

# **CDM: Opportunity for both Italy & China**

## **Addressing Climate Change**

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# Index

<b>1. The Kyoto Protocol and Clean Develop Mechanism (CDM).....</b>	<b>3</b>
<b>2. China environment issue &amp; opportunities on Kyoto Protocol.....</b>	<b>4</b>
2.1. <b>China national issues.....</b>	<b>4</b>
2.1.1 Environment issue.....	4
2.1.2 Social issues .....	5
2.1.3 Economic issues.....	5
2.1.4 Energy issues.....	5
2.2. <b>China strategies on the global climate change.....</b>	<b>6</b>
2.2.1 State plans.....	6
2.2.2 Summery the strategies and actions7	
<b>3. China-Italy CDM projects.....</b>	<b>9</b>
<b>3.1. The Italian context.....</b>	<b>9</b>
3.1.1 Energy profile9	
3.1.2 Plans and Actions to achieve Kyoto protocol targets11	
<b>3.2. China-Italy CDM projects introduction.....</b>	<b>11</b>
3.2.1 Chinese institutional settings.....	13
3.2.2 Italian institutional settings.....	14
3.2.3 Funds & cooperation.....	14
<b>3.3. Chinese, Italian CDM institutional settings,         Cooperation programme &amp; Funds introductions .....</b>	<b>15</b>
3.3.1 Projects Statistic and Area.....	16
3.3.2 Buyers and Projects.....	18
3.3.3 Studies from Italy-China CDM projects.....	20
<b>4. China post-Kyoto outlook: pressure or turning point? .....</b>	<b>21</b>
4.1 China - Post Kyoto - pressure.....	21
4.2 China is in a new dilemma of developing.....	22
4.3 China - Post Kyoto -turning point.....	22
<b>5. Conclusion.....</b>	<b>24</b>

## **1. The Brief introduction of Kyoto Protocol and Clean Develop Mechanism (CDM)**

The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) came into force on February 16, 2005, which now fully operated, is the international framework for achieving the first steps towards the ultimate objective of the UNFCCC. Most of the industrialized countries (Annex B countries , Annex I countries without Turkey and Belarus) have committed to reducing their aggregate emissions of greenhouse gases (GHGs) by 5.2 percent below 1990 levels during the protocol's first commitment period (2008– 2012)

The Protocol provides for a certain degree of flexibility in how the commitments may be met. The following three flexible mechanisms were established

- Emissions trading (ET) provides for Annex I Parties to acquire“Kyoto Protocol” units from other Annex I Parties and use them towards meeting their own emission reduction targets under the Kyoto Protocol.
- Joint implementation (JI) provides for Annex I Parties to implement projects that reduce emissions or remove carbon from the atmosphere in other Annex I Party countries in return for emission reduction units (ERUs). Annex I Parties can use the ERUs generated by JI projects to meet their emissions targets under the Kyoto Protocol.
- The Clean Development Mechanism (CDM) provides for Annex I Parties to implement project activities that reduce emissions in non- Annex I Party countries in return for certified emission reductions (CERs). The CERs generated can be used by Annex I Parties to help to meet their emission reduction targets under the Kyoto Protocol.

The CDM projects, which we consider mostly in this paper, beginning after January 1, 2000, have specific procedures and modalities for different types and sizes of projects (two main types are mitigation and sequestration), provide opportunities for emission reductions as well as sustainable development in developing countries. Therefore, as the Annex I country and developing country, CDM projects provide opportunity for a significant cooperation between Italy and China.

## **2. China environment issue & opportunities on Kyoto protocol**

### **2.1 China national issues**

The process of industrialization is often linked to deteriorating environmental quality and rarely turned around until a country has increased its standard of living. China has the same problem, industrialization and social change have raised the standard of living for millions of its people, but the increasingly severe problems associated with industrial growth also threaten the health of Chinese households. Some economists proudly proclaimed the country to be the “factory of the world”, but the manufacturing has been characterized by high consumption, large emissions of pollutants and low added value rapid, brings the environment pollution and energy sources crisis, as a result sixteen of the 20 most polluted cities in the world are in China

#### **2.1.1 Environment issue**

Currently, the main issues of Chinese environment are as following:

- **The climate condition is unfavorable, natural disasters are severe.**

The Chinese climate condition is related disadvantageous, comparing to the North American and west Europe, the atmospheric temperature of most areas in China seasonal change range is more acute, many places are cold in winter but hot in summer, especially in summer China is widely hot, to keep the appropriate temperature indoor has to consume more energy. Also the precipitation of China is unevenly distributing in space and time, which always brings floods and droughts.

- **Environment pollutions are very serious.**

According to the data in 2003, 90% of the rivers which pass the cities are severely contaminated, 75% lakes become atrophic; water is unsafe to drink, almost 300 millions rural populations are drinking unqualified water; almost 1/3 of the urban populations are living in the serious pollution atmosphere, we're confronted with the smog threat as a result of burning brown coal, which is the dirtiest kind available, and the rapid growing numbers of motor vehicle on the road.

Currently China face to the discard flood tide of household electric appliances, the simple disassembly way brings severe pollution; the industrial three wastes (waste gas, waste water and industrial residue) polluted farmland reach to 8.3% of the countrywide farmland; the improper use of fertilizers means the efficiency is low, as a result, the chemical fertilizers and pesticides are over used, 60% of which remains in the soil and underground water, farm produce safety is affected.

- **The ecological environment is weak and deteriorated fast.**

China's mainland coastline is 18,000 kilometers long, the close sea area is around 4.73 million square kilometers, so that China is easy to suffer the sea level rising; In 2005 the countrywide forest coverage rate is only 18.21%, deforestation has intensified annual summer dust storms; Desert is spreading with the speed of 3436sq.km/year, the sands of the Gobi desert have come within 200 miles of Beijing. 90% of the natural grasslands degenerated at the rate of 20,000,000 ha/year, until 2005 the desert or desert-like land is 2.63 million square kilometers accounting for 27.4% of the country's territory; Many rivers and groundwater are over exploited which bring a series of ecological crisis, and the coastal waters experienced 3 times red tides

compare to 1980's; 10-15% altitude plants are in severe danger.

### **2.1.2 Social issues**

China has the largest population in the world. Until the end of 2005 the Chinese mainland population is 1.31 billion, around 20.4% of world population, the degree of urbanization of China is relative low, around 750 million populations live in the rural area, urban population is only 43.0% of the national total population, lower than the world average. As a result of urbanization, China confronts the great pressure of labor employment, every year there're more than 10 million new rural labors transfer to urban area.

### **2.1.3 Economic issues**

The industries of China can be classified into three categories: primary (agriculture, forestry, and mineral production activities); secondary (traditional industrial sectors, power generation, and construction); and tertiary (the service sector, which includes culture and other social activities). Since late 1980s, the China's government started paying more attention to the transformation of industrial structures. The implementation of a series of industrial policies accelerated the development of the tertiary industry and restructures the secondary industry. The proportion of primary industry declined, the tertiary grew greatly, especially in sectors such as telecommunication, tourism and finance. The secondary industry inter-composition changed which accelerated the proportion of high value-added production. Such industrial structure change brought the energy conservation benefits.

However, up to now China economic level is still relative low. In 2005 Chinese GDP per capita is US\$ 1714 (based on exchange rate of the same year, the same below), only 1/4 of the world average, and the income is so different among different regions, in 2005 east area GDP per capita is US\$ 2,877, while the west area is only around US\$ 1136, only equivalent to 39.5% of the former. And economic development has proceeded unevenly in China, with urban coastal areas experiencing more rapid economic development than in other parts of the country, and the income diverse between rural an urban area, the average income of rural people is only 31% of urban people. China still has the big problem of poverty, the poverty- stricken people in China's rural areas numbered 23.65 million, with the per capita annual pure income less than 683 Chinese Yuan (US\$85.38).

### **2.1.4 Energy issues**

China's economic grows so fast, the consumption increasing rapidly these 25 years. With the 20% population of the world resources of China are insufficiencies, the petroleum reserves is only 1.8%, natural gas is 0.7%, ironstone is less than 9% of the world storage. As a result, the dependence on foreign resources of China gradually heightens, the rapid increase in oil import and a decline in coal export could tighten the supply-and- demand balance of the international energy markets and trigger a fierce competition for resources.

Because of the rapid increase of fossil energy demand and the high coal consumption the GHG emissions of China are relatively high too. The import issue is that China is the heaviest consumer of coal of all the major economies in the world today. Coal is China's most important and abundant fuel, In 2004 China consumed some 34% of the coal used worldwide and generated 74% of the growth in world coal consumption. In 2005, coal-driven power accounted for fully 76.4% of total primary energy consumption. There are two main types of market for coal. The first

brings together large state-owned mines, the biggest of which produce several million tons of coal per year, the large consumers of which are often state-owned, such as power plants or iron and steel smelters. This type of coal is typically sold through long-term contracts, and transported long distances. The other coal market is local, bringing together small mines, some producing a few hundred tons of coal or less annually, and most with the small industrial, residential, and commercial consumers. The inaccuracy in the data on local coal markets has been compounded by the government's campaign to close down small, unsafe coal mines, begun in 1997.

However, the energy consume per capita is relative low with the big population, in 2005 the Chinese product energy consume per capita is 1.7 ton standard coal, which is only 2/3 of the world average, far behind the developed countries average.

## **2.2 China's strategies for the sustainable development and climate change**

Recent years the environment crisis becomes a very important issue while the economic grows so fast. In May 1992, China as one of the first ten nations ratified the conversation held by the United Nations Framework Convention on Climate Change, and on August 30, 2002 China ratified the Kyoto Protocol, which came into force on February 16, 2005. Under Kyoto protocol, developing countries with less historical emission and current low per capita emission are exempt from the emission reduction for the period 2008-2012, China as a developing country the priority is to achieve sustainable development but share the responsibility with all countries in reducing emissions, for responsibilities, China has taken a series of policies and actions to address climate change under the national sustainable development strategy.

### **2.2.1 State plans**

#### **2.2.1.1 China's Agenda 21**

In 1994, China Agenda 21 which basis on China basic national condition was promulgated, and was adopted as a long term plan for economic and social sustainable development, aimed to promote the economy, society, resources and environment of mutual coordination. For example, Agenda 21 highlighted the environment protection while enough supplying national economic development.

However, the policies and actions on specific climate change not detailed, because many regions have to face the urgent domestic environment problems, but many policies match the objectives of UNFCCC to address climate change, such as energy conservation, clean technology development, and action on forest issues. Since 1994, Agenda 21 has implemented through many other plans, including China's five-year plans.

#### **2.2.1.2 Five-year plans**

- In March 1996, the ninth Five-year Plan (1996-2000) for National Economic and Social Development of China set the sustainable development as an important guideline and objective of economic and social development.
- In March 2001, the tenth Five-year Plan (2001-2005) further detailed the sustainable development; it brought forward a series of strategies for the specific objectives as ecological construction, restoration and environmental protection in several areas and different phases.
- Now is the eleventh Five-year Plan (2006-2010), which focuses on building an energy-efficient and environmentally friendly society, setting the Mid and Long term

development plan of Renewable energy conservation targets, technology transfer, capacity building, feasibility studies and cooperation on CDM. Quantified the GDP per capita in 2010 should be double of 2000 while the energy consumption GDP per capita in 2010 should be about 20% lower.

### **2.2.1.3 China's National Climate Change Programme**

In June, 2007, Government of China unveiled China's National Climate Change Programme (CNCCP), which is the first specific plan for climate change of China and also the first climate change plan by developing country. The strategies of the program aim to restructure the economy, improve the energy efficiency, innovative science & technologies, agricultural adaptation and forest planting. The fundamental data of CNCCP is based on the <The People's Republic of China Initial National Communications on Climate Change>, which took four years (2002-2006) to be completed by experts from 17 departments of China's government.

China doesn't quantified the emissions reduction targets in CNCCP, but it does not mean China will not assume responsibilities in responding to climate change, according to the strategic goal of CNCCP, China will make great efforts to achieve following objectives:

### **2.2.2 Summery the strategies and actions**

#### **● Sustainable development**

Based on the principles of CNCCP, the key point of China's climate change strategies is how to actively deal with the climate change issue in the process of sustainable development.

China has to improve and further implement the policies related to the sustainable development, speed up of a resource-conserving society, control the GHG emissions and develop a low carbon economy and society. The main actions are as following:

*Accelerating the transformation of economic growth pattern and the adjustment of the economic structure, reduce the energy and other resources consumption, expedite R& D, strengthen institutional innovation and mechanism construction, continue implement family planning, afforest and reforest planning ,etc.*

China qualified the targets have to achieve:

- I. The GDP per unit energy consumption in 2010 will reduced 20%, as mentioned above in the 11<sup>th</sup> Five-year plan, which means China will emit 1.5 billion tons less carbon dioxide and equivalent by 2010 while economy still continuing to grow rapidly.
- II. Raising the proportion of renewable energy (including large- scale hydropower) of the primary energy supply up to 10% in 2010 by energy consumption improvement.
- III. Increasing the forest coverage rate to 20% and realizing the increase of carbon sink by 50 million tons over the level of 2005 in 2010.

#### **● Enhancing capacity of adaptation to climate change**

Mitigation and adaptation both are important to cope with the climate change.

For the climate change mainly caused by greenhouse gas (GHG) emissions, the GHG mitigation is quite important, however, the global warming, sea level rising, glacier melting, and extreme weather events will not disappear in a short period with the mitigating of GHG emissions, we have to prepare for the adaptation of climate change.

For developing countries mitigation is a long and difficult challenge while adaptation is more

present and imminent task. To enhance the capacity of adaptation China will work on the energy conservation and structure promotion but also take practical measures.

The key areas of adaptations to climate change in China are as following:

**I. Agriculture**

Continue to improve agricultural infrastructures; promote adjustment of agricultural structure and cropping systems; breed stress- resistant varieties; prevent aggravation of grassland desertification; strengthen research and development of new technologies.

**II. Forests and other natural ecosystems**

Formulate and implement laws and regulations relevant to climate change adaptation ; strengthen the effective protection of existing forest resources and other natural ecosystems;

**III. Water resources**

Enhance water resources management; strengthen infrastructure planning and construction; promote the development and extension of technologies for water allocation, water- saving, and sea water utilization.

**IV. Coastal zones and coastal regions**

Establish and improve relevant laws and regulations; improve the capability in marine environmental monitoring and early- warning.

● **Improve climate change Science & Technology**

Science & Technology play more and more important role in climate change, especially the international technology cooperation and transfer, the studies and researches provides the scientific basis for developing and implementing national policies, also the relevant departments provide the international cooperation and projects in Clean Development Mechanism (CDM).

According to the CNCCP, China will strengthen the macro-management and coordination for climate change related scientific research; promote scientific research and technological development in key areas of climate change; strengthen the construction of talents in the area of climate change science and technology; increase the financial support to climate change related scientific and technological research.

● **Full implementation of commitments under the Convention and the Kyoto Protocol & Reinforcing international cooperation and communication.**

The UNFCCC and the Kyoto Protocol are the major legal frameworks for the international community to address climate change. All parties are supposed to faithfully implement their respective commitments under the Convention and the Kyoto Protocol.

China will seriously fulfill its commitments, and stimulate efforts to address climate change. China will also participate in regional cooperation which considered as helpful complement to the UNFCCC and the Kyoto Protocol, and will implement the international protocols cooperate with the native strategies.

The developed countries should fulfill their commitments of taking the lead to reduce their greenhouse gas emissions and providing financial assistance and technology transfer to the developing countries. As mentioned above technology has played an important role, should be strengthened to share the benefit of technological development worldwide.

### 3. China-Italy CDM projects

#### 3.1 Italy context

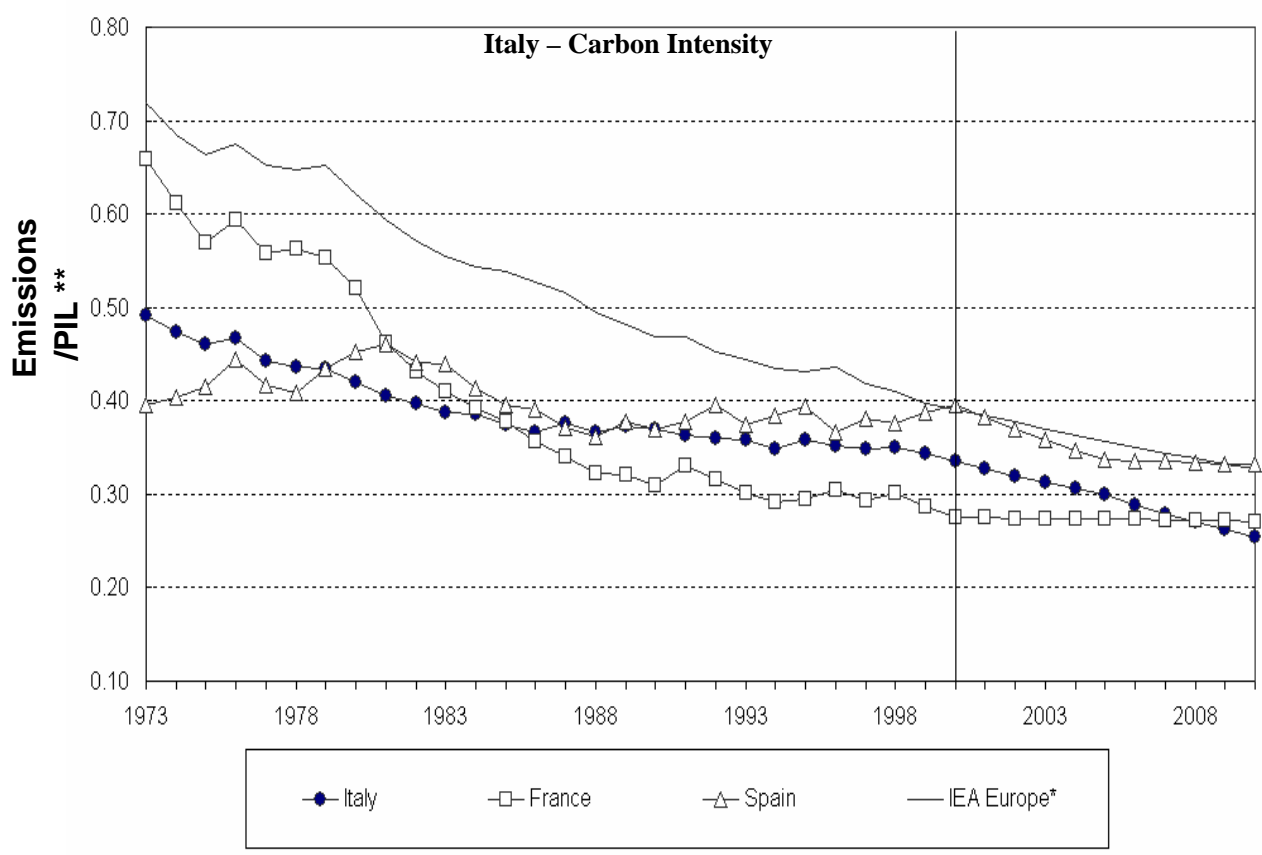
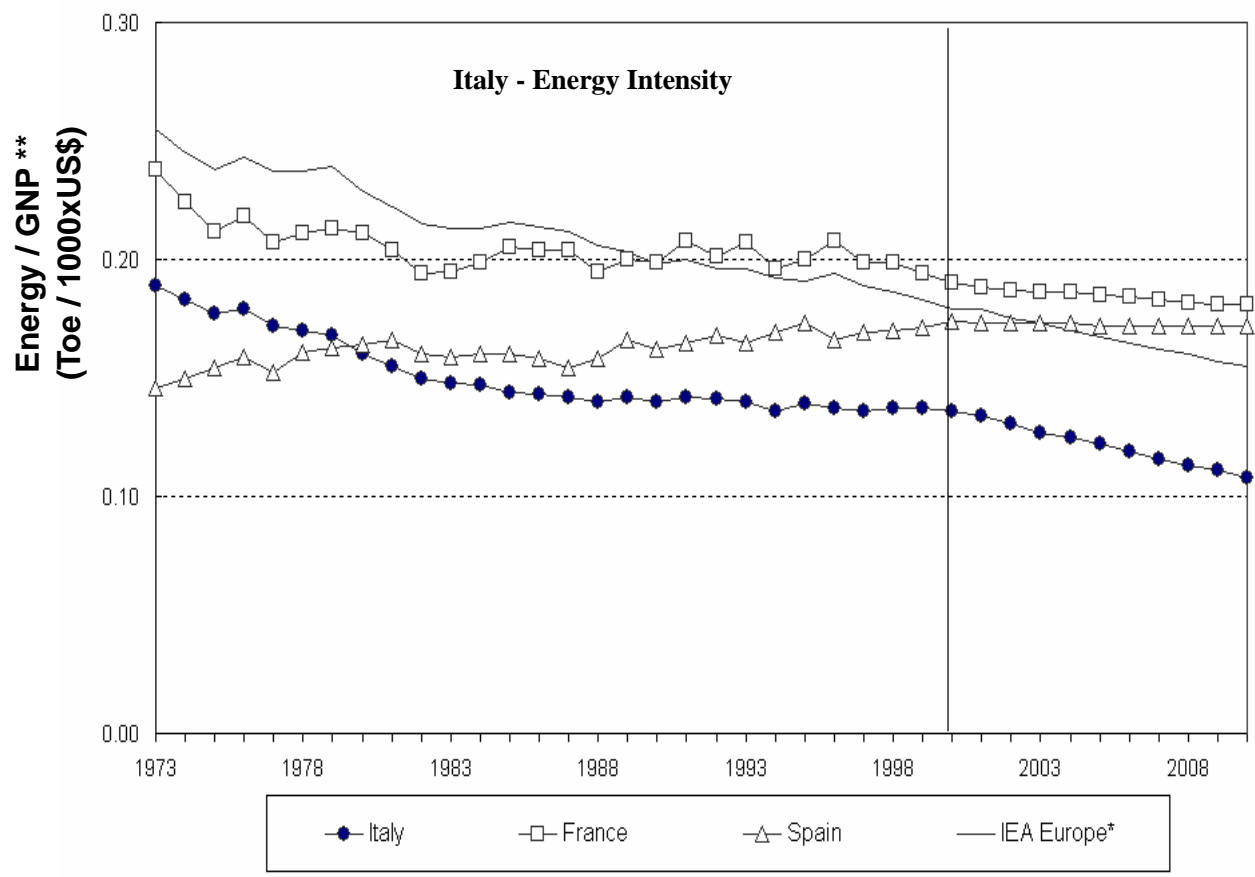
##### 3.1.1 Energy profile

Let's see some forms and graphs first.

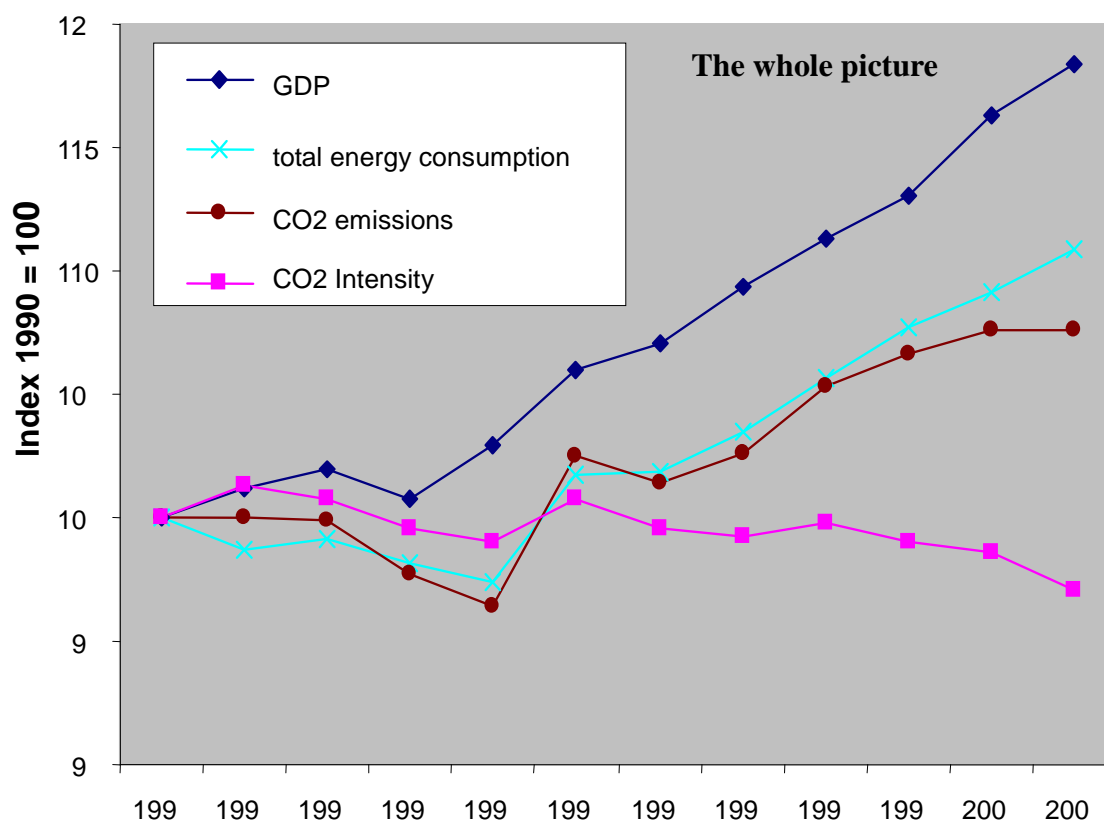
Italy – Energy Balance 2004 (Mtoe) (%)				
	Cons		Dom	Imp
Oil	88.0	<b>45</b>	5.4	82.6
Natural Gas	66.3	<b>34</b>	10.7	55.5
Coal	17.1	<b>9</b>	0.4	16.7
Total fossil	171.3	<b>88</b>	16.5	154.8 <b>94</b>
Electricity	10.0	<b>5</b>	-	10.0
Renewables	13.5	<b>7</b>	13.5	-
Total	194.8		30.0 <b>15</b>	164.8 <b>85</b>

Italy – Energy consumption forecast (%)					
	1990	2000	2010	2020	2040
Imported E	5	5	7	6	4
Renewables	5	8	8	9	10
Fossil	90	87	85	85	86

Source: Italian Ministry for the Environment and Territory



Source: Italy 2003 Review, International Energy Agency



\* Note: without Norway from 2002-2012      \*\* Note: 1995 PPP

Source: Italian Ministry for the Environment and Territory

**From the information above, we can analyze the Italian context as following:**

- Fossil contributes large amounts of energy consumption, of which oil and gas are important, accounting for 45% and 34% in 2004
- The renewables and electricity contribute relatively small amounts of energy consumption, and no nuclear energy by choice.
- The economic system is low energy intensity and low CO2 emissions and intensity.
- Ambitious Kyoto Protocol emission reduction objective (-6.5%). Around 255 Mton CO2 allocated to trading sectors within 2005-2007 per year, and asked by EU a reduction to 232 Mton CO2 per year.

**3.1.2 Plans and Actions to achieve Kyoto protocol targets**

*F.3.1.2.1: Emissions scenarios and reduction target for period 2008-2012 (Mt CO2 eq).*

"Business as usual" Scenario	"Reference" scenario (measures already approved or established)	"Reference" scenario (measures already approved or established)	Further reduction necessary to reach emissions target
579,9	528,1	487,1	41,1



<b>FROM ENERGY SOURCES</b>	<b>444.5</b>
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Energy industries, of which:	144.4	<b>-26</b>
- thermoelectric	124.1	
- thermoelectric	19.2	
- others	1.1	
Manufacturing and construction industries	80.2	
Transportation	134.7	<b>-7.5</b>
Residential and tertiary	68	<b>-6.3</b>
Agriculture	9.6	
Others( fugitives, military, distribution )	7.6	
<b>From other sources</b>	<b>95.6</b>	
Industrial processes (mineral and chemical industries)	30.4	
Agriculture	41	
Waste	7.5	
Others ( solvents, fluorinated)	16.7	
<b>Carbon Credits from JI and CDM</b>	<b>-12</b>	<b>-12</b>
<b>Total</b>	<b>528.1</b>	<b>-51.8</b>

Source: Comitato Termotecnico Italiano - Energia e Ambiente

For Italy, the Kyoto reduction target is ambitious, as we see from *F.3.1.2.1*, for period 2008-2012 is 487,1 Mt of CO<sub>2</sub> emissions to achieve, it is necessary to identify policies and measures for a further reduction of 41 Mt CO<sub>2</sub> (*F.3.1.2.1*), for this target Italy has to make efforts through both domestic and international measures, here are the national and international measures

- **Domestic measures,**

The actions in progress in Italy are as following:

- I. Replacing old power plants with new ones which are more efficient
- II. Improving energy efficiency in housing
- III. Increasing the energy consume share of renewables
- IV. Replacing up to 50 % of the present car park with higher efficiency models
- V. Improving recycling and decreasing energy waste
- VI. Increasing forestation for CO<sub>2</sub> temporary storage

- **The international measures and partnerships**

It's necessary to use the international measures to achieve the ambitious emission reduction objective, flexible mechanisms (JI/CDM) provide viable alternatives in the framework of global partnership. Italy is actively following the development of the JI and CDM flexible mechanisms frameworks and also carrying out the depth analysis by desktop studies and simulations of the role of governments and legal entities within the global carbon trading market.

Italian government has worked on a number of agreements of flexible mechanisms cooperation with countries in Eastern Europe, Asia and North Africa; the projects based carbon credits reduction will add up to 10% to 50% of the national emissions reduction during the first commitment period. Italy also acts as a founding supporter of the carbon funds (CDCF, Italian Carbon Fund, Biocarbon Fund) within the partnership of World Bank.

Flexible mechanisms will contribute to the overall reduction by:

- I. Activities sponsored by public institutions
- II. Activities carried out by private companies

The exact extent to which flexible mechanisms will contribute depends on evolution of both the carbon market and the national abatement costs.

*F.3.1.2.: Options for the adoption of additional emission reduction measures.*

	<b>Potential reduction (Mt CO2 eq /year)</b>
<b>A) Adoption of Additional Domestic Reduction Measures</b>	<b>30,4-44,2</b>
Use of energy sources	<b>22,3-35,4</b>
Industrial sector	5,1-9,6
Renewable sources	1,8-3,4
Residential and tertiary sector	3,8-6,5
Agricultural sector	0,28-0,34
Transport sector	11,3-15,6
From other sources	<b>8,15-8,80</b>
<b>B) Use of the JI and CDM Mechanisms</b>	<b>20,5-48</b>
Carbon removal	<b>5-10</b>
JI projects	2-5
CDM projects	3-5
Projects in the energy sector	<b>15,5-38</b>
JI Project to improve the efficiency of electricity generation and industrial activities	3-10
CDM projects for the production of energy from renewable sources	1-5
CDM projects to improve the efficiency of electricity generation and industrial activities	1,5-3
JI and CDM gas-flaring and gas-venting projects in oil wells	10-20

*Note: Among the detailed measures, a selection will be made by Inter-ministerial Committee for GHG reduction. Priority criterion will be the cost-effectiveness of the various options*

*Source: Comitato Termotecnico Italiano - Energia e Ambiente*

## **3.2 Chinese, Italian CDM institutional settings & Funds introductions**

### **3.2.1 Chinese institutional settings**

- **The National Coordination Committee on Climate Change( NCCCC)**

NCCCC is the main Policy making and coordinating CDM-related issues authority in China, main functions:

- I. Review national CDM policies, rules, and standards

II. Approve members of the National CDM Board

III. Review other necessary issues

● **The National CDM Board( NCB)**

NCB is established under the committee, which is co-chaired by the National Development and Reform Commission (NDRC) and the Ministry of Science and Technology (MOST), and the Ministry of Foreign Affairs (MFA) serves as the vice chair of the board. Other board members are the State Environmental Protection Administration (SEPA), China Meteorological Administration, Ministry of Finance, and Ministry of Agriculture. The main functions of the board are as following:

I. Reviews and assesses CDM projects / Qualification to participate/ design projects documents/ ascertain the baseline methodologies and GHG reduction emission / Certified emission reductions price /Funding and technology transfer

II. Report to the National Coordination Committee on Climate Change on the overall progress of CDM project activities, present issues that have emerged, and make further recommendations

III. Make recommendations on the amendments to the interim measured contribution to sustainable development

● **National Development and Reform Commission (NDRC)**

NDRC is designated national authority (DNA) of China, the responsibilities are as following:

I. Accept CDM project applications

II. Approve the CDM projects with MOST and MFA according to the conclusions of NCB

III. Issue the CDM projects approval documents authorized by government of China

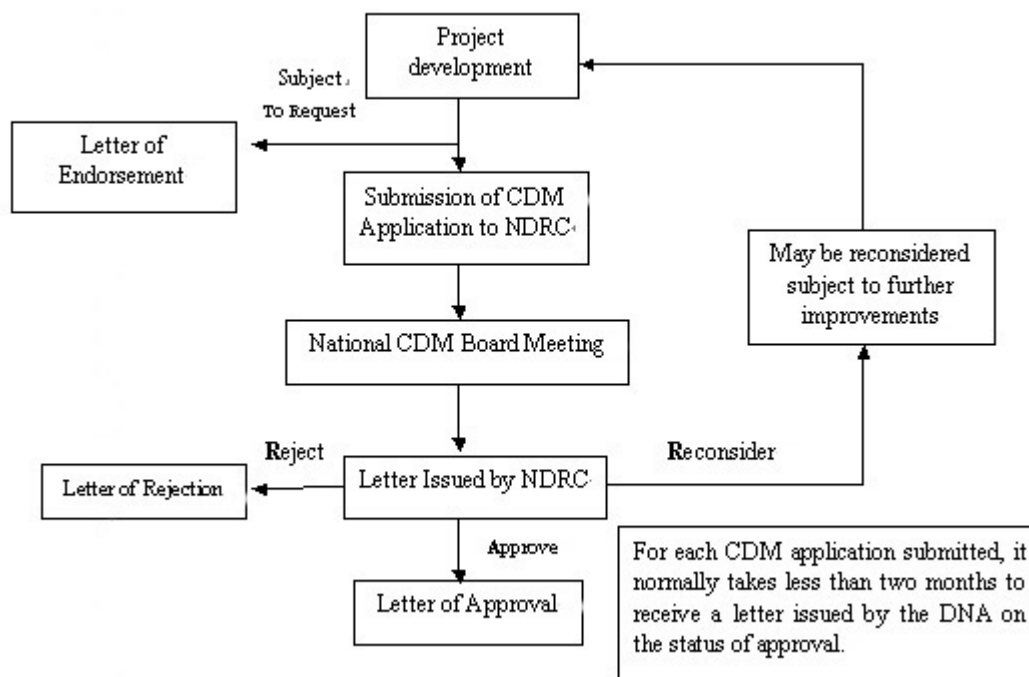
IV. Supervise and manage the implementation of CDM projects

V. Establish the CDM projects management institution consult with other departments

VI. Deal with other related foreign issues

National Development and Reform Committee (NDRC) is the Designated National Authority (DNA) in China responsible for the approval of CDM project applications.

### PROJECT APPROVAL PROCEDURES:



### 3.2.2 Italian institutional settings

Ministry for the Environment and Territory as the designated national authority (DNA) of Italy Department for Global Environment, International and Regional Conventions

### 3.2.3 Funds & cooperation

#### 3.2.3.1 Funds

There're several funds support CDM projects, mainly from World Bank Carbon Finance Unit, which contributed by governments and companies from OECD countries and invest the CDM or JI projects in developing countries by purchasing the emissions reductions.

Here are funds related to Italy and China CDM projects

- **Italian Carbon Fund (ICF)**

This fund is an agreement between World Bank and Ministry of Environment and Territory of Italy in fall 2003, the participants are both Italian private and public sector entities and the capital is US\$155.6 million, purchasing the GHGs reductions from projects in developing countries and countries with economies in transition that may be recognized under the Kyoto Protocol's CDM mechanism.

**Participants:**

Italian Ministry of Environment, land and Sea, S.I.E.T. S.P. A., Cementerie Aldo Barbetti S.P.A, ERG S.P.A, Endesa Italia S.P.A, Italcementi Group

- **Community Development Carbon Fund (CDCF)**

CDCF became operational in March 2003 as a public/ private initiative set to cooperate with the International Emissions Trading Association and the United Nations Framework Convention on Climate Change. The fund is capitalized of US\$128.6 million with 15 corporations/organizations Fund and nine governments which Italian government involved,

supports the carbon finance to the projects in poorer areas of developing countries.

- **Bio Carbon Fund**

This fund is aim to sequester or conserve carbon in forest and agro-ecosystems and poverty alleviation, which composed of two tranches: One is operationalized in May 2004 with capital of US\$53.8 million and the other operationalized in March 2007 which is still open to contributors, and Italian government participates in the fund.

- **China Clean Development Mechanism Fund**

This Fund is a public/ private initiative set to cooperate with the United Nations Development Programme ( UNDP ) and Ministry of Science and Technology of China (MOST), which became operational in March 2007 with the capital of US\$170 million, aims to expand the carbon market, reduce the GHG, provide the infrastructure construction and policy advices.

### **3.2.3.2 Sino-Italian Cooperation Program for Environment Protection**

The Italian Ministry for Environment and Territory (IMET) together with the Chinese State Environmental Protection Administration (SEPA), the Ministry of Science and Technology (MOST), the Chinese Academy of Social Sciences (CASS) and both Beijing and Shanghai Municipal Governments have engaged since 2000 an intense cooperation programme on environmental protection, which has been supported by IMET and SEPA with a contribution of 20 millions Euros and co-financed by the Chinese Government and Municipalities and also the Italian enterprises engaged, up to now there're over 50 projects implemented in China, which cover various aspects in the sector of sustainable development:(1) Energy Efficiency, Clean Energy & Renewable Energy; (2) Assist China to implement international conventions; (3) Air Monitoring; ( 4 ) Urban Sustainable Development & Eco-building; (5) Waste Recycle; (6) Sustainable Transportation; (7) Integrated Management on Water Resources; (8) Eco Conservation & Sand Control; (9) Sustainable Agriculture; (10) Capacity Building.

Here introducing a CDM study under this programme. "China CDM Study project" which is sponsored by World Bank, GTZ, Switzerland and Italy, directing at the promotion of CDM projects in China. The Study aims at the elaboration of methodologies of CDM real cases, the IMET financed the elaboration of two CDM methodologies, one for the iron & steel sector and one for the Eco-efficient building which realized in Tsinghua University. This study cover the topics regarding the main CDM methodology elements to be applied in the given projects, such as GHG sources and project boundaries, baseline setting, additionally, calculation of GHG emission reductions and the incremental cost for the emission reductions, etc.

### **3.3 China-Italy CDM projects introduction**

In 2006 China dominated the world CDM market on the supply side with a 61% market share of volumes transacted, and has represented 60% of the cumulative CDM market since 2002. Up to 2007, 17th Sep, China's Office of National Coordination Committee on Climate Change (DNA) has approved 737 CDM projects around the country, with the potential to generate 205.7 million certified emissions reductions (CERs) annually, and of which 112 projects have already been

registered, 16 projects have obtained total amount of 19,824,746 tons issued CERs from EB already, occupied 24.02 % of the total CERs issued, ranking the second following India in the world.

### 3.3.1 Projects Statistic and Area

Italy is a reliable partner on the global carbon market, and has played an active role in China, up to 17th Sep there're 66 projects approved by China DNA which total can generate 50million tons reduced carbon credits per year, and 10 projects have been registered (see F3.3.1.1)

*F 3.3.1.1 Projects in China registered to the CDM Executive Board Resources: UNFCCC*

Registered	Title	Methodology	Reductions
04 Jun 06	Project for GHG Emission Reduction by Thermal Oxidation of HFC23 in Jiangsu Meilan Chemical CO. Ltd., Jiangsu Province, China	AM0001 ver. 3	8,411,432
08 Aug 06	Project for HFC23 Decomposition at Changshu 3F Zhonghao New Chemical Materials Co. Ltd, Changshu, Jiangsu Province, China	AM0001 ver. 3	10,437,249
27 Oct 06	Project for HFC23 Decomposition at Limin Chemical Co., Ltd. Linhai, Zhejiang Province, China	AM0001 ver. 4	4,783,753
27 Oct 06	Project for HFC23 Decomposition at Zhejiang Dongyang Chemical Co., Ltd., China	AM0001 ver. 4	3,656,598
10 Nov 06	Facilitating Reforestation for Guangxi Watershed Management in Pearl River Basin	AR-AM0001 ver. 2	25,795
29 Mar 07	Huadian Inner Mongolia Huitengxile 100.25MW Wind Farm Project	ACM0002 ver. 6	263,800
02 Apr 07	Yunnan Whitewaters Hydropower Development Project	ACM0002 ver. 6	274,560
01 May 07	HFC23 Decomposition Project at Zhonghao Chenguang Research Institute of Chemical Industry, Zigong, SiChuan Province, China	AM0001 ver. 4	2,065,533
17 May 07	Rongcheng Dongchudao Wind Farm	ACM0002 ver. 6 AMS-I.D. ver. 10	29,091
27 Jul 07	Laizhou Diaolongzui Wind Farm	ACM0002 ver. 6	95,718

- **Baseline related**

Here are some introductions of the baseline applications of the registered Italy-China CDM

projects. To facilitate an understanding of the approved methodologies, the following section will summarize them according to the categories listed in the interim measures plus one other category.

The first sub- group includes ACM0001 (AM0002, AM0003, AM0010, AM0011), which are aimed at projects that process municipal solid wastes (MSW). This sub- group is applicable to the capture of landfill gas( LFG) where the baseline scenario is the partial or total atmospheric release of the gas, and the captured gas is flared or used to produce energy(e.g. electricity/ thermal energy). Emission reductions are achieved by diminishing LFG emitted into the open air as well as by reducing fossil fuel consumption. For all of these LFG recovery and utilization projects, ACM0001 is a consolidated baseline and monitoring methodology, others are the original sources of ACM0001.

The second sub- group which applied most in Italy-China CDM projects includes ACM0002 (AM0005, AM0015, AM0019)(hydro, wind, geothermal, solar sources, tidal, wave), ACM0002 is applicable to project activities that involve grid- connected electricity generation from renewable energy sources. There are a number of different sizes and sub-types of this project activity (e.g. run-of- river hydropower plants, hydropower projects with existing reservoirs where the volume of the reservoir is not increased, wind, geothermal, solar sources, tidal, wave). For all these renewable energy projects, ACM0002 is a consolidated baseline and monitoring methodology. During the actual methodology application, the separated methodologies of AM0005, AM0015, AM0019, which are the original sources of ACM0002, are also optional choices, depending on each specific situation.

- **CDM projects area**

To prompt the CDM at national level, the policy document, “Measures for the Operation and Management of CDM Projects”, was released first in June 2004 and then amended in October 2005. In the Measures, the priority areas for CDM projects are energy efficiency improvement, development and utilization of new and renewable energy , methane recovery and utilization.

Chinese government also collects a levy on the CER revenue of CDM projects (65% for HFC23 project, 30% for NO<sub>2</sub> and 2% for others). In fact, the priority areas of the interim measures fully reflect the Chinese government’s views of sustainability and technology transfer as recommended CDM activities.

For the Italy- China cooperation CDM projects area, from the view of quantity of projects the renewable energies area is accounting for 77.27% of the total, of which Hydropower plays a leading role; from the view of emission reduction/ t CO<sub>2</sub> e, HFC 23 which accounting for 76.06% is the main area. (see F 3.3.1.2)

### F 3.3.1.2 project category

Project category	Number of projects (%)		Estimated annual emission red /t CO2e (%)	
Energy savings	7	<b>10.60</b>	2,883,236	<b>5.74</b>
Reforest	1	<b>1.52</b>	25,795	<b>0.05</b>
HFC 23 decomposition	6	<b>9.09</b>	38,190,729	<b>76.06</b>
Reductionand/ or use of landfill gas emissions	1	<b>1.52</b>	64,302	<b>0.13</b>
Renewable energies	51	<b>77.27</b>	9,046,228	<b>18.01</b>
Hydropower	48	<b>72.73</b>	8,290,831	<b>16.51</b>
Wind power	3	<b>4.54</b>	755,397	<b>1.50</b>
Total	66		50,210,290	

### 3.3.2 Buyers and Projects

#### F 3.3.2 Italy – China Projects approved by the Chinese DNA up to July 31st, 2007

Buyer	Number
Enel S.P.A	<b>57</b>
Asja.biz	<b>1</b>
World Bank (ICF,CDCF,Bio Carbon Fund)	<b>6</b>
Endesa	<b>2</b>

From F3.3.2 we can see the Italian buyers are relatively simplex, Enel is the biggest buyer in Chinese carbon market, world bank with total 3 funds invest 6 projects, and for the private partner is quite few, only 2 companies with 3 projects total.

- **Enel:**

Enel is Italy's largest power company, leading electricity generator, the second-largest Italian distributor and vendor of natural gas, and also operates a wide range of hydroelectric, thermoelectric, nuclear, geothermal, wind-power, and photovoltaic power stations.

Enel has to achieve emission reduction (target surpassed) and fuel diversification (using the most efficient technologies), Its global emission is to be reduced from 69 (2000-2003 average) to less than 60 Million tons, as a result , Enel needs to coordinate and manage all the actions in an integrated way, seeking the CERs from international carbon market that CDM projects is one of the main measures.

Enel plays very actively in Chinese Carbon Market, Up to now Enel has already invested 57 CDM projects in China, accounting for 86% of the whole projects number, and its main CDM area is renewable ennergies, as hydropower and wind power.

Miss Gao who works in Chinese Enel office said that, China's CDM market is blooming currently under the raising of public awareness, Enel works with IMET for the Sino•Italian Cooperation Program since 1999 (chapter 3.2), and also cooperates CDM porjects with World Bank, but for most projects Enel selects the Chinese partners and operates projects itself. As one of the early investors Enel has got many experimences, now a number of projects have been approved, Gao said in the following years Enel will more focus on implementing existing projects, but Enel also concerns about the uncertainty of Post Kyotocol after 2012.

- **World Bank**

World bank is one of market facilitator and catalyst in the development of a market for carbon trade, manages eight carbon funds comprised of public and private participants: Prototype Carbon Fund( PCF) ; Netherlands JI and Netherlands CDM Funds; Community Development Carbon Fund( CDCF); Bio Carbon Fund; Italian Carbon Fund; Spanish Carbon Fund; Danish Carbon Fund; and has signed an MOU to create a ninth( Pan European Carbon Fund) with the European Investment Bank( EIB).

These funds are public or public- private partnerships managed by the World Bank as a Trustee. they purchase greenhouse gas emission reductions from projects in the developing world or in countries with economies in transition, and pay on delivery of those emission reductions. The emission reductions can be used against obligations under the Kyoto Protocol or for other regulated or voluntary greenhouse gas emission reduction regimes. All the emission reduction credits are purchased on behalf of the public and private sector Participants in the funds.

It is thus expected that the Bank's market share will decrease, and will be focused on reducing regulatory risk and uncertainty in the market, consolidating and streamlining carbon asset creation, and developing the frontiers of the market.

- **World Bank and Italian Ministry for the Environment, Land and Sea (IMET) cooperation**

As we discuss in chapter 3, Italy has an ambitious Kyoto Protocol emission reduction objective, for its commitment as well as sustainable development and poverty eradication worldwide, governments that are purchasing credits consistent with their national strategies to meet their objectives, Italian Ministry for the Environment, Land and Sea (IMET) works for this issue.

In partnership with the World Bank, IMET has been a founding supporter of the Community Development Carbon Fund and BioCarbon Fund, which judged as an efficient mechanism for extending the reach of carbon finance and the Clean Development Mechanism to developing countries. In addition, in March 2004 World Bank and IMET lauched the Italian Carbon Fund (ICF) which as Corrado Clini, the Director General of IMET said, “we see ICF as a balanced combination of a secure yet economical way to promote the protection of the global environment, acquire and disseminate carbon finance experience and leverage substantial investments in host countries while meeting some of our emission reduction obligations, became operational. Its project pipeline is diversified both in terms of technology deployed and regions involved. Thanks to the experience and the work of our partner in this venture— the World Bank— the ICF has achieved very positive results over time.” And he also mentioned after the involvement of the Italian private sector ICF has grown substantially with the capital now amounts to more than\$ 150 million.

### **Italy –China CDM project Case : Nanjing Steel Converter Gas Recovery Project**

China is the world's largest steel producingcountry— producing more than 300 million tons per year, but there is room for improvement in efficiency of the operations. The Nanjing Iron & Steel Co., Ltd.( NISCO) in Jiangsu Province of China has signed a greenhouse gas emission reductions purchase agreement with the World Bank, acting on behalf of the Italian Carbon

Fund( ICF) for the first energy efficiency project in China under the Clean Development Mechanism. The ICF through the World Bank will purchase around 600,000 tons of emission reductions from the project.

### **3.3.3 Studies from Italy-China CDM projects**

#### **● Advantages and disadvantages of investments in China**

Ms.Sara Leggio, who works in Dep.for Environmental Research and Development, IMET and in charge of the CDM projects between Italy-China and the cooperation with World Bank, from her view the main advantage in developing CDM projects in China is the fast growing economy which creating an enabling environment. The carbon finance and environment issue very often can not stimulate investments. But in China the flourish economy is very active in accepting the Kyoto Protocol rules and procedures and in creating the political and legislative infrastructures at a central level. The consultancies and technical expertise are very fast to establish. Therefore, the Chinese CDM market is particularly interesting since it's possible to integrate the investments decisions with environmental instances. And for the western economy the innovative environmental friendly technologies are very often the only added value to China.

When she mentioned the disadvantages, the barriers are very often linked with the culture differences. The business world such as the carbon market is internationally ruled with sometimes tacit rules. But those rules do not work sometimes in China and the approach is always very different. The time to implement a project is enlarged by the time to get known each business partner. The way of communicate is very different, much less straightforward and often it is not possible to not take into account those cultural differences. In addition, there is a gap in the knowledge of CDM business opportunities between the central institutional level and the country side where the majority of the projects could be implemented.

#### **● The Private participants of the CDM Projects**

From F3.3.2 we can see the Italian private actors involved in Italy –China CDM projects are very few, and even the private entities invested in carbon market are either obliged GHGs emission reduction targets (ex. Enel) or professional clean energy company (ex. Asja.biz ),why? here analyzing a few reasons as following:

I. The Italian private sector is generally very slow in considering the disadvantages of acting too late to CO2 permits, the advantages of procuring CO2 permits in advance are not widely cognized.

II. Italian banks are comparing not proactive and not leading the private investors in investing CDM projects abroad.

III. Italian private sector composition mainly based on Small and Medium Enterprises (SMEs), for this type of enterprise it's very difficult to act internationally.

## **4 China post-Kyoto outlook - pressure or turning point?**

### **4.1 China - Post Kyoto - pressure**

Since this year the North Hemisphere experienced the warmest winter never recorded, reducing greenhouse gas emission has become the core global issue of common concern to the international community, China is inevitable involved in.

China has never be that close to the global warming, many places in succession reports this winter is infrequent warm in weather history, the severe spring drought in southwest provinces brings a lack of water for millions people, Yangtse River is once too shallow to sailing, the northeast area encounters snowstorm...

On the other side, the pressure of requirement to quantify reduction of GHG from international community has never that close to China too.

Britain recently pledged cuts 60% of GHG emissions by 2050 and EU in this March agreed an ambitious deal which committing to reduce GHG emissions by 20% of 1990 level by 2020 but with the condition if the other nations make comparable efforts, and claims they can even reduce by 30% if US and China take part in.

EU recently called on China and India make the pledge to reduce the GHG emission, and European media asked the question about how China reducing GHG emissions in both two news conferences of the Minister of foreign affairs Li Zhaoxing and the Premier Wen Jiabao.

The Kyoto protocol which entered into force in 2005, as it designs, the fast developing countries as China and India and the United States are failed to be included by the regime of targets and timetable of Kyoto.

All the EU meetings and discussion around "Post Kyoto" are aimed to bring the main GHG emission countries to the new framework after 2012, one part is the developed countries as US, Canada, Australia etc, which quit or not sign to Kyoto Protocol, especially US, which is responsible for a quarter of the world's greenhouse-gas emissions; the other part is the emerging developing countries as China and India which not obliged to the reduce emissions but considered as big industrial GHGs emitters. Now many member countries agree that without the participation of both the US and the emerging developing countries in post-Kyoto agreement, the aim to stabilize greenhouse-gas emissions below dangerous levels may be not realized.

During the discussions at the G8 Summit in Heiligendamm, Germany set a timeline for post-Kyoto negotiations. And in Bali World leaders planed to rally for global negotiations on the framework and to be completed by 2009.

Jeffrey D. Sachs, the Director of the Earth Institute at Columbia University, indicates that the climate change problem can not be solved without the participation of China. From the end of 2007 the countries should negotiate the climate change system after 2012, and the basic principles should be formed in 2008, and in 2009 it's necessary to pass an agreement which should set binding targets and rules and include costs for those who fail to comply, the US and China should be included.

The above prevalent “Post Kyoto” timetable of international community means that, China certainly will confront more challenges of reducing GHG emissions in a series of multilateral and bilateral diplomatic situation latter.

#### **4.2 China is in a new dilemma of developing**

Now China is the second biggest GHG emission country behind US, but its historical GHG emissions is very low, the markedly increasing is only since 1990. Many people hailed when the new EU targets came out, but the fact is most share of historical and current global GHG has originated from developed countries during the industrialization process in 18<sup>th</sup> century, as Qin Dahe, the general director of China’s weather bureau, points out that CO<sub>2</sub> could last at most 3000 years in aero sphere, which means the GHG emissions from the human industrial revolution hundreds years ago has the most responsibility of the global warming.

The developed countries realized the industrialization and modernization by damaging and then curing the environment, now the GHG emissions is relatively low. But for developing countries as China in the next 15 to 20 years will continue to register a rapid economic growth, which means a rising demand for and consumption of energy and the growing of share of global emissions to meet their social and development needs.

The development history and trend of various countries has revealed the obvious positive correlations between per capita CO<sub>2</sub> emissions, per capita energy consumption and the economic development level. In the development history of human beings, there is no precedent where a high per capita GDP is achieved with low per capita energy consumption.

China is a country with a large population and at a relatively low level of development, and its economic development has long been constrained by the scarcity of per capita resources and it will continue to be so for a long time. China can not repeat the way developed world did, it can not afford the big consumption of resources and energy, the only resource of China can self-support is coal, but coal consumption will generate much CO<sub>2</sub>, pick up the GHG effect, this is quite a dilemma for China.

*A government report point out “the carbon emission future for China is quite rigorous, China have to sacrifice economic growth and urbanization if they compel to cut the GHG emissions.”*

#### **4.3 China - Post Kyoto -turning point**

There is now widespread scientific consensus that accelerated climate change is happening and that human activities are the principal cause, public awareness of climate change is greater than ever before. It’s the right time to use the political way to solve the global warming issue, “Kyoto Protocol” is one of result, China has to take more international responsibility.

*“Under the greater pressure we have to change our policies, have a more flexible and practical attitude...make new choices for the commit targets and forms.”* says a report from National Development and Reform Commission of China.

Up to now addressing to the climate change issue China has made many aggressive domestic policies in place, as mentioned in chapter 2, mainly including a pledge to quantify energy consumption per unit of GDP 20% lower by 2010 and to meet 15% of its electrical demands with renewable energy by 2020, and with the Kyoto Protocol economic tool “CDM” projects China has also become the important partner of developed countries to commit their GHG emission reduction.

But is “Post Kyoto protocol” only pressure for China? Or we can also consider it as the opportunity, which could adjust China’s economic structure, improving its energy efficiency, spur China to get rid of high consumption and high pollution development and to internalize the enterprises externalities pollution costs,

In China some situations are not optimistic after the implementation of Kyoto Protocol, on the one hand, some of the developed countries are awed of the restriction of Kyoto Protocol, transfer more high-carbon, high consumption and high emission projects to China, on the other hand, with the drive of local benefits and GDP adoration, so many places in China accept the investments without distinguishing cautiously. As a result, many high pollution projects have been constructed in China, and the long-term projects, especially will lead to a large resources waste if China quantified the reduction GHG emissions. Therefore, in the Post Kyoto era it would be better for China to improve its own environment assessable standard than passive inaction as before.

Form the view of Chinese enterprises, which always suffering from the antidumping of the low international price, but this low price is cost of low wage, high pollution and high consumption, and currently the bad result of economic externalities emerges though the international trades. To internalize the externalities, Post Kyoto is a turning point, with this external pressure, enterprises can adopt different internal ways such as purchasing the environment protection infrastructure, not only reducing the GHG emissions and improving the environment quality, but also solving the conflicts of enterprises costs and international trades.

Climate change is an issue involving both environment and development, but it is ultimately an issue of development. Science and technology are the key factor of sustainable development. One of the main reasons for China’s low energy efficiency and high GHG emission intensity is the backward technologies of energy production and utilization. Owing to the lack of advanced technologies as well as the large proportion of out-of- date processes and technologies, China’s energy efficiency is about 10% lower than that of the developed countries, and its per unit energy consumption of energy- intensive products is about 40% higher than the advanced international level. China is now undergoing large- scale infrastructure construction for energy, transportation and buildings, the features of intensive emissions associated with these technologies will exist for the next few decades if advanced and climate- friendly technologies could not be made timely available. The Post Kyoto could be another chance for China to develop the new technology as early as possible, and have more opportunities to get the support from developed countries, as CDM projects experiences under the Kyoto Protocol.

## 5. Conclusion

Global climate change is widely concerned of international community, which has and will continue to have serious negative impact on the global, national and local ecosystem and social-economic development. The UNFCCC and the Kyoto Protocol as the major legal framework addressing this urgent issue are significant, all the parties should take their responsibilities and faithfully implement their respective commitments, China and Italy are inevitable involved in.

Under Kyoto Protocol, China as developing countries with less historical emissions and current low per capita emission is exempt from quantified GHGs emission reduction in 2008-2012, based on the principle of common but differentiated responsibilities, China has taken a series of policies and actions to address climate change under the national sustainable development, e.g. Chinese government has set an ambitious target to achieve a deep reduction target for energy intensity and major pollutants; in June, 2007, China unveiled the National Climate Change Programme, which is the first climate change plan launched by developing country.

But as a consequence of the rapid industrialization, urbanization and economic growth, China has entered the period with heavy pollution load, and is facing serious urgent issues as energy shortage and environmental degradation, also because of the rapid increase of fossil demand and the high coal consumption the GHG emission of China is relatively high which ranking the second in the world after US. China has to made a great efforts to achieve the targets, one of the important measures to fulfill the plans is the advanced Science and Technology, and CDM as one of the flexible mechanisms provided by Kyoto Protocol is one way to transfer the technology from developed countries through projects cooperation.

Italy as the Annex I country has an ambitious objective of (-6.5%) GHGs emission reduction under Kyoto Protocol, to achieve the targets Italy has made plans through both national and international measures, here are some principles of Italy National Plan: maximizing economic efficiency and exploiting synergies between climate change polices and other policies (e.g. renewable), promoting technology innovation and diffusion, integrating of carbon finance activities in existing project finance activities, facilitating global and regional partnership, etc.

As mentioned in the paper, project-based carbon credits are expected to offset national emissions reduction of the first commitment period between 10% and 50%. So, the flexible mechanisms as JI and CDM on account of the relatively low unit cost for reducing emissions will complement Italian internal policies with the projects sponsored by public institutions and carried out by private companies.

Italy plays a actively role in international carbon markets, as the paper mentioned there're several carbon funds Italy invests, including Community Development Carbon Fund (CDCF), BioCarbon Fund, and Italian Carbon Fund(ICF), of which the ICF is an agreement between World Bank and Ministry of Environment and Territory of Italy purchase greenhouse gas emission reduction from projects in developing countries and countries with economies in transition that may be recognized under the Kyoto Protocol's CDM mechanism.

Italy also plays a active role in China CDM market, until 17<sup>th</sup> Sep, 2007 there're 10 projects

registered and 66 projects approved by China DNA which can generate 50 million tons reduced GHGs. To prompt the CDM at national level, China released a policy document in 2004 and then amended in 2005, “Measures for the Operation and Management of CDM Projects”, defined the priority areas for CDM projects are energy efficiency improvement, development and utilization of new and renewable energy and methane recovery and utilization, and in these areas Italy has much experience and advanced technologies.

But if we consider the forms in this paper we’ll see that the Italian investors are only a few companies or institutions, Enel is the biggest, and then world bank, IMET with the carbon funds, but the private partners are quite few only 2 companies. We consider some reasons in the paper, so based on this paper we make some suggestions as following:

- The private Italian companies especially the companies who can provide advanced technology or work on related CDM areas, please realize the importance of procuring CO2 beforehand, catch the chance to invest in Chinese blooming CDM market, and for the Small or Medium Enterprises if it’s difficult to invest privately could consider the national or international funds
- Italian banks may adopt some new terms to provide more chances for the Italian private enterprises to invest CDM projects
- Italian Government (e.g. IMET) could make more efforts to make the enterprises understand the possibilities for biomass CDM projects and enhance the links with European countries and EU carbon credits market.