financial) barriers to implementing the project;
- The project cannot be common practice, e.g. the project is on a positive list of projects agreed to be additional.

The CDM Project Standard[293] refers to a number of guidance documents which are complementary to the CDM Tool to assist in identifying additionality:

- Guidelines on the assessment of investment analysis;
- Guidelines for objective demonstration and assessment of barriers;
- Guidelines on additionality of first-of-its-kind project activities;
- Guidelines on common practice.

292) Clean Development Mechanism Tool01 Methodological tool. Tool for the demonstration and assessment of additionality. Version 07.0.0

293) Clean Development Mechanism CDM project standard CDM-EB65-A05-STAN. Version 07.0

The other MRV standards, e.g. the GHG Protocol and ISO standards, do not provide specific guidance or rules on assessing additionality.

4.4. Integrity of Units (All Mechanisms)

a. Leakage

Leakage of greenhouse gases occurs where, as a result of emissions regulation, and particularly emissions pricing, industrial activity that produces emissions falls in more regulated countries (that impose higher costs on emissions) and rises in less regulated countries. Concerns over leakage can be environmental or economic. There are environmental concerns when leakage reduces the effectiveness of emission regulation, leading to a shift in the location of emissions rather than their reduction. For example, production of globally traded commodities may shift with little impact on either production or consumption, but with an increase in emissions.

Economic effects relate to the loss of economic activity, and this may be of concern whether production shifts to a country that is not regulated or to another regulated country (e.g. with a national emissions cap), but with lower emissions prices.

The main concern here is with environmental integrity and thus with leakage that results in higher emissions. Regardless, the factors used to identify firms and activities at risk of leakage are the same. Predictions of leakage are focussed on identifying industries that are most likely to reduce production as a result of an emissions price. Usually this is industries that are: trade-exposed－they produce an output that is widely traded and for which prices are set in international markets such that they cannot pass cost increases on; and emissions-intensive - an emissions price has a material impact on their costs.

b. Requirements

The risks of leakage are reduced when there is greater harmonisation of the level of costs imposed on sectors vulnerable to leakage.

It can also be limited through free allocation of emission units to vulnerable industries, or potentially through border tax adjustments. Free allocation comes in a variety of forms. Lump sum allocation of emission units compensates firms for any cost increases but does not change the cost of emitting or reducing one more tonne, especially if free allocation continues in the future, even if an industrial plant closes. Under these circumstances the incentives to reduce production remain, such that free allocation may not prevent leakage.

In contrast, if levels of free allocation change with levels of industrial activity then the risks of leakage are reduced but the incentive to limit emissions is removed or diminished also. Incentives to reduce emissions by reducing output are removed because the benefit of reducing emissions (no requirement to purchase an emission unit) is met by an equal cost.

Chapter 6 Conclusion

The Paris agreement provides to enhance collective ambition of countries in the world and to reduce the emissions to keep ‑2℃ after post-2020. That's why it ask the country to take the synchronized communications, syntheses of information for the most innovative elements of the post 2020 and 2030 arrangements. Accordingly, countries including EU, AU, China and Korea had announced the Intended nationally determined contributions as an initial step for implementation, and have tried to ratify it in national level.

INDCs of individual country is kind of an ambition mechanism to enable Paris Agreement Goals to be achieved, the keys of its' implementations is possible solutions for each country to need to follow-ups and apply for its undertaking at its political and economic situations. Since the climate change matter depends not only on domestic factors, but also on international cooperation to make their contribution for the ultimate collective goals. I think it is important and the first step to understand the sequence of national and international processes and activities in each countries and to know the framework for a planned mechanism. In this consideration, this report could make some contribution to get information on some countries' status of climate change.

In EU, as we mentioned at Chapter 2, they have tried to make the revitalization their Climate Change policy and implementation to go for a low-carbon country with reduction goal for emissions by at least 40% in 2030 compared to 1990 levels. Additionally, in EU, the member states have launched the clear and ambitious 'Mission Innovation' to reinvigorate public and private clean energy innovation and to develop and

deploy breakthrough technologies and achieve cost reductions. It is evaluated to make important synergy effects between energy, transport, circular economy, industrial and digital innovation, which will be a leading role to EU low carbon and energy efficiency technologies.

In AU, the government implemented several climate policies and legislations to reduce emissions and operated Carbon Pricing Mechanism also known as Carbon Tax from 2012, which was repealed and replaced by Emissions Reduction Fund (ERF) and its Safeguard Mechanism. It is an example that shows how much the Climate Change Policy depends on the political and economic decision. Even though AU has changed its implementation to ERF, it seems that it is going to be difficult for the government to meet its 2030 emission reduction target. Aside from ERF, to achieve its emissions reduction target, AU government has suggested some complimentary policies such as renewable energy target, energy efficiency improvements, phasing out of synthetic GHGs.

In China, it is the one of the largest emitters in the world, and the most rapid growth country among other developing countries. In its transition for just economic development to the sustainable development for climate change, China has shown the innovative development pathway for low-carbon and the framework to cooperate with other regions and countries. Following the adoption of the CDM in 2004, China have launched ETS pilots with Beijing, Chongqing, Guangdong, Hubei, Shanghai, Shenzhen and Tianjin, and it will be changed to the national development and reform commission. Also, it has tried to search for the specific program and guidelines to increase energy efficiency and optimize energy structure as well as carbon sink such as forest coverage to 23% by 2020.

In Korea, it launched its national ETS from 2015, which is the first nationwide Cap-and-Trade program in Asia. Even though it was non-annex 1 country under kyoto protocol, korea made a major step to reduce the emissions as for one of the OECD's fastest growing GHG emitter under Low Carbon Green Growth. Furthermore, Korea has announced the national reduction target at INDC for Paris agreement with various plans for energy efficiency and renewable energy improvement. It is kind of the cooperation to participate in the implementation of climate change required by UNFCCC and get some initiative of new development solutions through climate change. Until now, the guidelines and programs for the policy and the legislation are under working, but it could be referred to the procedures for the next steps.

Compared with the background, reduction target and the policy & legislation for Climate Change, we could recognized the consideration and procedures are similar even though it reflects on their political and economic situations among 4 countries. Through this analysis, we could read the next steps and ultimate goals on climate change, and it may play the role for guideline to search for effective implementations.

The table shows the comparative issues on climate change in EU, AU, China and Korea reflected by this paper.

[Table 6-1] Comparative Issues on Climate Change in EU, AU, China and Korea

	EU	AU	China	Korea
Reduction Target	- △ 40% by 2030 compared to 1990	- △ 26% to 28% below 2005 by 2030	- △ 60~65% from 2005 level by 2030	- △ 37% BAU level by 2030
ETS	- in ETS, △ 43% by 2030 compared to 2005 - in non-ETS, △ 30% by 2030 compared to 2005	- 2012 to 2014, Carbon Pricing Mechanism repealed (also ETS referred to be Carbon Pollution Recudtion Scheme) - substituted by Emissions Reduction Fund from 2014	- from 2011, launched pilot ETS and will initiate a national level of ETS in 2017.	- in ETS, which was launched from 2012, it covers emitters to be accounted for 67.7% GHGs
Energy Efficiency & Renewable Energy Policy	- 27% of energy efficiency improvements by 2030 - 20% target for renewable energy sources and 10% target for renewable	- 40% of energy efficiency improvements between 2015 to 2030 - 20% of renewable energy target by 2020	- According to the 11th 5 years period projects, design for energy-efficiency program on buildings, transport and	- 47% of energy efficiency improvements by 2030 - 11% renewable energy target by 2030

	EU	AU	China	Korea
	transport fules by 2020		household so on - 20% of renewable energy target	
Others	- focused between energy, transport, circular economy, industrial and digital innovation - Co2 limits for cars and Vans	- Safeguard Mechanism to prevent a rise in the emissions above BAU	- increase the forest stock volume by about 4.5 billion cubic meters on the 2005 level - Environmental protection tax on non-ETS sectors published in sep. 2016	- the possibility of carbon market linkage after 2020

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