Sino-Italian Cooperation Program
Environmental Training Community

中-意合作计划
环境培训园地

newsletter
工作通讯

Green Olympics
绿色奥运

08

Italian Ministry
for the Environment, Land and Sea

VIU
Venice
International
University

Italian Ministry for the Environment, Land and Sea
意大利环境领土与海洋部
Via Cristoforo Colombo, 44
00147 Rome Italy

Venice International University
TEN Center, Thematic Environmental Networks
威尼斯国际大学
Isola di San Servolo
30100 Venice Italy
Tel. 电话 +39 041 2719525-524
Fax 传真 +39 041 2719510
ten@univiu.org

Sino-Italian Cooperation Program for Environmental Protection
中国 – 意大利环境保护合作项目管理办公室
Program Management Office, Beijing
北京项目管理办公室
Oriental Kenzo-Office Building Room 25 a-d
48 Dongzhimen Waidajie,
100027 Beijing, P.R.China
中国北京市东直门外大街48
号东方银座写字楼25 a-d
房间 邮编: 100027
Tel. 电话 0086-10-51600666, 84476610
Fax 传真 0086-10-84476455
newsletter@sicppmo.org
info@sicppmo.org
Program Management Office, Shanghai
上海项目管理办公室
Room 1901-1906,
The Center, 989, Changle Rd.
Shanghai, 200031 P.R. China
上海市长乐路989号世纪商贸广场1901-1906室
中意环保项目上海办公室
Tel. 电话 021 61104860
Fax 传真 021 61104861
info@sicppmo.org

AGRINNOVA

Editorial board
Corrado Clini,
Italian Ministry for the Environment, Land and Sea
Ignazio Musu,
TEN Center, Venice International University
Maria Lodovica Gullino,
Agroinnova, University of Turin

Edited by
TEN Center
Thematic Environmental Networks,
Venice International University
Italian Ministry for the Environment, Land and Sea

Project coordination
Alessandra Fornetti
Gianluca Ghiara
Ilda Mannino

Grapich design
Peppe Clemente, studio Cheste, venezia

Cover & on focus photos by
Andrea Penisto

English proofreading
Felicity Menadue

Chinese translation
Mike Peng, Beijing

Contributions by
Ivo Allegrini, Maria Pia Ancora, Selina Angelini, Lisa Botter,
Eleonora Chinellato, Corrado Clini, Marco G. Cremonini,
Sara Da Canal, Lorenza Fasolo, Alessandra Fornetti,
Gerardo Fratini, Gianluca Ghiara, Jianliang Huang,
Ilda Mannino, Marino Mazzon, Dengli Ming, Ignazio Musu,
Patrizia Scalas, Denise Tonolo, Luigi Torriano,
Riccardo Valentini, Francesca Zennaro

Editorial

Corrado Clini, Director General, Italian Ministry for the Environment, Land and Sea

The 2008 Olympic Games provide an opportunity to transform Beijing from a polluted and congested city into a “sustainable” city. All of the great initiatives that have been made, such as the enhancement of the public transport system, the realization of the Olympic plants and the intervention on traffic have been oriented towards environmental protection.

Italian Ministry for the Environment, Land and Sea started its program of collaboration with the Beijing Municipality in 2003. Through the years the program has been extended and developed to realize about 20 projects on different issues such as natural resource protection and conservation, air quality monitoring and management, water resource management, the development of renewable energy sources and energy efficiency improvement, sustainable urban planning, the promotion and development of low emission transport technologies and systems, and the use of municipal solid waste as an energy source.

The cooperation between the Ministry for the Environment and the Beijing Municipality has provided the opportunity to supply instruments to control air quality, a laboratory for the monitoring of the environmental quality (especially for the Olympic sites) and a laboratory to control car emissions.

The purpose of the program is not only the Olympic event. It also aims, through the development of these projects, to introduce competent and long-term technological solutions to optimally support the local institutions in environmental protection.

A widespread sensibility in environmental and sustainability issues has been created through the “Beijing Public Educational Centre for Environment and Sustainable Development Project” which has scheduled the building of a centre for environmental education in the technological Park of Zhongguancun in Beijing. A fundamental aspect of the project’s activities is the training of the Chinese staff with a focus on “best practices” in air quality management, specifically the technical and managerial aspects. This is achieved through both traditional lessons (in Italy and China) and “study tours” of Italian institutions and administrations (i.e. the Municipality of Rome, the Municipality of Milan, the Lombardy Region and ARPA-Regional Agency for Environmental Protection) providing a useful and profitable exchange of experiences.

EU Members set to Demand Tougher Biofuel Standards

European member states look set to demand stricter sustainability criteria for biofuels made from agricultural crops in a bid to avert negative environmental side effects linked to their mass production.
The draft suggests that governments have agreed that a Commission proposal, requiring all biofuels used in Europe to deliver life-cycle CO_2 savings of 35% compared to conventional fuels, is too weak.
A spokesman from the European Parliament nevertheless said that a compromise among governments on an alternative 'two-step approach' now 'looks clear'. Such an approach would entail imposing an initial minimum cut of 35%, which would then be scaled up.
However, member states remain divided as to the timing and size of the final savings that should apply, with some countries demanding final cuts of as much as 60% and others much less.
The draft paper is the provisional outcome of discussions within a special biofuel working group, set up by member states in order to hammer out 'core criteria' for the sustainable production of biofuels.
The idea is that the criteria, once finalized, would be included in two key pieces of future EU legislation aimed at promoting the use of biofuels in transport. The first is the Renewables Directive presented by the Commission, which asks that 10% of all transport fuel consumption in the EU be derived from biofuels by 2020. The second is the Fuel Quality Directive currently under discussion in Parliament and Council, which would require fuel suppliers to reduce greenhouse gases emitted by their fuels throughout their life-cycle by 10% between 2011 and 2020, either by enhancing supply efficiency or increasing the proportion of biofuel they include in their fuels. Additional criteria would also include, as proposed by the Commission, a ban on biofuels produced from forests, wetlands and other 'highly biodiverse' grasslands.

EU Wind Sector Confident despite Cash and Skills Shortage

Europe's wind turbine makers are facing higher raw material costs; moreover, due to a lack of trained workers and insufficient investments in electricity grids and new wind parks, the growth rates of previous

years are lower than expected. However, the sector remains confident that EU renewable energy targets will be met.
As a consequence of that, the European Commission proposed new legislation on renewable energies, featuring binding percentage increases for each member state.
The wind energy sector has enjoyed impressive growth since 2000 and particularly since the middle of the decade. Europe's wind capacity grew by 19% in 2006 alone, with the global wind energy market swelling by 32%, or approximately 15,000 megawatts, according to the European Renewable Energy Observatory.
In 2007, global growth figures for the sector were even higher than in 2006, but Europe's share of the global total declined, with the US taking the lead and developing nations in Asia and India

generating an unexpected turnaround (China in particular has set its sights on becoming a global leader in wind turbine manufacturing).
As a result, Europe's growth rates are expected to level off in the coming period. In Germany, for example, growth is being slowed by insufficient electricity grid infrastructure, hesitant investors, and rising raw material costs, notably for copper and steel, according to the German Wind Energy Association (BWE).
The Commission wants wind to provide 12% of the bloc's power by 2020, up from the current figure of 3.7%. To reach this sub-target, 9.5 gigawatts of new wind energy capacity needs to be installed annually over the next 12 years.
The proposals were largely welcomed by the renewables industry, though concerns remain that an excessive use of trading in renewable energy certificates may undermine existing financial support schemes at a national level; for example, member states with limited wind, solar or hydro potential will prefer to trade virtual renewable energy certificates in order to reach their targets.

Calls Grow for EU to Suspend Biofuels Push

Following a warning from the World Bank, the European Environment Agency said that the EU must suspend its target of raising the share of biofuels in transport to 10% until a more comprehensive scientific study on their environmental risks can be carried out.
In March 2007, EU leaders committed to raising the share of biofuels in transport from current levels of around 2% to 10% by 2020, following growing concerns over rising oil prices, energy security and climate change.
The EEA report found that biofuel production for vehicles based on first-generation technologies – produced from food and feed crops – does not optimally use biomass resources with regard to

fossil energy saving and greenhouse gas reduction.
Furthermore, a new report by the World Bank suggests that biofuel production has played a key role in pushing global food prices up by 83% over the last three years. The report also blames higher energy and fertilizer prices, a weak dollar and export bans for the recent food price hikes that have sparked outbreaks of violence in a number of developing countries in the past weeks.
On the other hand, biofuel producers in Europe lament the fact that the debate has become so emotional and irrational, insisting that existing scientific assessments show the 10% target to be absolutely manageable without unsustainable pressure being put on soil, water and biodiversity, even if it is entirely based on domestic production.
Due to those reports, the Committee warned about the amount of land required to meet the 10% target, requiring a specific paper on this issue. A draft directive has been delivered introducing a range of "sustainability criteria" for biofuels to counter growing concerns about the risks related to their mass production, including deforestation, hikes in food prices and water shortages.
The final directive should be released in the near future.

EU Adopts Stricter Air Quality Rules

The EU Council of Ministers has endorsed a new directive setting binding EU-wide limits for fine particle emissions, which cause respiratory diseases, reducing European life expectancy by up to three years.
According to the Commission, 370,000 people in Europe die prematurely every year from diseases linked to air pollution - 350,000 of them due to atmospheric microparticles or dust of a diameter less than 2.5 micrometres known as particulate matter ($PM_{2.5}$), which originates from transport (cars, ships and planes), agriculture and small industrial plants.
The Commission's proposed Air Quality

Directive seeks to group five existing pieces of legislation into one and focus on reducing emissions of key airborne pollutants.
The new EU Air Quality Directive was approved in April 2008, following an agreement reached by the Council and the Parliament at the end of 2007. The directive sets EU-wide limits on fine particle emissions ($PM_{2.5}$) for the first time ever.
These microscopic particles, emitted mainly by cars and trucks, pose health risks due to their ability to pass unfiltered through the nose and mouth, penetrating deep into human lungs and bloodstreams, where they can cause potentially fatal respiratory and/or pulmonary diseases.
The directive obliges member states to reduce exposure to $PM_{2.5}$ in urban areas by an average of 20% by 2020, based on 2010 levels, bringing the exposure levels below 20 micrograms/m^3 by 2015. In other areas, the member states will need to respect the $PM_{2.5}$ limit value set at 25 micrograms/m^3 by as early as 2010, if possible, and at the latest by 2015.
Furthermore, the Commission announced a number of new legislative proposals to be put forward by the end of 2008 to improve upon the directive just approved. The updated directive will include a further reduction of the member states' permitted national emissions of key pollutants, a reduction of emissions associated with refuelling of petrol cars at service stations, as well as addressing the sulphur content of fuels.

MEPs Want Tougher Waste Recycling Targets

According to MEPs who voted for a revision of the EU Recycling Directive in April 2008, recycling targets should be increased and incinerators subjected to efficiency criteria when burning waste for energy recovery purposes.
Waste and recycling policies are a cornerstone of EU environmental protection efforts, but the policy framework has been criticized for being too fragmented and inefficient. The current revision of the Waste Framework Directive seeks to address this issue.
According to a majority of MEPs in the Parliament's Environment Committee, 50% of the EU's household waste and 70% of construction waste should be recycled by 2020; these targets should accompany member state efforts to stabilize waste production by 2012.
The vote is part of the Parliament's second reading on the revision of the EU Waste Framework Directive - a controversial piece of legislation that is plagued by widely differing waste and recycling practices across the EU.
At EU level, member states and the Parliament have locked horns on the level of recycling targets, the kind of hierarchy that should be used to determine waste handling and the classification system that should be used to distinguish waste incineration from recovery.
Some countries which possess a large number of incinerators want their facilities to be classified as recovery operations. Since part of the incineration process produces energy, such a classification would qualify such facilities for EU financial support; on the other hand, a number of MEPs are skeptical after having previously proposed that incinerators should be classified as recovery operations only if their principal purpose is energy production.
The Commission compromise on the matter is that incinerators should be classified as recovery operations only if they respect energy efficiency criteria established by Brussels. These criteria will need to be reviewed after two years.

Introduction to Green Olympics: Conceptual Framework

Ming Dengli, Beijing Municipal Environmental Protection Bureau

Beijing, the capital city of China, covers a total area of 16,410 square kilometers with a population of 15.8 million. As a metropolis under rapid development, Beijing, like other big international cities, faces environmental pressure associated with this development.

For many years China has dreamt of hosting the Olympic Games. Since its winning bid in 2001, "Green Olympics" has been one of the three themes raised by China. Beijing has used the process of preparing and hosting the Olympics as a great opportunity to accelerate city-wide environmental improvement and enhance the city's sustainability; the concept of environmental protection and sustainable development is embodied in the whole process of preparing an environmentally-friendly Olympic Games. Meanwhile, a large scale communication program on environmental protection and "Green Olympics" has been launched, hence the environmental awareness of the whole society has been significantly improved.

City-wide Environmental Improvement Program

Beijing developed its "Olympic Action Plan" according to the environmental commitments made in the bid for the Olympic Games. The plan has been implemented with key actions listed in the countdown program.

Air pollution has taken top priority in Beijing's environmental program. Over 200 measures have been implemented in 14 phases to control air pollution since 1998. These include:

Optimizing Energy Structure to Control Coal-burning Pollution

Natural gas and other types of clean energy have been introduced to replace coal burning and improve the fuel structure. Natural gas supply increased from 300 million m^3 in 1998 to 4.5 billion m^3 in 2007.

Enhancing Vehicle Emission Control

Development of the public transport system has always received priority in the city's development plan. There are now 8 metro lines operating within a 200km radius and over 10,000 old polluting public buses have been scrapped and replaced with new clean buses .There are now 4,000 natural gas buses within the bus fleet, which is the largest of its kind in the world. More stringent local vehicle emission standards have been enforced in succession since 1999. Beijing now applies emission standards equivalent to Euro IV and new vehicles in Beijing are as clean as those in Italy.

Industrial Pollution Control

Economic structure and industrial distribution have been adjusted, with high energy consumption and high polluting plants forced to close. Since 2000, over 200 polluting industrial plants have either closed, adopted other production methods, or relocated.

In addition to the above-mentioned changes, ecosystem conservation and enhancement has been highlighted; green buffers have been built in the mountains, suburbs and urban areas. Programs on sand control, waste mines rehabilitation etc. have been implemented.

The application of solar energy, bio-mass, and other types of renewable energy has been encouraged.

With continuous efforts in the past seven years, air quality has been significantly improved, along with the rapid economic and social development. Annual average concentrations of SO_2, CO, NO_2 and PM_{10} in the ambient air decreased by 34%, 26%, 7%, and 9% respectively, with those of SO_2, CO and NO_2 reaching national standards.

Moreover, the urban wastewater treatment rate increased to 92%. Ninety-nine percent of domestic solid waste generated in the urban area now receives safe treatment and disposal, the forest coverage

rate has increased to 51.6% and the coverage rate of afforestation in the city has reached 43%.

Realization of the "Green Olympics" Concept

To avoid and minimize the potential negative impact of the games on the environment, the Beijing Organizing Committee for the Games of the XXIX Olympiad (BOCOG) has developed its Environmental Management System (EMS) according to ISO14001 standards. The EMS has been certified and strictly implemented to ensure that the concept of environmental protection and sustainable development is observed in the whole process of preparing and hosting the games. It has created a new model of environmental management in mega sports events.

Venue Construction and Operation

Guidelines have been developed for the use of solar energy, geothermal and other types of renewable energy, energy saving, the protection of water resources, water saving, environmentally-friendly design, the use of environmentally-friendly materials, and the prevention of noise and solid waste pollution in the construction and operation of all new and renovated venues.

Sponsors and Accommodation Service

Environmental requirements have been set for all sponsors and contracted hotels and restaurants that provide accommodation and food services to the games.

Transportation

A convenient public transport system will be provided. Spectators will be encouraged to take public transport to the venues; low emission vehicles will be used for this purpose and super low emission and zero emission vehicles will be used in designated areas.

Sports and Key Events

Recognizing the great influence of the Olympics, Beijing has taken this opportunity to conduct a large-scale public awareness program on environmental protection, sustainable development and the "Green Olympics". The program has promoted the establishment of a new dynamic environmental protection mechanism among the government, enterprises, and the public.
"One World One Dream", the slogan of the Beijing Olympic Games, incisively expresses the idea that protection of the earth is a common goal among human beings.
The "Green Olympics, Green Action Promotion Group" co-established by government bodies and non-government environmental protection organizations, has promoted the sustainable development concept of environmental protection, energy saving and eco-balance in communities, schools and construction sites and hence the green lifestyle is being formed.
The "One Less Driving Day" program advocated and organized by non-government organizations which encourages green travel to save energy and decrease CO_2 emissions, has received a positive response from the general public.
The Sino-Italian Beijing "Green Olympics" Cooperation Program, launched by the Italian Ministry for the Environment, Land and Sea (IMELS) in 2003, has touched on areas such as environmental pollution control, achievement of "Green Olympics" commitments, promotional activities etc., playing an important role.
With the games just one month away, it's a great pleasure to share information on Beijing's efforts and achievements with regard to the "Green Olympics" commitment in Venice International University's newsletter.
We are confident that the Beijing Olympic Games will create a rich environmental legacy for Beijing, China, and even the whole world.

kuxi 2/2

The Environmental Protection of Beijing: How will it be maintained after 2008?

Jianliang Huang, Chinese Academy of Social Sciences

In recent years, Beijing's environmental pollution problems have been widely noticed. Since its successful bid for the Olympic Games, which are fast approaching, Beijing's environmental conditions have become the focus of world attention. The attitude of Beijing government officials has remained unchanged regarding the environmental quality during the Olympic Games. Beijing has the ability to fulfill the commitments they made during the bidding period for the Olympic Games. "Worry and panic are unnecessary", said Du Shaozhong, the Deputy Director of the Beijing Environmental Protection Bureau on 26 May 2008. Some international organizations are very positive about Beijing's environmental conditions during the Olympic Games. At the World Conference on Sport and Environment held from 25-27 October 2007, the Beijing Olympic Organizing Committee (BOGC) received the "Public Awareness Award of Ozone Layer Protection" from Mr. Shafqat Kakahel, the Vice Executive Director of The United Nations Environment Programme. According to the initial evaluation results, the Beijing Olympics and Paralympics 2008 have met the green criteria. On 25 October 2007 at this conference, the 2008 Beijing Olympic Games Environmental Review Report was officially issued by the United Nations Environment Programme. The report, consisting of 163 pages, presents many important issues such as air quality, transportation and energy. Mr. Achim Steiner, Under-Secretary-General of the United Nations and Executive Director of the United Nations Environment Programme, made it clear that Beijing is able to fulfill its commitment to the environment. "Beijing should be proud of its significant achievements", the officer from the United Nations Environment Programme said. In Paris, from 9-11 November 2007 at the Third Air Quality Congress (Respiratory Conference), the general assembly granted Beijing an Air Quality Improvement Special Award in light of Beijing's active efforts and outstanding achievements gained in air pollution control in preparation for the "Green Olympics". Whilst the quality of the environment has improved greatly, Beijing's sky still seems gray to athletes and ordinary Beijing residents. Although Beijing has made great progress, the Beijing Olympic Organizing Committee is under great pressure to reach the high benchmark achieved by the "Green Olympics" in Sydney 8 years ago. In the event that a famous athlete refuses to take part in a sporting event such as a marathon or cycling race due to environmental problems, the consequences would be too much for the organizers of the Beijing Olympics to bear. Compared to 20 years ago, Beijing's environment has been improved dramatically, as many people living in the capital can testify. In spring, for example, women wore head coverings because the wind was too strong; in winter people never experienced a clear day and, after returning from the street, had a layer of black dirt on their face. Now people in Beijing hardly ever wear head coverings. According to statistics from the Beijing Environmental Protection Bureau, the number of days in a year where the Beijing urban air quality is equal to grade II or better is 246, compared to 1998 when it was only 100 (Fig. 1).

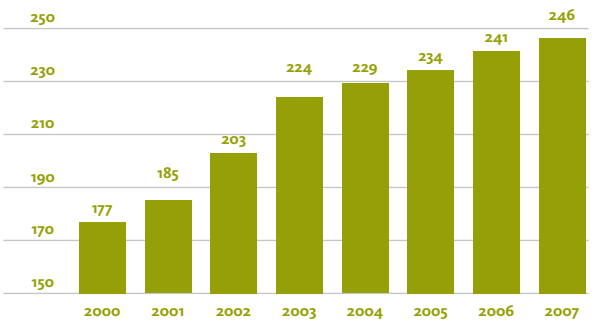


Fig. 1 The number of days in a year where the Beijing air quality index is equal to or better than grade II.

Released by the Beijing Environmental Protection Bureau, the Beijing Environmental Report has recorded its environmental progress. Over the past ten years, from 1998 to 2007, Beijing's Gross Domestic Production (GDP) increased 2.79 times from 237.6 billion RMB to 900.6 billion RMB. However, Beijing's major environmental indicators have greatly improved compared with the same period ten years ago. For instance, the total amount of sulfur dioxide emissions fell from 266,700 tons in 1997 to 106,100 tons in 2007 (down by 43%); the total emissions from Chemical Oxygen Demand (COD) decreased from 111,300 tons to 106,100 tons (down by 5%) during the same period; soot emissions dropped from 196,500 tons in 1997 to 79,700 tons in 2007 (down by 60%). The urban sewage treatment rate rose from 35.3% in 1998 to 92% in 2007; the average concentration of sulfur monoxide in the urban air fell from 0.12mg/m^3 in 1998 to 0.047mg/m^3 in 2006 (down by 61%). The average concentration of carbon monoxide decreased from 3.3 mg/m^3 in 1998 to 2.1 mg/m^3 in 2006 (down by 34%). Other environmental indicators have also been improved in varying degrees. Whilst in accordance with the most stringent international standards, the "Green" criteria for the Beijing Olympic Games have not yet been fully reached, but Beijing spares no effort.

Beijing residents are determined to hold a successful Olympics. They feel a great responsibility to do so. They are willing to cease driving private cars every other day before and during the Olympics for example. However, what people in Beijing are most worried about are the environmental protection problems after the Olympics. As the capital of China, the public awareness of environmental protection has improved. Beijing residents are not satisfied with the status of environmental protection. According to a survey report released by China's Environmental Culture Promotion Association on 7 January 2008, of all the provincial cities, Beijing's satisfaction with regard to its environmental quality ranked 3rd last. In the October 2007 edition of Sports Illustrated in Beijing, a survey was undertaken to investigate air quality problems in Beijing. Results showed that 42% of residents were optimistic and very optimistic about the improvement of Beijing's air quality and 71% were worried or extremely worried about the possibility of extreme air pollution incidents occurring in Beijing (like the London smog and the Los Angeles photochemical smog incidents).

The concern of Beijing citizens is justified. Beijing's atmospheric environment is subject to geographical factors. Beijing is surrounded on three sides by hills. There is an air temperature inversion layer in Beijing in which the low-level air near the ground has a lower temperature than the higher-level, like a lid covering a pot. Water vapor in the atmosphere and various pollutants are difficult to disperse. In winter this phenomenon is particularly serious. In addition, Beijing is very vulnerable to the negative impact of environmental problems. For example, the spring dust storms mainly originate from central and western parts of China and Mongolia. The wheat straw burning by the farmers in the Hebei province surrounding Beijing can cause serious adverse effects to Beijing's air. In November 2006, in order to ensure reasonable air quality during the Olympic Games in Beijing as well as the neighboring provinces, including Tianjin, Hebei, Shanxi and Inner Mongolia, the State Environmental Protection Administration (now Ministry for Environmental Protection, MEP) set up a coordination mechanism ensuring air quality. They took concerted action and measures to stop or reduce production by enterprises generating air pollutants. However, it is obvious that this is not a long-term plan.

Beijing's environmental quality, in particular the air, is subject to China's industrial structure and energy consumption structure. Beijing's tertiary industry in the entire GDP has reached 70%, taking up almost the same percentage as that of most international metropolises. However, around Beijing, the industrial structure in Shanxi, Hebei, Inner Mongolia and other regions is still industrial-based with a particularly heavy chemical industry. The situation in the coming 10 to 20 years cannot be changed. The large number of emissions generated by the heavy chemical industry around Beijing poses a difficult long-term problem that is not easily solved. China's energy consumption is composed mainly of coal, making up 70% of the total. Coal combustion therefore contributes to the large amount of polluting emissions in China. Since China's energy consumption structure cannot be changed and there is no effective technological solution to significantly reduce the pollution of coal burning, possible improvement of the environmental atmosphere in Beijing and even in China has almost reached its limit. Another tough problem is the rapid growth of automotive vehicles in Beijing. The number may reach 3.5 million in 2008 and although a large number of measures have been taken, the automotive exhaust pollution is a growing headache for the authorities.

Once the Olympic Games are over Beijing faces another problem - a lack of motivation in environmental protection. Before the Olympics, because of the commitments made during the bidding, the Chinese Government made a concerted effort to ensure the successful hosting of the Olympic Games. The investment of 50 billion RMB was made to move the Capital Steel & Iron Corporation out of Beijing. Additionally, some factories have had to cease or limit their production. All of these arrangements will stop upon the conclusion of the Beijing 2008 Olympics. Although China's central government has been promoting a "resource-saving and environmentally-friendly society" as its basic national policy, so far, environmental protection work has not really been the focus of governmental departments at all levels. From the point of view of the government, once the downward trend in the growth rate of the national economy occurs, pursuit of economic growth at the expense of the environment and resources will be repeated. From the perspective of the Chinese residents, for the last few years the public awareness of environmental protection has improved, yet this improvement does not mean that people are willing to bear the cost or the responsibility of environmental protection. The average Chinese resident does not have the awareness with regard to changing their consumption and behavior. The energy-saving products available would struggle to find a market due to their high cost and few people would refuse to buy a car for the sake of protecting the environment. Whilst everyone would like a clean, pleasant and healthy environment, not many would consider making any payment for it.
Beijing's environmental protection has a long way to go after the 2008 Olympic Games.

Air Quality Monitoring for the Beijing 2008 Olympic Games

Ivo Allegrini, Italian Institute for Atmospheric Pollution, National Research Council, Rome
Maria Pia Ancora, Italian Institute for Atmospheric Pollution, National Research Council, Beijing

Economic development has always been followed by environmental degradation: developed countries have experienced significant air pollution problems which have been tackled over a reasonably long time as control devices have evolved and production technologies improved. In addition to technical efforts, local and central administrations have developed efficient management approaches in order to reduce emissions from mobile and fixed sources. Past experiences have proved that air pollution can be significantly reduced. Also, nowadays administrations can rely on sufficiently tested technologies and management approaches to reduce, as much as possible, the time needed to produce "clean air".

From a health management perspective, six pollutants are categorized as classical pollutants by the World Health Organization. They are lead, particulate matter (PM), sulphur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO) and ozone (O_3). In the case of PM, total suspended particles (TSP), comprising particles of all sizes, have historically been monitored and continue to be measured in developing countries. However, a statistically significant association has been found between adverse health effects and ambient PM_{10} (particles equal to or smaller than 10 microns, also known as inhalable particles) concentrations, and recent studies using $PM_{2.5}$ (particles equal or smaller than 2.5 microns, also known as fine particles) data have shown an even stronger association between health outcomes and particles in this size range. Many countries have moved to measuring PM_{10} and, more recently in industrial countries, to $PM_{2.5}$.
In addition to the six classical pollutants, air toxin emissions of concern in vehicle exhausts include benzene and polyaromatic hydrocarbons, both well known as carcinogens. Other pollutants readily associated with vehicle exhaust have a negative effect on human health and the environment. Of these, CO, O_3, NO_2 and SO_2 are mainly associated with short-term health effects; while PM and air toxins have long-term accumulative harmful impacts. Pollutants O_3, NO_x, and SO_2 have a regional impact resulting in a detrimental effect on local ecosystems, contributing to acid rain, degraded visibility, reduction in crop yields and eutrofication.

China's Air Pollution and National Standards

According to the PRC Ambient Air Quality Standard [GB 3095-1996] there are three 24-hour pollutant exposure standards corresponding to three categories: Class I, parks and specially protected areas; Class II, residential areas; and Class III, designated industrial zones. These functional zones (pollution standards) I, II, and III were determined by considering the effects of pollution on the environment and the human body.
The values for the three regulated pollutants, SO_2, NO_2 and inhalable particulates, in respect to this standard are summarized in the following table.

China's efforts to control urban air pollution in recent years have mainly targeted three pollutants: SO_2, PM_{10} and NO_2. The SO_2 problem is closely linked to coal burning and industrial-type sources, while NO_2 concentrations are more related to motor vehicle emissions in urban areas. PM pollution has a more complex nature, with coarse PM originating mainly from coal burning and fugitive dust, while fine particulates (that are currently being monitored in only a few cities) are from a variety of sources including secondary pollution of ozone and gaseous pollutants such as HC and NO_X. To tackle such a complex air pollution problem, a comprehensive approach addressing all pollutants together must be adopted. More

Ambient air quality standard (GB3095-1996)

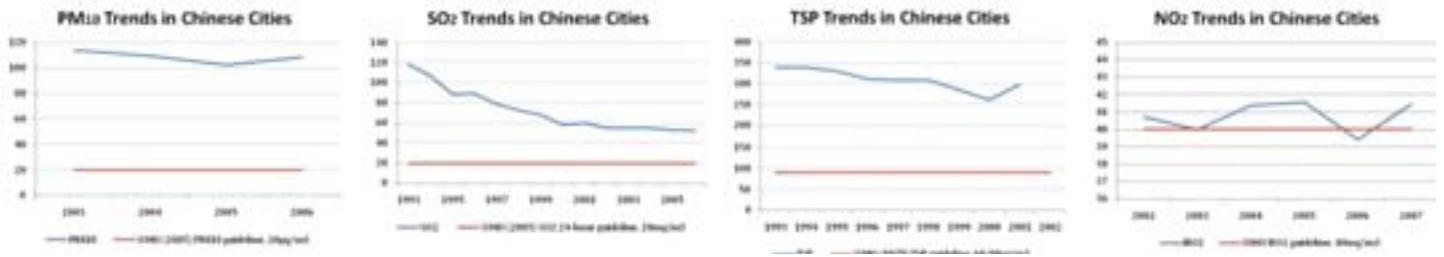
Pollutant	Time	Limit Value(mg/m³ in standard situation)		
		Level I (fit to reservation park/ scenic resort and other reservation place)	Level II (fit to residential quarter/ universal industrial areas/ rural area etc.)	Level III (fit to special industrial areas)
SO_2	Annual average	0.02	0.06	0.1
	Daily average	0.05	0.15	0.25
	Hourly average	0.15	0.5	0.7
NO_2	Annual average	0.04	0.08 a	0.08
	Daily average	0.08	0.12 a	0.12
	Hourly average	0.12	0.24 a	0.24
TSP	Daily average	0.04	0.1	0.15
	Annual average	0.05	0.15	0.25
CO	Daily average	4	4	6
	Hourly average	10	10	20

pollutants, such as CO and O_3, should be included in the monitoring and API evaluation system, and the monitoring network should be expanded to include road side stations as well. $PM_{2.5}$ and air toxins should be further studied for their impact on human health.

Human resource management in the environmental protection field, especially in the air quality sector, is the main potential obstacle in the successful fight against air pollution: the personnel specifically dedicated to air pollution problems at the national level (i.e. within the State Environmental Protection Agency) comprise of no more than 8-10 people. Nationwide, including all the affiliated institutions of SEPA, the number does not reach 3,000 (the US Environmental Protection Agency's permanent staff on air pollution is about 3,000).
The recent elevation last March of the former State Environmental Protection Administration to the rank of a ministry directly under P. R. China State Council (Ministry for Environmental Protection, MEP), is encouraging and inspires belief in a real change in China's approach towards both its own and the global environment.

Air Pollution Monitoring in the Olympic Village (and more): the Project.

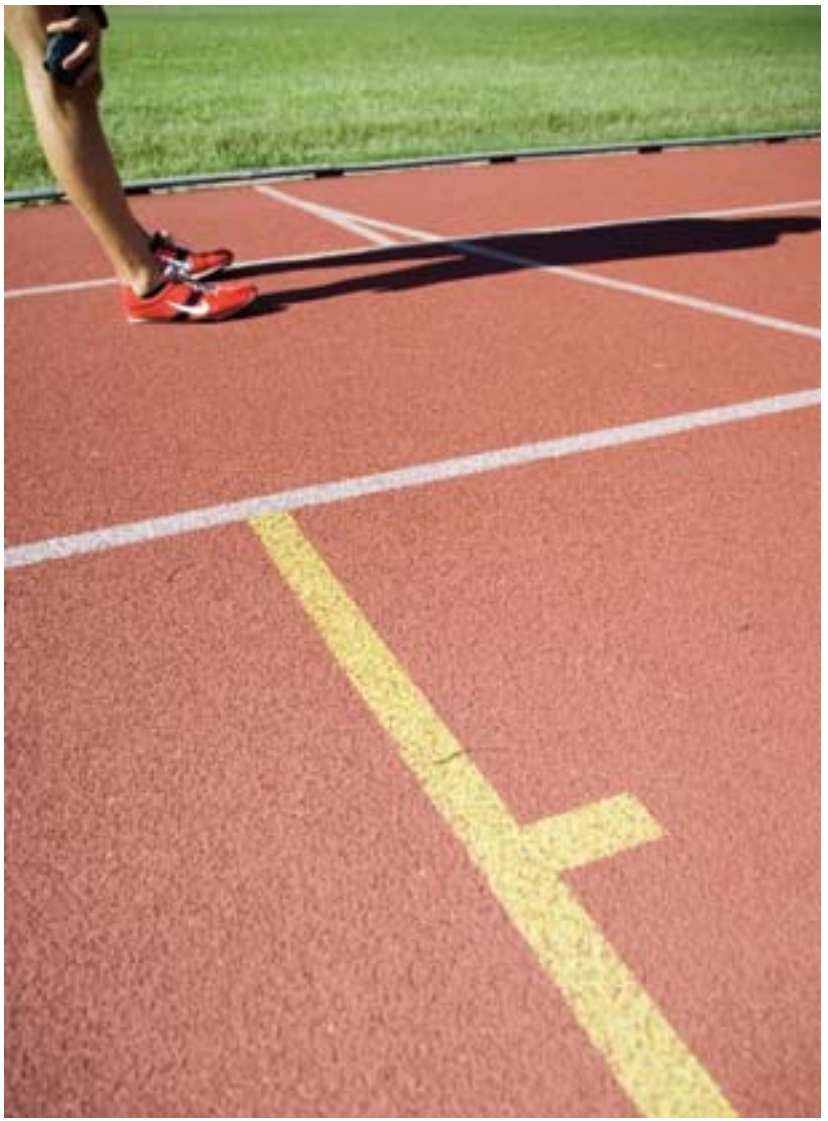
For a while now Beijing's dramatic surge as an economic and political global player has been attracting the international community's attention. The upcoming Summer Olympic Games have intensified the world's focus on China and on the measures the country undertakes in the field of environmental protection. When it was chosen as the host of the 2008 Olympics, Beijing promised the world a Green Olympics: namely, to act as a responsible member of the global community, therefore advancing its development as an ecologically sustainable society. The Italian Ministry for the Environment, Land and Sea (IMELS) has supported the Beijing Municipal Government (BMG) to fulfill this commitment since 2003, developing a number of projects on air quality monitoring, among other sectors, in the framework of the Sino-Italian Cooperation Program for Environmental Protection.
One of the first and most important projects implemented with the Municipality of Beijing aims to improve the city's environmental agency's ability to monitor and understand air pollution phenomena in the urban area, with a special short-term focus on the Olympic event.



[Source: Clean Air Initiatives for Asian Cities]

Air quality is one of the most important issues to be taken into account, because it will affect the quality of life of both the athletes and training teams as well as the biological performance of the athletes at such an important international event. It is therefore essential to provide effective monitoring tools able to generate easily recognizable and interpretable air pollution data.
This advanced monitoring system has been engineered by the Institute for Atmospheric Pollution of the Italian National Research Council (IIA/CNR), on behalf of the Italian Ministry for the Environment, Land and Sea. It includes a fixed "super-site" monitoring station located in the Olympic Village, three mobile stations equipped with sampling and analyzing devices for rapid site intervention and diagnosis of environmental pollution accidents an advanced and sophisticated technology for the chemical analysis of toxic compounds such as POPs (Persistent Organic Pollutants) and EDCs (Endocrine Disturbing Compounds).
The whole monitoring system is characterized by a high degree of innovation and reliability due to the quality assurance and quality control procedures that have been developed and put in place for all the instruments and their use.
The Sino-Italian fixed station was installed and tested in August 2007 in the Olympic Village, in the north-west part of the Haidian district, a few hundred meters away from the proposed main accommodation facilities for the athletes; less than 1 km away from the spectacular "Bird Nest" stadium and the "Watercube" sites, as well as the hockey stadium. It allows for the measurement of air pollutants, some of which are not regulated by the current Chinese national standards on air pollution, such as ozone, $PM_{2.5}$ and volatile organic compounds (VOCs).
Moreover, it will provide reliable measurements of the most critical pollutants affecting the health and performance of the athletes and the health of visitors, as well as important meteorological parameters, such as direct measurement of the atmospheric stability through Radon and daughters measurements.
The information gathered by this station, one of 27 air quality monitoring stations that are part of the city's network and spread throughout the urban area, will be interpreted and studied by Chinese and Italian experts in order to forecast air pollution dispersion characteristics during the Beijing Games. They will therefore be able to suggest the most suitable actions and plans to improve the city's environment, the quality of life of athletes and visitors during the Games and, above all, its citizens beyond the event.
The Calibration and Air Quality Monitoring Mobile Unit is intended for on-site calibration of air quality monitoring stations. This is an important step towards the evaluation of data quality coming from monitoring networks. Such a mobile unit is one of the most important tools for central agencies dealing with the measurement of air pollution, since it checks the apparatuses directly on the field where most cases of measurement deviations are experienced.
In addition, this mobile unit can be used as a classic monitoring mobile unit, thus providing a very useful tool for the evaluation of atmospheric pollution in different sites and employing the most advanced and reliable instrumentation. This Sino-Italian unit is part of the mobile system to be used by the city's environmental agency to measure pollution along the marathon's route during the 29th Olympic Games as well as other events running through Beijing.
Since anthropogenic pollution is caused by both urban and industrial emissions, it is very important that Beijing Municipality can monitor stack emissions and evaluate the emission factors of industrial plants. For this purpose, a mobile unit has been designed and equipped to allow for the characterization of emitted pollutants from stacks and thus develop "fingerprints"

which can help to identify pollutants in the atmosphere. An additional advanced mobile unit is used for emergency responses. It is equipped with instruments to sample and analyze hazardous pollutants in the air, water and soil in case of accidents.
An extensive training program on the use and maintenance of all of the equipment supplied and on theoretical aspects of the pollution problems in urban areas and their management has been carried out during the development of the project, delivered by the Italian experts at the Italian Institute for Atmospheric Pollution in China and on several study tours in Italy.
Helping relevant local and national authorities to understand pollution phenomena using cost-effective technology and supporting them in the development of the most suitable air quality monitoring systems and management practices has been the main activity of the Italian Institute for Atmospheric Pollution in China in the past six years. Within the framework of the Sino-Italian Cooperation Program for Environmental Protection, CNR/IIA is responsible for the design, implementation and management of several projects on air quality in several municipalities such as Beijing, Shanghai, Suzhou, Lanzhou, Wulumuqi, as well as a series of projects developed with the national environmental agencies.



The ITS-TAP and the IBOCS Projects on Sustainable Mobility are Contributing to the Green Olympics Initiative

Marino Mazzon, Thetis S.p.A

The two projects, ITS-TAP – Intelligent Transport Systems for Traffic Air Pollution, and IBOCS – Intelligent Bus Operation and Control System, are respectively initial pilot projects in evolution.
Both these projects help improve air quality, through selective traffic limitation and Olympics bus transport management in Beijing, a city where several important environmental improvement initiatives have been carried out, triggered by the Olympics but with a long-term view to provide permanent benefits to the population.
The number of vehicles in Beijing increases by some 350,000 units every year and, after the reduction of major industrial and heating originated pollution, traffic is going to become one of the main sources of harmful emissions as it is in major cities worldwide. In fact, in a city that boasts 16 million inhabitants, in 2004 the number of private vehicles amounted to 2 million, whereas today it has reached a level of 3.8 million. As the numbers increase so too do the pollutants, among them PM10 caused by vehicle traffic, which today accounts for 23% of the pollutants.
The first project, a joint venture coordinated by Thetis and involving Fata DTS, ATAC and Ecotema, and undertaken between 2004 and 2008, was carried out to develop an "intelligent" Limited Traffic Area within the second ring road. The innovative idea behind this pilot project lies in the fact that it allows limited access to the more polluting vehicles during pollution peaks, which are forecast by a mathematical model based on the continuous monitoring of traffic pollutants and the number of vehicles circulating in the ring road area. Hence, data from a network of 6 fixed and 3 mobile air quality monitoring stations and 22 traffic count portals is collected by a data center at the Beijing Environmental Protection Bureau to populate a mathematical model predicting pollution peaks for the following days. In this case, it is possible to prevent some classes of polluting vehicles from entering the second ring road area for a suitable period. Television cameras can read the unauthorised vehicle number plates for enforcement purposes.
In addition, a GPS and software based bus fleet management system is providing state-of-the-art bus planning, real time control features and passenger information. This particular pilot system is operated by BPT (the Beijing Public Transport corporation) which is one of the largest in the world with over 25,000 urban vehicles and around 80,000 employees.
Today, Beijing is the only Chinese city able to experiment with this new concept of an integrated and adaptable system for traffic limitation management, thanks to the joint effort of the Beijing Environmental Protection Agency and the Italian Ministry for the Environment, Land and Sea. The achieved result is the creation of a finalised flexible tool to help mitigate the impact of traffic on air quality and to improve the public transport service. The positive results achieved during the pilot project convinced BPT to request that the bus service management system of ITS-TAP be extended to the fleet of buses covering the 34 special "Olympic lines" during the games.
This new project is named IBOCS (Intelligent Bus Operation and Control System) and is a joint venture between Thetis and ATAC, the Rome Mobility Agency. The Olympics will encompass 31 stadiums and 41 training facilities. The organizing efforts are proportional to the large numbers that we are accustomed to when referring to China. The "Olympic family" (athletes, trainers and journalists) will be served by more than 2,000 new low-emission coaches, whilst for the spectators the current bus and metro network will be reinforced with over 2,000 new buses operating on 34 special routes controlled by the IBOCS system.

This means that more than 4,000 buses will be used for the special Olympic services, which is more or less equivalent to the total number of city buses operating daily in Rome and Milan together.
Various measures will be taken to limit the amount of traffic in circulation. In fact, the implementation of number plate restrictions is also planned during the Olympics, and as a result of this it is estimated that there will be a further two million passengers using public transport.
The IBOCS project will enable the planning and real-time GPS monitoring of the 34 special bus lines, managed from a brand new main control room at BPT headquarters involving over 2,000 vehicles dedicated to spectator transport, on top of the 200 buses used for the pilot project previously mentioned.
A two-component system is proposed for the IBOCS project. The first involves planning the bus timetables and shifts with sophisticated computerised programs based upon operational research methods, optimizing resource management in public transport. The second deals with the real-time service monitoring, based upon the GPS system for the buses.
The software for the IBOCS project is extending the pilot project's scope, covering the characteristics and features necessary for the specific requirements of the Olympics as well as the general BPT public transport policies. In particular, a two-level infrastructure has been deployed, with BPT headquarters covering the bus lines' high level definition, planning and supervision, whilst 11 bus companies will cover the detailed service planning and dispatching, using the same software integrated architecture. New software has been introduced, in Chinese with Chinese user interface, as well as advanced features such as statistical and real-time report management. Once the Olympics are over, all Olympic buses will be reallocated to the 11 bus companies. The Beijing Bus GPS service, run by BPT and its operational bus companies is then expected to operate using IBOCS.
ATAC will provide the services for the planning of the special Olympic lines and for the technical and organizational training of the BPT personnel. The objective is to transfer their specialist knowledge and experience acquired in the management of public transport during important events (such as the Jubilee in 2000 and other events that are held regularly in the Italian capital) to their Chinese partners. In February 2008 a delegation of 12 managers from BPT attended an introductory practical course in Italy held by ATAC, and from that organised further coaching activities in Beijing.
To implement IBOCS, Thetis and ATAC have opened a new office in Beijing run by qualified Italian and Chinese staff providing local technical assistance, in a long term effort to support BPT operational processes. Customer support is based on the many years experience of Thetis in public transport planning and GPS management technology, since the first GPS system was installed on the Venice vaporetti (water buses) in 1997. Indeed Thetis has deployed such systems in several city bus networks, including Rome (for Jubilee year 2000), Vicenza, Parma and Bologna. The first system in Venice has now been upgraded to include over 700 buses on the mainland and integrates the new contactless smart card ticketing system. In Milan, the Venetian company has implemented a GPS system for all of the 800 trucks used daily for urban waste collection.
The IBOCS contract stems from a long-term agreement signed in November 2007 by BPT, Thetis and ATAC, under which the Chinese holding and the two Italian companies will draw on the experience acquired during the games. The agreement also contemplates the institution of a Sino-Italian company to transfer the best practices to other Chinese cities.

An Integrated Approach to Combat Dust Sandstorms in Northern China and Beijing Area

Marco G. Cremonini, Patrizia Scalas, Luigi Torriano, D'Appolonia, Genoa, Italy
Sara Da Canal, Gerardo Fratini, Riccardo Valentini, Department of Forest Sciences and Resources, University of Tuscia, Viterbo, Italy

Introduction

In recent years, unprecedented heavy and frequent Dust and Sand Storms (DSS) have affected extensive areas of northern China, including Beijing. Recognizing the great importance of the phenomena, the Chinese Government and the Beijing Municipal Administration have been taking measures to prevent and control DSS by combating the ongoing desertification processes and improving the ecological environment of the Beijing surroundings and sensitive areas in northern China. However, effectively combating desertification is problematic due to the substantial lack of knowledge about the mechanisms of this phenomenon and the enormous dimensions of the problem.

In order to understand the DSS phenomena and to propose and test methodologies for the prevention and mitigation of the DSS impacts, the SICP project "WinDust" was launched in 2005 by the Italian Ministry for the Environment, Land and Sea (IMELS) and the Beijing Municipal Environmental Protection Bureau (BMEPB). The project was developed by D'Appolonia and the University of Tuscia, in close collaboration with BMEPB and the Cold and Arid Regions Environmental and Engineering Research Institute (CAREERI) of Lanzhou. Scientific support was provided by Lamont-Doherty Earth Observatory, Columbia University of New York, USA, and the Applied Meteorology Foundation of Ibimet-CNR, Florence, Italy.

The distinctive idea behind the project was to integrate scientific research, experimentation and practical implementations for rural development in order to develop one comprehensive and participatory methodology rather than "a single solution to a single problem".

According to this approach, a number of *in situ* pilot projects were designed and atmospheric, emission, and transport models, Remote Sensing (RS) technologies, Geographical Information System (GIS) tools, and field measurements were applied to study DSS. The results obtained were evaluated in order to plan future intervention activities and define an integrated management approach to DSS mitigation and control.

RS-based Detection of Potential Dust Sources

Advanced RS technologies were employed to develop an extensive multi-source and multi-temporal analysis aimed at identifying the baseline environmental conditions in the study area (extending from the Alashan Prefecture to the Beijing Municipality, for about 1800 km east-west and about 700 km north-south), and detecting the potential dust/sand sources at a regional and local scale. Specifically:

_ For selected target areas in the Beijing Municipality and Alashan Prefecture, Spectral Mixture Analysis (SMA), which was applied to Landsat ETM+ imagery, allowed spatial differentiation of spectrally distinct rock and soil substrates and, thus, characterized potential dust/sand sources;

_ Changes in the vegetation cover over the period 1981-2003 were investigated by analyzing the time series of the AVHRR (Advanced Very High Resolution Radiometer) Normalized Difference Vegetation Index (NDVI). The investigation of the regional changes of the soil-vegetation system and the current soil conditions allowed the estimation of relative aridity as a potential for dust/sand sources;

_ A Digital Elevation Model (DEM) covering the study area was produced from SRTM (Shuttle Radar Topography Mission) data to provide an adequate topographic characterization for the representation of the atmospheric circulations by the DSS model;

_ Synthetic Aperture Radar (SAR) dataset was employed to characterize aerodynamic roughness and unconsolidated surfaces, indicating the potential for surface materials rising.

Dust Fluxes Measurements and Modeling

To detect the most intense dust sources, a brand-new technology based on the Eddy Covariance methodology, was employed to develop a prototype system that measures vertical net fluxes of dust due to wind erosion in a way that allows clear detection of any dust emission or deposition event. This prototype system was employed to monitor wind erosion over a two-month period (May and June 2005) in six selected sites: four hot spots in the Alashan area, and two in Beijing area. The monitoring campaign included an emission inventory which looked at the most relevant soil types and investigated and assessed them in relation to their contribution to dust emissions. Specifically:

_ Among the four sites monitored in the Alashan region, the Goby-type soil areas (covered by sparse shrubs) were found to be the most intense dust sources; desert grassland also seemed to have a high potential for dust emission, even though wind speed in the monitoring period did not reach high values;

_ Monitoring of a desert area where intense air-sowing reforestation was promoted by the Chinese Government showed that the intervention was effective in reducing the dust emissions;

_ Monitoring of natural desert sites and degraded sites around the Beijing area (i.e. a maize field and an abandoned rubble pit) showed that, in terms of dust emitted per unit area, a rubble pit can be equally as powerful a source as the desert.

Furthermore, the extensive data collection allowed for the setting up of the parameters (such as site-specific particle size distributions and soil roughness) of the dust emission model by Lu & Shao. It provides horizontal and vertical fluxes and estimates dust emission rates based on the volume removed by impacting grains. The application of the model in the same conditions monitored by the prototype system allowed a detailed investigation of the model capabilities.

Dust Sandstorms Modeling

A three-dimensional atmospheric, emission, dispersion numerical prediction model was developed in order to provide a regional characterization of DSS dynamics in northern China (from Alashan to Beijing).

To calibrate the model and perform a DSS regional analysis, the numerical prediction model was employed to simulate two relevant DSS events: 20-22 March 2002 and 28-30 March 2004. The simulations allow for better understanding of the mechanisms of the DSS propagation and, thus, the evaluation of the role played by the degraded areas surrounding Beijing (such as abandoned rubble pits) on the DSS affected capital.

To evaluate how the DSS origin and propagation could alter based on the changes in the land cover features, DSS modeling was carried out for two intervention scenarios, which foresaw the potential reduction in the dust/sand emissions:

_ In two selected areas in the Alashan region, possibly related to the implementation of reforestation/afforestation programs;

_ In the Beijing area, due to the rehabilitation of a relevant number of abandoned rubble pits.

The results of the modeling activities showed that a reduction in the potential dust/sand emissions due to remote sources (i.e. mainly the Alashan area during spring) should be considered relevant in the mitigation of severe DSS events affecting the Beijing area. Nevertheless, emission reduction from local sources, which were not found to be strongly related to extreme meteorological events, should be considered in the improvement of the Beijing air quality. The investigation was supported by the analysis of the meteorological conditions responsible for DSS origin and propagations in northern China, based on the daily meteorological data and weekly snow cover for the period 1979-2004 (i.e. NCEP-NCAR Reanalysis dataset and EASE-Grid Weekly Snow Cover dataset). It was observed that during spring, as a result of the Indian Monsoon, the snow cover extends throughout most potential sources for dust/sand, except for the Alashan and a few other areas. Since the presence of snow cover is relevant to the inhibition of dust/sand emission, the area of Alashan could play an important role during spring in terms of dust/sand emissions. It was also found that the pattern of the wind field in northern China is favorable, especially during spring, to transport dust/sand from the Alashan desert areas to the Beijing area. A direct corridor between Alashan and Beijing, relating to the Asian Jet Stream, was observed especially in the months of March and April.

Demonstration Projects for Dust Sandstorms Mitigation and Control

Human activities are known to be one of the destructive factors contributing to DSS, mostly through overexploitation of natural resources in areas already threatened by severe climatic conditions.

To reduce the anthropogenic impact on the territory while helping DSS mitigation, several pilot projects were

designed and implemented in the "WinDust" project framework. In doing so, state-of-the-art methodologies and technologies were introduced by Italian experts and integrated into traditional practices, so as to gradually turn the local economy toward a more sustainable one, while mitigating and preventing DSS. Developmental pilot projects were tested to evaluate the effectiveness, reliability and potential of innovative agriculture technologies and methodologies.
Preliminary results of pilot projects encouraged further efforts in introducing more sustainable techniques and methodologies, both in the agricultural sector and in the recovery of degraded lands.

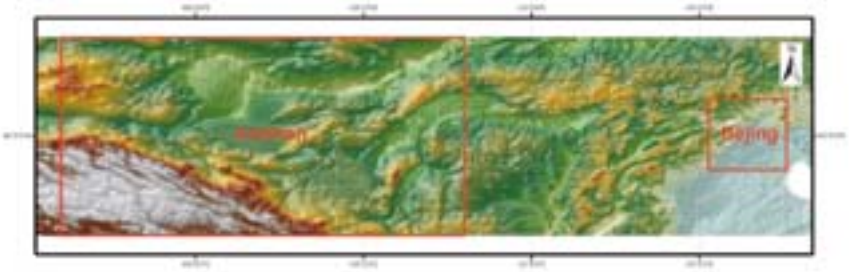


Fig. 1 Geographic coverage of the study area and indication of the Alashan and Beijing target areas (red boxes). The Digital Elevation Model obtained from the Remote Sensing analysis of interferometric and stereo data is shown as background.

Energy and Water Saving in Agriculture

A socio-economic investigation of the Alashan area, carried out within the project framework, detected two urgent ecological problems listed among the major causes of desertification in the region: (I) the over-exploitation of groundwater, and (II) the over-cutting of forestry resources. To address these issues, a pilot project of energy substitution and energy/water saving in agriculture was developed in a 2 hectares area of a rural farm, 20 km south of Jartai, in the Alashan Left Banner. The pilot project included a fully renewable energies-based drip irrigation system, a short-rotation plantation to produce biomass using fast-growing cover plants (i.e. *Populus alba*, *Robinia pseudoacacia*, *Salix matsudana*), and a plantation of *Haloxylon ammodendron* a key ecological resource in the region.

Micro-propagation-based Plant Production

In order to increase the availability of healthy young plants that could be grown in dedicated nurseries and then transplanted into the natural environment, a laboratory test for in vitro propagation of *Haloxylon ammodendron* was conducted at the University of Tuscia (Viterbo, Italy). This represents one of the first attempts to reproduce such species in laboratory conditions.
The laboratory activities, which were basically aimed at developing a procedure for optimizing plant development from seeds, focused on improving the growing agents and conditions for germination and the multiplication of adventitious shoots and rooting.

Conservation-tillage Trial Fields

Abandoned and active agricultural fields were recognized by Chinese experts as one of the most important sources of dust in the areas surrounding Beijing, involving more than 50,000 hectares. In order to tackle the problem, "conservation tillage" techniques were considered an effective practice in reducing wind erosion on worked soils. Advanced Italian technology (seeder machinery) was used to implement the conservation tillage technique in field trials delivered to Chinese experts. The field trials involved different working layouts and methodologies including: (I) leaving maize stalks standing in the fields in autumn, no-till sowing in spring and weed control with chemical spraying; (II) chopping stalks and covering the ground in autumn, no-till sowing in spring and weed control with chemical spraying; (III) traditional mouldboard ploughing procedure in autumn; (IV) minimum tillage (modified ridge tillage system); (V) no tillage.

Rubble Pits Reclamation

Engineering consultancy was provided to Chinese experts for two pilot projects concerning the reclamation of abandoned rubble pit sites in the Beijing area. These are considered one of the major causes of the air quality deterioration and potentially contribute to DSS affecting the Beijing area.
Two pilot projects developed by Beijing EPB were selected in order to evaluate the best practices for the environmental reclamation of the sites and for the consequent reduction of dust/sand emissions. Technical advice was provided on: (I) techniques for rehabilitation and stabilization of the slopes, also providing specific products to combat the erosion processes (i.e. geotextile); (II) methods for re-vegetation of the sites; (III) evaluation of different rehabilitation solutions based on the local conditions; (IV) methodology for the assessment of rehabilitation projects; (V) landscaping techniques.
The obtained results provided a reference for similar rehabilitation action in the Beijing area.

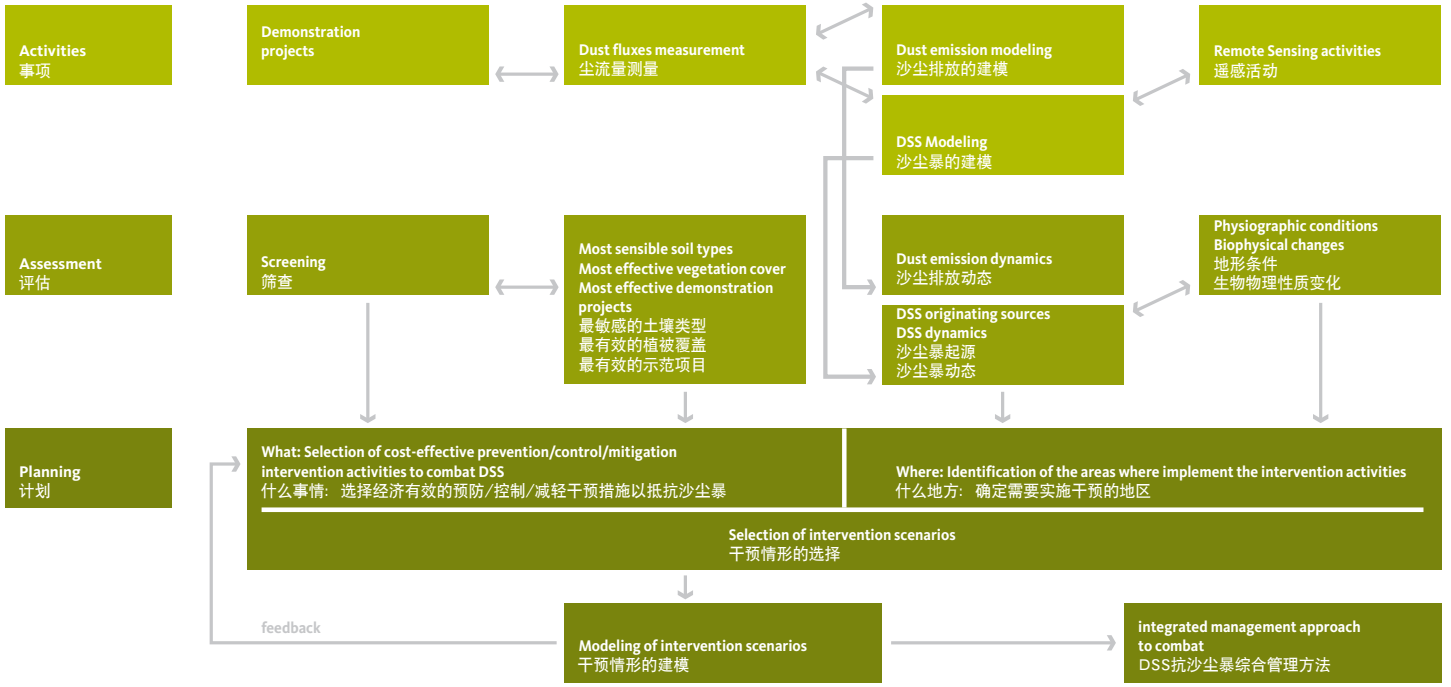
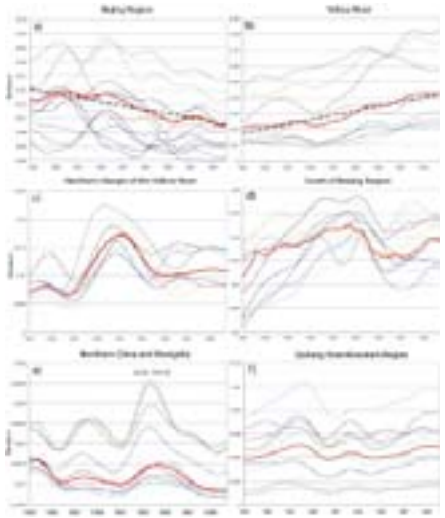
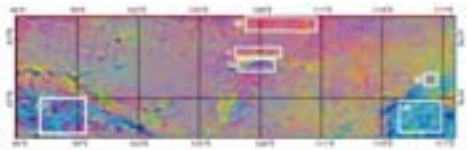


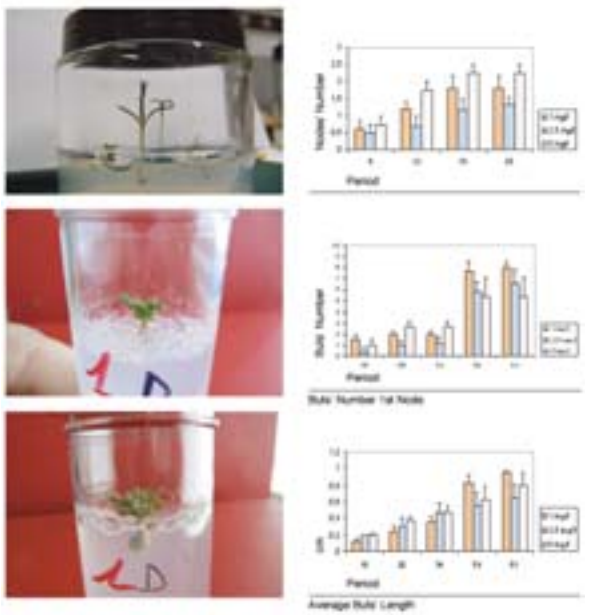
Fig. 2 The integrated approach of WinDust project. Performed activities (top panel) included cross-sectoral actions (broken arrows) and produced several results that were assessed. The results of the assessment (center panel) set the basis for the planning of future intervention activities and for the contribution to the definition of an integrated management approach to DSS mitigation and control (bottom panel).



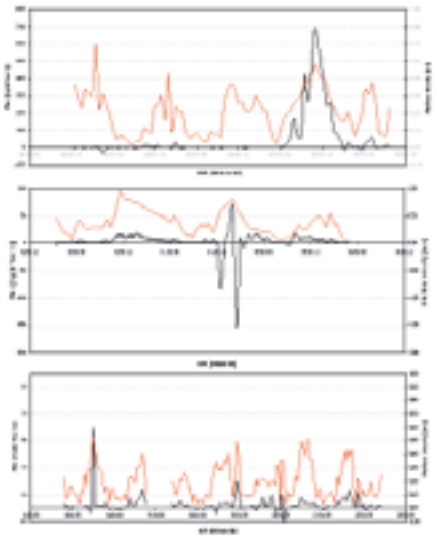


Red, Green and Blue (RGB) image of the NDVI averaged over the beginning, middle and end of the time series. Each of the three bands was normalized by the sum of the three to give a relative comparison between the three different time periods. Red pixels indicate areas where NDVI was higher at the beginning of the time series; similarly, blue represents areas that have increased in NDVI in recent years. White boxes highlight regions where relevant changes in the NDVI were detected from 1981 to 2003. NDVI trends for the different pixels in the selected regions. The solid red line represents the averaged NDVI in each selected region. For the Beijing (a) and Yellow River (b) regions the regression line was obtained (broken solid black line).

Layout of the drip irrigation system and a sketch of the solar pumping system (top). Details of the installation (bottom).

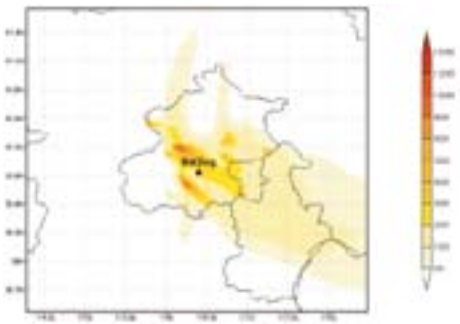


Shooting and elongation phases in the *in vitro* micro-propagation experiment for *Haloxylon ammodendron*.

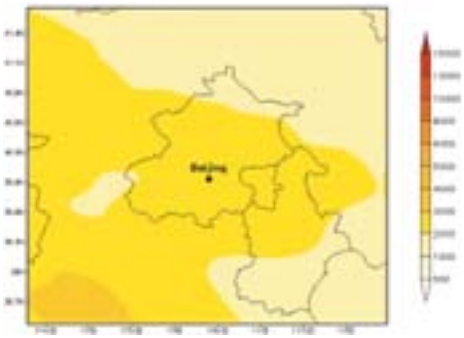


Time series of net PM7 fluxes (black lines) and friction velocity (red lines), for GB1, DG1 and AS2 sites corresponding to a goby-type soil land in Alashan (top graph), an air-sowed area in Alashan (center graph), and an abandoned rubble pit in Beijing (bottom graph).

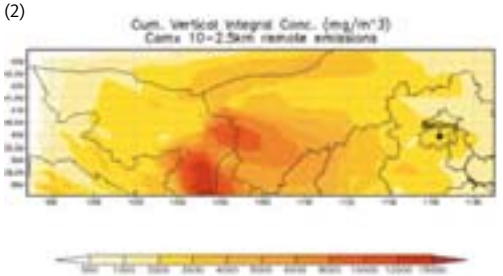
(1a)



(1b)



(2)



March 2002 case study. Vertical integrated concentrations cumulated over the simulation period due to: (1a) remote emissions at regional and (1b) local scale, and (2) due to local emissions. Concentrations due to local emissions (expressed in µg/m³) are negligible compared to the concentrations due to remote emissions (expressed in mg/m³).

VIU training program echo from participants

This section is written by the Chinese participants in the trainings in Italy.
We hope hereby to provide the Newsletter readers with an authentic flavour
of the training experience.

Chinese Academy of Social Sciences
Eco-Management: Strategies and Policies
Beijing, 15-19 October 2007

From 15-19 October 2007, I participated in the Beijing Phase of Eco-management Strategies and Policies Training Program V. Since I am mainly engaged in teaching, I express my thoughts from the perspective of training patterns, transformation of environmental protection incentives and talent training. Firstly, I really appreciate such training patterns. The organizers invited related environmental protection personnel from China's government, scientific and research institutions and enterprises to participate in the training and delivered the lectures from the angle of human and natural sciences. Although the training in Beijing lasted five days, it effectively spread relevant knowledge on environmental protection and promoted communication and cooperation in multi-areas between Italy and China. It conclusively proved that resolving environmental problems also relied upon creativity in organization. It is imminent that China starts implementing environmental protection and finding new solutions to environmental problems in similar ways to those developed in Italy.
Secondly, international pressure is becoming a powerful incentive for environmental protection. The binding force of EU environmental law on EU countries and some changes in Italy were introduced in the lectures. Meanwhile some international stress was also imposed on China, which reflected the global trend of environmental issues. Environmental problems were once confined to regions where several environmental hazards had occurred, whereas now, various countries in the world are cooperating jointly to resolve problems such as ozone holes and global warming amongst others. Moreover, the international pressure in environmental protection may result in a new round of economic competition in the field of eco-building, eco-textiles and new energy, etc. In the process of training, we were impressed by the valuable experience gained by Italy with regard to both environment and economic growth. It was really appreciated that Italy actively promoted some comparatively mature technology and management experience in China. Finally, I would like to talk about my feelings on talent training. The lecturers are specialized in the fields of economics, law, biology, hydrology and geology, energy planning, urban layout, climate change and other aspects related to this training. The training courses are closely linked with each other.
With the globalization of environmental issues, it is imperative that China considers how to cultivate reserve talent as soon as possible with systematic and sustainable development views to deal with environmental issues. The effect of environmental education is profound, as it not only exerts influence on decision-makers and designers but it also has an impact on consumers. I hope to learn more about this cultivation during study tours in Italy from 10-24 May 2008, in order to see how environmental education is implemented from elementary school to university in Italy. **Dr. Hu Yan,** Sichuan Normal University

Ministry of Science and Technology
Capacity Building on Sustainable Development and Legal Aspects

Italy, 20 October – 3 November 2007

The Sino-Italian Capacity Building Workshop on Sustainable Development and Legal Aspects was sponsored by the Chinese Ministry of Science and Technology (MOST) and the Italian Ministry for the Environment, Land and Sea (IMELS), and jointly organized by the Administrative Centre for China's Agenda 21 (ACCA21) and the Venice International University (VIU) in Italy from 20 October to 3 November 2007. Twenty-three Chinese participants took part in the workshop from S&T institutions, universities and research institutes.

The objectives of the workshop were to promote Sino-Italian scientific & technical communication and cooperation in the field of environmental protection and sustainable development, and to enhance capability building of management and policy-making in sustainable development.

The participants systematically studied the environmental policies and legal aspects of sustainable development in the EU and Italy through the relevant courses. These included environmental policy in Italy, EU environmental legislation and policy, water management and its legal aspects, air pollution control and its legal aspects, European energy policy and the industry role, sustainable agriculture, its legal aspects and so on. During the workshop, the participants visited many sites including the ARPAV, VESTA integrated waste management plant and the Venice Lagoon, which served to help better understand the courses.

The participants realized from the workshop, that for the sustainable development of our society, it is crucial to have the support of policies, legal regulations and finance, as well as the backup of science, technology and public participation.

The workshop deeply impressed participants with its distinctive objectives and rich content, combined with theory, case studies and site-visit activity. The workshop also broadened their horizons and enhanced their awareness of the importance and urgency of sustainable development. They look forward to further communication and cooperation between China and Italy in the field of sustainable development.

Chinese Academy of Social Sciences
Energy and Industry

Italy, 3-17 November 2007

The trainees took part in the Energy and Industry training session elaborately organized by Venice International University (VIU) in Italy from 3-17 November 2007. The trainees said that the training courses, consisting of interesting subjects and informative materials, were well designed and delivered by professional lecturers. They were followed by suitably selected site visits, which not only benefited them in theory but also widened their horizons and broadened their minds. Additionally, the trainees were deeply impressed by the beautiful Italian surroundings and greatly appreciated the organizers' hospitality and consideration.

Trainees were exposed to advanced Italian concepts and practices in energy and industry through lectures and site visits. The experts introduced the marketing prospects and application of solar energy, geothermal energy, wind energy, biomass energy and hydrogen energy to the participants. The trainees indicated that China could take note of Italy's technology and experience in renewable energy in order to utilize substantial domestic natural resources efficiently. The site visits of EniTecnologie, EXPLORA, TiFS building and VEGA gave the trainees an insight into the aspects and use of clean energy, eco-building, remediation of industrial areas and more.

The professor from CASS said it was worth spreading knowledge in China about the Italian experience in managing the Venetian lagoon, promoting sustainable development in port cities, raising energy and environmental protection awareness, as well as protecting and restoring ancient Roman and Venetian cultural relics. An official from Tangshan Science and Technology Bureau said that visiting VEGA had been of great benefit to him because Tangshan was in great need of advanced technology to renovate conventional industries and was transforming from a resource-oriented city to a newly industrialized city. He said a similarity could be found between the development of VEGA and the high technology in Tangshan.

The trainees suggested that, for better understanding, the lecture information should be translated into Chinese. Some preferred more site visits over pure theory, which could be given in Beijing training sessions. In addition to introducing technical factors, the trainees hoped to know more about related systems and mechanisms as well as the experience and lessons in converting the innovative technology into commodities. Overall, the trainees thought the training was instructive in relation to their work in the future. They hope the training mode can be continued to benefit more people.

Shanghai Environmental Protection Bureau
Environmental Management and Sustainable Development
Italy, 1-15 December 2007

The Italy-Shanghai Environmental Management and Sustainable Development Training Course, organized by the Italian Ministry for the Environment, Land and Sea (IMELS) and the Shanghai Environmental Protection Bureau (SEPB), was held during 1-15 December 2007 in Italy.

During the 15-day course, 16 lectures were presented by Italian experts and officials. They included environmental management and policy in Italy and the EU, local Agenda 21, assessment of environmental issues in Venice, sustainable traffic, the policy of energy saving and renewable energy, and the management of hazardous and medical waste. The site visit to IMELS, Thetis S.p.A and SMAT wastewater treatment plant deeply impressed us. We concluded three aspects as follows:

1. Policies and implementations on energy efficiency in Venice.

The practice of energy saving and pollution reduction learned from the Italians will provide valuable experience for Shanghai to construct energy saving buildings and improve energy efficiency, including centralized heat supply and refrigeration systems, the usage of clean energy (CNG public bus) and renewable energy (bio-diesel oil).

2. Active implementation of local Agenda 21 in Italy.

Under the framework of the AALBORG agreement, many Italian cities had implemented characteristic sustainable development projects including Rome's eco-sustainable energy project, Cremona's green public purchasing network project, Florence's sustainable traffic project and Ferrara's waste disposal project.

3. The efficient medical waste management in Turin.

Medical wastes in Turin were well controlled by way of classified collection, disposal systems and charge criteria. New knowledge about medical waste disposal and management was introduced through this course, which will be helpful in surveying medical waste disposal in Shanghai carried out by SEPB.

The trainees had two suggestions as follows:

1. Add more site visits and case studies related to the course lectures in order to learn about more advanced experiences, which will help to solve some practical problems in Shanghai.
2. Continually develop similar environmental protection training courses so as to exchange information and share experiences between technicians from both countries.

Electromagnetic Pollution, BMEPB
Italy, 12-26 January 2008
21 participants

With the increasingly fast development of new and innovative electronic technologies, together with the constantly increasing global demand from new users, the Beijing Municipal Environmental Protection Bureau has investigated the consequences, in terms of electromagnetic pollution, of such a rapid diffusion. VIU has interpreted the findings of BMEPB, designing a training agenda which includes the different aspects of the "dark face" of electromagnetism, as well as the rising environmental awareness and concern of the population, who are paying more and more attention to this issue.
The training included the study of electromagnetic frequencies coming from generating equipment, household appliances, computers, AM/FM transmitters, cell phones, microwave ovens, etc. - objects and equipment that surround us in our daily life. It has been interesting to find out that in fact some aspects of electromagnetism are still unknown and researchers all over the world are involved in deepening their knowledge on the subject; in particular, the debate on the effects on human health is still wide open and controversial. In this context, the training course looked for the cooperation of university researchers and experts from public and private companies who participated as lecturers in class or as speakers on the site visits.
When in Rome, the delegation met experts from APAT (Agenzia per la Protezione dell'Ambiente e per i servizi Tecnici – Agency for Environmental Protection and Technical Services), whilst, in Siena, professors of the University of Siena presented an overview of Italian and EU legislation on environmental protection as the framework to define possible rules, limits and standards as a tool to prepare the participants for understanding the local case studies. In Venice, professors from the Universities of Venice and Padua, and experts from public (ARPAV) and private (Dynamic Group) companies analyzed and presented local case studies, in particular those linked with monitoring surveys and the impact of electromagnetic sources, especially on human health.
The visit to the Ugo Bordoni Foundation in Bologna gave the participants the special chance to meet with high-level researchers who, within the Foundation, are enhancing and developing strategies in the communication sector. In particular, the meeting with a PMM delegate gave them the opportunity to be introduced to the most widely used monitoring equipment production. The training ended in Turin with lecturing sessions by a professor from the Polytechnic Institute of Turin and a site visit to the private company Teseo, an electromagnetic compatibility technology provider, which allowed the participants to become familiar with technologies for monitoring the impact of low and high frequencies in the environment.

Air Quality Control, MEP

Italy, 19 January-2 February 2008
24 participants
Italy, 12-26 April 2008
24 participants

Several studies on the impact of pollutants on the population support the evidence that cleaner air means considerable savings in human lives and economic resources. For this reason, in the 2008 Advanced Training Program, SEPA (which recently became MEP – Ministry for Environmental Protection) decided to focus on air pollution in three out of four training courses. The first two, held in January and April respectively, analyzed the main sources of pollution and the countermeasures available.
The growing number of private cars in Chinese cities, consisting of millions of inhabitants, is raising the awareness on traffic pollution. Different approaches are available to reduce airborne pollutants, especially from the technological point of view, with the production of cleaner engines and the attempt to introduce new fuels such as hydrogen and biodiesel. On the other hand, a different approach towards the mobility issue appears to be needed. The increase in the use of public transport is probably the winning choice, not only for the protection of health but also in order to create less congested and more liveable cities. During the training, different traffic plans adopted in several Italian cities like Rome and Milan were discussed to identify those most applicable in China; technical and scientific experiences in air quality monitoring systems were presented with special emphasis on the monitoring projects already developed in China by the Italian National Research Council. Pollution abatement in the industrial sector was another aspect taken into consideration. The issue of air quality legislation and the application of emission restrictions in the productive system raised much interest among the participants. The fundamentals of air quality legislation were presented, focusing on the path followed to obtain the set of laws in force these days. On the other side, the role of industrial associations such as Unindustria Venezia, in helping small enterprises deal with environmental regulations and in promoting a greener image of the industrial world was highlighted.

Waste Management, CASS

Italy, 23 February–8 March 2008
41 participants

The Waste Management training has become a regular appointment with the Chinese Academy of Social Sciences within the Advanced Training Program of Venice International University, since it has been organised for the fourth year now thus reflecting the importance of this topic in the urban development of China.
The aim of the course was to introduce the main aspects of sound waste management, through the presentation of best practises and the legislation developed in Italy and Europe to tackle this problem.
Many site visits took place especially at plant sites, including the multimaterial selection plant for the disposal of plastic, glass and aluminum in Rome, Rocca Cencia; the landfill site of Sogliano in Rimini, used for solid waste management; the incineration plant for hazardous waste in Ravenna; in Venice, the integrated waste treatment plant in Fusina; and the integrated waste water treatment plant in Treviso. Integrating different waste management systems were both the Centro Riciclo Vedelago in Treviso for waste recycling and the industrial waste management plant for special and hazardous waste in Turin.
Such site visits demonstrate not only advanced technological solutions for waste

treatment and disposal but they also show how the private and public sectors interact and deal with waste management, both at an urban and at industrial level.
The policy aspect was the most cross-cutting issue faced in the entire waste management training; in particular, with regard to hazardous waste, legislative provisions and standards for preventing damage to human health and environment were widely discussed and debated.
Particular attention was devoted to energy and material recovery from waste: RDF used to produce less polluting energy for electricity; compost for agricultural purposes; heath from incineration; and a new material from plastic selection. These are just a few of the by-products to be obtained from waste, for which the quality increases proportionally to the improvement in separate collection. On this subject, the excellent performance of the province of Treviso and its integrated waste management plan was presented as a case study.

New and Renewable Energy, MOST

Italy, 8-21 March 2008
27 participants

The high cost of fossil fuels and the awareness of their progressive depletion should be a strong incentive for exploring new energy sources and making them competitive on the market.
The New and Renewable Energy course organized for the first MOST delegation and held in Italy in 2008 aimed at exploring these new possibilities.
Hydrogen is one of the sources on which high hopes have been placed as it is considered the clean fuel of the future, however, further research for its use in daily life is still needed and several pilot projects are currently ongoing in different countries with regard to this.
The VEGA Hydrogen Park in Venice is one of these and represents a clear example of the scientific effort made to find a way to clean up production processes and utilize them safely.
Whilst hydrogen is not yet on the market, other “traditional” renewable energy sources are readily available and widespread. In many countries, solar energy companies such as the Italian company Enipower, (visited in Rome by the MOST delegation), as well as wind companies, are becoming very active in the economic reality of the renewable energy production trend, proving that the technological aspect is far less of an obstacle than the policy aspect.
An important aspect explored during the course was, therefore, the policy support. In Siena and in Venice different aspects of the European environmental legislation and the importance of market incentives adopted by European countries were analyzed; it was highlighted that, most of the time, the more a technology is widespread the higher its increase in efficiency, with benefits for both consumers and producers.
The experiences presented during the course didn’t hide the difficulties in store for cleaner energy supply, however, they did provide some successful examples as incentives to actively move further in this direction.

Vehicle Emission Control, BMEPB

Italy, 29 March–12 April 2008
21 participants

Traffic congestion is of major concern for Beijing City and is caused by a great increase in the number of vehicles in the past few years. Consequently, air quality and urban mobility are seriously affected by heavy traffic. Moreover, the forthcoming Olympic Games have drawn the attention of the international community to the high level of air pollution, which could affect the success of the Olympic marathon.
In this context, the Beijing Municipal Environmental Protection Bureau has expressed its interest in dealing with these issues, and in particular, to find successful case studies to possibly adopt in its city.
A specific training course on Vehicle Emission Control was organized by VIU at the end of March, in which sustainable urban mobility as well as air quality monitoring and pollution reduction were addressed.
The Mobility and Environmental Agency of Rome, ATAC, was the starting point of the training session. The mobility plan of the city of Rome and the impact on CO_2 emissions was presented as a case study. A similar visit to the Mobility and Environmental Agency of Milan provided the opportunity to compare this sustainable mobility plan with the one previously presented and see the approaches and similarities used by Italian local government institutions and the Chinese EPB in terms of competency and areas of intervention. In addition, the mobility plan of the city of Bolzano was presented this time, by a local association dedicated to sustainable development.
A round table discussion with Italian and Chinese professors and experts, held in Siena, focused on the new measures and standards that were being adopted by the Bejing Municipality for the air quality and pollution control in preparation for the Olympic Games.
In Venice, a delegate of the research and counselling company TRT Trasporti e Territorio, introduced the delegation to the methodologies and planning tools used for sustainable urban mobility in different urban scales, while the relationship between vehicle emissions and air pollution in urban areas was analyzed in depth by a researcher of the Italian National Research Council (CNR).
Special projects operating with China on intelligent transport systems were presented by Thetis.
In Turin, thanks to the contribution of professors from the Polytechnic Institute of Turin, the issue of vehicle emission control was approached from the root of the problem, as IVECO presented environmentally friendly solutions for vehicle engines, which, through innovative and environmentally friendly energy sources such as hydrogen and natural gas, prevent the emissions of vehicle pollutants.

Capacity Building on Clean Development Mechanism, MOST

Italy, 5-19 April 2008
26 participants

Whilst the introductory course on Capacity Building on Clean Development Mechanism held in Beijing in the beginning of April was aimed at presenting the current situation of CDM development in terms of policies, the training organised in Italy focused on the practical and technical aspects of CDM projects.
China's interest in CDM is due to the possibility of benefiting from huge investments from many Annex-I Countries, both environmentally and economically.

The lectures given in Rome and Siena focused on the present situation in Italy relating to carbon finance and the Italian Carbon Fund and explained the main features of Clean Development Mechanism including its function, cycle and role according to the rules and principles of the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol (KP).
Since the draft of a CDM project needs to take into consideration many aspects besides the reduction of greenhouse gas emissions, some lectures were devoted to pointing out the importance of two strictly connected issues: the baseline setting and the additionality criteria. The latter one is especially difficult to meet as it deals with economic, social, technological and environmental matters at a time.
Geothermal, hydrogen and solar are just a few of the renewable energies that can be used for these projects. Many case studies were discussed at length as a way to show how up-to-date technologies utilizing zero or low emission energies are also more efficient from an economic point of view, compared with oil or coal.
Projects related to forestry and reforestation were included in the agenda, as carbon sinks were approved as eligible CDM projects.

Beijing Olympic Village Thermal Solar Hot Water Project

On 30 July 2005, an agreement between the Italian Ministry for the Environment, Land and Sea (IMELS) and the Beijing Municipal Environmental Protection Bureau (BMEPB) identified scientific and technical activities to be implemented during the Beijing 2008 Olympic Village Thermal Solar Central Heating Project.
The Olympic Village is located on the northwest corner of Olympic park; inside there are a total of 42 buildings comprising of 6 or 9 floors and 1,800 apartments; a total construction area of 520,000 square meters. These 42 buildings are divided into four blocks. The 1,800 apartments can accommodate 16,800 people during the Olympic Games period. There will be a total of 16,800 athletes in need of sanitary hot water; the maximum daily hot water demand is 600,000 liters and this can be provided by a solar system. The size of this solar collector is around 6,000 m^2 and it will be the largest direct flow heat pipe system in the world.
The project proposes that on each roof there will be a roof garden, and the solar collector will be placed on the frame of the roof, perfectly integrating with the building. The Olympic Village Thermal Solar Project can generate a maximum of 600,000 liters of hot water (at 45°) per day and can save 5 million kWh of electricity, or 600,000 cubic meters of natural gas, reducing CO_2 emissions by 3,800 tons every year.

This is the first large thermal solar project in China which uses direct flow heat pipes and close pressure system technology in accordance with the DIN standard.
The principle of the system design is to maximize solar energy use, system efficiency and achieve a balance between investment and advanced technology.
This system has the following advantages:
_ It is divided into three parts; thermal solar energy collection, solar energy storage, and solar energy distribution. This kind of design enables the system to provide consistently high quality sanitary water to the consumer. It is also the first thermal solar system in China to introduce the function of bacteria distinction.
_ There is one sophisticated control system for this project; the whole system can run automatically while the computer monitors and diagnoses the operation of the system. The dates are transferred into Excel format and from there the system can calculate its efficiency etc.
_ It uses a Direct Flow heat tube (DF) for this project; DF tubes are not only highly efficient but also can meet all kinds of mounting requirements, such as horizontal, vertical, angle roofs etc. As the solar collector was designed to be put on top of a roof garden and horizontal mounting is needed, only DF tubes can meet these requirements.
This project not only has the above mentioned technical advantages but it will also influence the building industry, particularly due to the fact that clean energy was chosen to support the “Green Olympic Concept”. Once the Italian company has finished the planning of the Olympic Village project, many other Chinese office buildings will follow this example and it will encourage the development of other high level thermal solar projects in China.

Zero-emissions Transport within the Olympic Village

In the framework of the International Cooperation Program between the Italian Ministry for the Environment, Land and Sea (IMELS) and the Beijing Municipal Environmental Protection Bureau (BMEPB), a fleet of Italian-built electric motorcycles, hybrid cars and hydrogen-fuelled vehicles will be placed at the disposal of the Olympic Games organizers to transport the athletes.

Following the experience of the 2006 winter games in Turin, the Italian company FAAM (a leader in the international market and selected to develop this project) will distribute 35 electric vehicles, known as Smile, one of which is powered by an innovative fuel cell using hydrogen energy production. Acquired by the metropolitan city of Beijing, the electric vehicles will have another job in addition to their more typical purpose: transporting people and materials as well as, in a larger scale, the improvement of the air quality in the urban center.
Due to the request received from the Olympic Committee, 32 of these special electric cars will be equipped with climate-controlled cabins to stabilize temperature and regulate humidity. This will ensure that the guest athletes have places where they can breathe clean air, free of fine dust, excesses of anhydride carbonic and other impurities that could gather in the capital's sky.
To achieve the right atmosphere, the delicate instruments are placed in a prepared chamber, partly to isolate them from temperatures and external agents.
Moreover, following the Italian tradition, the Smile electric vehicle has an incredibly innovative design and is assembled using very light materials.
The use of these innovative vehicles will consequently "showcase" them worldwide for their state-of-the-art design and technology, developed by Italian companies.

Sustainable Programme for Rehabilitation of the Shichahai Lakes in Beijing Urban Area

The Shichahai Project, undertaken under the Sino-Italian Cooperation Program for Environmental Protection, aims to enhance the water quality of the Shichahai lakes system in Beijing's urban area.
The first phase of the project, completed in December 2005, provided an insight into the pollution problems of the lakes and identified the most appropriate measures to restore water quality in view of the 2008 Olympic Games. The project concluded that it is necessary to implement small treatment plants (5 l/s capacity each) along the lakes in order to restore the water quality of the system. In January 2006 the Italian Ministry for the Environment, Land and Sea (IMELS) and the Beijing Municipal Environmental Protection Bureau (BMEPB) agreed to proceed with the implementation of the solutions identified in Phase 1 and implement a pilot project consisting of the detailed design and construction of a water treatment plant and fountain system in the Qianhai and Xihai lakes respectively.
The construction of the works will be supported by a monitoring campaign that will consent to evaluate the physical and chemical processes in the lakes throughout the year and provide the basis for the optimization of the newly installed treatment works.
Monitored data will be used to enhance the mathematical model developed under Phase 1 so that it becomes a valid tool for the planning and management of the lakes. The enhanced model will be used to further evaluate the environmental restoration solutions identified in Phase 1 and explore them in more detail with respect to the dataset supplied by the survey campaign.
The tools developed throughout the project, database and monitoring network will be supplied to BMEPB and training courses will be held with the relevant local experts to make sure these instruments will be replicated following the project's completion.

Miyun Reservoir Protection Plan

Beijing is an area with stringent water resources. The water resource is only about 227 cubic meters per capita, far lower than international water shortage lines (1,000 cubic meters) and international water resource cordons (1,700 cubic meters). As the city size in Beijing has been expanding in recent years, the problem of short supply of the water source is worsening day by day. The water shortage crisis is threatening the survival and the socio-economic development of urban activities including the Olympic Games 2008.
In order to protect the water source of the Miyun Reservoir, the only surface drinking water source in Beijing, the Mayan County government has implemented the migration project of a first class protection zone of it, banned breeding fish in it and established a law enforcement team to protect the water source of the reservoir.
The above measures will ensure that the water quality standards of the Miyun Reservoir are met.
However, due to the impact of regional environmental and economic development and the lack of a comprehensive plan to prevent and control water pollution in the reservoir, the quality of the Miyun Reservoir and its surrounding environment show a declining trend.
The project aims to develop a comprehensive plan for water pollution control and prevention in the Miyun Reservoir and to suggest general guidelines for the sustainable development of the watershed area.
The project is divided into two phases, the first being the environmental and socio-economic characterization of the reservoir and its watershed area, and the

second phase, the finalization of the overall objectives.

Sustainable Urban Design: the Case Study of Huai Rou New Town

The Huai Rou new town master plan, commissioned by the Municipality of Beijing, was the occasion for a deep analysis of urban sustainability - one of the most important topics in present day China.
The present Huai Rou town is situated in the Beijing district, 50 km from the capital; the project extends over an area of approximately 870 hectares situated east of the existing Huai Rou. The Huai Rou new town master plan was designed on the basis of local culture, context and tradition and on a set of design concepts founded on the European experience, taken as keystones to build, together with the Chinese partners, an eco-friendly town.
The methodological principles, drawn from reflections on sustainability, can be highlighted by the following key concepts: complexity, accessibility and adaptability, supporting the concept of a livable and legible town in the pursuit of sustainable development.
The master plan must integrate, in an omni-comprehensive and flexible design, the various systems that regulate the urban structure: the creation of more efficient private and public transport systems (based on the existing roads linking the old town to the eastern villages, following the Chinese traditional street grid, reducing traffic congestion by diffusing the public transport system and connecting the railway station to the key transport interchange), a decrease in pollution and waste generation, improvement of human scale activities, use of eco-friendly technologies and buildings, and a significant presence of green spaces as urban textures.
On 19 June 2007, the Huai Row master plan was officially presented in Beijing in the "Sino-Italian Beijing Strategic Environmental Assessment" Workshop in the presence of high official representatives from the Beijing Municipal Environmental Protection Bureau and the Italian Ministry for the Environment, Land and Sea.

The Spline

The Spline, which started in 2005, as part of the Sino-Italian Cooperation Program between the Italian Ministry for the Environment, Land and Sea (IMELS) and Beijing Municipal Environmental Protection Bureau (BMEPB), identifies scientific and technical activities for the implementation of sustainable projects.
The project area, which extends over approximately one kilometer by one hundred meters, is located on the central axis and in the south of Beijing, between the third and fourth ring, and brushes the Liangshui River on the north side.
The Spline demonstrates how, through a deep study of the area, it is possible to create a relationship with the adjacent buildings, recapturing their modular order and at the same time enhancing the recognizable features of the new buildings.
Moreover, another purpose of the project is to demonstrate that the study of the complex surrounding area is essential in understanding how the project should be developed.
In particular, the project raised the following points:
_ The definition of the facades and of materials;
_ The definition of the functional and distributional layout of the building;
_ The optimization of the plant engineering system.
A multiplicity of theories was also examined for the internal arrangement of the spaces in order to make them adaptable to different needs: the plant module was conceived to be assembled and disassembled to obtain versatile spaces. In conclusion, the design process gave us the opportunity to conceive a building complex, improved by suitable technological systems whilst maintaining a human perspective.

Beijing Shishahai Condensing Boiler Domestic Heating Project

The Beijing Shishahai Condensing Boiler Domestic Heating Project is part of the Sino-Italian Cooperation Program between the Italian Ministry for the Environment, Land and Sea (IMELS) and the Beijing Municipal Environmental Protection Bureau (BMEPB).
Shishahai is located in the downtown area of the Xicheng district in Beijing. Traditionally people have used coal-fired stoves as a heating device in winter, due to the very complex underground situation and connecting a natural gas pipe line into this living area is not feasible. In winter, thousands of families use coal stoves for heating and CO_2 emissions are quite heavy and pollute the air. From January 2006, the project was officially implemented. During the 2006 and 2007 winters, particularly the heating seasons, the BMEPB, Xicheng District Government and the Xicheng District Environmental Projection Bureau made great efforts and tried different ways to solve this problem.
One of the solutions is to use wall hung condensing boilers to provide heating for different sized family houses. After several on-site checks, an innovative satellite heating solution was selected.
Condensing technology can effectively absorb the heat from the fired exhaust gas and at the same time sharply lower the exhaust temperature, CO_2 and NO_X emissions. Additionally, boiler efficiency can reach 108%.
Merloni Termo Sanitari (MTS-the Italian company involved in the project) proposed the use of condensing wall hung boilers and satellite solutions for this specific area.
Test results show that both from consumer satisfaction and government investment points of view this is a feasible solution.
Ten families and one office were selected

to test this system. After two years of testing, the results show that this solution is feasible. Compared with other solutions the advantages of this one are: energy saving; environmentally friendly; easy to install and construct; economical with low investment; an innovative system; easy heating charge collection.
The project was successfully accepted and reviewed in May of 2008.

FPT (Fiat Powertrain Technologies) for Beijing 2008 Green Olympic Program

This project and FPT represent another fruitful example of the Sino–Italian Cooperation Program between the Italian Ministry for the Environment, Land and Sea (IMELS) and Beijing Municipal Environmental Protection Bureau (BMEPB) in the framework of the "Beijing 2008 Green Olympic Program".
Since 2000 FPT has been working to define useful products for the Beijing Public Transportation Corporation (BPTC). The FPT strategy is based on the continuous improvement of the "clean" diesel engine and on the use of alternative fuels and driveline systems for congested urban areas.
The FPT choice among alternative fuels is compressed natural gas.
In the year 2002, FPT signed an agreement with IMELS to develop a suitable CNG engine for the Chinese market.
For commercial vehicles, to change from a diesel engine to a spark ignition engine is a significant change. To make this change without achieving the maximum benefit in terms of exhaust emissions is unthinkable in the FPT strategy.
For this reason, FPT has chosen a stoichiometric (chemically correct air/fuel ratio) combustion process with exhaust gas, after treatment using a three-way catalyst (complying with the strictest emission regulations, such as the EEV standard included in the EEC 1999/96 Directive).
In summary, in order to achieve very low exhaust emissions, the strong points of FPT technology are: stoichiometric combustion system with three-way catalyst; multi-point sequential fuel injection system; individual spark plug-ignition coil assemblies; differential piston pressure reduction system.
The program with IMELS included the supply of 300 CNG engines free-of-charge to BPTC aimed at improving the environmental conditions in Beijing city, in addition to the 1000 units of CNG engines that BPTC purchased in 2006.

The Sino-Italian Ecological Energy Efficient Building (SIEEB)

The Sino-Italian Ecological Energy Efficient Building (SIEEB) is an example of ecobuilding on which the Chinese Ministry for Science and Technology and the Italian Ministry for the Environment, Land and Sea (IMELS) worked on together.
Recently, China has seen a dramatic increase in energy consumption and CO_2 emissions because of the rapid expansion of the building sector: SIEEB is the answer to the need for buildings with a low environmental impact. Its aim is to combine energy efficiency objectives (in particular CO_2 emission reduction) with a functional aspect and a contemporary architectural image. This eco-efficient, eco-friendly project was realized at the Tsinghua University Campus in Beijing.
The structure was designed by Italian architects, and its construction was managed by Italian engineering firms.
A technically-advanced showcase for environmentally-friendly building, SIEEB utilizes the most innovative Italian technology to make the most of the external environment and to optimize its internal conditions. Primary energy needs are supplied by photovoltaic panels, which achieve maximum efficiency in solar energy absorption during winter and sun protection during summer, while gas engines and electric generators produce almost all the supplementary energy required. Sophisticated sensors and CO_2 detectors control room temperatures and lighting to minimize energy waste. Smart monitoring control, good inside ventilation, water recycling, environmental low impact materials and heat loss avoidance contribute to make SIEEB a platform for developing long-term cooperation in environmental protection in the building sector, as well as a symbol of Sino-Italian collaboration.

Beijing Public Educational Center for Environment and Sustainable Development

The "Beijing Public Educational Center for Environment and Sustainable Development" Project is one of the projects which best interprets the will of the Italian Ministry for the Environment, Land and Sea and of the Beijing Municipality to boost people's interest in environmental themes. The aim of the project is to build a center for environmental education in Beijing's Zhongguancun technological park, by taking advantage of EPB's experience in environmental quality monitoring. The key goal is to create a widespread sensitivity to problems concerning environment and sustainability, so that public awareness of environmental themes linked to the 2008 Olympics increases. The project involves Chinese media, private associations and educational activities in residential districts. The work plan includes seven specific undertakings: a) a workshop for green communities; b) publications concerning sustainable development; c) an idea contest in chinese and English for Beijing students comprising of topics related to environmental problems; d) activities concerning mobility education; e) real-time quality monitoring through an internet web cam system; f) a selection of the best Italian publications concerning sustainability, with Chinese translation and free distribution to students; g) the making of television programs about the Chinese understanding of sustainability in Italy.

what's next

Spring and summer at Venice International University, when there is a break in academic activity, is the perfect time for research and workshops in the idyllic San Servolo gardens, amongst the shade and sea-breeze.
It is this same garden that enchanted the Vice Ministry of Environment Zhou Jian, who visited Venice International University in May with a delegation of the newly established Chinese Ministry for Environmental Protection (former SEPA), and stressed the importance of training the people within its Ministry, especially since the Ministry had been recently recognized to Chinese MEP - Ministry for Environmental Protection.
VIU was also honoured with the visit of the CASS Vice President Li Shenming who used the occasion to discuss the interesting topics of global economic issues and hence, environmental issues that may develop into future cooperative ventures.
The VIU spring and summer workshops season opened in May with Harvard University "Executive Session on Bio-fuels and Sustainable Development" (19-20 May) in the frame of the Grand Issues in Sustainability conference series. This year's workshop on bio-fuels was convened by the Sustainability Science Program at Harvard University's John F. Kennedy School of Government, in cooperation with the Global Bio-energy Partnership and with the support of the Italian Ministry for the Environment, Land and Sea (IMELS). After the opening remarks by Mr. Corrado Clini, chairman of the Global Bio-energy Partnership and director general of IMELS, and Mr. Bill Clark, co-director of the Sustainability Science Program, leaders from developing countries and other concerned constituencies discussed how the future development of bio-fuels could be directed to promote sustainable development in both production and consumption.
The "Growth, Trade and Environment: State of Art and Future Research Perspectives" workshop (9-10 June) promoted by Professor Musu, president of the VIU's TEN Center, brought together scholars from the most outstanding institutions and universities in the world in the field of environment and environmental economics. Among them were: B.Copeland, University of British Columbia; P. Goorha, Deakin University, Melbourne; P. Hatzipanayotou, University of Athens; D. Marconi, Banca d'Italia, Rome; P. Peretto, Duke University; F. Ricci, Universitè Cergy-Pontoise; F. Sanna Randaccio, Università La Sapienza, Rome; P. Sgro, Deakin University, Melbourne; S. Smulders, University of Calgary; Q. Xue, Tsinghua University, Beijing; E. Yu, City University of Hong Kong; J. Zou, Ren Min University, Beijing.
The workshop was organized in cooperation with the SSE-Advanced School of Economics in Venice; the Center for Environmental Economics and Management of the Department of Economics, Ca' Foscari University of Venice; and the SSAV-School of Advanced Studies, also in Venice.
The second edition of the one-week training course "Energy Technologies and Management" will be held from 30 June to 4 July. This short training course will bring together experts on energy from the public and private sectors, with the overall goal of addressing the need for up-to-date, objective and practical knowledge and information on tools and methodologies in the energy field.
The "International Summer Research Workshop" is the first of a joint DUKE-VIU workshop series which

will be held annually over the next 2-4 years, in Venice and in Durham, NC alternately. The series will tap the partner institutions' complementary research focus: Duke University's Center on Globalization, Governance & Competitiveness (CGGC) global value chain approach, and the Venice International University's Center for Studies on Technologies in Distributed Intelligence Systems (TeDIS) empirical research into Italian industrial districts. Support will be given by TEN Center's environmental expertise, coupled with VIU's research project on sustainability chains. Students from the Chinese Academy of Social Sciences and Tsinghua University have been selected to join the Summer Research Workshop.
Seven training courses will be arranged at VIU from May to September, involving 6 out of 7 Chinese partners and covering a broad range of issues such as Water Pollution Prevention and Control (CASS, 10-24 May); Multilateral Environmental Agreements (MEP, 17-31 May); Environmental Management (SEPB, 24 May -7 June) and Sustainable Development for "Eco-city": Application and Case Studies (TSTC, 13-27 September).
The training activity of VIU's TEN Center will also include the Course for Sustainability: Strategies, Methodologies and Policies arranged in cooperation with the REC - Regional Environmental Center for Central and Eastern Europe.
This year the course will involve the government of Kazakhstan (thanks to the cooperation of CAREC) and will target officials from the country's different ministries in three individual sessions, held respectively in Astana and Venice.
Another edition of the course will involve participants from Black Sea countries including Turkey, Bulgaria, Romania, Ukraine, Georgia and Moldova, thanks to the cooperation of the REC regional office in Turkey. The course will include two sessions, opening with the first one at Bilgi University Campus in Istanbul in June, and closing in October with the second one in Venice at VIU.