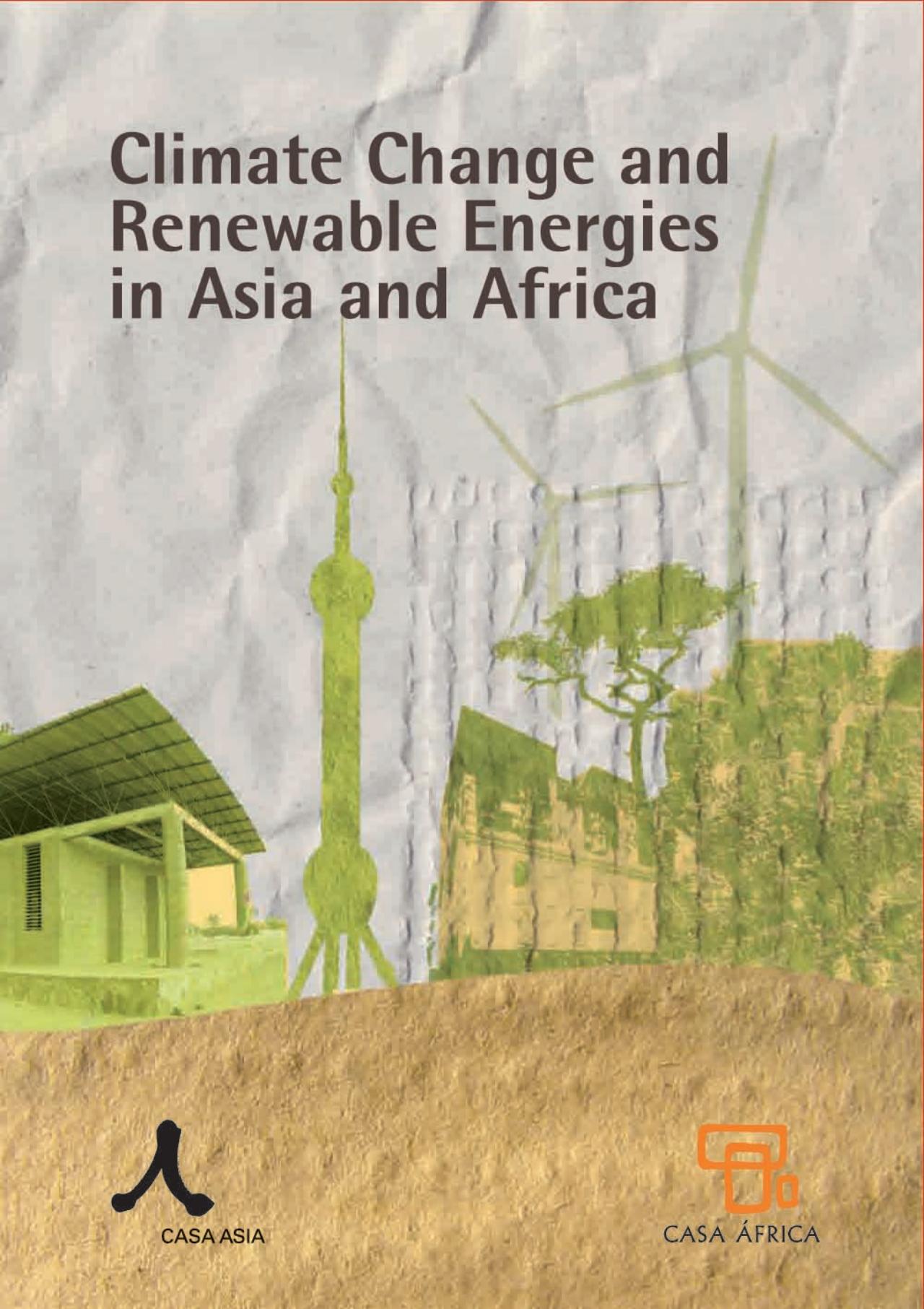


Climate Change and Renewable Energies in Asia and Africa



CASA ASIA



CASA ÁFRICA



CASA ÁFRICA



CASA ASIA

Climate Change and Renewable Energies in Asia and Africa 2010

Copyright 2010 Casa Asia / Casa África

ISBN:

Published 2010

Edited by:

Casa Asia / Casa África

Coordinated by:

**Martínez-Taberner, Guillermo; Sánchez-Pinto, Ico;
Vilella-Casaus, Mariel**

Designed by:

Ingogroup, impresión y diseño, S.A.

The views expressed in this book are those of the authors and do not necessarily reflect the views and policies of Casa Asia or Casa África

Contents

Page

4

Forewords

6

Ricardo Martínez Director General, Casa África

7

Jesús Sanz Director General, Casa Asia

8

Preface

20

Rajendra K. Pachauri
Olusegun Obasanjo

28

Introduction

FIRST PART

32

Sustainability and Climate Change: The Main World Challenge

James Moran - Mounkaila Goumandakoye - Rafael Tuts - Alicia Montalvo

SECOND PART

56

International Cooperation and Energy Policies to achieve Sustainable Development

Anil Terway - Mohammed AbdelRahman - Rosa Elcarte

THIRD PART

74

Sustainable Energy Policies of the Main Asian and African Countries

Akio Morishima - Muhammad Enamul Huq - Mahama Kappiah - Steve Sawyer

FOURTH PART

102

Business Cooperation in the Renewable Energy Sector

Anil Kane - José Donoso - Manuel Cendagorta-Galarza - Ajay Prahhbu

Appendix

128

ASEFUAN Dialogue on Climate Change and Sustainable Development

'Minimums and Recommendations'

Forewords

Casa Asia and Casa África present the conclusions of the International Conference on Climate Change and Renewable Energies in Asia and Africa organized in collaboration with the Spanish Agency for International Development Cooperation AECID, the Obra Social Fundación “la Caixa”, QuEST, ACS Foundation and Técnicas Reunidas.

The publication includes four different parts on multilateral programmes for sustainable development concerning energy, regional and global policies in the struggle against climate change, strategies for the use of clean energy in Asian and African countries, and entrepreneurial cooperation in the renewable energy sector between Africa, Asia and Europe.



CASA ÁFRICA



CASA ASIA

Page

6

Forewords

Ricardo Martínez

Director General, Casa África

7

Jesús Sanz

Director General, Casa Asia

Ricardo Martínez

Director General, Casa África



Although it was announced during the previous century, today, well into the 21st century, climate change has been undoubtedly confirmed as one of the most relevant issues on the international and development cooperation agendas.

The United Nations Framework Convention on Climate Change (UNFCCC), held in Copenhagen in December 2009, ended on the one hand with the Copenhagen Accord, a minimum agreement promoted by the United States and supported by Brazil, South Africa, India and China which showed the weight of emerging countries in international negotiations on the climate and the model for economic development. On the other, and for the first time, developing countries, under the umbrella of the "G-77 + China", united their voices, requesting industrialised countries to assume the historical debt, in particular through supportive instruments to develop adaptation and mitigation programmes. Developing countries in Africa and Asia, which contribute less than 10% to global greenhouse gas emissions but suffer the worst consequences of global warming, call for a binding agreement that takes into account the principle of equity and common responsibility as well as the differing circumstances, historical responsibilities and capabilities of the countries. South Africa, the only African country within the group of the BASIC emerging countries (Brazil, South Africa, India and China), leads the ambitious mitigation programmes in the continent, and will host the seventeenth meeting of the UNFCCC in 2011.

For this reason, at Casa África -within the framework of our collaboration with Casa África- we also wanted to provide elements for reflection and debate on climate change from the African perspective. In particular, to debate their environmental policies, their new energy models, the cooperation programmes

concerning sustainable development and the possibilities of entrepreneurial collaboration in the clean energy sector.

The International Conference, which was attended by a highly qualified and large audience, is a manifestation of both the importance that Spanish society has placed on climate change and the environment, and of the growing presence of the 'Casas' in relevant issues of the Spanish foreign agenda.

We are doubly satisfied for this publication: firstly, it contributes towards establishing the real dimension of the climate debate and encouraging a wider understanding of the matters at stake, and secondly, it has once again placed the African and Asian voices in the spotlight of the great global challenges ahead.

Finally, I would like to express our acknowledgment to all the participants to the Conference and to the contributors to this timely publication. I would like to extend this recognition to the African participants and the representatives of the institutions in Africa who made possible this international meeting and in particular to Chief Obasanjo, the ECOWAS Commission and ECREEE, NEPAD, UN-Habitat, and the regional offices of UNDP-GEF and UNEP.

Jesús Sanz

Director General, Casa Asia



For the second year running, Casa Asia and Casa África, with the invaluable collaboration of the Spanish Agency for International Development Cooperation (AECID), have undertaken an annual joint project in the field of development cooperation. This time the aim was to analyse and raise awareness among Spanish civil society concerning the impact that climate change has in developing countries in the Asian and African continents and the importance of fighting its effects through the use and implementation of renewable energies.

We gathered global leaders, representatives from multilateral bodies and regional and national institutions, renowned experts on the subject, leading companies in the renewable energy sector and active members in international cooperation to start an open debate on the social and economic consequences of climate change. The main issues debated were the multilateral programmes for sustainable development concerning energy, regional and global policies in the fight against climate change, strategies for the use of clean energy and entrepreneurial cooperation in the renewable energy sector between Africa, Asia and Europe.

I would like to insist on our gratitude towards all the participants who came from all over the world for their contributions to the debate during the International Conference on Climate Change and Renewable Energies in Asia and Africa, and for the interesting contributions included in this publication. Likewise, I would like to thank all the institutions that supported the project right from the start. In particular, I would like to express my grateful acknowledgement to First Vice President of the Government, María Teresa Fernández de la Vega, the Housing Minister, Beatriz Corredor, the State Secretary for International

Cooperation, Soraya Rodríguez, and the State Secretary for Climate Change, Teresa Ribera.

As an institution for public diplomacy, the main function of Casa Asia is to promote and carry out projects that contribute towards improving knowledge on the reality of Asia and reinforcing relations between Asian countries and our own country. The conferences that shaped the present publication are a further example of this function, which is only possible thanks to the collaboration of the Asian representatives and the constant support of the Spanish institutions. To all of them, thank you for continuing to help us build bridges for collaboration between Asia and Spain.

Preface

Rajendra
K. Pachauri

Director General of The Energy and Resources Institute (TERI) and Chairman of Intergovernmental Panel on Climate Change (IPCC), awarded the Nobel Peace Prize for the year 2007

Dr Rajendra K. Pachauri assumed his current responsibilities as the Chief Executive of TERI (The Energy and Resources Institute) in 1982, first as Director and, since April 2001, as Director-General. TERI does original research and provides knowledge in the areas of energy, environment, forestry, biotechnology, and the conservation of natural resources to governments, institutions, and corporate organizations worldwide. He is also the Chancellor of TERI University since August 1998. In April 2002, Dr Pachauri was elected the Chairman of the Intergovernmental Panel on Climate Change, established by the World Meteorological Organization and the United Nations Environment Programme in 1988 (Re-elected in September 2008). IPCC along with former Vice President Al Gore has been awarded the "Nobel Peace Prize" for the year 2007. He has been appointed as Director, Yale Climate and Energy Institute from July 2009. He has been active in several international forums dealing with the subject of climate change and its policy dimensions.



I feel a great deal of warmth for the Spanish society, a great deal of admiration for what it is doing and I am delighted to learn that Spain has passed legislation and brought into law a set of measures that are obviously going to make a major difference in moving Spain towards the goal of sustainable development. Indeed, several other countries in the world will follow your example. Because I think this is a period when we have to set examples. We have to create precedents by which other countries and other societies gain a great deal of confidence and encouragement.

I would like to also congratulate Casa Asia for the remarkable work that has been initiated by this organisation. Casa Asia is clearly ahead of its time because it has focused on other parts of the world which unfortunately in the past have not received the kind of attention they deserved, and it seems to me that in an integrated economy, in this globalised world, our understanding of what happens in other regions and our ability to be able to help other regions, to bring about a pattern of sustainable development in their actions, is really going to be of critical importance.

What I would like to do is to briefly go into some of the findings of the 4th Assessment Report of the IPCC which, I have great pleasure and nostalgia in mentioning, was released in this country, in the beautiful city of Valencia in November 2007; that's where the Synthesis Report of the 4th Assessment Report was completed, accepted and released. I also want to mention that we have started work on the 5th Assessment Report of the IPCC, which will be coming out on 2013-2014 and we expect that a number of areas that perhaps we were not able to focus on, or did not have enough information and knowledge on in the 4th Assessment Report, will be covered in the 5th Assessment Report.

In this preface, I'd like to present very briefly several important aspects relating to climate change.

Firstly, I'd like to deal with the observed impacts and the observed levels of climate change. If you look at the changes in the global average surface temperature since the beginning of industrialisation, you will find that there are fluctuations in this temperature, and this is clearly the result of natural factors

initially, which have always been responsible for weather and temperature changes that have taken place since time immemorial. But what is particularly noticeable is the fact that if you look at the last 50 or 60 years the trend has been upwards and, in fact, if you drew a line over the past 100 years, you'd get a clear picture of the trend, which is towards an increase in temperatures. In the 20th century the increase in temperature amounts to 0.74 °C. However, what is even more dominant is the fact that if we draw a line and show the trend over the last 50 years, the rate of increase is almost twice that of the 100 year trend. And it's also important to see that the level of the last 12 years rank amongst the 12 warmest years in the instrumental record of global surface temperature. So we are clearly on an increasing trend as far as climate change is concerned. May I say there have been a few reports in the media which seem to indicate that the Earth is warming, climate change is taking place at a much faster rate than what the IPCC had projected in the 4th Assessment Report. Now I would like to point out that nothing could be further from the truth because we have clearly underlined the fact that there is an increasing trend in changes in temperatures, in changes in other variables related to climate. Eleven of the last twelve years ranked among the twelve warmest years in the instrumental record of the global surface temperature.

Eleven of the last twelve years ranked among the twelve warmest years in the instrumental record of the global surface temperature

If you look at what has been happening, this is just an indicator of some of the changes that have taken place. Regarding the cumulative balance of the glacier mass in different parts of the world, what is particularly worrisome is the fact that water supplies which are essentially stored in glaciers are projected to decline over the course of the century. Water supplies stored in glaciers are projected to decline over the course of the century.

Water supplies stored in glaciers are projected to decline over the course of the century

One definition of these glaciers is the fact that they are the water towers in which we are storing water in different parts of the globe. And if these water towers are drained of the total quantity of water, then clearly it would affect the flow of river systems that essentially originate in several of these glaciers, and coming from my part of the world this is an issue of great concern for us because all the river systems in the northern part of the subcontinent originate in glaciers. Our projection of the IPCC is that approximately five hundred million people in South Asia are likely to be affected by the reduced flow of water in the river systems that originate there, and approximately 250 million people in China. So the implications of this, the impact of the changes that are taking place would affect a very large part of humanity.

As a result of the melting of bodies of ice as well as the thermal expansion of the oceans we also know that the sea level is rising very rapidly, and if you look at the changes that are taking place, during the 20th century our records indicate that the average rise of the sea level has been of about 17 cm, which may not seem a lot initially, but if you live in a small island state where the bulk of the land mass -which is generally very small- is no more than a meter or so (above sea level) then clearly this 17 cm increase represents a major threat to all forms of life on the small island states and on some low lying coastal areas. The global average sea level has risen since 1961 at an average rate of 1.8 mm/year and since 1993 of 3.1 mm/year.

The global average sea level has risen since 1961 at an average rate of 1.8 mm/year and since 1993 of 3.1 mm/year

We have clearly brought out the fact that the global average sea level has risen since 1961 at an average rate of 1.8 mm per year, and since 1993 at almost twice that rate; 3.1 mm per year. So it is obvious that the sea level is also rising very rapidly, far faster than was the case in the past. All this has a number of major implications along with several other effects of climate change. We are incidentally now working on a special report for the IPCC on extreme events, which will highlight and provide knowledge on a broad range of extreme events which have been taking place across the world, the intensity and frequency of which have been growing very rapidly. And this is just a listing of some extreme events; droughts, we have extreme precipitation events, we have very intense cyclones; in the country of Myanmar a cyclone hit a large part of the southern portion of that country leading to approximately 100,000 deaths, though today we know the real figure was actually much higher, and that it was initially underestimated. More than 90% of deaths related to natural disasters occur in developing countries.

More than 90% of deaths related to natural disasters occur in developing countries

This is largely the result of the fact that we know, as the IPCC has assessed in several regions, that the intensity of cyclones is becoming much worse, and therefore these are some of the threats that we will have to deal with, because climate change is not a mere smooth and steady rise in temperatures. It is accompanied by a major disruption of the entire climate system itself. More than 90% of deaths related to natural disasters occur in developing countries, and I think the difference lies in the kind of infrastructure, the kinds of institutional arrangements that exist in developed countries. Just to give you an example, every time there is a hurricane that perhaps hits Florida or parts of Louisiana, people close their homes, get into transport and move away to safe locations. But when a cyclone of similar intensity hits, for example, parts of south Asia, people firstly

do not get adequate warning, and if they do, they really have nowhere to go, because the infrastructure for them to move elsewhere, the places where they may be able to get shelter elsewhere, are completely lacking; so this is where I think we have to look at the equity, the ethical and the differential dimensions of climate change and its impacts.

Just to quickly go over some other expected impacts. We have brought out projections of temperature increase by the end of this century, and they range from 1.1°C to 6.4°C, which are the results of changes in the economy, changes in technologies, and changes in demographics that are going to take place between now and the end of the century.

In order to focus on what might actually happen we have come up with what we call so-called best estimates; at the lower end of the range we have come up with a best estimate of 1.8 degree Celsius and at the upper end a best estimate of 4°C. Continued emissions would lead to further warming of 1.1°C to 6.4°C over the 21st century (best estimates: 1.8° - 4°).

*Continued emissions would lead to further warming of 1.1°C to 6.4°C over the 21st century
(best estimates: 1.8° - 4°)*

Even the lower end really implies a number of major threats because a 1.8°C increase, along with the 0.74°C that took place in the previous century gives you a total temperature increase during these two centuries of over 2.5°C, and we know that 2.5°C will lead to some extremely severe effects of climate change that we have to avoid at all costs.

Key vulnerabilities in Asia

Agriculture and food supplies will be affected in several parts of the continent. Water availability will be affected, such that large numbers of

people will be living in a state of water stress. The numbers shown over here are significant, from 120 million to 1.2 billion people in Asia alone, so this clearly is something that will disrupt the means by which society has been able to live and function in the past several decades and perhaps centuries.

Human health will be affected, not only because of increased floods, droughts and heat waves, but also because vector-borne diseases will increase in the revised climate that we are going to deal with.

Coastal areas are particularly vulnerable, and I might mention that a large number of the megadeltas are extremely vulnerable. This includes cities like Shanghai, Dhaka and Calcutta, as there is a large concentration of population in those places, together with a great amount of property and infrastructure, all of which would be threatened by coastal flooding which is very likely to happen in a number of these delta areas.

Key vulnerabilities in Africa

Looking at Africa, there are very serious challenges there. We have projected almost crisis level developments in several parts of Africa.

Regarding agriculture and food supply, as early as 2020 we are likely to see a decline in agricultural yields and productivity in several countries of as much as 50%. We must remember that several countries in this continent have very low income and that if they are not able to grow enough food to feed themselves, in a continent where you already have large scale malnutrition, they would really have no means with which to import food, even if it was available in the global market.

So this can lead to crises combined with water stress, where we projected that by 2020 itself we would have 75 to 250 million people living in a state of water stress. Then we can clearly visualize that just in about 10 years from now we are likely to face major challenges, and therefore some of these societies, some of these countries, need urgent and large scale help, and the sooner the better.

One of the things that I would like to highlight for the consideration of Casa Asia is the fact that in this continent we will have to create the capacity by which scientists, academics, can be trained to carry out detailed assessment of the effects of climate change, and to come up with means by which they are able to adapt to these effects over a period of time. Because even if we were to bring about a sharp reduction in emissions of greenhouse gasses today, even down to 0 levels, there is enough concentration in the system by which climate change will continue for the next two or three decades. Therefore, there is a certain inevitable level of climate change that we have to prepare for, and in regions like certain countries in Africa, where there is already a high level of vulnerability, we need to be deeply concerned about this.

Human health is another area in Africa where, given the fact that there are a number of pandemics, you have several existing health problems; we need to move rather quickly to make sure that the impacts of climate change do not exacerbate the health conditions that exist there already.

Coastal areas, in Africa, are also extremely vulnerable and we need to be conscious of that. As can be seen in the picture on the vulnerability of coastal deltas, the large dots are the ones that are the most vulnerable. But there are several other spread all around which also have high levels of vulnerability and these are cities which are not quite mega deltas but have a large enough population to make them highly vulnerable.

Now, we need to understand, and here may I say that the Norwegian Nobel committee having given the Nobel peace prize in 2007 to Mr Al Gore and us, the Intergovernmental Panel on Climate Change (IPCC), was possibly conscious of the fact that climate change can lead to conflict; it can be a threat to peace. What would happen is that, with the impacts of climate change, there is a danger of rising ethnic conflicts, which can be linked to competition over increasingly scarce resources, such as water. Wherever you have water stress there are undoubtedly going to be conditions in which you could create conflict. Numbers of environmental refugees could increase as extreme events, floods and famines

Figure 1. Relative vulnerability of coastal deltas as indicated by estimates of the population potentially displaced by current sea-level trends to 2050 (extreme >1 million; high 1 million to 50,000; medium 50,000 to 5,000) [B6.3]. Climate change would exacerbate these impacts



Source: Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the IPCC, Cambridge University Press, Cambridge, UK, pp. 23–78.

become more frequent, and climate change could force hundreds of millions of people from their native land by the end of the century.

I might mention, purely by way of an anecdote, that in July before the G8 summit in L'Aquila I tried very hard to see prime minister Berlusconi, but unfortunately I was not able to do that, maybe his calendar was busy at that point of time. People asked me what I would tell him, and this is precisely what I said I would tell him if I got the opportunity: a country like Italy or for that matter any other country in the developed world, is extremely vulnerable to the impacts of climate change elsewhere. There would be clearly a problem of failed governance, failed states, and major distress on a large scale if we do not act early enough. And this could be disruptive of peace, not only in countries that are directly affected, but where the spillover impacts could be seen, in other parts of the world. And this is an issue that we need to keep in mind very clearly, so hundreds of people could perhaps be forced to leave their homes and that clearly has very major implications for every society.

Role and potential of renewable energies in Asia and Africa

We need to bring about change, and I think this change will take place particularly in the energy sector. I was in Abu Dhabi few months ago, and I happened to chair the jury of a major award that Abu Dhabi has introduced which is called the Zayed Future Energy Prize, and this is a pretty generous prize, 1.5 million dollars for the winner, 350.000 dollars for two runners up. This is a very distinguished jury, except for the undistinguished chairman; we looked at a whole range of entries, but what I find very heartening in at least the consciousness that is gripping people over there, is related to the fact that they realised that they have to look beyond the era of oil. That of course is driven by a whole set of other considerations, but I think we have a unique opportunity to bring about a major transition, and to me it seems that the challenge of climate change gives you an opportunity to do something that we should have done maybe 30 or 40 years ago, when the first oil price shock took place. There were some countries that were smart enough, that were far-sighted enough to introduce changes; if you take the case of

France, they went in a big way towards nuclear energy; if you take the case of Japan, they got rid of some their energy intensive industries and brought about very sharp improvements in energy efficiency. Several other countries have done likewise, I mean the case of Spain, I am very happy to see that there has been an emphasis on the development of solar energy, and I can assure to Spanish institutions that if they keep on this path, if they intensify their efforts, they will be leaders in the world. And there is a huge market that is going to develop elsewhere, which obviously Spain will be able to make the best use of.

Now if we look at what has happened in the field of renewable energy, we started from a very small base, but fortunately growth has been very encouraging, and even last year, when investments were not available, and clearly the market was rather sluggish, there's been a 5% growth worldwide in 2008 alone. And emerging countries are playing a major role in the manufacture and installation of renewable energy devices. Despite global recession, investment in renewables energies in 2008 increased by 5% from the 2007 record. Emerging countries play a major role in the manufacture and installation of renewable energy.

Despite global recession, investment in renewables energies in 2008 increased by 5% from the 2007 record. Emerging countries play a major role in the manufacture and installation of renewable energy

But this is where I think partnerships are critically important. I want to share with you something that my institute has been involved in as far as India is concerned. We are working with a group from North America, the Clinton Climate Initiative and we have also been in dialogue with Mr Terway from the Asian Development Bank, where we are trying to promote two

major solar thermal power plants or complexes of 3,000 to 5,000 MW each. The major benefits of something like that are for, in the first place, the economies of scale; in the second place, if all the equipment or the bulk of the equipment is manufactured in a country like India, the cost would be substantially lower than importing it from elsewhere, because you can take advantage of lower scientific and technical costs and in general lower labour costs, so I think there is a unique opportunity in developing countries to bring about change in the right direction. Indeed, renewable power capacities in the developing world and the EU have been established in the top 6 countries in 2008.

If you want to look at the potential in Africa, that continent of course has substantial renewable energy resources, most of which are under-exploited. I am not going into the details, but something that is extremely exciting is the possibility of North Africa becoming a major exporter of solar generated power, for the benefit of at least southern Europe. I think this also brings about an integration of economies and a means by which Africa and some of the poorest regions of Africa can really start getting substantial income flows that would bring about a major change in their fortunes. So I think there are enormous opportunities that perhaps we have not seized in the past and we need to move on with as quickly as possible. Africa has substantial new and renewable energy resources, most of which are under-exploited.

Africa has substantial new and renewable energy resources, most of which are under-exploited

The main benefits of renewable energy in developing countries are; firstly, we can offset a substantial proportion of the projected growth in greenhouse emissions, as these are countries where growth is inevitable, essential and long overdue. But if we can bring about a shift towards wider use of renewable energy,

then growth can clearly take place without an increase in emissions.

It offers the opportunity of earning foreign exchange, it certainly provides opportunities for investments and it also can ensure much higher employment. As a matter of fact, we have carried out an assessment in India; 1 MW of coal based power requires 7 people by way of employment, in the case of solar based power generation, this figure is in the order of 23 people, so there is a major difference in the employment potential of these technologies versus conventional technologies. Moreover, we also have the benefits of decentralized supply, which can meet local demand.

So what we can do is to create some movement towards Copenhagen, and I hope Copenhagen will produce opportunities by which we can bring about a major transition in the future of energy, which has to move quickly. If you look at Figure 2 just focus on the topmost row over here: if we want to stabilize the increase in temperature between 2°C and 2.4°C, then global emissions have to peak no later than 2015. Frankly, I am a little disappointed that the G8 agreed on this aspirational goal of a 2°C temperature increase as the limit that they will accept, but they did not talk about how quickly emissions will have to peak and how quickly emission cuts will have to take effect.

So this is very clear, and we also need to see that we can now build on the momentum

that has been created by several international developments.

You will remember that the Secretary General of the UN organised this high level meeting on 24th September 2007 where about 60-70 heads of Government and leaders were present. When they held the same event on 22nd September 2009, there were about 100 world leaders present. I had the privilege of addressing these leaders myself, and some of the things that I mentioned about the dangers in some of the most vulnerable regions in the world, and how these could spill over to other locations is precisely what I presented to this group as well.

I think there are some really encouraging signs, one often hears the excuse that the world is going through recession, how can we afford moving to renewable energy? My response would be: this is really your unique opportunity to move towards renewable energy, and as I indicated earlier, there are benefits of employment, benefits of decentralized energy supply, and therefore I think whatever stimulus is being implemented in different parts of the world can easily provide huge benefits by focusing on a green stimulus.

I want to highlight the enormous problem of energy access in developing countries. For this purpose my institute has launched a major programme called "Lighting a Billion Lives" which is based on the realisation that 1.6 billion people in the world have no access to

Figure 2.

Stabilisation level (ppm CO ₂ -eq)	Global mean temp. increase (°C)	Year CO ₂ needs to peak	Change in global CO ₂ in emissions in 2050 (% of 2000 emissions)
445-490	2.0-2.4	2000-2015	-85 to -50
490-535	2.4-2.8	2000-2020	-60 to -30
535-590	2.8-3.2	2010-2030	-30 to +5
590-710	3.2-4.0	2020-2060	+10 to +60

Source: Intergovernmental Panel on Climate Change (IPCC)

electricity, and 400 million of them, incidentally, live in India.

The project "Lighting a Billion Lives"

The Sunderbans, West Bengal. Lighting up this web of islands is still a distant dream, but hope has found its way. The sun is lighting up the nights. Solar lanterns are turning night into day. Studying is full of joy. The struggle to cook in the dark is over. Electricity has brought new pride. Bina has become an entrepreneur. She runs a solar charging station with her friends. They rent out lanterns to the villagers and even repair them. The villagers are discovering new vocations. Betel-leaf cultivation, coaching centres, furniture making. TERI is bringing light to rural homes across the world. The first bearers of light that will change a billion lives. Lighting a Billion Lives. An effort to banish darkness. A movement to illuminate homes. A mission to clean the Earth. Come join our mission. We are committed to enabling a billion lives to access light from solar technologies.

*For details contact: LaBL secretariat:
akanksha@ten.res.in.*

Government of Spain is doing in this country. We stand in admiration of all that you are doing, and I hope the rest of the world will follow the lead that you are setting.

This is just an example of the many innovative things that we can do and the need now is for us to think outside the box, to look at the enormous opportunities we have and the challenges we face, and if we work together clearly we can come up with a whole range of initiatives that can give human society a much brighter future.

So let me, in conclusion, thank the organisers for giving me this opportunity, and may I compliment Casa Asia and may I pay tribute to her Excellency the minister Beatriz Corredor for the remarkable things that she is doing and the

bio Climático y
nergias Renovables
Asia y África
nate Change and
newable Energies
Asia and Africa

Adrid · CaixaForum · 26-27/11/09



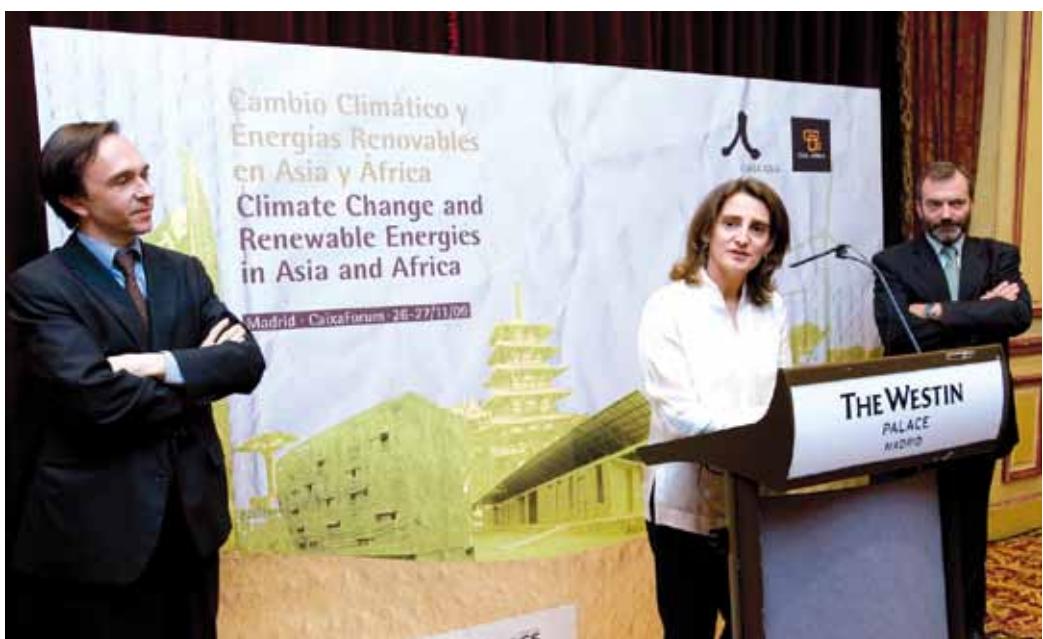
Opening Remarks. First Vice President, Minister of the Presidency and Government Spokeswoman.



Welcome and Opening Remarks. Left to right: Jesús Sanz, Director General, Casa Asia; Soraya Rodríguez, State Secretary for International Cooperation; María Teresa Fernández de la Vega, First Vice President, Minister of the Presidency and Government Spokeswoman; Elisa Durán, Deputy Director General of Fundación Obra Social "la Caixa"; Ricardo Martínez, Director General, Casa África.



Beatriz Corredor, Minister of Housing, with the Director General of Casa África (left) and the Director General of Casa Asia (right).



Teresa Ribera, Deputy Minister for Climate Change of the Ministry of the Environment and Rural and Marine Affairs of the Government of Spain.



Closing Session. Left to right: Jesús Sanz, Director General, Casa África; Beatriz Corredor, Minister of Housing, Spain; Rajendra Pachauri, Director General of The Energy and Resources Institute and Chairman of Intergovernmental Panel on Climate Change; Ricardo Martínez, Director General, Casa África.



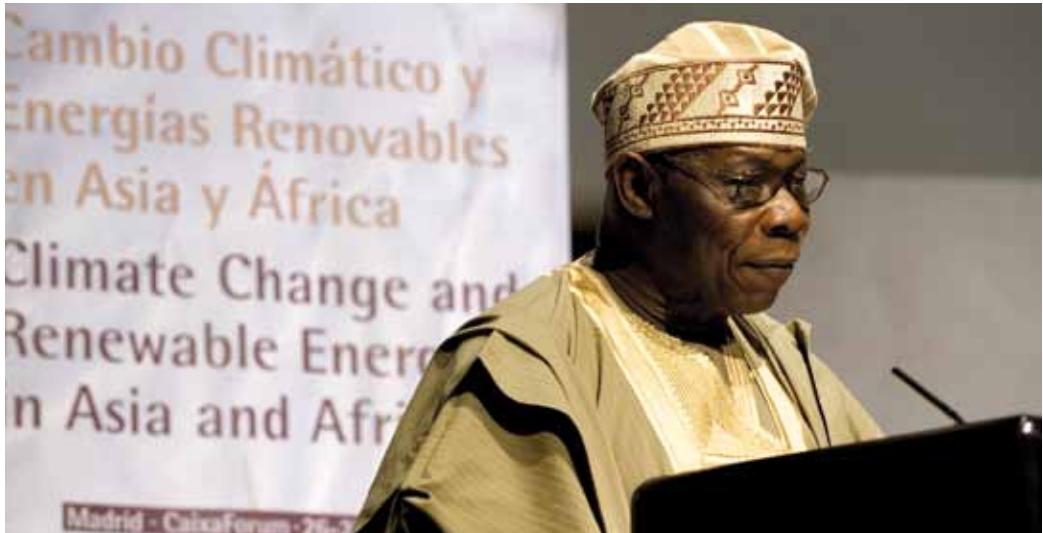
The CaixaForum Auditorium during the International Conference.

Preface

Olusegun
Obasanjo

*Former President of Nigeria,
member of the Africa Progress
Panel and of the
Club of Madrid*

Olusegun Obasanjo joined the Nigerian army in 1959 and after a brilliant career, he led the Third Marines Division that ended the Civil War in 1970. In 1975 he became the state vice-president and a year later the Head of State after the assassination of General Murtala. He held this position until 1st October 1979, when he handed over power to Shehu Shangari, the democratically elected president, which made Obasanjo the first Head of State in the history of Nigeria to voluntarily step down from power. In 1995, General Abacha imprisoned him for an attempted coup d'état. After his liberation in 1998, the first democratic elections in sixteen years were held. Obasanjo was a candidate and won, occupying the presidency until 2007. His administration renegotiated and paid Nigeria's debt, thus leading the country towards the path of sustainable development. He established the Africa Leadership Forum (1988), founded the Bells University of Technology (2005) and inaugurated the Presidential Library (2005). He is a member of the National State Council, the Africa Progress Panel, the Club de Madrid and is currently the Special Envoy of the United Nations Secretariat in the Democratic Republic of the Congo and the Great Lakes Region.



Beyond Copenhagen: what is the deal for Africa?

About 70 years ago, as a young boy growing up in my village at Ibogun, a rural, largely agrarian community in the south-western part of Nigeria, I experienced the zeal, ardour, love of nature and its preservation among members of the community.

Over the years, as I grew up and traversed Nigeria and other African countries, I was hit in the face by the same setting of the African, regardless of his or her social standing or setting, striving to be the best in spite of overwhelming odds and fearsome challenges. Challenges of poverty, disease, and illiteracy pop up at almost every corner. Popping up as counter, are efforts, both adequate and inadequate, at national and regional levels to halt these problems on their tracks. The celebration of our success stories when we rise, and the reflection over our failures when we falter, should be the hallmark

of our friends. And in Casa África, we see a true friend of Africa.

I indicated in my letter to Mr. Ricardo Vázquez in response to his invitation to present this address, that "Casa África should be commended for its commitment towards showing what works in Africa. Knowing that prejudices die hard, Casa África must persevere to work to remove prejudices and wrong perspectives held by Africans and non-Africans about Africa, and by showing that things can be made to work in Africa properly. There can be order, wholesomeness, efficiency, beauty and progress in Africa."

I intend in this address to share some of my thoughts with you with regard to where we are in Africa, where we ought to be, and how to get there on the twin and inter-related issues

of climate change and renewable energies. More importantly, after the niceties and talk of Copenhagen, what happens to Africa and what deal should it take away? Since time limitations will preclude full elaboration of these issues, I will present major outlines of my views in this address.

My elaborated views are emerging as aggregates of a central theme - "Human Security in Africa" to which I have devoted a sizeable part of my life. The Olusegun Obasanjo Presidential Library, the first Presidential Library in Africa, which was set up when I left Office as President of the Federal Republic of Nigeria, is being developed around this central theme. The Centre for Human Security is a sub-set of the Library, as is the Institute for African Culture and International Understanding, it is the first UNESCO category 2 Institute in Africa.

The Centre for Human Security provides a base for theoretical, qualitative and quantitative analyses to unravel causal relationships and interdependencies, which link or activate security threats in the cultural context of Africa. These threats are multifaceted and multidimensional as human security is starting to take into account a range of evolving threats including illiteracy, poverty, food insecurity, environmental degradation including climate change, international terrorism, drug trafficking, money laundering, illegal arms dealing, institutional corruption, organised crime, and disease. The Centre proceeds from such analyses to make recommendations for action at the community, national, regional and global levels. I invite Casa África and other individuals and institutions to partner with the Centre in the pursuit of the lofty goal of improving human security in Africa.

From the start of the industrial revolution in the late 18th Century, developed nations have achieved ever-greater prosperity and higher living standards. From this period especially, human activities have come to affect our atmosphere, oceans, geology and biodiversity. The emission of greenhouse gases, associated with industrialisation and strong economic growth is causing global warming at a rate that has become unsustainable in the long-term. Those who initially had doubts must by now

have been convinced that climate change with the attendant global warming is a reality and the effects are now noticeable. The African Partnership Panel, of which I am privileged to be a member, states, in its 2009 report states that, "Climate change is a reality that is already affecting the lives of millions of Africans and will have a profound impact on the programming of public expenditures and public receipts in every African country. If left unchecked, it threatens to undo some of the progress made in recent years and will jeopardize countries ability to generate sustained economic growth, create employment, and achieve the Millennium Development Goals."

"Climate change is a reality that it is already affecting the lives of millions of Africans and will have a profound impact on the programming of public expenditures and public receipts in every African country. If left unchecked, it threatens to undo some of the progress made in recent years and will jeopardize countries ability to generate sustained economic growth, create employment, and achieve the Millennium Development Goals"

The evidence for anthropogenic climate change is now clear and convincing. Recent scientific data as given in the *4th Assessment Report* of the Intergovernmental Panel on Climate Change (IPCC) has established that man-made emissions of greenhouse gases such as carbon dioxide and methane are responsible for observed warming of the planet. The scientific evidence surveyed by the IPCC shows that Africa has already experienced a high increase in mean temperatures and is likely to be hardest hit by the changes brought by long-term climate change.

Sea level rise and coastal flooding; biodiversity loss; heat waves, droughts, severely reduced agricultural production and food security; desertification; oxygen depletion, forest fires and negative health impacts such as increased malnutrition, increased deaths, disease and injury due to heat waves, floods, storms, fires and droughts, and increased frequency of cardio-respiratory diseases are some of the negative consequences of climate change. And these could be worse.

Our journey on the global environment and climate change road is dotted with notable landmarks. At each stop, world leaders bemoaned the rapid decline in the environment induced largely by anthropogenic factors. At each stop, targets were set to slow down and ultimately reverse the decline. At the next stop, the “to-do-list” for the previous stop had few check-marks indicative of few accomplished tasks. From the Earth Summit in Rio in 1992 to the UN Climate Change Conference 2007 in Bali, there have been many unfulfilled promises. High reduction targets are advocated, but low emission-free base load power is delivered. However, in spite of our failure to meet the mark, a number of positive strides were recorded on our march. Greenhouse gas emissions dropped, new technologies took CFCs from our cooling systems, renewable energies were explored with greater vigour, and the voices of conservationists rose in stridency, triggering off pockets of biodiversity conservation efforts.

Two major developments blighted the road to success. Some world leaders cold-footed to act on account of a perceived deleterious effect on reducing carbon emissions on the economy. Selfishly, they looked the other way as their industries and automobiles choked the earth with CO₂. Secondly, some doubted that human activities leading to the release of greenhouse gases are making our earth warmer. The counterclaim was that global warming is a freak of nature that will soon pass away and that changing our socio-economic lifestyle is unnecessary. Those who hold this view are wrong and they can be described as the enemy of nature and the enemy of man.

Now, we know better. Now, we know that it is better for our economies to be hurt than to be

out of existence, leaving no economy to run. Now, we know better that global warming is not a freak of nature but a phenomenon that is exacerbated by human activities. Incidentally, this knowledge and this consensus have emerged as a silent victory for the environment in this first decade of the 21st Century.

But now, we must push to gain more ground through a greater thrust for renewable energies. This push has brought us here to Madrid and will take us to Copenhagen in the next few weeks. For us at this meeting and the forthcoming Copenhagen conference, the motto should be: “be innovative and sustainable in the development and use of renewable energies”

“Be innovative and sustainable in the development and use of renewable energies”

In all of these, where does Africa stand?

There are numerous pockets of efforts in Africa on research, development and use of renewable energies. In the past two decades, African governments have increasingly taken steps to tap into huge non-fossil fuel energy resources of the continent. One of these is solar source, which is renewable, clean and free. The geographical position of the continent, due to the proximity of most of its landmass to the equator, endows it with generous amount of solar energy. Many countries receive bright sunlight for about 325 days per year, which translates into 2.000 kW·h per square metre per year, approximately. When harnessed, solar energy can serve any location in Africa without the burden of expensive and large-scale infrastructure developments of power grids.

African countries are at different but increasing levels of establishing large-scale solar power facilities. Algeria, Botswana, Cameroon, Ghana, Kenya, Nigeria, Senegal, South Africa, Zambia and Zimbabwe provide examples. The greatest potential for Africa is seen in the provision of solar power on a relatively small-scale, to communities for cottage industry and domestic use.

We turn next to wave and wind power. The coastline of Africa is extensive. Waves buffet the large shores all around the perimeter of the continent and offer huge potential for harnessing. Wind power is prominently displayed near coastal locations, mountain ranges and large open fields. The availability of wind power on the western coast of Africa is substantial, exceeding 3,759 kW·h. A new, very large wind farm is set for completion in Kenya in 2012. The project around Lake Turkana in northern Kenya aims to generate 300 MW of electricity per year, one quarter of Kenya's current installed power and one of the highest proportions of wind energy anywhere in the world. There are already large wind farms in Egypt and Morocco, while Ethiopia, Nigeria, Tanzania and South Africa have all announced plans to generate large amounts of electricity from wind. It is worth noting that the Ethiopian Government is building the 120 MW Ashegoba plant in north Ethiopia, which will provide 15 percent of the nation's present energy needs.

As for biofuels, Africa is one of the world's largest biomass energy consumers (firewood, agricultural residues, animal wastes, and charcoal), calculated as a percentage of the overall energy consumption. Biomass accounts for as much as two-thirds of total African final energy consumption. In comparison, biomass accounts for about 3 percent of final energy consumption in OECD countries. Wood, including charcoal, is the most common and the most environmentally detrimental biomass energy source. Firewood accounts for about 65 percent of biomass use, and charcoal accounts for about 3 percent.

In Africa, hydroelectric power is the only significant grid-connected renewable energy source. It covers over 30 percent of the continent's energy needs, yet only about 5 percent of its potential has been harnessed. Hydro-projects are built to provide energy for industrialisation and social and economic development with such benefits as irrigation, navigation, water supply, fisheries and tourism.

Geothermal power is spread in hotspots all over the continent but mostly concentrated in

eastern Africa. Since 2001, efforts were made at tapping the enormous potential for geothermal energy in the Great Rift Valley, which spans several countries including Eritrea, Ethiopia, Djibouti, Kenya, Uganda and Zambia.

In 1999, as President of the Federal Republic of Nigeria, my Government set up the Federal Ministry of Environment with the core goal of formulating and implementing policies that promote sustainable development. Through the efforts of the Ministry, the country now has a national policy on the environment, which has been the driver for numerous programmes and projects on reducing greenhouse gas emissions and promoting sound environmental practices at individual, community and industrial levels. With specific reference to renewable energies, the Energy Commission of Nigeria has continued to research into and to promote the development and diffusion of machinery and devices for renewable energies.

For example, two of the Energy Research Centres of the Commission, namely the Sokoto Energy Research Centre and the National Centre for Energy Research and Development in Nsukka, have developed and introduced into the market renewable-energy appliances with more than 90% local content. Some of these appliances include solar crop dryers to process agricultural products; solar water heaters to provide hot water in hotels and hospitals; solar cookers; solar chick brooders to produce day-old chicks; solar water distillers to produce distilled water for batteries; solar PV water pumps for clean potable water; vaccine refrigerators for hospitals and immunisation programmes in rural areas; solar battery chargers; improved wood burning stoves and sawdust stoves; biogas plants for cooking gas and bio-fertilizer.

Furthermore in Nigeria, there is a significant increase in the number of registered Clean Development Mechanism (CDM) projects including the Pan Ocean Gas Utilisation Project and the Save 80 Fuel Efficient Wood Stove. The United Nations Framework Convention on Climate Change (UNFCCC) registered both projects a few months ago. The projects would go

a long way in reducing problems of deforestation and accompanying land degradation across the country as well as complementing the objectives of the nation-wide afforestation programme. A National Climate Centre is also expected to be commissioned soon.

Admittedly, Africa's contribution to the global effort of developing high-tech renewable, low/zero-carbon emission machines and devices such as electric cars is paltry. As we can see from the foregoing, we are making steady progress in the development of a number of not-so-high-tech solar, hydro and wind-powered devices, which make renewable energy available to our people. Due note should be made that about two thirds of sub-Saharan African communities are rural dwellers with minimal energy needs. Hence the low-tech renewable energy devices involving solar, biofuels, wind and water will address a sizeable proportion of the energy needs of these communities. We must neither covet nor copy the extravagant energy-consuming lifestyles of most developed industrialised countries. We must be innovative to devise means of living well without being the destroyers of life and supporting props. One does not have to be at the cutting edge of technology to be innovative. I should quickly add that since energy demands of the rural and urban communities in Africa are projected to increase substantially in the coming years, we must accelerate the pace of shifting our research on renewable energies from low to appropriate tech. This calls for greater investment in research and development and the establishment of a special fund by the African Union and its Member States to expand the scope of research on low technology on one hand, and to target contextually relevant and appropriate tech on the other, with regard to renewable energies.

In all of these, let us look at the strengths and vulnerabilities of Africa. An area of strength is the abundance of raw materials for renewable energies. As stated earlier, the region is blessed with solar, hydro, geothermal, wind and biofuel energy resources. If carefully harnessed, these resources will produce more than double the energy yield of fossil fuels and hence save

our planet from the deleterious effects of global warming. The relatively low energy needs of the region, especially in large rural communities, is another area of strength. The strength derives from the reduced stress on available energy stock and the ease of meeting the energy needs with a minimal investment effort. Thirdly, there is the attraction of potential investors to Africa, especially from Asia, notably emerging economies like China and India, with whom we should cooperate, in addition to maintaining our friendship and cooperation with the West. Investment in renewable energies is increasingly attractive and will spin immense dividends in the years ahead.

Yet there are challenges and vulnerabilities. These include inadequacies in regulatory and technical standards, lack of policy sustainability from one government to another, cultural restrictions on land use in some countries, low level of technical expertise, corruption in different shades and forms, and inadequate institutional frameworks. Most of these challenges and vulnerabilities can be addressed only if Africans work together politically, economically and in the area of research and development in science and technology. In these areas, Africa must be the main architect of its fortunes.

The question to which I turn attention as I close this address is: what is life after Copenhagen for African countries regarding issues of renewable energies and climate change? We will be approaching the Summit with an agenda to join other regions in cutting down on greenhouse gas emissions and encouraging the development of green technologies. When the summit will close and we are back in our different countries, what will happen next, or at least, in the next 10 years?

Copenhagen must ensure adequate quantum of funds to be made available, particularly to enable developing countries to make a sustainable reversal on climate change. Life after Copenhagen in Africa should see us developing from the global agreement, an Africa regional energy Master plan under the aegis of the African Union. This Master plan will

have Member States pooling resources to avoid duplication and waste. Sub-regional economic communities such as ECOWAS will feed into the development of this regional plan, thus ensuring a bottom-up approach. Drawing from regional plans, National Energy Master plans, which will be a sub-set of the sub-regional plan, should be institutionalised through an Act of the various National Assemblies, after thorough debate on a consensus basis.

Beyond these plans, a robust monitoring mechanism for implementation should be instituted.



The Directors General of Casa África and Casa Asia receive First Vice President, Minister of the Presidency and Government Spokeswoman, María Teresa Fernández de la Vega.

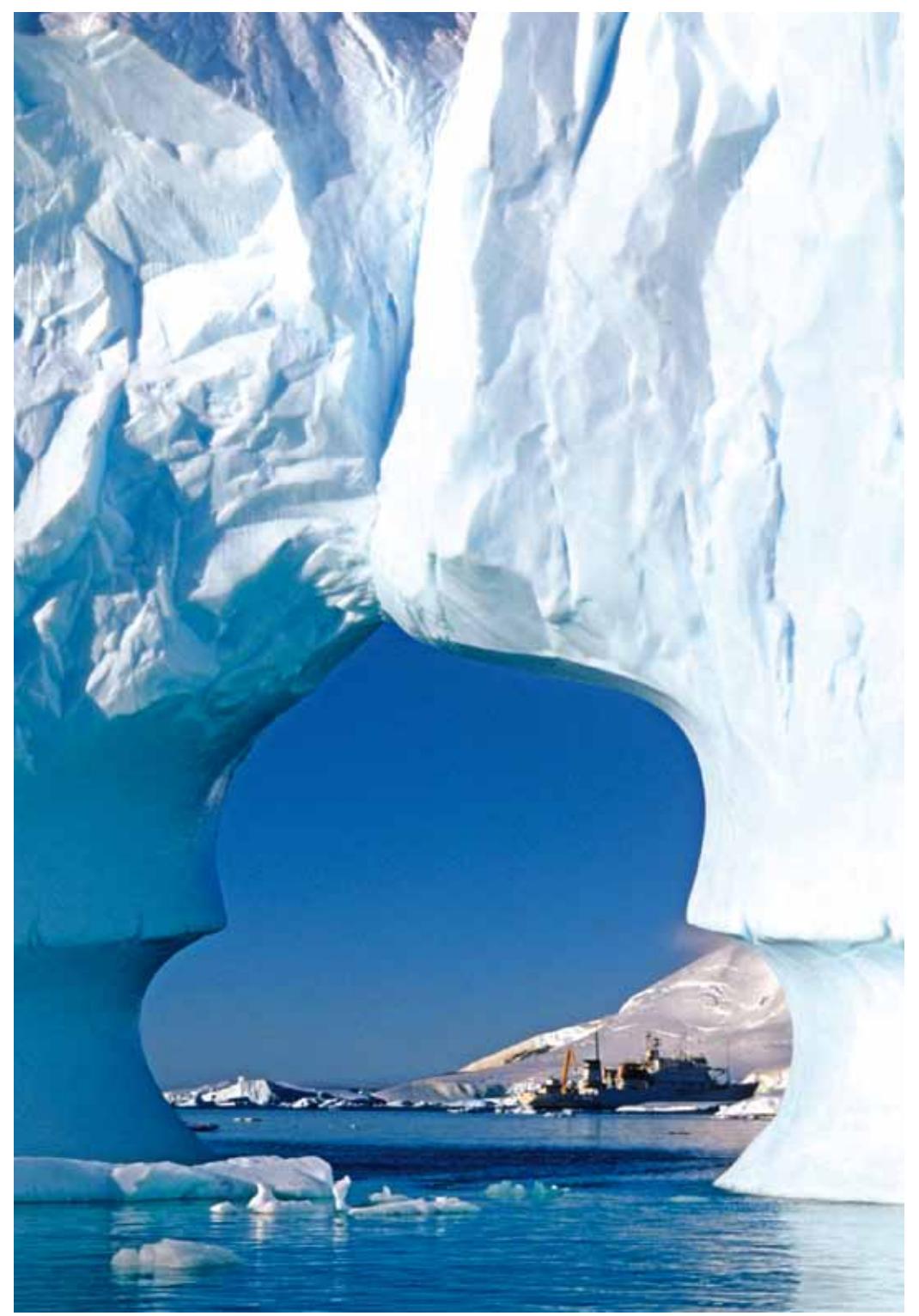


Some of the 500 participants during the coffee break.

Introduction

The model for economic growth in developed and developing countries is unsustainable in terms of energy and the environment, due both to the limitations of traditional resources and to the deterioration of the environment. The average temperature of the earth's atmosphere is rising at an alarming rate; eleven out of the last twelve years have registered the highest average annual temperatures since temperature measurements started on a global level. An important part of this warming is due to the progressive increase of greenhouse gas emissions caused by human activity. The response to the resulting climate change and its impacts on nature and people is one of the great challenges that humanity will have to face in the 21st century. The reformulation of the energy model on which economic growth is based is compulsory for rich countries, but it is particularly necessary from the perspective of developing countries in Asia and Africa, as they are most vulnerable to the consequences of environmental deterioration, as shown by reports on the social and economic costs derived from it.

The effects of climate change have increased the vulnerability of all the world's countries, but this vulnerability is particularly evident in some regions of less-favoured countries. Small states formed by islands, such as the Maldives Islands or many Pacific islands, countries with a high coastal population, such as Senegal or Bangladesh, large cities located in some of the



world's most important deltas such as Shanghai, Calcutta and Dhaka, are areas particularly vulnerable to the main consequences of climate change, such as rising sea levels. A phenomenon that causes displacements, reduced yields of crops close to the coast due to salinisation or also a reduced availability of water, and which by the year 2020 could affect millions of people in the Sub-Saharan region of Africa.

Analysing what is happening in the parts of the world that have not received maximum attention from industrialised countries during recent years, and analysing the possibilities of cooperating with local, national and regional actors to reach sustainable development is currently a debate of critical importance for any country in the world, as it is one of the most important challenges that humanity must currently face.

With the aim of raising awareness on the social and economic consequences of climate change and highlighting the main possibilities of international cooperation between Africa, Asia and Europe that could favour environmentally sustainable development models, Casa Asia and Casa Africa, with the collaboration of the Spanish International Cooperation Agency, the "la Caixa" Social Project Foundation, QuEST, the ACS Foundation and Técnicas Reunidas, organised in late 2009 in Madrid the «International Conference on Climate Change and Renewable Energies in Asia and Africa». The gathering included the participation of over thirty global leaders, institutional representatives, renowned experts on the subject and representatives from companies in the renewable energy sector.

The present publication is the result of this international conference and is articulated through four thematic blocks dedicated, respectively, to: multilateral programmes for sustainable development concerning energy; regional and global policies in the fight against climate change, strategies for the use of clean energy in Asian and African countries, and entrepreneurial cooperation in the renewable energy sector between Africa, Asia and Europe.

The establishment of adaptation and mitigation measures for climate change is currently one of the goals that must complement sustainable

development strategies in Asian and African countries. In the first section top representatives from multilateral bodies describe the costs of climate change, the energy models their development projects are committed to and the measures that are being taken to bring about a transition towards a more efficient resource management model that can reduce greenhouse gas emissions. We thus have a comparative global view of the sustainable development model used as a reference and of the most prominent action mechanisms of Africa and Asia's main multilateral institutions, regarding the fight against climate change and sustainable development.

Climate change will have a profound effect on the populations of Asia and Africa, particularly among the poorest sectors of the population in developing countries, which depend on activities that are sensitive to the climate, such as agriculture, stockbreeding and fishing, and which lack the resources and options to mitigate or adapt to the effects of climate change. The achievement of Millennium Development Goal (MDG) number 7, to guarantee the sustainability of the environment, is basic in order to meet the other MDGs and guarantee the right to health or decent housing for future generations. In the second section, representatives from the main cooperation agencies for world development explain the programmes they have carried out to tackle the issue of climate change and the promotion of sustainable development in Asia y África.

Many institutional initiatives have been currently launched in the field of adaptation and mitigation -particularly the latter- through multilateral programmes for sustainable development regarding energy management and regional policies in the areas mentioned. In the case of Africa we could highlight the regional programmes and action mechanisms of institutions such as the United Nations Environment Programme (UNEP), which carries out programmes such as the Rural Energy Enterprise Programme or the Africa Green Economy Initiative. From the United Nations we should also mention the work carried out by UN-Habitat, whose strategy consists of supporting governments and other local actors

in order to promote an agenda of sustainable urban growth. In addition, the entry of the African continent in the global carbon market is being encouraged through an increased number of projects attached to the Clean Development Mechanism.

Another region where the predicted impacts of climate change will be particularly devastating and damaging for the least favoured sectors of the population is the Asia-Pacific region. In this respect, the Asian Development Bank (ADB) is actively taking part in the fight against the causes and consequences of climate change through its Strategy 2020 programme, or more specifically, the ADB Climate Change Fund, which includes over 44 projects for the integration, mitigation, adaptation and reduction of contaminant emissions; and finally, the ADB Carbon Market Initiative, which supports projects dedicated to the reduction of greenhouse gas emissions.

On a national level, the main African countries and regional blocks already have or are in the process of developing a national strategy for climate change. Such is the case of South Africa, Kenya, Uganda or the African Union (AU), through the The New Partnership for Africa's Development (NEPAD) or the Economic Community Of West African States (ECOWAS). Among these, we could highlight the commitment of the ECOWAS to create a Regional Centre for Renewable Energy and Energy Efficiency.

In the case of Asia, China seems to be committed to carrying out certain efforts to fight climate change. This country wants to reduce the contribution that the use of coal has on its economic growth rates by increasing the role of renewable energies for energy production which, according to the Chinese strategy, would represent 15% of its total energy production by 2020. In the case of India, it is expected that the production of wind power will represent over 40% of greenhouse gas emission reductions between 2008 and 2012. In the case of Japan, over the next ten years the new government has pledged to reduce carbon emissions by 25% in relation to emission levels of 1990. Some of the countries that suffer the effects of climate change the most due to their high vulnerability,

such as Bangladesh, are also examining ways to exploit the potential of clean energies such as wind and solar power.

Finally, as is outlined in the fourth and last section, renewable energies have become one of the industrial sectors with the greatest potential for growth for the Spanish economy, while at the same time it is an opportunity for many companies to broaden international cooperation within the private sector. Spain is one of the leading countries in renewable energies, mainly wind and solar power, while the Asian and Pacific region is set to become the largest market to invest in this sector. Likewise, large inter-regional renewable energy projects are starting to emerge in Africa, such as the Desertec photovoltaic energy project, in which the Spanish company Abengoa is participating, or the Lake Turkana wind farm in Kenya, the continent's largest. In the field of research and innovation, ECOWAS, with the support of the Spanish Government, is setting up the ECOWAS Regional Centre for Renewable Energy and Energy Efficiency.

The challenge posed by climate change is a global challenge, and as a result, only a global response can guarantee success in the fight against it. The aim of this publication is to bring together the different African, Asian and European initiatives on a regional, national or local level, in order to identify the possible synergies and promote the most successful avenues for international cooperation.

1.

Sustainability and Climate Change: The Main World Challenge

FIRST PART

Page

34

James Moran

Asia Director of European Comission

40

Mounkaila Goumandakoye

Director of the Regional Office for Africa of the
United Nations Environment Programme (UNEP)

44

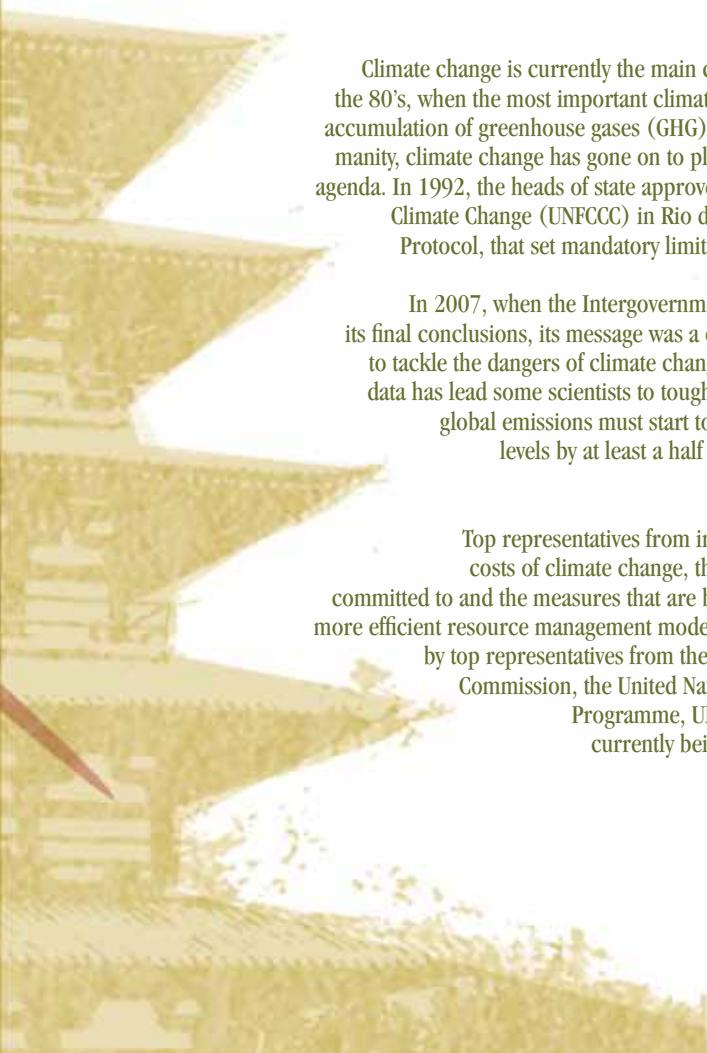
Rafael Tuts

Head of the Urban Environment Planning Branch of the
United Nations Human Settlements Programme (UN-Habitat)

50

Alicia Montalvo

Director of the Spanish Climate Change Office



Climate change is currently the main challenge faced by humanity. Since the decade of the 80's, when the most important climate scientists warned that the repercussions of the accumulation of greenhouse gases (GHG) in the atmosphere posed a serious threat to humanity, climate change has gone on to play a prominent role in the international political agenda. In 1992, the heads of state approved the United Nations Framework Convention on Climate Change (UNFCCC) in Rio de Janeiro and in 1997, they negotiated the Kyoto Protocol, that set mandatory limits on GHG emissions for industrialised countries.

In 2007, when the Intergovernmental Panel on Climate Change (IPCC) presented its final conclusions, its message was a clear warning of the need to take political action to tackle the dangers of climate change. Since then, the stream of published scientific data has lead some scientists to toughen their recommendations and to conclude that global emissions must start to be reduced over the next decade to cut present levels by at least a half by the middle of this century, if we want to avoid potentially dangerous climate change impacts.

Top representatives from international and multilateral bodies describe the costs of climate change, the energy models their development projects are committed to and the measures that are being taken to bring about a transition towards a more efficient resource management model that can reduce GHG emissions. The proposals by top representatives from the Spanish Office of Climate Change, the European Commission, the United Nations Environment Programme and the UN Cities Programme, UN-Habitat, show in this chapter the energy that is currently being dedicated to the management and prevention of climate change and offer possible solutions.

James Moran

*Director for Asia in
the European Commission*



James Moran studied at the Universities of Keele (Great Britain), Harvard and London. Since August 2006 he is the director for Asia at the Directorate-General for External Relations of the European Commission (EC). Prior to that he directed the China and Southeastern Asia units of the same EC department. He leads the negotiations in the European Union for a series of alliances with new partners and cooperation agreements with a number of countries of this region. His work on Asia includes the launch, in July 2003, of the EU strategy to reinforce its ties with countries in Southeastern Asia and the production of the action plans concerning EU-China relations of the EC. He has broad experience in the field of the EU's foreign policy, trade and development. Since he became part of the EC in 1983, James Moran has occupied a number of positions in Brussels, Jamaica and Jordan, directing the last two missions. He is the main author of the publication Taking Europe to the World (2004), which commemorates the 50th anniversary of the Commission's Foreign Service.

1.

Climate change and energy resources in Asia

Global warming is one of the gravest challenges the world faces today. Unless global action is taken quickly, irreversible and catastrophic damage will likely be the result. The process of climate change is occurring faster than anyone expected and it affects all of us, including in the EU. Landslides, erosion, droughts, floods and other disasters are becoming increasingly frequent in Europe. Another aspect of climate change is the wider impact on glaciers and hydropower, the most widely used form of renewable energy, which is particularly relevant for Asian countries. Experts warn that retreating glaciers from the Alps to the Andes and to Asia are likely to seriously disrupt hydropower generation in coming decades.

Therefore, climate change, environment sustainability and energy resources are key areas for cooperation between the EU and the Asian countries. Asia is home to three of the top six emitters of greenhouse gases in the world: China, the main one, Indonesia, which is the fourth largest emitter in the world after the US and the EU, and India. In addition, next to the industrialising countries of East Asia, like Japan and South Korea, the continent is also home to some of the most exposed countries. Bangladesh and especially the Maldives are extraordinarily vulnerable to the effects of climate change.

Climate change, environment sustainability and energy resources are key areas for cooperation between the EU and the Asian countries

Altogether Asia is a key part of the world when looking at these challenges.

As far as global warming is concerned, the old adage “the only two things in life which are certain are death and taxes”, could add climate change, given the scientific consensus.

Global warming requires urgent global action. The developed world has, of course, the greatest responsibility. That is why the EU has already played a key role in developing two major treaties on the subject: the 1992 UN Framework Convention on Climate Change (UNFCCC), and its Kyoto protocol, agreed in 1997. However, a realistic long term policy framework is needed to tackle climate change both internationally and at home. The European Union has made a legally binding commitment to a 20% emissions reduction by 2020, compared to 1990 levels, and it will increase that to 30% if other developed countries commit themselves to comparable reductions and if developing countries can contribute as much as they can, according to the notion of common and differentiated responsibilities. The EU is also committed to increasing the share of renewable energy sources in energy use to 20% by 2020. These are legally binding commitments for all EU Member States.

But all the countries of the world have to play their part in meeting these targets. For the developing world to do its bit, action is needed on financing. In this regard, in October 2009, the European Commission envisaged that approximately one hundred billion Euros a year are needed by 2020 in additional finance to the overall level of international public support

1. Sustainability and Climate Change: The Main World Challenge

required, which until then had been estimated to lie in the range of anything between 20 and 50 billion Euros a year. The EC also proposed a fast-start international public support programme up to 2013 enabling immediate action. For this programme, an estimated global figure in the range of five to seven billion Euros a year will be needed. The final extent of all these proposals is, of course, linked to the nature of commitments to be made by all actors involved. All countries, except the least developed, should contribute to international public financing according to a comprehensive global distribution key based on emissions levels and on GDP.

This is, of course, easier said than done. Aid budgets are under pressure. It is a tough time for public budgets everywhere. However, the political commitment to react effectively to these challenges should lead to a balanced solution in the near future that will make these funds available. Public opinion demands it.

The environment underpins sustainable development and in many ways it is the very basis for promoting economic and social development and strengthening economic and political relationships. It is therefore one of the areas in which the EU wants to develop an enhanced platform for operational cooperation in the framework of the strategy. It is also an area where a regional approach is particularly suitable and effective for tackling common regional challenges.

The countries that are most affected by global warming also have to adapt to the new situation and the EU is ready to support them with all means, including financial. Effective adaptation to climate change can be achieved through, for instance, investments in health and education; improved access to water and energy; sustainable land, forests, and water management; enhancement of carbon stocks; combating desertification; protection of ecosystems and biodiversity; investments in flood protection infrastructure; sufficient water supply (including drinking water); and crop insurance schemes.

The world has clearly entered a new energy landscape, which is characterised by rising

energy demands in a large number of countries, increasing geopolitical complexities in energy supply, and instability in some exporting nations (e.g. security threats, terrorism, ageing energy infrastructure, high and volatile energy prices, etc.). Development cooperation in support of mitigation in least developed and most vulnerable countries should therefore be oriented towards promoting win-win strategies for adaptation and sustainable development. It should support access to efficient low carbon energy systems, transition to energy-efficient technology, renewable energy, increased energy security as well as sustainable management of land and marine ecosystems and wetlands, sustainable agriculture including food production, green growth and capacity building related to sustainable forest management.

Development cooperation in support of mitigation in least developed and most vulnerable countries should be oriented towards promoting win-win strategies for adaptation and sustainable development

There is much to gain from working together, since the challenges arising from climate change will get worse if nothing is done. Dependency on fossil fuels will stay over 80% until 2030. Regarding the situation in Asia, its global demand will increase by 45% and although the continent has significant fossil fuels reserves, energy security is a major concern, especially in the oil sector. The oil import dependency of the South East Asian countries, for example, is projected to rise from 10% to nearly 70% between now and 2025. Moreover, 80% of the oil imported from outside the Asia-Pacific region comes from the Middle East and that level of dependency should probably be best avoided. Altogether this means that Asia's energy situation is extremely fragile, while at the same time there are, of course, extraordinarily dynamic and fast growing economies that depend greatly on fossil fuels to continue their growth. More progress in

the field of innovative renewable technology is fundamental to address this major challenge. Combining efforts will give Asia and the EU considerable leverage in building a stable, transparent and secure global energy market. Four main areas of cooperation between Europe and Asia can be distinguished.

First of all, sharing information on policies, regulation and support schemes can make a massive impact on energy security. This was the aim of the Asia-Europe Meeting (ASEM) Beijing Summit on Sustainable Development last year. All European Union Member States and the seventeen Asian countries that joined ASEM signed up to it and have been working on launching the programme.

Secondly, great benefits can be obtained from cooperation on development of new technologies and green growth. More sustainable methods of energy use need to be explored.

A third area of cooperation is of course improving energy efficiency. A number of Asian countries have set themselves ambitious targets. China, for instance, has a five-year plan that has missed its targets in one or two years, but now it seems to be getting back on track. Moreover, in this area, a lot is to be gained from exchanging information about energy efficiency measures, such as building standards and energy labelling for products and services. Also in the investment field there are many possibilities, such as regulatory and financial incentives.

Finally, it is very important to promote and increase investments in renewable energy, which can include a whole series of aspects ranging from research to real investment in infrastructure.

With regard to cooperation with Asia, the EU has at the moment more than 160 projects in virtually every Asian country, which are directly related to climate change adaptation and mitigation. These run for two or three years and the EU intends to expand the significant aid programs in Asia for the period up to 2013. The programme on Sustainable Consumption and Production in Asia (SWITCH), which focuses on the Small and Medium scaled Enterprises

(SME) sector, helps through subsidising programs that involve firms working on innovative technology in cutting edge areas of climate change mitigation. A new EU instrument, the Asia Investment Facility, offers softened loans in the climate change field to Asian partners who wish to take on these loans from the European Investment Bank, from the EBRD, and from the International Financial Institutions. This could be an interesting departure in terms of spurring investment in this area. Likewise, the EU contributes to the Global Fund as well.

Concerning bilateral cooperation I would highlight three key countries.

The first one is India. During the annual EU-India summit last November, climate change was a key area. Cooperating multilaterally with India can be difficult, since the country is - to some extent understandably - hesitant as far as global cooperation is concerned. Bilateral cooperation with India is beginning to take off, particularly in fields of solar energy. However, a greater deal on cooperation needs to be done with India and we will continue working very hard with the Indians going forward.

Secondly Indonesia, with whom the EU recently signed a Partnership and Cooperation Agreement in which climate change is mainstreamed. Indonesia has made extraordinary progress in its approach to this problem. As noted earlier, Indonesia is the world's fourth largest emitter, most of it due to forest burning rather than to industrial production. The Indonesian government under President Yudhoyono has, however, shown an impressive level of engagement on climate related matters. As a major developing country, it has taken up its part by, for instance, setting itself the target of 26% reduction by 2020. The EU has a number of cooperation programmes in Indonesia, including the programme to assist in the fight against illegal timber harvesting (FLEGT).

The EU has a number of other Partnership and Cooperation Agreement (PCA) negotiations in process, including one with China. These PCAs strive to mainstream climate change in the technical

1. Sustainability and Climate Change: The Main World Challenge

field, in the environmental field, as well as in areas such as security, where there are certainly climate change related problems. Recently China has committed itself to an emission reduction target of 40% to 45% by 2020 based on 2005 levels. It has also stated that it does not accept any independent verification or monitoring of this figure. Although it is clearly a step forward and China now joins the EU, the United States, Japan, Indonesia and other major countries involved that offer targets, a greater deal needs to be done with regard to achieving a legally binding future of the kind the EU has enacted itself.

The EU cooperates with China in a whole series of bilateral projects, like the Near Zero Coal Project. This concerns a major pilot operation on carbon capture in the country and is now nearing the execution stage.

With regard to Asia as a whole, the European Commission has, via its technical assistance programmes, carried out a large number of regional and national projects for the countries of the region. These actions include water governance, water supply and integrated management pilot projects, support for drafting climate adaptation strategies and disaster preparedness action plans, or for the development of projects to increase energy efficiency, decrease the amount of fossil fuels burnt, use the Kyoto mechanisms and inform the public about climate change. The EC also supports Asia in efforts to improve land management, to protect forests, and develop environmental monitoring and ecological education.

With regard to Asia as a whole, the European Commission has, via its technical assistance programmes, carried out a large number of regional and national projects for the countries of the region

Overall, in the environmental field, from 2002 to 2008, the Commission has committed about 330 million for 164 projects of varying scale and scope with Asia.

EC assistance follows a two-pronged approach.

Firstly, assistance will continue to provide technical advice and capacity building through regional programmes focusing on specific aspects of climate change. Climate change has been a prominent feature of the Commission's regional cooperation programme for some years: the main element here is the SWITCH effort, which involves 90 million Euros of funding over 2007-2010.

As regards the Least Developed Countries (LDC), the EC launched the Global Climate Change Alliance (GCCA) initiative in 2007 to support developing countries most vulnerable to climate change, in particular LDCs and Small Island Developing States (SIDS), to increase their capabilities to cope with the effects of climate change, in support of the achievement of the Millennium Development Goals (MDGs), and to have their voice better heard in the international climate change negotiations. Close to 100 million Euros has been earmarked for the GCCA up to 2013. The GCCA will provide a platform for dialogue, as well as practical cooperation in support of the international negotiations on an ambitious post-2012 climate change agreement and of effective measures at national and regional level. So far in Asia, the Maldives and Bangladesh have received financial support for adaptation activities in 2009, while it is likely that other LDCs in Asia will receive support in the coming years.

Secondly, under the Asia regional indicative programme 2011-2013:

- The regional integration component will support initiatives and/or cross-border cooperation of South Asian partners in capacity building given the region's vulnerability to natural disasters. To facilitate the equitable and sustainable well-being of the people of the Hindu Kush-Himalayas regional transboundary programmes will be launched to adapt local land use systems to climate change.
- The policy and know-how based cooperation component will support environment, energy and climate change and will focus on three activities:

- A follow-on SWITCH aimed at promoting 'green growth' by financing projects that encourage more sustainable consumption and production in Asian industries. It will define actions to deal with major environmental challenges in Asia in particular the region's increasing consumption of natural resources, including energy, leading to rising greenhouse gas emissions, and environmental degradation.
- Forest Law Enforcement, Governance and Trade (FLEGT) to tackle illegal and unsustainable logging.

- Asia Investment Facility (AIF): this facility will focus on climate change relevant and 'green investments'. It aims at mobilising and complementing resources of our main financial partners (EIB, KfW, and AFD) and will facilitate investments in the areas of energy, environment and climate change, as well as SME financing. The proposed facility, to which around 35 million Euros could be made available, would help to generate funding for infrastructure and technology transfer projects in the relevant areas.

Additional funding for climate change activities in third countries will likely become available in years to come. The EC will also continue to pursue and strengthen our dialogue with each country on

environment, climate change, and related reforms which provide essential input for the development of joint work programmes, and mechanisms for the implementation of cooperation activities.

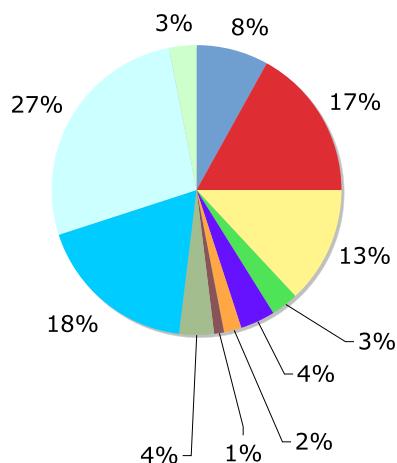
In Europe the development of environmental policy has taken time, and few EU Member States could claim that the situation in their countries is perfect. But the EU has learned a lot in the process, and this experience can be shared to the benefit of reform processes taking place in Asian countries.

Figure 1. EC Contribution to Climate Change. Commitment by sector.

EC contribution to Climate Change	319.334.000€
Commitment per sector	Percentage
Support Environment Policy	8
Renewable Energies	17
Protection of Natural Areas	13
Pollution Control	3
Energy Efficiency	4
Building response capacity to CC	1
Waste management	4
Agriculture	18
Forestry	27
Adaptation in other sectors	2
Awareness raising	3

Source: European Commission, Climate Action for Better Development.
<http://ec.europa.eu/europeaid/climate-change-actions/>

Commitment per sector



- Support Environment Policy
- Renewable Energies
- Protection of Natural Areas
- Pollution Control
- Energy Efficiency
- Building response capacity to CC
- Waste management
- Agriculture
- Forestry
- Adaptation in other sectors
- Awareness raising

Mounkaila Goumandakoye

Director of the Regional Office for Africa of the United Nations Environment Programme (UNEP)



Mounkaila Goumandakoye has occupied a number of high-ranking positions in a wide range of national, regional and international institutions inside and outside the United Nations: political advisor and acting director of the Drylands Development Centre of the UNDP, director of Environment of the Republic of Niger, head of the Ecology and Environment Division of the CILSS (intergovernmental organisation dedicated to environment management and the reduction of drought in the nine Saharan countries in Central and Eastern Africa), and regional coordinator of the United Nations Sudano-Saharan Office for Central and Eastern Africa, among others. Mr. Goumandakoye graduated at the University of Arizona (USA) in the field of Hydrographic Basin Management. He also holds the title of Applied Sciences Engineer awarded by the Mali Polytechnic Institute.

Climate Change and related areas

The United Nations Environment Program (UNEP) is based in Nairobi, Kenya, but we have a global mandate; providing support not only to Africa but to the entire world. Our work is organised in six areas, which are Climate change, Ecosystem Management, Environmental Governance, Harmful Substances and Hazardous waste, Post Conflict and Disaster Management, Resource efficiency-Sustainable Consumption and Production, and one area that is really cross-cutting and recently developed, in relation to climate change: Green Economy.

I would like to focus on our activities in Africa in relation to climate change and renewable energies. We have been providing services in two areas: first, we provide the necessary policy guidance to the African Ministerial Conference on Environment (AMCEN) and various subregional and regional initiatives, to develop the African Common Position on Climate Change. We have provided scientific evidence concerning Africa to make it clear that the continent is only contributing 3,8% of greenhouse gas emissions worldwide, but that it will be the most affected in terms of damage.

Just to give an example in the area of agriculture, the Intergovernmental Panel on Climate Change (IPCC) estimates that in Africa we will be facing a reduction of 50% of the yield by 2020, meaning, in fact, huge consequences not only to the economy but also in other areas related to food security.

Second, UNEP provides support in different projects on adaptation and mitigation. Likewise, in the area of energy, the initial focus was on resource efficiency (support policy for energy

saving, regulations on standards, labels, etc.), but recently we have moved to renewable energy and carbon finance. UNEP is not exactly a funding agency but we provide support to link science to policies and to build bridges between policies and programmes, by providing policy advisory services, technical support and catalytic funding.

I would like to highlight three important concrete projects in the area of energy and carbon finance:

- Rural Energy Enterprise Development Programme exists in a certain number of countries, but I will focus on the example of Tanzania to illustrate what exactly is happening.
- Another important programme is the Renewable Energy Finance Initiative, particularly in the area of solar energy in Tunisia, Morocco, and Egypt.
- Finally, another important project using carbon finance to promote sustainable energy in Africa is related to solar and wind energy resource assessment, the Capacity Development Initiative of the Clean Development Mechanism. This programme is being implemented in a number of countries - I will not go through all the different projects - but it is worth mentioning because one important area related to climate change where African countries can be supported, is renewable energy. Current renewable energy use in Africa is about 60% of the total energy use, but this 60% comes from firewood and waste, so we really need to move on to other

1. Sustainability and Climate Change: The Main World Challenge

renewable energies like solar power and other energy sources.

Current renewable energy use in Africa is about 60% of the total energy use, but this 60% comes from firewood and waste, so we really need to move on to other renewable energies like solar power and other energy sources

I think it is important to say that we have currently 11 Cleaner Production Centres in Africa and that this number is growing. These Cleaner Production Centres are basically providing support to countries in the areas of consumption and production efficiency. Particularly in the area of energy, we are

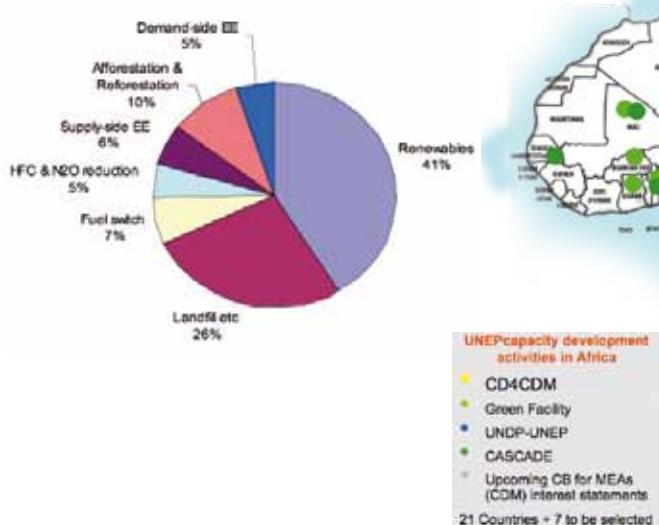
making some good progress. The projects shown in the map below belong to the Capacity Development Initiative of the Clean Development Mechanism, which is being developed in a certain number of countries.

In the area of Clean Development Mechanism, the continent has gone from 2 projects in 2004 to 112 projects, but this number is still very insignificant compared to the four thousand projects worldwide. However, it shows progress and we are providing support so that Africa can also benefit from this mechanism.

An important number of projects are being developed in Tunisia, in the area of solar water heating. We are moving now from 58,000 installations to an estimated number of 180,000 in the next two years. The energy generated by these projects is equivalent to 280,000 tonnes of CO₂ and is worth 4.5 million USD at market prices. In the case of Tanzania,

Figure 2. Map of CDM projects in Africa and Project types.

Project types in Africa



the Rural Energy Enterprise project is worth mentioning, which is basically about sisal waste converted into biogas, also used in the generation of electricity. These are some pilot projects that we hope in time we can up-scale to many other African countries.

In terms of perspective, president Obasanjo mentioned the huge potential Africa has in renewable natural resources. If you take the case of solar energy, most African countries have 325 days of sunlight, and in fact 80% of the landscape receives around 2000 kW·h per square meter, which means there is a huge potential that could be harnessed. We also have wind in significant figures, plus biofuel and geothermal. We specially have a great potential in geothermal but for the time being we are only using 1% of it.

Ultimately, it is quite positive that the message that the UNEP is receiving from the African countries is that they would like to embrace the low carbon economy development path, that they do not want to imitate the Western World and its development based on carbon, because the negative impacts in the planet as a whole have become obvious to all.

So in terms of perspectives, our two-year programme 2009-2011 is going to be mainly focused on mitigation and adaptation and another important and growing initiative supported by the EU: the Africa Green Economy Initiative, which is aimed at blending energy efficiency and renewable energy in order to create a low carbon economy in Africa. Building on the different initiatives going on and the comprehensive programme that Africa is developing with support from the UNEP and other agencies, our aim is to provide support in the areas of solar, wind, bio-energy and geothermal energy.

There are a certain number of aspects to take into consideration such as for example financial risk, market investment, technology transfer and also capacity building issues. We are planning to analyse these in different countries. Kenya, for example, is trying to look at all the different potential possibilities in the area of energy.

As you can see they looked at different options like solar energy, biofuel, nuclear energy, oil, etc. to see what is in fact the most important and less expensive option for the country, and for the time being -this can change with time- they considered small hydro and geothermal are the most promising in terms of investment and low cost. So this is just one example in one country, but it will be assessed in others.

Rafael Tuts

*Head of the Urban Environment
Planning Branch of the United
Nations Human Settlements
Programme (UN-Habitat)*



Rafael Tuts is presently responsible for the application of the Cities in Climate Change Initiative (CCCI) and the Urban Development Strategies Programme that are part of the Sustainable Urban Development Network (SUD-Net). The CCCI is focused on reinforcing the capacity of cities in developing countries to integrate climate adaptation and the reduction of problems in the planning, management and investment plan processes, placing particular emphasis on the most vulnerable citizens. Rafael Tuts has also worked for UN-HABITAT as the head of the Training and Capacity Building Branch (2005-2008), acting head of the Urban Management Section (2000-2004) and coordinator of the Localizing Agenda 21 Programme (1995-1999). Before working for the United Nations, Mr Tuts worked as a research fellow at the University of Nairobi and the University of Leuven (1987- 1994).

1.

Cities and Climate Change: the perspective of UN-HABITAT

This article draws on key elements of the presentation made by Mr. Rafael Tuts, Chief, Urban Environmental Planning Branch, UN-HABITAT on the occasion of the Meeting on Climate Change and Renewable Energies held in Madrid in November 2009. It also draws on the UN-HABITAT Climate Change Strategy 2010-2013 and on feedback received from a wide range of international partners following the Copenhagen Summit.

Climate Change is recognized as one of the defining problems of the 21st century. Emissions of carbon dioxide and other greenhouse gases (GHG) caused by human activity are already bringing a rise in air and sea temperatures that cause unpredictable and often disruptive climate changes. The vast majority of the climate impacts, it is believed, will be negative and will severely affect those most vulnerable and less able to adapt, especially in developing countries. The future of hundreds of millions of people in urban areas across the world will be affected by the impacts of climate change and the overall vulnerability of human settlements will increase.

The relation between urbanization and climate change is inextricable and the role of cities in addressing climate change is of crucial importance. Our understanding of the dynamics of climate change and of the strategies for response is also evolving rapidly, bringing to the fore the urgency to address the sustainability of the world urbanization patterns. UN-HABITAT has embarked on designing an agency-wide strategy aimed at providing support to local governments and other local actors in promoting the urban sustainability agenda within climate change discussions as well as building local capacities to address climate change challenges across the urban sector.

Cities contribute to Climate Change

Urbanization and climate change are virtually inseparable. In thermodynamic models of the atmosphere, cities appear as heat islands. This is due to the high density of concrete and asphalt, as well as to the high-energy consumption and the high GHG emissions occurring in cities with large populations. Energy for heating or cooling, and lighting residential and commercial buildings account for a quarter of GHG emissions globally while transport accounts for 13.5 %. CO₂ is mainly emitted in urban areas and it is urban and inter-urban activities that lead to the emission of significant amounts of other GHG. Together, energy for electricity, heating, transport and industry generates more than 60% of greenhouse gas emissions. Rich cities produce more greenhouse gases than poor cities as increased income and changing lifestyles increase consumption and energy dependence.

Within cities, approximately half of the GHG emissions are from energy in use in buildings and the operation of appliances, a situation symptomatic of our built environment and our quest for quality-of-life in urban places. The other half is due to the use of fossil fuel for transportation. Where there is reliance on private cars for transport, there are typically exceptionally high levels of emissions. In addition, due to continuing global urbanization, a reduction in the amount of green cover, parks, trees and agricultural surfaces in urban areas, reduces a city's ability to absorb CO₂. Moreover, poor waste management releases chlorofluorocarbons (CFCs) and gases such as methane into the atmosphere.

1. Sustainability and Climate Change: The Main World Challenge

Cities are affected by Climate Change

The impact of climate change on cities will be severe. It will include higher temperatures and pollution, with consequential risk to human health and human activities. Severe weather events, including tropical storms and drought will contribute to an increase in local and inter-urban migration and add new challenges for urban development including, for example, issues of land use and land tenure. The impacts of climate change may negatively affect the infrastructure, worsen the access to basic urban services and unfavourably affect the quality of life in cities. Abrupt and large-scale climate change could lead to a loss of 5-10% of GDP, with developing countries at the higher end of that estimate.

While demand for potable water rises, so climate change will adversely impact the supply and quality of water resources. Most affected will be the urban poor - the slum dwellers in developing countries. Climate change may create conducive conditions for the spread of vector-borne diseases such as malaria and dengue fever, impacting human health well beyond the current range of such diseases.

Three quarters of all large cities are located on the coast, with 60% of the world's population living in Low Elevation Coastal Zones (LEcz) (less than 10 meters above sea level). The rise in sea level will threaten coastal infrastructures and will pollute groundwater resources through salt intrusion and the inundation of water supply and sewage disposal facilities. In Polar Regions, thawing will reduce the stability of cities located on permafrost.

The impact of climate change on political and personal security is also of particular concern. Forced immigration caused by drought, or sea-level rise will contribute to unplanned urbanization, create disputes over access to land, services and other resources. The rule of law will be threatened by statelessness and other security threats in human settlements where existing capabilities are constrained by development challenges, skill shortages and economic limitations. In certain countries,

migrants are the most vulnerable population; marginalized in informal settlements and living outside the formal economy. It will be important to ensure that "climate change refugees" are not reduced to extreme urban poverty in host cities and countries.

Cities are part of the solution

Cities and local authorities have the potential to influence both the causes and consequences of climate change. They can also contribute to national and international strategies to prevent unacceptable climate change impacts. Currently, urban transport, the construction industry and shelter-related energy are the principal contributors of greenhouse gases to the atmosphere. On the other hand, cities offer opportunities to reduce emissions through economy of scale interventions and the numbers of communities involved in reduction strategies. The obligation consequently falls on cities to provide leadership and direction and to implement practical initiatives for the communities and citizens they represent. In a participatory manner, they can develop local strategies towards a sustainable future, addressing climate change impacts; mitigation and adaptation through good governance, urban planning and management and including the application of new building codes and other appropriate laws designed to ensure minimal emissions of greenhouse gases.

Already, cities around the world are carrying out a vast range of activities related to energy efficiency, renewable energy, cleaner production and the application of regulations to control industrial emissions and to improve architectural designs for energy efficiency. Efforts to reduce traffic, improve traffic flow and improve public transportation are just but a few local authority actions which significantly reduce carbon dioxide emissions.

It is crucial that successful measures and good practice are shared through effective information dissemination. To this end, many cities have linked with others to form "cities in climate change networks", sharing experiences and information, and learning from each other on the planning and management implications of climate change,

including preparation for, and implementation of, municipal climate change action plans. However, in the developing world, local authorities are in need of further support relating to capacity building, information acquisition and exchange, technology transfer, technical support and establishing an enabling environment.

UN-HABITAT's mandate regarding climate change

The crucial role of cities and of urban planning in addressing climate change has been largely demonstrated, and paths of change that need to be undertaken to achieve results are becoming more and more widely accepted. How, then, is UN-HABITAT deploying its support to the Climate Change agenda?

It is important to recall that since its creation in 1978, UN-HABITAT has supported hundreds of cities in improving their living environment. This has been achieved through its various programmes with a wealth of experience and lessons on building local capacity for improved urban management, planning and governance, which inform UN-HABITAT's current work on climate change.

The UN-HABITAT 22nd Governing Council adopted Resolution GC22/3 on Cities and Climate Change, which reflects the increasing recognition of the relation between urbanization and climate change. It also recognizes that proper adaptation and mitigation actions taken at the local levels and being integrated into national policies will be of importance in tackling the global challenge of climate change.

The framework for action: the Cities and Climate Change Strategy

Four key strategic areas have been identified through consultation with partners and building on the past experience in promoting sustainable urbanization. These key strategic areas are listed below:

Policy Dialogue and Advocacy:

Promoting the crucial role of cities in climate change strategies at global as well as national levels; advocating for the consideration of the extreme impact of climate change on the urban poor, youth and women; promoting the participation of cities in national and international dialogue and policy making; and including ministries of housing and construction in such a dialogue.

Institutional Strengthening:

Strengthening capacities in promoting pro-poor clean and affordable technological options; promoting innovative approaches to urban planning and management based on a participatory decision-making approach; conducting vulnerability assessments and risk mapping at the local level; expanding the range of capacity-development approaches in order to support local authorities in addressing climate change; and providing support to the

building design and construction sectors aiming at mitigating climate change.

Promoting Innovative Implementation Partnerships:

Strengthening existing cooperation with the United Nations Framework Convention on Climate Change, with others UN agencies and with Cities Associations on issues of cities and climate change; facilitating cities' access to financial resources for urban mitigation and adaptation including utilizing the Clean Development Mechanism in the construction sector in developing countries; and exploring new partnerships with the private sector and with networks of community based organizations

Awareness, Education and Networking:

Targeting formal education and continued learning institutions; encouraging professionals to integrate climate concerns in architectural design, urban planning, environmental technology, financial management and local economic development; and collecting and sharing case studies on good practice, amongst other, on promoting energy efficient buildings and settlement structures and on mechanisms to assist cities in preventing land-use conflicts arising from relocation of human settlements.

1. Sustainability and Climate Change: The Main World Challenge

This resolution lays the foundation for UN-HABITAT's further work in this field and calls on governments, amongst others, to widen the geographical scope of the ongoing work on cities and climate change and to expand the range of capacity-development approaches in order to support local authorities in addressing climate change.

UN-HABITAT activities on Cities and Climate Change

Climate Change is definitively an issue that calls for an integrated and multidimensional approach, where mitigation and adaptation measures are equally important and are addressed through advocacy, tools development, networking and capacity building. Therefore, UN-HABITAT's work on climate change cuts across the focus areas of UN-HABITAT Medium Term Strategic and Institutional Plan (2008-2013). Some planned and ongoing activities are the following:

The Global Report on Human Settlements 2011 focusing on Cities and Climate Change will be an important endeavor aimed at improving evidence-based knowledge, among Governments and Habitat Agenda Partners, on current conditions and trends with respect to the links between cities and climate change, and how cities can mitigate and adapt to climate change impacts. The report will identify and highlight effective city level policy responses to climate change that need to be promoted.

The World Urban Campaign is a new systemic approach towards partnership, advocacy and networking, through unique and periodic events (such as World Habitat Day and the World Urban Forum); the publication of magazines and reports and the development of television content and educational tools. Cities and climate change will be one of the key entry points for the Campaign.

The Cities and Climate Change Initiative (CCCI) aims at enhancing climate change mitigation and preparedness of cities in developing countries. This initiative aims to enhance policy dialogue between various levels of government with a view to improving strategic

responses with a clear urban dimension. It also provides support to selected local governments and encourages innovation and reform. The initiative has a strong awareness, education and capacity development component, focusing on tertiary learning institutions and professional associations. The initiative is currently working in a dozen countries in all major regions.

UN-HABITAT is also strengthening the emphasis on climate change in other areas of work, including urban planning, urban governance, sustainable buildings and construction, post-disaster shelter reconstruction, urban transport, urban energy, review of building regulations, climate change adaptation in the water and sanitation sector, as well as integrating youth and gender as important dimensions throughout the climate change portfolio.

In order to maximize synergies, strategic partnerships are being developed between UN-HABITAT and other UN bodies, building on the common UN rationale, which recognizes the increased vulnerability of human settlements as one key impact of climate change. In addition, UN-HABITAT is cementing existing partnerships with non-governmental organizations, educational establishments, scientific institutions and financial bodies. Key among such partners are the associations of local governments at global and regional level, specialized non governmental organizations and professional associations.

The Copenhagen Accord

The Copenhagen climate summit was certainly a historic moment in the global response to climate change. Many hoped that the Copenhagen Climate Conference would be able to "seal the deal" and result in a fair, ambitious and equitable agreement, setting the world towards a path to avoid dangerous climate change.

The "Copenhagen Accord" is a concise document containing an outline of a future framework to address climate change. Its provisions on mitigation by developed countries are widely seen as "weak". What many characterized as the most successful part of the Accord relates to short- and long-term financing. Developed countries

came to Copenhagen with clear promises to fund mitigation and adaptation actions in developing countries. The Copenhagen Accord, even if not formally adopted, represents an important political message and advanced many difficult issues on the negotiation agenda. A large number of countries have already come forward with relevant submissions, which sends a signal of a strong political support for the Accord.

The focus in 2010 should shift towards implementation, including fast-track and long-term financing in the Copenhagen Accord. In this regard, the Secretary-General of the United Nations has launched a High-level Advisory Group on Climate Change Financing. As part of its work, the Group would develop practical proposals on how to significantly scale-up long-term financing for mitigation and adaptation strategies in developing countries from various public as well as private sources, with particular focus on the need for new and innovative long-term sources of finance.

Copenhagen saw a major mobilization effort of the local government movement. More than 1,200 local government representatives joined more than 115 Heads of State in a shared commitment to a global climate solution. So far, 2800 cities have come up with voluntary GHG reduction targets. Local governments - along with other sub-national entities and, increasingly, the corporate sector - appear to be committed to lead the way, but there is an urgent need for national governments to further enable and empower cities. Meanwhile, local governments are committed to continuing their efforts on emissions reductions and innovative solutions until the final deal is sealed.

Way forward

The outcome of Copenhagen makes local government climate leadership more imperative than ever. However, world leaders still have a responsibility to reduce emissions quickly and dramatically, to avoid the thresholds of dangerous climate disruption. A binding agreement is needed to launch a clean energy revolution that transforms and revitalizes economies. Governments are called upon to bring local governments in as partners, give Mayors a seat at the table and share the

responsibility. Local governments need to tell national governments clearly what they need to intensify local action.

UN-HABITAT is committed to further incorporate climate change concerns into its work, recognizing that the rethinking of the built environment, services and urban activities is crucial to respond to climate change. It will focus on building local government capacity to design and implement adaptation and mitigation strategies through sound urban planning, management and governance. It will help range the voices of local government actors in national and international debates. The ultimate goal is to promote innovation in basic services, building technology and transport as vital element of more sustainable, resilient and equitable cities.

Alicia Montalvo

*Director General, Spanish Office
for Climate Change*



Alicia Montalvo is Director General of the Spanish Office for Climate Change (Ministry of the Environment and Rural and Marine Affairs) a position she has held since 2008. She has a BA in Economics from the University of Valencia and Master in Public Administration from Harvard University (1992). Mrs. Montalvo has been a State Official of the Trade and Economy Service since 1987 and has served in various posts related to the international trade, Director of Trade Policies and Investments, Director of Economic Policy, and Assistant Director-General of International Economy. Between 1993 and 1997 worked as assistant professor at the Universidad Carlos III (Madrid).

1.

Spain's Climate Change Policy in view of Copenhagen and the Spanish 2010 EU Presidency

First of all, I would like to thank Casa Asia and Casa África for inviting me to participate in this conference, which I think is being held at a very appropriate moment.

International negotiations are really advancing these days, every minute we find new data and new announcements, and I think that it is an interesting moment to stop and think about where we are and how far we can go, and what we want for the future climate change regime, particularly bearing in mind that Spain will preside the EU Council during the next semester and a large part of the responsibility lies with us to make the Copenhagen agreement a publicly binding text affecting us all.

What we are really most interested in right now is reaching an agreement that avoids the risks that scientists have warned us about. A scientific foundation is fundamental for our work and for this reason we would always like to emphasize this point: we are not dealing with hypothetical speculation and arbitrary approaches; we have a very clear scientific foundation that tells us that we have to take immediate action to avoid irreversible damage associated with temperature rises of over two degrees with respect to pre-industrial levels.

Therefore what we need to do now is reach a very clear agreement offering us a specific regulatory framework within which to act in the medium and long term, with a possible technological framework, that is, with technologies that can really be applied and used in the short term, and that are accessible not only for developed countries but also for all developing countries. And of course with an adequate financial framework that allows for the use of resources to tackle the challenges we face.

As for the regulatory framework, what we need are clear reduction goals. We need figures that

allow us to catch up with the trajectory of the two degrees centigrade. This means reaching certain emission levels. If in the year 2010 we have 50 gigatonnes of emissions, in the year 2020 we would have to reduce them to 44 gigatonnes and by 2050 we would have to reach 20 gigatonnes. That is, we are dealing with a significant reduction where, in addition, there has to be a turning point which should be reached between 2015 and 2020. In short, we have a set of very clear goals that we must reach, and cannot stray from this path. Otherwise we will be proposing and increasing the actions and costs to carry out the fight against climate change.

A technological transformation is necessary; both in the short and long term. If we think about what might happen from now until the year 2020, 2030, what we have to achieve is the deployment and generalisation of technologies that are already available. This is a very important aspect of the debate. We are already developing energies that offer us the possibility of achieving 70% of the necessary reductions; what we need to do is make this technology accessible for all countries. We are talking about wind power, solar power, and of course the energy savings and efficiency measures.

If we think about how far these actions can take us, we realise that the energy efficiency and energy saving measures could cover up to 50% or more of the necessary reductions. Along with this, renewable energies could allow us to reach an additional 20% of the necessary reductions. That is, we already have the technologies that allow us to reach adequate reduction levels, what we have to do is mobilise these technologies and generalise their use; in short, to make them accessible.

What kind of investment does this require? We are talking about figures that, if compared with the estimated costs derived from the impacts of



climate change, could be considered to be low. Figures that vary between 0.5% and 1% of GDP, when we know that the costs associated with the impacts will be far higher.

It is therefore necessary to set up financial frameworks that allow us to carry out this technological transformation.

Of course if we think about the long term and the margins we need to reach the necessary reductions, it will be important to promote new technologies; it will be essential. We are talking about technologies such as the capture and storage of CO₂ and other types of renewable energies that are still in the early stages of development. In this case we consider that the cost could be greater, reaching up to 1.4% of GDP by the year 2050, which is the horizon we have set for ourselves. But we still think there is an important potential and that the national frameworks, of developed countries in particular, must make investments in R&D in order to develop these technologies and make it possible to transfer them to developing countries.

Let us not forget that though right now the biggest emitters of CO₂ are the countries of the OECD, mainly the USA and the EU, within 30 years the large emerging economies will be the main emitters of CO₂ if we do not make efficient technologies available to them. It is therefore essential that we act now, when the transformation can still be carried out at affordable costs and when we are still at an ideal time to avoid the consolidation of growth models we do not want.

I think that the Spanish experience can be reproduced in these countries and that is why Spain, which will preside the EU Council during the next semester, has energy and climate change among its most important priorities.

Therefore, access to the tools is a fundamental aspect of this international agreement. Not only the goals, not only the technology, but the tools that will allow us to make this technology available to whoever needs it. We are talking about the need to develop an adequate financial framework that must focus on two fundamental aspects.

Our experience in the renewable energy sector shows that in effect, the initial investments to set up this type of energy are important, but a high degree of political compromise is required

First of all policies that offer a correct CO₂ price signal. We have to advance in carbon markets, which have allowed CO₂ to become something that has a price and therefore a cost.

Insofar as these actions allow us to save on emissions, they can bring benefits, that is, low-carbon technological activities are offered incentives and this type of action must be reinforced. We think that carbon markets are one of the most powerful tools we need to continue to work with, and of course we need to reinforce the actions that safeguard the environmental integrity of these carbon markets. As for other actions that allow us to mobilise resources, of course it is necessary to mobilise public resources. Both in developed countries themselves where we have to carry out the necessary actions, and in developing countries, mainly emerging economies that have sufficient capacity to take action on a national level. But the mobilisation of a sufficient and important amount of international financing is also necessary. In this context, the needed funds have been estimated at close to 100 billion Euros in the year 2020; these are estimates by the European Commission that Council has recently approved, and which must be financed with both the carbon markets I have referred to and with national and international public financing.

This is one of the great challenges we have to face regarding the Copenhagen agreement, and will of course require a great degree of political compromise. Therefore -and just a few days away from the start of the Copenhagen summit and with recent news of commitments by USA and China-, we could ask ourselves what we consider to be an acceptable agreement that would calm our worries regarding the need for

1. Sustainability and Climate Change: The Main World Challenge

a regulatory framework that will allow us to develop a new long term model for growth and development.

For us, an acceptable agreement must include four fundamental elements.

First of all there must be compromises for reduction, that is, numbers for developed countries; we have seen some figures, but of course we need to be sure about the comparability of these efforts.

We are talking about a global agreement that must involve all of us. We believe that the fact that USA and China have joined this effort is a very important step; although in a sense this might condition our schedules, I still think that this is excellent news. However this will have to be seen in the context of an international agreement. Our reference is the 2°C mark and we cannot scale down our ambitions.

Second, we need to see actions, compromises by developing countries, mainly the large emerging economies. We have seen that China has assumed important compromises and we think that these compromises must be internationalised, that is, to place them within the context of an international agreement.

What this means, effectively -and this would be the third element of the Copenhagen agreement-, is the establishment of a set of rules that are shared by all. We are talking about the need to work on the same bases, on the same monitoring systems that allow us to verify that we are reaching the goals we need, and therefore these rules must be clearly outlined in the Copenhagen agreement.

Last of all, in Copenhagen we need an important financial package. Particularly regarding short term action. It is essential that we make a sufficient volume of resources available to developing countries in order to set the agreement in motion. This requires investment in observation systems, investment in education, investment in skills, and of course dealing with the most urgent needs concerning adaptation. The EU has worked on this issue and is committed to assuming part of the international

effort necessary to make this possible, but it is also essential to design a financial architecture for the long term. Climate change requires a revision of the international financial architecture consistent with a new model for growth and a new model for development cooperation. The Copenhagen agreement must also include something that is important for everyone, which is a clear mandate to transfer this agreement to a legally binding text. Let us not forget that right now we are working within the framework of the Kyoto Protocol, which is a treaty, and that we need the new regime to be of the same nature as the one we have now.

Evidently this is not a simple issue, there are many different visions as to how the future regime has to be outlined, but for us (for Spain and the EU) it is essential that the text is legally binding, and we share the concern of many developing countries, mainly African countries, that this becomes a reality as soon as possible. In short, we believe that right now we are in a key moment to send out signals for the future.

It is essential that a compromise is made at the highest political level, as we believe that a clear and certain sign that there will be irreversible changes to our model will bring forward the action needed to reach our goals

We are optimistic regarding the outcome of Copenhagen because we see that there has been substantial progress during the last few years. There is still a long way to go, and in any event we are prepared, as the next presiding country in the EU, to make any necessary efforts in order to give this legal status and have a clear new regime that binds us all.



First Roundtable - Sustainability and Climate Change: The Main World Challenge.

High representatives of multilateral and national organizations explained the socioeconomic costs of climate change, the new elements in their energy strategies and programmes and the concrete measures that are being applied to achieve a more efficient management of energy resources.



Some of the participants during the session.

2.

International Cooperation and Energy Policies to achieve Sustainable Development

SECOND PART

Page

Anil Terway
58 Responsible for the Department of Sustainable Development of the Asian Development Bank (ADB)

Mohammed AbdelRahman
64 Energy Adviser of NEPAD

Rosa Elcarte
68 Director of Multilateral and Sectorial Cooperation of the Spanish Agency for International Development Cooperation (AECID)

Scientific evidence is warning us that over the next few decades, thousands of people will have to face many difficulties throughout their lives as a result of the relentless warming of our planet. Food supplies will decrease and many of the earth's forests will be destroyed. These alterations will not only affect delicate ecosystems such as coral reefs, but also the chemical composition of the oceans, which are rapidly acidifying.

These dramatic changes will affect the whole planet, but those who will suffer first and who will be the most hard-hit are the world's poor. The most recent climate models indicate that the most vulnerable are the arid tropic regions, where climate change threatens the supply of food for millions of people; along with increased sea levels and the growing intensity of typhoons. In a warmer world it is probable that epidemics will spread and the fact that there are millions of people who currently live in extreme poverty and face ecological deficiencies -water, land, forests-, will exacerbate the forthcoming problems of climate change.

In this respect, we need to support these countries in their search for development models based on low consumption of greenhouse gas GHG in order to reduce emissions from fossil fuels, through energy efficiency, substitution of fossil fuels with cleaner sources of energy, and finally, we need to promote environmentally-friendly technologies through research, development and practical application. It is equally important that we carry out the pertinent research on the impact, vulnerability and risk assessment of the most affected communities to mitigate the serious consequences in an effective way.

Anil Terway

Head of the Sustainable Development Department of the Asian Development Bank (ADB)



Anil Terway is the Senior Advisor and Practice Leader (Energy) in the Regional and Sustainable Development Department of Asian Development Bank (ADB). He is the first ADB senior staff to fill this position, which was created in 2009 as part of a human resource initiative for leading and supporting ADB's energy sector operations under the long-term Strategy 2020. Earlier, he led the energy sector operations in People's Republic of China and Mongolia for 4 years, and has over 9 years of experience in developing and supervising energy projects and programs in east, central and southeast Asia. Anil Terway also co-chairs ADB's community of practices for energy and the Clean Energy Working Group.

He worked in India prior to joining the ADB in 1996; he was in the management consulting team of Pricewaterhouse Coopers for about 2 years; held various positions in the operations of large thermal power stations and corporate planning in power companies for 20 years; and worked in an integrated steel plant for a year. He is an electrical engineer and has a MBA degree.

The Role of Renewable Energies in Asia. ITLE ADB's Clean Energy Program

The Asian Development Bank vision

Climate change is a global challenge and the case for action is particularly strong in Asia and the Pacific. The region is home to more than half of the world's poor, who will suffer the most from the adverse impacts of climate change. Moreover, as a consequence of rapid and carbon-intensive economic growth, the region is fast becoming a major source of greenhouse gas (GHG) emissions.

The need for better understanding of climate change in the region has become even more important due to the ongoing time-bound discussions for reaching an agreement on the terms of the international climate change regime beyond 2012 which is supposed to conclude at the United Nations Framework for Climate Change Convention (UNFCCC) Conference of the Parties (COP) in Copenhagen in December 2009.

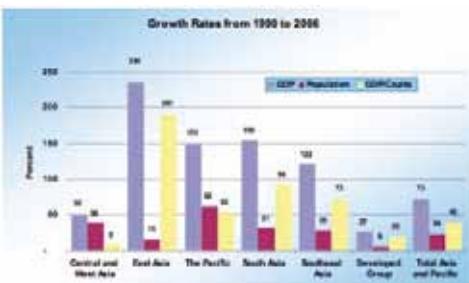
Developing countries in Asia and the Pacific are responding with strategies and programs for both climate change mitigation and adaptation. As the region's development partner, ADB is committed to assist in these efforts by helping fill gaps in financing, capacities, and knowledge.

ADB, based in Manila, is dedicated to reducing poverty in the Asia and Pacific region through inclusive economic growth, environmentally sustainable growth, and regional integration. Established in 1966, it is owned by 67 members - 48 from the region. In 2009, it approved \$16 billion in loans, \$1.11 billion in grant projects, and technical assistance amounting to \$266.8 million.

Growth economy and GHG emissions in Asia

The region's rapid economic expansion has clearly brought substantial benefits to its poor. Populations and incomes have increased. Millions have been lifted from poverty. Despite bringing many benefits, the pattern of this growth, fueled by rapid urbanization and intensive energy and resource consumption, has not come without a price. Under current trends, Asia and the Pacific's GHG emissions will soon be the world's largest. Without increased low-carbon investments and better land-use practices in Asia and the Pacific, it will not be possible to control global GHG emissions at the level necessary to avert dangerous climate change impacts.

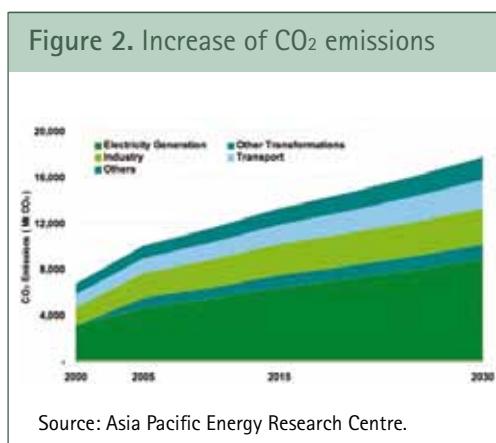
Figure 1. Growth rates from 1990 to 2006



Source: Asia Pacific Energy Research Centre.

2. International Cooperation and Energy Policies to achieve a Sustainable Development

Under a business-as-usual scenario, energy demand in developing Asia will almost double by 2030. Emissions from energy use are projected to increase by 100% between 2007 and 2030, at which point the region will be responsible for 45% of all global energy-related emissions (compared with 31% in 2007). Particularly, CO₂ emissions are expected to grow at 2.3% per year through 2030 - a slightly slower pace than the projected energy demand growth. If the majority of systems being installed used clean energy options, few alarms might ring. Various clean technologies to mitigate carbon emissions exist today. However, coal and oil fuel the expansion of developing Asia. Another cause for concern is the rapid growth in personalized transport, which is driving up Asia's demand for oil. In 2030, oil use by the transport sector is projected to be three times bigger than it is today-decreasing energy security in the region and increasing transport sector-related CO₂ emissions.



Challenges and vulnerabilities

Adaptation to climate change has become a great challenge to many Asian countries that emit a high amount of GHG and still have an important need for development. Various studies estimate that even if atmospheric CO₂ concentrations are kept below dangerous levels through concerted international action, adapting to inevitable climate change impacts will cost poor countries at least \$10 billion to as much

as \$150 billion per year, depending on whether these figures refer to infrastructure alone or broader economic impacts. Costs include necessary adjustments to existing infrastructure and industry in response to floods, storm surges, water shortages, cyclones, and other impacts of climate change.

Unfortunately, the majority of developing countries are particularly prone to one or more of these risks and are not yet adequately prepared to deal with the resulting effects on agricultural output, labor productivity, health, infrastructure, and internal displacement. Asia and the Pacific's vulnerability to climate change is dictated by its unique physical and socioeconomic attributes, including high population density, still relatively low income levels, long coastlines, and the prominence of agriculture and fishing in providing livelihoods for the rural poor.

To avert the worst damage, it will take shared understanding of long-term goals, effective leadership, and an ability to build and facilitate concerted action among all players at every level.

Challenges

1. Energy Security

- Increasing demand for energy.
- Volatility in energy prices.

2. Climate Change

- Significance of global warming and climate change.
- Need to promote low carbon emission options and technologies.

3. Energy Access

- MDG targets cannot be met without modern energy services for all.
 - 2.5 billion people rely on traditional biomass.
- Mobilizing financing is challenging.

ADB Energy Policy

The Asian Development Bank (ADB) is taking an active role in Asia and the Pacific to address

the causes and consequences of climate change. Under its long-term strategic framework, Strategy 2020, ADB responds to climate change as part of the broader agenda of promoting environmentally sustainable growth in Asia and the Pacific. Addressing climate change is also critical to achieving inclusive economic growth-another strategic agenda under Strategy 2020-as the adverse impacts are predicted to disproportionately affect the poor and women.

Particularly, the aim of the ADB Energy policy is to help Developing Member Countries (DMC) to provide reliable, adequate, and affordable energy for inclusive growth in a socially, economically, and environmentally sustainable way. Core priorities of ADB's climate change program are:

- Scaling up clean energy, including expanding the proportion of renewable energy supply in Asia and the Pacific as well as promoting energy efficiency.
- Promoting low-carbon, climate resilient, transport and urban development;
- Investing in climate-resilient development;
- Furthering sustainable land use and forest management; and
- Supporting associated policy and institutional strengthening.

ADB will increasingly leverage private sector funds, the carbon markets, private insurance, and concessional finance for its DMCs beyond traditional loans and grants to support climate-friendly economic growth. This investment in both "hard infrastructure" and "soft" capacity building measures will encourage the spread of transformative technologies throughout the region. Experiences gained by ADB and its partners are being shared through publications, media outreach, cooperation with regional knowledge hubs, training events, and other modes of dissemination.

The ADB program follows several principles of implementation:

- Prioritize and broaden support for energy

efficiency improvements and renewable energy projects.

- Wide-ranging efforts to provide energy services for inclusive growth.
- Accelerate programs to extend energy services to communities and groups.
- Access to energy is essential to reducing poverty.
- Promote effective regional cooperation in the energy sector to strengthen energy security.
- Emphasize promotion of energy sector reforms, capacity building, and governance.
- Encourage private sector participation and PPP to enhance efficiency through competition, and to increase investable resources, but not as the end objective of reforms.
- All energy sector investments will comply with ADB safeguards policies regarding the environment, involuntary resettlement, and indigenous peoples.
- Not to finance nuclear power generation.
- Not to finance coal mine development except for captive use by thermal power plants, and oil field development except for marginal and already proven oil fields.
- Promote superior knowledge management and dissemination of good practices and lessons learned; support advocacy and assistance to DMCs in technology transfer and deployment.
- Collaborate with a range of development partners Identify specific situations in each DMC while planning and designing of interventions, especially for Pacific DMCs.
- Monitor policy implementation using results framework.

Through the ADB Climate Change Fund (CCF), capitalized initially from \$40 million in ADB's net income, we are already supporting 44

2. International Cooperation and Energy Policies to achieve a Sustainable Development

projects that support the integration mitigation, adaptation, and reduced emissions from deforestation and degradation (REDD) further into ADB's country programming, and make these actions more affordable and competitive. With partners from other MDBs, ADB is working to program and disburse the Climate Investment Funds (CIF). ADB is an executing agency of the Global Environment Facility (GEF) and can assist DMCs in accessing resources for both mitigation and adaptation measures through this partnership. A number of technical assistance grants- some financed by bilateral development partners - have also been mobilized to increase capacity in ADB for integrating climate change into its programming.

Knowledge Solutions and Dissemination

ADB aims to contribute to international dialogue on climate change including economic costs and benefits of national and regional actions on mitigation and adaptation measures, and to raise awareness of the urgency of climate change challenges and their socio-economic impacts. With this purpose, ADB is undertaking a number of flagship studies such as:

- Economics of Climate Change in Southeast Asia.
- Climate Change and Energy.
- Building Climate Resilience in the Agriculture Sector.
- Climate Change and Migration.
- Infrastructure for a Seamless Asia.

ADB also sponsors and organizes knowledge-sharing events such as:

- Asia Clean Energy Forum (annual): policymakers, private sector firms, and non-governmental organizations (NGOs) across Asia will gather on 22-25 June 2010 in Manila, Philippines during the 5th Asia Clean Energy Forum: Meeting the Technology Transfer Challenge. The forum will promote best practices in policy and finance and will

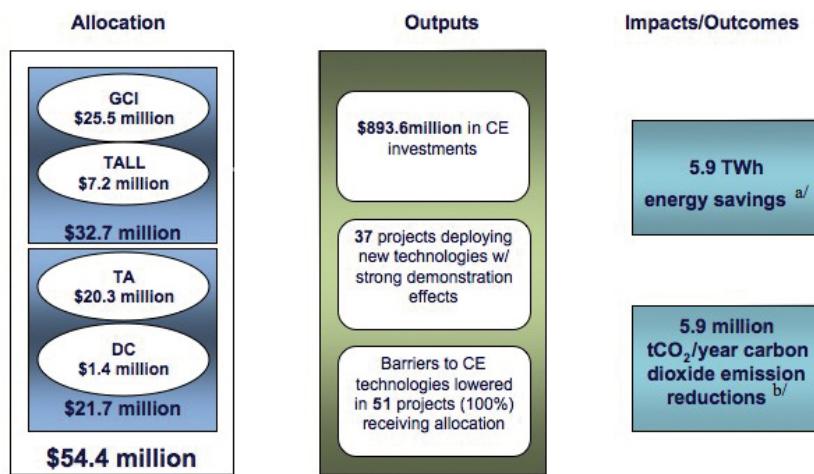
seek to catalyze actions that respond to the challenges posed by a new era of clean energy.

- Transport Forum: the 2010 ADB Transport Forum will be held in Manila, Philippines and it will focus on Changing Course in Transport. The three-day ADB Transport Forum, featuring ministers, key decision makers from industry, top researchers and representatives of civil society from more than 30 countries, will provide a unique forum for discussing and debating some of the most crucial issues facing transport in Asia. It is now clear that a business as usual scenario is unsustainable and the need to change and move along a different growth pathway is driven by a range of economic, social and environmental challenges, including climate change, congestion, and the provision of basic mobility.
- High-Level Dialogue on Climate Change (June 2009): the Dialogue seeks to catalyze national and regional actions and contribute to global response to climate change by enhancing awareness and knowledge of latest thinking on issues and solutions to the causes and consequences of climate change especially those facing Asia and the Pacific; sharing information and best practices on policies, technologies, and financing that will spur climate change mitigation and adaptation actions in the region; promoting regional cooperation to ensure that mitigation and adaptation investments provide the greatest benefits and pay off in the long term-regionally, nationally, and locally; fostering partnerships between policymakers, experts, practitioners, financing entities and other stakeholders to advance climate change solutions.

Surpassing the Clean Energy Target

Clean energy is one of ADB's highest priorities, with over one fourth, or 27%, of the total approved loans in 2008 supporting projects with clean energy components. As of 20 July 2009, ADB's clean energy investments for the year have reached about \$870 million.

Figure 3. Allocation CEFPPF and CCF funds



Source: ADB

a/ covers only energy efficiency investments attributed to CEFPPF/CCF financing

b/ covers all clean energy investments attributed to CEFPPF/CCF financing

ADB set a target of reaching \$1 billion a year in clean energy investment by 2008-2010. ADB's total investments in clean energy amounted to around \$1.6 billion in 2008, surpassing the \$1 billion target by almost 70%. With high levels of confidence for clean energy investments, ADB targets the annual lending for related programs to \$2 billion by 2013.

All these investments have been possible thanks to contributions from:

- Clean Energy Financing Partnership Facility (CEFPF), composed of:
- Clean Energy Fund (Australia, Norway, Spain, and Sweden).
- Asian Clean Energy Fund (Japan).
- Carbon Capture and Sequestration (Australia).
- Climate Change Fund (CCF) from ADB: \$25 million for clean energy
\$5 million for sustainable land use; and
\$10 million for adaptation

The CEFPPF and CCF funds allocations, outputs, impacts, and outcomes, as it is shown in the figure below.

ADB's Carbon Market Initiative (CMI)

Securing adequate finance and capacity is a fundamental obstacle for developing countries trying to adopt cleaner energy technologies. The Carbon Market Initiative (CMI) supports the development of GHG mitigation projects by providing carbon finance at the most critical stage-project preparation and implementation. CMI's Asia Pacific Carbon Fund and the recently established Future Carbon Fund combined can purchase carbon credits generated up to 2020 to cofinance clean energy and other GHG mitigation projects. CMI also provides experts for technical advice on project development and implementation, documentation, and capacity building. In addition, CMI offers developing member countries marketing support for their carbon credits to be sold in the global carbon market.

Mohammed Abdel Rahman

Energy advisor at the NEPAD secretariat in Johannesburg



Dr Abdel-Rahman is the Energy advisor of the New Partnership for Africa's Development (NEPAD), an African agency dependent on the African Union. Furthermore, he has been an advisor to the Egyptian Energy Regulatory Agency almost since it was first set up in 2001, and was deeply involved with the Agency's activities. In addition, he has always been an active member of the Department of Electric Power and Machines at the Faculty of Engineering, University of Ains Shams, El Cairo, with many studies and publications. His academic record is not limited to engineering, but extends to business administration and financial studies.

Electrification in Africa: the challenge

Electricity is the backbone of economic development. However, the African continent still lags far behind the world on its electrification, especially in rural areas. Furthermore, the private sector is the vehicle of choice for electricity sector development. However, private sector involvement in the energy business requires a number of upstream groundwork prerequisites from a risk averse financier's perspective.

Consequently, there exists a need to furnish an environment that is attractive for the private investor. This requires a strong regulatory framework that ensures the private capital of the leveled playground. There is a great lack in this aspect within the African continent.

Conventional wisdom in Africa tells us to follow the development model already trekked by developed countries. However, historically speaking, those Mega projects established in the developed world came after successive multiple smaller projects. The choice of the private sector as the vehicle of choice for infrastructure projects puts a huge burden on the African countries.

Infrastructure Investment Characteristics:

Long term investment

An infrastructure investment is a long-term investment with pay-back periods that may go up to 15 or 20 years. This hugely increases the risk of

the investors. Therefore, the investor should seek higher returns to efficiently utilize its funds.

Asset specific

Infrastructure investment once established on the ground cannot be utilized in any other application other than its original intention. This makes the whole contract susceptible to leverage application from both parties, whether a service provider or an off-taker. This is a mutual risk that should be ameliorated for both parties.

Capital intensive

Energy infrastructure is a capital-intensive business. The business is characterized by a high fixed to variable costs ratio. The huge capital required is a hindrance that prevents small, lighter, more liquid investors from participating. Hence, the financing mechanism of choice is a large heavyweight financial approach to the project in a syndicated manner.

Efforts to establish an investment-friendly environment in Africa

Indeed the continental cause for the establishment of an investment-friendly environment has been lead by a multitude of initiatives including the Africa-Europe Action Plan, which is the background for cooperation between Europe and Africa in energy. The Africa Europe Action Plan has identified priority areas for action.

2. International Cooperation and Energy Policies to achieve a Sustainable Development

These areas are:

- 1) Mobilising additional resources and support for access to energy services.**
 - Create adequate political and regulatory frameworks.
 - Support implementation of regional and national energy access policies.
- 2) Regional and intercontinental integration of energy systems and markets.**
 - Support priority “win-win” projects, as identified by NEPAD, PIDA, TEN, etc.
 - Build institutional capacity to plan and implement integration plans.
- 3) Enabling an environment for scaling up investments and mobilising private capital.**
 - Implement stable, equitable and transparent investment conditions.
 - Intensify efforts to attract European investment to Africa’s energy sector.
- 5) Promoting renewable energy and energy efficiency.**
 - Create appropriate institutional capacity: renewable energy/energy efficiency policies; support centres; resource mapping.
 - Support renewable energy and energy efficiency programmes and projects.
- 6) Reducing gas flaring and venting.**
 - Support the World Bank Global Gas Flaring Reduction Partnership.
- 7) Developing institutional and technical capacity.**
 - Support capacity building for national, regional and continental institutions (Regional Economic Communities - RECs, Union of Producers, Conveyors and Distributors of Electric Power in Africa-UPDEA, African Forum for Utility Regulators-AFUR, African Energy Commission-AFREC, African Electrotechnical Standardisation Commission - AFSEC) for instance on information systems, databases, planning, standardisation, etc.
- 8) Fostering political and technical dialogue, contacts and exchanges.**
 - Support technical and political dialogue on: projects and programmes for interconnections, access, capacity building;

- Evaluate possible specific European contribution to priority actions;
- Encourage twinning between homologue agencies and authorities.

Examples of Upstream Ground Work

Indeed the establishment of an investment-friendly environment requires many upstream works to start, including policy guidelines within the continent. The objective is that those guidelines, if adopted by continental, regional, and national bodies, will bring harmony to the legislative and regulatory framework within the continent. This in itself will alleviate a good part of the risk associated with the regional projects. The purpose of these guidelines is to be eventually shared with the African Union Commission and adopted through the African Union due process for implementation on both regional and continental levels. The proposed guidelines are:

1) Internal Market Regulations Guidelines

Similar to the present worldwide best practice, there exists a need to establish a guideline for the internal energy markets regulation within the continent. The African Union (AU) member countries should buy in and accept those guidelines. This requires an extensive harmonisation effort with the African Union Commission (AUC).

2) Cost of Service Guidelines

Cost recovery and tariff setting are the cornerstones for an appealing electricity sector. There must be a continental consensus on the rules of electricity cost of service estimation. This requires an effort in building these guidelines based on the present practices in the various countries of the continent.

3) Utilities Financial Planning Guidelines

The establishment of the credit worthiness of the utilities within the continent is crucial for the intervention of the private sector. Our experience shows that investors eventually eye the credit worthiness of the off-taker together with its accounting practices as a prerequisite for engagement into further ventures

in business. Consequently, there exists a dire need to bring the international practices afore to the African utilities to assist in promoting their profile.

4) Cross Border Energy Trade Guidelines

Energy cross border trade is a difficult issue to tackle. However, established guidelines for cross border trade should increase competitiveness of the electricity industry within the continent thus increasing its appeal to private investors.

5) Transmission and Distribution Utilities Benchmarking and Performance Enhancement

Parallel to the establishment of the aforementioned guidelines, a performance monitoring mechanism that covers the technical, financial, and economic performance of the energy sector should be put in place. This mechanism is primarily concerned with the electricity sector's natural monopolies, transmission and distribution. This mechanism shall monitor the impact of the introduced policies and provide feedback for necessary actions whenever necessary. They require the establishment of a performance measurement mechanism to guarantee a minimum service level for the customer. Indeed, incentive regulation requires the establishment of such a renfe mechanism in place to allow the gains of improved performance to pass through to the customer.

6) Capacity Building

Lack of capacity is a chronic problem in the continent. It is a challenge to build, sustain, and grow this capacity within the continent. However, no due effort shall be spared to invest in African people.

7) Small and medium enterprises (SMEs) in the energy sector

The African continent is endowed with a multitude of renewable resources including solar potential, geothermal, wind, and lush forests. However, some of those resources are not exploited because of competitiveness to other forms of fossil energy. The other, biomass, is exploited in a non sustainable manner leading to the shrinking forestry in Africa. The challenge is how to devise a policy

on renewable energy to bring up its potential while achieving the Millennium Development Goals in a sustainable manner.

One big advantage of the renewable projects is the modularity of the project itself. This is a business opportunity for the continent's small investors. There is a need to bring in a whole set of legislative tools within a policy framework to tap into the SME's potential to engage in the energy business in Africa. The prices offered by the renewables of Africa are competitive with all other types of generation including hydro.

The question is how to introduce this business in a manner that will eventually result in a spiral positive feedback loop that will result in the economic growth of the business.

Conclusions

The African continent is facing an electrification challenge. The challenge is huge and should not be under estimated, especially with the private sector set as the means to bridge the financing gap for the infrastructure investment. Much groundwork is required to establish this investment-friendly environment. SMEs in energy, especially renewable, are a fast parallel track for the electrification of the continent. Still lots of background work needs to be done. However, counting on the continent inventory of entrepreneurship this path may provide wider economic benefits to the continent at large.

Rosa Elcarte

*Director of Sectorial and
Multilateral Cooperation
of the Spanish Spanish Agency
for International Development
Cooperation AECID*



Rosa Elcarte is a professional paediatrician and mother of three children. For over fifteen years she has been dedicated to Development Cooperation in a number of fields, in both NGOs for development and in the Spanish Spanish Agency for International Development Cooperation AECID. For over 7 years she has been working in the AECID, first as General Coordinator of Spanish Cooperation in Bosnia and Herzegovina and later with the same functions in Colombia. Prior to that she worked for 10 years at the Virgen del Camino Hospital in Pamplona, the last few in the Paediatric Endocrinology Department, where she worked in different research groups and participated in a number of publications.

Climate and poverty: the scope for development cooperation

As all of us here already know well, the fight against the adverse effects of climate change is maybe the most important environmental, economic and social challenge that humanity will face in the 21st Century. As it has already been highlighted during the last few days, there is an overwhelming scientific consensus¹ according to which climate change is real, that it has its origin in human activity and that its negative impacts in the medium and long term in areas such as agricultural production, water resources, ecosystems or human health are a clear threat to human development and the fight against poverty.

Experts indicate that it is urgent to act now to keep the global temperature rise during the 21st century within the threshold of 2° C above the level of the pre-industrial period; otherwise, the inertia and cumulative consequences of climate change could lead us towards a “dangerous” climate change.

The cost of not acting is greater than the adverse effects of climate change (we only have to think about the impacts of droughts, extreme climatic phenomena, tropical storms or rising sea levels). After the publication of the Stern Review on the “economics of climate change” there is an international consensus on accepting that the solution to the problem of climate change is feasible, more feasible than the cost of doing nothing.

But climate change is not only a serious threat to the global environment, but also to human development and the fight against poverty, to the extent that the adverse effects of it are particularly felt in poorer countries with economies based on the primary sector. In all developing countries, millions of the world's poorest inhabitants are forced to face the impacts of climate change.

In general, the most vulnerable populations and those who are less capable of adapting to change are found in developing countries. As a result, they will suffer the consequences of climate change to a greater extent, despite having contributed much less to the source of the problem. There is an inversely proportional relationship between responsibility for climate change and vulnerability to its effects. Thus, while the poorest people live leaving an almost imperceptible ecological footprint, they bear the brunt of the consequences of an unsustainable management of resources carried out from other parts of the planet. As indicated by the 2007-2008 UNDP Human Development Report, behind the problem of climate change there is a clear problem of equity.

As is well known, climate change is already slowing down efforts to meet the Millennium Development Goals (MDG): climate change will reduce the income of the most vulnerable populations and will increase the absolute number of people who are at risk of hunger

To talk about the fight against poverty and the fight against climate change is to talk about the same thing, because the effects of climate change are already an obstacle to reduce poverty and many efforts made through international cooperation are limited because they did not include the climate risk factor in their plans and programmes.

1. Read the fourth report by the Intergovernmental Panel on Climate Change (IPCC).

2. International Cooperation and Energy Policies to achieve a Sustainable Development

We have before us the important challenge of integrating climate change in Development Cooperation.

The International and Spanish response from the point of view of development cooperation regarding climate change

On an international level, The United Nations Framework Convention on Climate Change (UNFCCC), acknowledges as basic principles of operation,

- 1) the common though differentiated responsibilities of the parties involved, including the,
- 2) right to sustainable development of the Parties that are developing countries.

The principle of common though differentiated responsibilities implies that all countries have to fight climate change, but logically most of this effort must be made by the countries that have generated the problem (that is, industrialised countries). The second means accepting that developing countries have legitimate aspirations regarding the development of their economies, which could -almost inevitably- mean an increase in emissions by these countries due to industrialisation and higher energy consumption.

The Convention acknowledges that the Parties that are developed countries must provide new and additional financial resources to cover the expenses incurred by the developing Parties in compliance with their obligation to provide information and adopt all possible measures to promote, facilitate and finance the transfer of technology and access to solid knowledge from an environmental point of view.

Two special funds have been created within the framework of the Convention, financed by developed countries, to help developing countries develop in a sustainable way both in terms of reducing greenhouse gas emissions and adapting to the effects of climate change:

- i) The Special Climate Change Fund and

ii) The Least Developed Countries Fund.

Both are managed through the Global Environmental Facility, (GEF).

The Kyoto Protocol (KP), on development of the Framework Convention, establishes, for the first time, quantified compromises of emission reductions for developed countries (5% during the 2008-2012 five-year period of anthropogenic emissions of the 6 gases being controlled) and articulates a series of mechanisms to facilitate the fulfilment of such compromises. Among these mechanisms, the Clean Development Mechanism is introduced as a flexibility mechanism, by which developing countries can benefit from investment projects made by developed countries that bring a reduction of greenhouse gas emissions. The KP also created a new fund, the Adaptation Fund, which is financed with a 2% rate of the price of CERs (Certified Emission Reductions) that are produced in the CDM projects. This fund is used to undertake climate change adaptation projects in developing countries. The agreement to make this fund destined to finance adaptation projects operative was recently adopted at the COP 14 (Conference of the Parties) in 2008.

At the next Conference of the Parties of the UNFCCC that will take place in Copenhagen in December 2009 the “Bali Action Plan” negotiation process is planned to be closed, in which the 189 countries that are parties will participate with the aim of offering a multilateral response to climate change starting in 2012, based on four pillars: mitigation, adaptation, technology and financing.

There is an international consensus on the urgency of reaching this agreement starting from 2012. The scientific community considers an agreement to avoid dangerous climate change essential, as the amount of carbon dioxide that the world's drains can absorb without generating dangerous climate change has its limits, limits that we are already approaching. This requires answering to the need for development, mitigation and adaptation of developing countries.

On a national level, conceptually, the fight against the adverse effects of climate change is one of the priorities of Spanish Cooperation.

Thus, the 2007 Environment and Sustainable Development strategy, elaborated to develop the II Master Plan for Spanish Cooperation (2005-2008) already includes climate change as a strategic line “contributing towards mitigating climate change and reducing its impacts on man and on ecosystems, reducing vulnerability and encouraging adaptation to its effects”. After pointing out the need to work on both aspects, adaptation and mitigation, it establishes four priority areas of action:

- 1) Political dialogue and strengthening of capacities.
- 2) Adaptation to climate change.
- 3) Mitigation of climate change and,
- 4) Improved monitoring of efforts and integration in all other cooperation policies.

The III Master Plan for Spanish Cooperation includes the conceptual framework of the II Master Plan and the Environment Strategy, taking a further step by giving the fight against climate change not only a sectorial focus but also, in line with international progress, a cross-sectional focus.

Cross-sectional focus

Thus, the III Master Plan points out that *“all actions by Spanish Cooperation for development must foresee, whenever possible, the changes that can take place in the environment, highlighting the need to take into account in all actions the consequences that may follow due to climate change, in order to ensure the sustainability of development over time.”*

The III Master Plan states expressly “When prioritising actions and defining their content, the climate risk shall be contemplated, while encouraging the integration of climate change in the planning and strategies of member states at all levels (national, regional and local).”

Sectorial focus

As for the sectorial focus, let me remind you that the general aim regarding environmental sustainability, climate change and the habitat of

the III Master Plan is “to contribute towards the sustainable management of natural capital and development models that allow for improved welfare and quality of life among the population

“To strengthen the institutional capacities regarding environment management and participation processes to reduce the impact of climate change and the ecological vulnerability of the population, encouraging sustainable environmental human development”

In order to reach this goal 7 strategic lines have been established, which contemplate

- i) institutional reinforcement,
- ii) reduction of vulnerability,
- iii) prevention of risks and natural catastrophies,
- iv) mitigation programmes through the fight against deforestation and clean energy policies,
- v) support for the adaptation of vulnerable areas,
- vi) encouragement of participative processes and civil society, and,
- vii) the gender issue.

As regards budgets, Spanish cooperation during recent years has made an important effort to increase the resources dedicated to climate change, reaching 109.5 million Euros in the year 2007. This budgetary effort has been channeled in particular through a multilateral route, where Spain is among the top donors in many funds, with a very important contribution to the Fiduciary Fund of the UNDP, in order to fulfil the MDG, of almost 64 million Euros in 2007.

2. International Cooperation and Energy Policies to achieve a Sustainable Development

Likewise, the AECID, immersed in an important and intensive reform, has created the Sectorial and Multilateral Cooperation Office of which I am proud to be the current director, and within it the Environment and Climate Change Area has been created, with the exclusive aim of strengthening the quality of all the actions that we undertake from a technical point of view in these two components.

During this year 2009 we have carried out a profound diagnosis of all our actions and right now we have started a Sectorial Action Plan for the Environment by the Agency within the framework of the Master Plan, which will clearly highlight the issues of climate change.

1) Access to energy and development: Spain's commitment to renewable energies

Finally, let me highlight the importance of the goal of these conferences, as we are all aware that access to energy is essential for human development. Access to energy is vital to access water, agricultural production, health services, education, job creation and environmental sustainability. According to estimates by the International Energy Agency, 1.6 billion people in developing countries do not have access to electricity, and out of these little under 600 million people live in the Least Developed Countries (LDC²), while 500 million people lack access in Sub-Saharan Africa³. In addition, most people without access to electricity live in rural areas. In Sub-Saharan Africa, the percentage of rural population without access to energy is 90%.

This data tells us that many countries will not reach high enough energy access levels to meet the Millennium Development Goals. In order to reach goal 1, to reduce the number of people living in poverty by half, it is estimated that almost a further 1.1 billion people would need to have access to electricity by 2015 and 2 billion people would need access to modern fuels by the same year⁴.

On the other hand, the energy consumption model based on burning fossil fuels is the main cause, according to the Fourth Report

by the Intergovernmental Panel on Climate Change (IPCC), of the increase of global CO₂ concentrations which cause climate change.

- It is obvious that fighting climate change and eradicating poverty entails a commitment to a low-carbon energy and economic model.

2) Renewable energies as the foundation for sustainable development in developing countries.

This change of paradigm is possible but requires:

- The mobilisation of vast public and private resources (see next point).
- The transfer of affordable, clean, reliable and safe technologies.
- The integration of climate change in development policies and strategies, as has already been mentioned.
- The reinforcement of human and institutional capacities for their integration in national policies (governability).

Faced with the challenge and complexity of climate change and the eradication of poverty it is essential to join efforts and search for agreements, because there is a lot at stake.

2. According to the classification by the United Nations. There are 50 LDCs and 45 Sub-Saharan countries. 31 countries belong to both categories.

3. Source: International Energy Agency (IEA) "World Energy Outlook" (2006).

4. *Idem*.



Second Roundtable - International Cooperation and Energy Policies to achieve a Sustainable Development.

Representatives of international development organisations have described their programmes regarding adaptation to or mitigation of climate change impacts and the importance of working towards a sustainable development.



Some of the participants during the session.

3.

Sustainable Energy Policies of the Main Asian and African Countries

THIRD PART

Page

76

Akio Morishima

President of the Japan Climate Policy Centre

80

Muhammad Enamul Huq

State Minister for the Ministry of Power, Energy and Mineral Resources, Bangladesh

88

Mahama Kappiah

Executive Director of the ECOWAS Regional Centre for Renewable Energies and Energy Efficiency

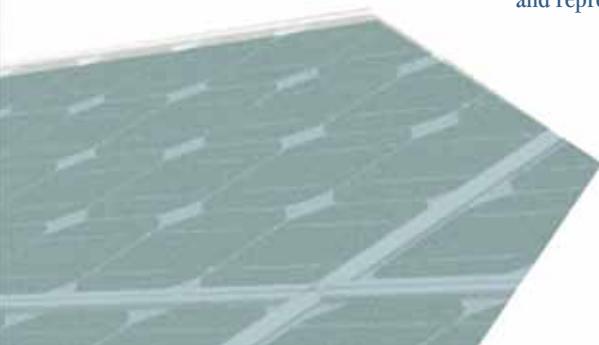
94

Steve Sawyer

Secretary General of the Global Wind Energy Council

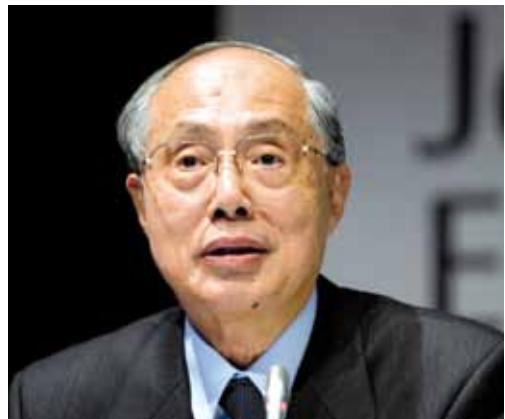
A large majority of Asian and African countries are starting to establish policies to advance towards sustainable economic development, but there is no homogeneity among their strategies. China wants to reduce the importance that the intensive use of coal has on its economic growth rates by increasing the role of renewable energies, which should represent 15% of its total energy production by 2020. In the case of India, the growth of wind power should represent over 40% of greenhouse gas emissions reductions between 2008 and 2012. In Sub-Saharan African countries we can find regional institutions such as the Centre for Renewable Energy and Energy Efficiency (ECREEE) which among other goals aims to reach the Millennium Development Goals by 2015 in Western Africa, offering half of the region's population access to the modern energy services that renewable energies provide.

This part analyses some of the best practices and transition strategies towards energy models based on clean energies in Asian and African countries. Being familiar with the energy policies of the different countries allows us to know the realities and potentials of each region, and represents an excellent opportunity to create future international cooperation scenarios concerning energy.



Akio Morishima

President of the Japan Climate Policy Centre



Professor Akio Morishima is a graduate of the University of Tokyo School of Law and of the Harvard Law School. From 1971 to 1996 he was Professor in the Faculty of Law at Nagoya University, and also spent periods as Visiting Scholar and Visiting Professor at the Yale and Harvard Law Schools and at the Universities of British Columbia and Leiden (Netherlands). Since 1994, he has been Professor Emeritus at Nagoya University and Professor at Sophia University, Japan. In 1998 Professor Morishima was appointed President and Chairman of the Board of Directors of the Institute for Global Environmental Strategies and in 2000 he became President of the Central Environmental Council of the Environment Agency of Japan. He is also President of the Japanese Association of Environmental Law and Policy, and of the Japan Association of Environmental Sciences. Professor Morishima is the author of many books and articles on environmental law.

3.

Japanese energy policy and cooperation with Asian countries

Japanese climate policy started as early as the 1980's when the international community started to be concerned about climate change. Japan was the first member of the international community to start the negotiations of the United Nations Framework Convention on Climate Change (UNFCCC). Even before the discussions on the UNFCCC started, Japan supported the Brundtland Commission and the 1992 Rio de Janeiro process, and then the Brundtland Commission's report on Our Common Future. In 1990, when the report was submitted to the UN Assembly, Japan prepared the action programme, and our cabinet drew the action programme in 1990.

Japan was the supporter and initial member of the UNFCCC, and so as far as intentional climate policy is concerned, Japan has been working very hard to build a framework to achieve the goal of sustainable development from the very beginning. Japan wanted to lead the ratification of UNFCCC and hosted Protocol adoption in 1997. At that time Japan proposed a 2% reduction target, and I was a member of the national council that made the preparations and drafted the policy measures - how to implement this 2% reduction target. As a result of the negotiations, Japan committed to a 6% reduction and since then we have tried very hard to comply with our Kyoto target. In 2005, Japan ratified Protocol and, needless to say, the first commitment period started in 2008 until 2012.

The main target of Japan's climate policy is to comply with our common and differentiated responsibility as an Annex 1 country under UNFCCC. As I mentioned, Japan took the responsibility of a 6% reduction under Protocol, which we hope to achieve through a

0.4% of domestic mitigation, a 3.8% of carbon sequestration, mainly from forestry, and a 6% reduction through Kyoto mechanisms, mainly through CDM, in cooperation with, mainly at this stage, China, Indonesia and other mostly Asian countries.

Regarding industry, we implemented the so-called voluntary commitments, whereby industry, in cooperation with the government, tries to reduce their emissions by themselves. They set the target and if they cannot meet their own target, they purchase CDM credits from abroad, mainly from China. We have spent lots of money in those.

For the energy efficiency in the household and business area, services sector, buildings, vehicles, and electric appliances, Japan counts on a regulatory scheme called the Top Runner's approach designed to stimulate the continuous improvement of the use-phase energy efficiency of products within selected segments of markets.

For the public, central and local governments provide information to the consumers on how to change their lifestyles, but this is not a very easy task. The government also provides subsidies as well.

Moreover, as Japan is the main Annex 1 country in Asia, we have a key role in the transfer of technology to Asian developing countries including China and recently India, in order to enhance their technology and improve their energy efficiency, particularly in the steel and other carbon intensive industries. Through this initiative, Japan tries to decrease CO₂ emissions worldwide. For Japan, this is a very important

3. Sustainable Policies of Energy Policies of the Main Asian and African countries

way to contribute to climate change mitigation and adaptation in the world. This transfer of energy efficient technologies takes place through the CDM, MDGs and others.

Japan is also trying to negotiate how to set up a regional cooperation organisation through bilateral or multilateral arrangements with the cooperation of China and the Asia-Pacific Economic Cooperation (APEC) countries, with the aim of adapting to climate change or mitigating global warming according to the region's characteristics.

Main features of Japan's climate policy

Very recently, last September, we had change of government. Mr Hatoyama is now in power as Prime Minister, and he announced that Japan will reduce its emissions by 25% in relation to our 1990 emission levels. This is the most stringent reduction, even more rigid than the EU proposal, so it is very ambitious. Since the Prime Minister announced it at the UN assembly we

are now trying to decide how we can challenge what Mr Hatoyama said and we are discussing how we can meet this target within 10 years. In any case, that we should be able to do it.

As for energy policies, Japan does not have any energy resources at home. Just after the war, in 1945, we had coal, but now we do not have coal anymore, as we exhausted all the coalmines. In the 1960s we started to import petroleum, and we heavily relied on it. Then the 1973 and 1978-9 crises came and we were hit by the so-called oil shortage of the Middle East, therefore we started to introduce nuclear power and imported natural gas. When you look at our domestic production, nuclear is a very large portion of it. We started with renewable energies as early as 1990, when the technology of renewable energies started. We started with solar or photovoltaic and windmills. Japan is almost the first country that got windmill and solar technology started, but now Spain has overtaken us in wind technology.

Figure Table 1. Trends in Total Primary Energy Supply and Percentage by Energy Source

"Statistical Handbook of Japan 2009" by Statistics Bureau, Japan

**Table 7.1
Trends in Total Primary Energy Supply and Percentage
by Energy Source**

Item	FY1995	FY2000	FY2005	FY2006	FY2007	(Petajoules)
Total primary energy supply	22,685	23,622	23,787	23,777	23,861	
Energy self-sufficiency (%)	19.0	18.9	17.6	18.1	16.3	
Petroleum	12,430	12,008	11,644	11,186	11,211	
Coal	3,750	4,286	4,829	4,865	5,074	
Natural gas	2,479	3,061	3,288	3,601	3,892	
Nuclear	2,700	2,873	2,677	2,661	2,317	
Hydro	761	778	672	767	650	
Others	564	616	676	697	715	
Percentage						
Petroleum	54.8	50.8	49.0	47.1	47.0	
Coal	16.5	18.1	20.3	20.5	21.3	
Natural gas	10.9	13.0	13.8	15.1	16.3	
Nuclear	11.9	12.2	11.3	11.2	9.7	
Hydro	3.4	3.3	2.8	3.2	2.7	
Others	2.5	2.6	2.8	2.9	3.0	

Source: Ministry of Economy, Trade and Industry.

So we were pioneers in the renewable energy sector - photovoltaic in Japan started in 1992. We introduced the subsidies in 1994 but after 10 years, the government considered that we did not need to subsidize this industry any more, and we stopped supporting it in 2005. Then Germany introduced the feed-in tariff in 2000 and strengthened it in 2004, so that the accumulated installed PV capacity of Germany surpassed that of Japan. Japan is now 2nd or maybe 3rd; we are no longer at the top position. Even though, Japan was the first to embrace photovoltaic technology, now Germany has overtaken us.

When it comes to wind, Japan started with wind power development in around 1990

and subsidized it, but subsidies stopped in the 90's. Natural conditions in Japan are not ideal for wind power, because we have tropical storms and heavy lightning, which break the windmills -sometimes a 60 metre per second wind can easily break windmills, as heavy lightning can do too-. On top of that, offshore windmills cannot be easily repaired and also our grid system is not developed enough. Since Hatoyama announced that we will meet the 25% reduction target, we are thinking of how we can change the grid system and how we can improve the technology so windmills can withstand tropical conditions. Although right now wind generating capacity is nearly one tenth of that of Spain, I hope that very soon Japan will overtake Spain.

Figure 2. Japan's Total Installed Capacity for Wind Energy

Japan's Total Installed Capacity for Wind Energy									
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
MW	136	302	338	580	809	1,049	1,309	1,538	1,880

Source: Global Wind Energy Council

Muhammad Enamul Huq

Honorable Bangladesh State
Minister of Power, Energy and
Mineral Resources.



State Minister for Power, Energy and Mineral Resources Brig. Gen. (Retd.) Muhammad Enamul Huq was born on January 10, 1947 in a noted muslim family in Chandpur under Shibgonj Upazila of Chapai Nababgonj District. He is the eldest son of Late Mojahar Hossain and Mrs. Ferdous Mahal. He passed Matriculation in 1962 from Humayun Reza High School at Monakosha Union of Shibgonj Upazila and HSC in 1964 from Comilla Victoria College. He obtained B. Sc Engineering (Electrical) degree in 1968 from Bangladesh University of Engineering and Technology (BUET). After academic life he joined Pakistan Military Academy on 13 January, 1969 and was commissioned in EME corps. When he was serving as a captain in the then Pakistan Army, he was inspired by the call of Independence by Bangobandhu Sheikh Mujibur Rahman in 1971 and actively participated in the war of liberation. He was appointed ADC to the Honourable President of Bangladesh on 1st December, 1971. Mr. Huq was in various important positions in his career and promoted as a Brigadier General on 29 September, 1992. He served as the Chairman of Rural Electrification Board (REB) from 1993 to 1997. He visited many countries of the world including USA, Canada, Japan, France, Philippines, China and India. After his retirement from the Military Service in 2001, he joined Bangladesh Awami league, the country's largest political party and devoted himself to people's welfare. Brig. Gen. (Retd.) Muhammad Enamul Huq is an elected member of the parliament and sworn in on July 31, 2009 as the State Minister for Power, Energy and Mineral Resources.

3.

Political and environmental strategies of major Asian countries. The role of renewable energy in Asia

Introduction

Renewable Sources of Energy play a key role in economic and social development of a country. These may also be helpful in the achievement of the Millennium Development Goals, as well as in tackling the challenges of energy security especially for developing countries and global climate changes. Renewable energy sources contribute significantly in achieving a sustainable energy future as well as energy security of a country. The development and sources of renewable energy along with transfer and scale-up of their related technologies need to be fostered through international cooperation and partnerships.

Most developing countries import oil to meet energy needs. Due to increased oil prices, the foreign currency expenditure on energy imports sometimes been met at the expense of other essential imports. At this stage, renewable energy help to diversify the sources of supply for meeting energy demand and provide clean and sustainable energy generating none or little greenhouse gases. In addition, renewable energy is also an appropriate option for decentralized energy systems.

Renewable Energy

Sources

The renewable energy sources include biomass (combustible, renewable and waste), small hydropower, solar, wind, ocean, and geothermal energy. Biomass is currently the largest renewable energy source due to its extensive noncommercial

use (mainly for cooking and heating) in developing countries. Biomass contributes major share of the total renewable sources followed by hydropower. The share of other forms of renewable sources is minimal.

Development

Developments of renewable energy sources in rural areas contribute in improving agricultural productivity, health, education, communications, small-business enterprise and above all, quality of life. Operational costs of renewable energy are low and unlike those of fossil fuels, are not subject to fluctuating prices. Moreover, grid extension is not required, which saves transmission costs. Thus, there is a need to frame suitable policies that encourage development of renewable energy, for which long-term support is needed.

Biofuels are attracting increasing interest worldwide for their potential in addressing energy security and climate change by substituting gasoline and diesel in the transport sector. Developing countries are also being attracted towards biofuels as a way to stimulate rural development, creation of jobs and save foreign exchange. However, there are issues related to development of biofuels. Due to rising demand for biofuels, farmers have an increased economic incentive to grow crops for biofuel production instead of crops for food production. This could lead to food security issue-reduced food production and increased food prices.

Renewable energy development has been hindered by its relatively high initial cost. However, with larger markets and economies of

3. Sustainable Policies of Energy Policies of the Main Asian and African countries

scale, renewable energy equipment prices have fallen recently and are almost cost competitive with fossil fuel technologies, especially when life cycle and environmental advantages and income from carbon credits are considered. In fact, many renewable energy technologies, in the near future are likely to be economical compared to some fossil fuels.

Even if sources of renewable energy - such as wind, water, and sunlight - are generally available, there are sometimes constraints: hydropower depends on water availability and wind and solar power depend on climatic conditions. As such, renewable energy lacks the reliability needed for grid operations unless energy storage devices, such as fuel cells, are commercially available. Renewable sources from sun, wind, tide, and waves are currently not suitable to directly provide either base-load or peak-load power when needed. Solar power is suitable for heating purposes but its potential for electricity generation is limited due to interruptions associated with unfavorable weather and night time, resulting in a low capacity factor. Solar photovoltaic cells are more suitable provided battery storage facilities are built in. Wind turbine operation is restricted within a limited range of wind velocity and requires alternate backup provisions to ensure power supply at times of unfavorable weather.

Research is under way to develop systems that can be adopted within the grid system without any additional redundancy so that the contribution of solar and wind power can be significantly increased. The involvement of the private sector is critical in the development of renewable energy because of the need for innovation and more efficient use of resources. In some developing countries, the private sector is already engaged in promoting renewable energy. Promotion of an enabling policy framework is needed to encourage private sector participation in renewable energy development.

Bangladesh Scenario

Renewable energy in the form of traditional biomass is the main source of primary energy in Bangladesh, comprising some 35% of total primary energy use. However, the size and economic potential of the modern sustainable

renewable energy resources e.g. solar photovoltaic, wind power, biogas, amongst others, are presently rather low. Renewable energy developments also face investment hurdles, as the purchase or installation costs are generally much higher than fossil fuel energy sources, although running costs can be much lower. The major sources of renewable energy considered in Bangladesh are:

Hydro-power

Karnafuli Hydro Power Station is the only hydropower plant in the country, located close to the Kaptai lake, with a capacity of 230 MW. Geography and socio-economic condition of the country may not allow bigger expansion of hydro-electricity in Bangladesh. The possibility of installing mini and micro level hydroelectric power plants in the hilly areas of Bangladesh could be explored.

Biogas

Biogas may be the most promising renewable energy resource. Presently there are about 50,000 of households and village-level biogas plants in place throughout the country. This is a real potential to harness basic biogas technology in rural electrification, through village-level biogas production and internal combustion (or even micro turbine) power generation.

Solar energy

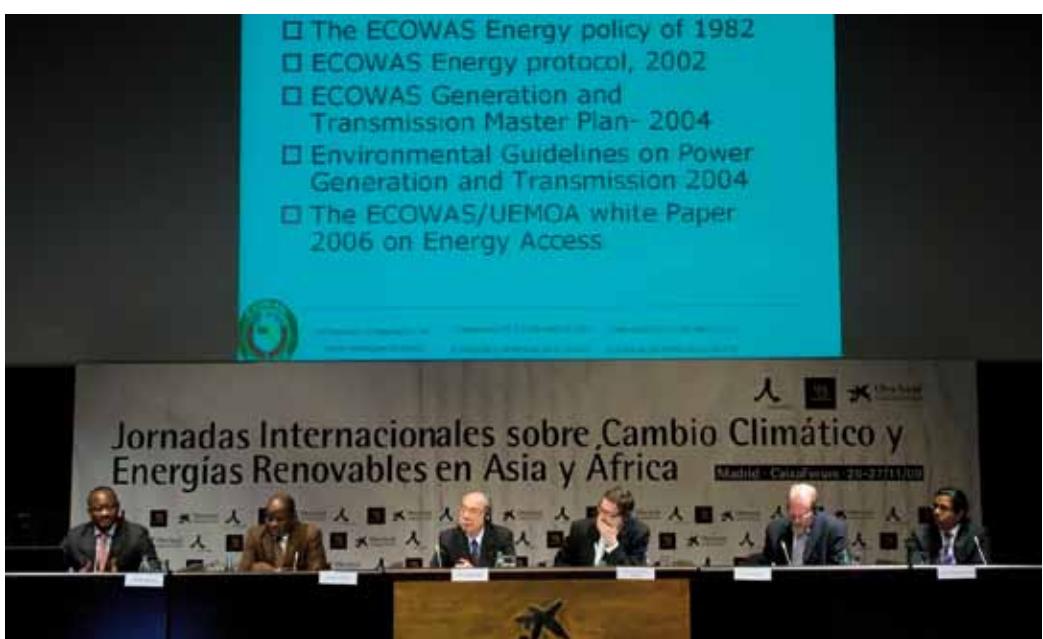
Solar energy has a great potential in Bangladesh, but due to its high cost of production, it still has a long way to go and become commercially competitive. Indeed, it is gradually becoming popular in remote areas of Bangladesh and the government has undertaken an ambitious subsidy scheme to promote it. At the present, there are about 2, 64,000?? solar panels installed throughout the country.

Wind energy

Based on today's technological development, Bangladesh is exploring the potentiality of wind power. Windmills are with capacity of 2 MW in operation in the coastal area of Bangladesh. The



Third Roundtable - Sustainable Policies of Energy Policies of the Main Asian and African countries.



Most countries are establishing policies to promote a sustainable development of their economies. However, the implementation of these political strategies is not homogeneous. This section revises some of their best practices and strategies in the transition towards improved energy models based on clean energies.

3. Sustainable Policies of Energy Policies of the Main Asian and African countries

country has to wait for a break through wind power technology to be competitive against other conventional and commercial sources of energy. In this sense, the best effort may be made to make use of every potentiality wind energy has in the country.

Biodiesel

Biodiesel may also be one of the most promising sources of energy. Though Bangladesh is a densely populated country with 150 million people just in 150,000 Sq. Km areas except the hilly areas, most of the areas are covered with fertile and high yielding crop producing land. Government is considering taking the necessary steps for Jatropha plantation in both sides of railway tracks and high ways, marshy land and costal belt of the country.

Gasohol

Gasohol is a fuel mixture of ethanol and gasoline that can be used in the internal combustion engines of most modern automobiles and light-duty vehicles without need for any modification on the engine or fuel system and nowadays. The private sector is undertaking projects to produce gasohol from molasses used in proportion with gasoline.

Geothermal power

Some potentiality of geothermal may exist in the north-west corner of the country, where geothermal gradient has been recorded at 14.940 C/100 meter in our place which is higher than country's average of 2.50 C/meter and is also much higher than economically potential geothermal gradient of 10.70 C/100 meter. This possibility could be explored in the country.

Environmental strategy

Asia is very diverse in environmental terms; it is home to the world's highest mountains and the most populated lowlands, to deserts, rain forests and paddy fields. Some parts of Asia are at serious threat due to rising sea levels (Bangladesh, Maldives). Demographic pressures, rapid economic growth, inadequate environmental

investments and legislation, and poorly enforced environmental protection measures, have all contributed to the increasing stress on the environment and led to unsustainable use of natural resources. The high geological and climate instability that characterize the continent brings a high risk of disasters such as earthquakes, tsunamis, hurricanes, cyclones, floods, droughts and associated forest fires. Climate change is likely to compound such problems. Meanwhile, human-induced disasters linked to industrialization have also affected the local environment.

Energy conservation, emissions standards, monitoring requirements and other aspects of environmental policy can be integrated into national policies to strengthen the renewable energy sector development.

Political strategy

Investments in energy development, environmental regulations, energy-saving mandates, as well as energy security and policies have become increasingly significant among Asian countries. Political establishments play a critical role in prioritizing the energy industry in the development agenda of any country. Governments of most Asian countries have proactively promoted the development and the use of renewable energy sources such as geothermal, bio-fuels and hydro-electricity through various incentives in the form of tax breaks, exemption from taxes, and investment incentives. These tax incentives include income tax holidays, tax and duty free importing of capital equipment, and tax credits on local equipment.

Governments of most Asian countries are also introducing policies on renewable energy, energy conservation, alternate fuel products and environmental protection to address issues on energy security and pollution abatement. In this context, countries may include energy policies and strategies in their political agenda, aiming at achieving energy security and mitigating greenhouse gas emissions.

In the energy policies and plannings, some countries have highlighted the importance of energy security, larger share of renewable energy, promotion of ethanol facilities, and greater power generation through alternate

sources. The plan, which focuses on wide-scale development of renewable energy and other energy-efficient technologies, is likely to help step up energy production in the industry. This will greatly help many sectors, especially transport, to reduce oil dependency on external sources. The development of renewable energy and the alternate fuels is expected to create attractive opportunities and lure domestic participants. The Government is encouraging investments in natural gas-fired power plants and strengthening of transmission lines to improve electrification rates across the country.

The present financial crisis poses significant new challenges and opportunities for renewable energy and energy efficiency technologies, especially their transfer to developing countries. As private investment in these types of technologies will fall both during and in the immediate aftermath of this crisis, a possible policy response will significantly increase public investment at both national and international level, in large-scale renewable and energy efficiency development. To move forward, both public and private sector investments will be required in infrastructure, technology development and production of renewable energy, and greater energy efficiency. Governments could provide incentives for consumers and utilities to improve their energy efficiency, such as by providing revenue incentives and certification programs, as well as by enforcing standards and encouraging public and private partnerships.

Energy is a key component of any sustainable development strategy. The basic needs of many people are not being met without proper and modern energy services. Fight against energy poverty is the major concern of the world community within its activity towards elimination of people's poverty. According to the United Nations, nowadays almost 2.5 billion people have no access to modern energy services, more than 1.6 billion do not use electricity. Environmental pollution as a consequence of energy poverty (utilization of poor quality fuel) annually causes death of about 2 million children under age of five years.

In this connection, UN Member States should contribute in reduction of energy gap between developed and developing countries. The provision of affordable, sustainable energy services will substantially facilitate the achievement of many of the UN agreed Millennium Development Goals to eradicate poverty and improve the general well being of communities.

Energy Cooperation

Cooperation in energy enables integration of markets for higher economic development, and is an effective way to address energy security as well as promote energy efficiency. Each country has individual energy needs and resources; integrated regional planning allows for identification of the most cost-effective and environmentally sustainable regional projects. Many developing countries have abundant natural resources, which can be effectively traded in large energy markets in neighbouring countries, thus benefiting all parties. It is in each country's interest to promote clean air and environmental protection; by collaborating at a regional level, countries may maximize these regional public goods. Barriers to regional cooperation in the energy sector include technical compatibility (e.g. compatible specifications of transmission lines) and policy framework compatibility. An enabling policy framework for regional trade of power and gas is needed, along with the regional infrastructure to encourage regional cooperation and trade in the energy sector.

However, member countries may develop cooperation among themselves for the energy sector in the following areas:

- Benefit from each other's experiences in institutional and pricing reforms in the energy sector;
- Transnational energy lines (electricity, gas and oil) for an integrated and prosperous economic future of member countries;
- Special focus on energy availability in rural areas, including conventional and non-

3. Sustainable Policies of Energy Policies of the Main Asian and African countries

conventional forms of energy for economic development and poverty reduction;

- Promotion of non-conventional and renewable sources of energy through sharing of manpower, expertise, know-how and training programmes;
- Implementation of measures to increase energy efficiency and saving;
- Stimulation of alternative energy sources development;
- Creation of new energy capacities and transportation;
- Exchange and introduction of high-tech in production, processing and exploitation of hydrocarbon;



Mahama Kappiah

*Executive Director of the Regional
Centre for Renewable Energy
and Energy Efficiency of ECOWAS
(Economic Community of
West African States)*



Before occupying his current position, Mr Kappiah was an official at ECOWAS for a number of years, first as a senior technician of the ECOWAS Commission's Energy Department and later its Director. He has represented ECOWAS at a number of international seminars and conferences as an expert in energy, renewable energies and climate change, and in interregional cooperation. He is currently directing the development of the new ECOWAS Regional Centre for Renewable Energy and Energy Efficiency, whose main office is in Praia, Cape Verde. This centre receives substantial financial and technical support from the Spanish Government. Kappiah received a Masters Degree in Mechanical and Electrical Engineering at the Kharkov Polytechnic Institute in Ukraine. He has worked on the regional project of the Gas Pipeline of West Africa, the West African Power Pool, and the creation of the ECOWAS Electricity Regulation Regional Authority and the ECREEE.

ECOWAS Regional Centre for Renewable Energy and Energy Efficiency (ECREEE) at a glance

On 12th November 2007, ECOWAS organized a conference on Peace and Security in Ouagadougou, Burkina Faso. The Ouagadougou Declaration highlighted the need for regional cooperation in various sectors. In the energy sector, the declaration articulated the need to establish a Regional ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE). The foundation for the Centre was laid with Regulation C/REG.23/11/08 of the 61st Session of ECOWAS Council of Ministers in Ouagadougou, Burkina Faso, on November 23rd, 2008. It was decided to establish ECREEE as a specialized ECOWAS agency which acts as an independent body but within the legal, administrative and financial framework of ECOWAS rules and regulations. In November 2009 the ECOWAS Commission established ECREEE with support of the Austrian Development Cooperation (ADC), the United Nations Industrial Development Organization (UNIDO) and the Government of Cape Verde. The Agency for International Development Cooperation (AECID) joined the initiative and supports the project activities of ECREEE.

Governance Structure

The ECREEE secretariat is based in Praia, Cape Verde. The Government of Cape Verde provides office space and infrastructure. This also includes training facilities for capacity building programs facilitated by the Centre.

The secretariat operates with a small team of full-time staff and will carry out most of its activities in cooperation with national institutions and the private sector. In forthcoming months the Centre will undertake a call for cooperation partners

in West Africa and internationally. The working languages of the Centre are English, French and Portuguese.

Intervention Logic: regional response to interrelate energy challenges

The proposal to establish ECREEE is a necessary regional response to the specific needs of ECOWAS Member States as expressed in national and regional policies. It is also responding to international energy and climate policy decisions. It is acknowledged that without major investments in sustainable energy frameworks and infrastructure in West Africa, the regional energy access, energy security and climate objectives cannot be achieved simultaneously in the forthcoming decades.

Alongside of other low-carbon solutions, renewable energy (RE) systems can increase access to modern, affordable and reliable energy services, improve energy security and support the region's economic and social development in an environmentally-benign manner. RE systems are especially effective if they are combined with energy efficiency (EE) measures which are usually available at low cost.

Renewable Energy & Energy Efficiency potentials and barriers

West Africa can rely on a wide range of untapped RE & EE potentials in various sectors. The RE potentials are significant but unevenly distributed in the region. So far, West African

3. Sustainable Policies of Energy Policies of the Main Asian and African countries

countries do not take full advantage of their RE & EE potentials due to various technical, financial, economic, institutional, legal and capacity related barriers. Moreover, the inter-state energy trade in the region is minimal so far.

Selected RE potentials in the region:

- A total of 23,000 MW of hydroelectric potential is concentrated in five of the 15 Member States, of which only 16% has been exploited.
- There is good potential for all forms of bio-energy. Traditional biomass is already the main source of energy for the poor majority and accounts for 80% of total energy consumed for domestic purposes.
- There are considerable wind and ocean energy resources along coastal regions and on specific sites inland.
- The region has vast solar energy potential with very high radiation averages of 5 to 6 kW·h/m² throughout the year.

Value added through ECREEE

ECREEE assists to overcome the mentioned barriers for RE & EE development and tries to create an enabling environment for the establishment of regional RE & EE markets in West Africa. In this regard ECREEE cooperates with other national and regional institutions and the private sector in the ECOWAS region (e.g. centres of excellence, West African Power Pool, WAPP, the Regulatory Authority).

ECREEE can play an important role in scaling up innovative approaches on regional levels.

Vision, mission and objectives of ECREEE

The ECREEE vision and mission is guided by the energy policy decisions of ECOWAS. The adopted ECOWAS/UEMOA White Paper on access to energy services in rural and peri-urban areas provided a clear vision for the role of energy services regarding the achievement of the MDGs particularly and for socio-economic development in general. The White Paper expresses ambitious numerical targets for access

to modern cooking fuel, to motive power for productive activities and to electricity. The important role of RE & EE in future investments was highlighted in the policy.

Vision and mission

Based on the Project Document for the Centre, the Study on the Regional Agency for Energy Access (RAEA) and the White Paper's proposal to establish the RAEA, the ECREEE vision and mission statements were formulated as follows:

Vision Statement: to improve energy security, increase access to modern, affordable and reliable energy services and support the region's economic and social development in an environmentally benign manner through the promotion and use of renewable energy and energy efficient technologies in ECOWAS member states.

Mission Statement: in line with the vision statement above and the Plan of Action on access to modern energy services set forth in the White Paper on RAEA, the Mission Statement has been formulated for the ECREEE as follows:

- To lead and coordinate the implementation of the ECOWAS/UEMOA regional plan of action and White Paper on Energy Access for increasing access to energy services by promoting the use of renewable energy resources;
- To improve energy security by promoting energy efficient technologies in ECOWAS member states;
- To contribute to achievement of the MDGs in West Africa by making available to at least half of the people in the region, access to modern energy services using renewable energy and energy efficient technologies.
- To enable the ECOWAS region to take advantage of the Clean Development Mechanism.

Objectives

ECREEE is aiming at the following overall and specific goals:

- Overall goal: contribute to achievement of the MDGs in West Africa by providing at least half of the people with access to modern energy services using renewable energy and energy efficient technologies and services.
- Specific goal: lead and coordinate activities in the plan of action of the ECOWAS/UEMOA Regional White Paper on Energy Access that focus on RE & EE technologies and services.

Activities of ECREEE

The Centre supports activities and tries to mobilize funds for the creation of regional renewable energy and energy efficiency markets. Five thematic programs of ECREEE are proposed to address the challenges and barriers to market penetration of renewable energy and energy efficiency technologies and services in the region. The five thematic programs are:

- Policy Frameworks and Quality Assurance.
- Capacity building.
- Advocacy, Awareness Raising, Knowledge Management and Networking.
- Renewable Energy Projects.
- Energy Efficiency Projects.

Policy Frameworks & Quality Assurance

The Centre will be involved in providing support for national bodies that are responsible for prioritizing, planning and establishing appropriate policy and regulatory frameworks to ensure affordable access to energy, energy efficiency and renewable energy technologies and services.

The ECREEE also intends to stimulate the private sector in developing and implementing energy efficiency and renewable energy technologies and services projects in the region. Another issue

to the overall framework is the setting up of firm and realistic portfolio standards for renewable energy resources both for the member states and the region. There is the need to put in place policies that require certain percentages of annual electricity and thermal energy use in member states and the region to come from renewable energy.

Capacity Building

The introduction of innovative renewable energy and energy efficient technologies require the development of technical skills. There remains a continuing shortage of qualified personnel in the renewable energy and energy efficiency sectors in the region, in both the public and private sectors. Technical knowledge is needed to build a critical mass of policy analysts, economic managers and engineers who will be able to manage all aspects of renewable and energy efficiency technologies and services development in the region. Trained manpower capable of designing, developing, manufacturing, installing and maintaining renewable energy and energy efficiency technologies is a prerequisite for their successful implementation. Human, institutional and corporate capacity building in RE&EE is therefore required for the realization and sustenance of the goals and objectives of the Centre. This is also required to sustain the scientific, engineering and technical skills relevant for the design, development, fabrication, installation and maintenance of renewable energy and energy efficiency technologies.

Advocacy, Awareness Raising, Knowledge Management and Networking

Awareness of the opportunities offered by renewable energies and technologies, and for energy efficiency technologies and services, is low among both public and private sector stakeholders. The general perception is that renewable energy is not yet a mature technology (applicable to a wide market), and is only suited for a niche market and only viable if heavily subsidized. Similar perceptions are held for energy efficiency technologies and measures. There is a need for dissemination of information on RE&EE resources and technologies availability, benefits and opportunities to the general public

3. Sustainable Policies of Energy Policies of the Main Asian and African countries

- users as well as investors. To emphasize the importance of the communications functions of the Centre, advocacy and public awareness strategies will be used.

Renewable Energy Projects

In addressing the challenges to widespread dissemination and utilization of Renewable Energy Technology (RET) in the region, the Centre will develop programs that will seek to create the necessary policy and regulatory environment at national and regional levels to support the widespread development of RETs. Financing plays a major role in the promotion of renewable options.

Studies have shown that the main obstacle to implementing renewable energy projects is often not their technical feasibility, but the absence of low-cost, long-term financing.

This problem is complicated by competition among projects for limited funds and is compounded by unfavourable macro-economic conditions.

The Centre, in collaboration with private enterprises, will identify ways of financing renewable projects. Models for financing renewable energy projects should be models that can provide these technologies to consumers (including the very poor) at affordable prices while ensuring that the nascent renewable industry continues to grow and remain sustainable. The Centre therefore will need to develop and pursue novel and innovative financing tools to help to disseminate renewable energy projects throughout the region. In particular the ECREEE will seek to develop carbon market credits and raise funding from bilateral and multilateral donors. The Centre will also facilitate the design, development and deployment of projects (demonstration projects and commercial projects), in member states.

Energy Efficiency Projects

In order to address the challenges confronting efficient energy utilization in the region and fully harness the opportunities that abound for energy

efficiency, the Centre will develop programs to stimulate and promote the use of energy-efficient appliances and practices: energy-saving technology in industries, households, commercial and public buildings and energy efficient transport systems and paths, in order to reduce energy consumption, reduce the emission of green house gases and reduce energy costs for consumers. Products under this program shall include the application of compact fluorescent lamps, and the development of standards for refrigerators, air conditioners etc.

Other activities that will be implemented include:

- Develop Pilot projects in selected locations in member states to demonstrate the savings from use of energy efficient equipment;
- Create a platform for knowledge exchange and sharing of experiences among member states and develop a capacity building and training program for representatives of member states in the field of energy efficiency and demand side management;
- Develop regional Appliance Efficiency Standards and equipment labelling;
- Raise partners' awareness on the regional energy efficiency program and mobilize resources for financing program activities.

Target Beneficiaries

The main target beneficiaries of the activities, programs and projects of the Centre shall consist primarily of renewable energy and energy efficiency market players and enablers in the ECOWAS region. More specifically, the following stakeholders will benefit from the ECREEE activities:

- Policy makers in energy and related sectors: will have better capacity to develop, implement and operationalise policies and strategies that are conducive to the dissemination of renewable energy and energy efficiency technologies in the ECOWAS.
- Energy supplying companies will benefit from a closing of the technology gap in the

renewable sector and will thereby attract more foreign direct investment (FDIs).

- Policy makers will benefit from a reduction of future costs created by the impact of global warming and other ecological catastrophes caused by the excessive use of outdated energy technologies.
- The private sector such as small and medium enterprises (SMEs), entrepreneurs, equipment manufacturers, project developers financing institutions: as a result of the project will be trained on various aspects including renewable energy project identification, development, implementation, funding mobilization, equipment manufacturing etc.
- National institutions charged with promoting renewable energy and energy efficiency will benefit from the project through targeted training programs that include regional equipment standards and performance labelling schemes, policy implementation etc.
- Policy makers, private sector and national institutions will benefit from the project through awareness-raising programs on renewable energy and energy efficiency.
- Research institutions, universities, private sector and civil society organizations: will benefit from research programs of the energy research centre (ERC) as result of the project.
- National standards organizations and import control outfits.
- Ultimately, the greater population in the ECOWAS region will benefit from increased access to modern, reliable and affordable energy services.

ECREE and GEF activities

During its fourth replenishment period, the Global Environment Facility (GEF) adopted the GEF Strategic Program for West Africa (GEF SPWA) that has an energy component funded by a GEF grant amounting to US\$ 45 million. Under the GEF SPWA, each ECOWAS member state accessed GEF grants to implement renewable

energy and energy efficiency projects. In line with the mandate of the ECREEE, i.e. leading and coordinating activities to promote renewable energy and energy efficiency programmes and projects in the ECOWAS region, the Centre will naturally become a focal institution for the GEF program. In particular, the Centre will play a central role in promoting coherence, integration and knowledge management components of the SPWA. In connection with this, discussions are currently underway among GEF, UNIDO and the Centre with a view to agreeing on a collaborative framework on the current and future GEF projects in West Africa.

Supporting partners

In November 2009 the Commission of the Economic Community for West African States (ECOWAS) established ECREEE with support of the Austrian Development Cooperation (ADC), the United Nations Industrial Development Organization (UNIDO) and the Government of Cape Verde. The Agency for International Development Cooperation (AECID) joined the initiative and supports the project activities of ECREEE.

Steve Sawyer

Secretary-General of the Global Wind Energy Council



Steve Sawyer spent 30 years working for Greenpeace, primarily on a wide range of energy issues. He was the CEO of both Greenpeace USA (1986 to 1988) and Greenpeace International (until 1993), and served as Head of Delegation to many sessions of Protocol/ UN Framework Convention on Climate Change negotiations, as well as heading delegations to the Johannesburg Earth Summit in 2002 and numerous sessions of the Commission on Sustainable Development. Mr Sawyer is also a founding member of the REN21 Renewable Energy Policy Network and was a Member of the Steering Committee of the Renewables 2004 ministerial conference in Bonn. Since 2004, Mr Sawyer has been an expert advisor to the Chinese government on the formulation of the country's Renewable Energy Law. He has been involved in a number of joint publications with GWEC (Wind Energy Outlook 2006), EWEA (Wind Force 12), EPIA (Solar Generation 2006) and EREC (Global Energy Scenario 2006). Mr Sawyer has been the Secretary-General of the Global Wind Energy Council since 2007.

Renewable Energy in Asia

Global context / Focus on China wind

Global Wind Energy Council represents the largest companies in the wind industry as well as the major national and regional associations. Regarding renewable energies in Asia, several key aspects should be presented: the scale of global investments in renewable energy; an overview of the wind market; the climate regime and what needs to be done; a brief touch on carbon markets; and then portray in very visual terms, the emission reductions that are actually occurring from wind power as well as the potential reductions that may be implemented in the future.

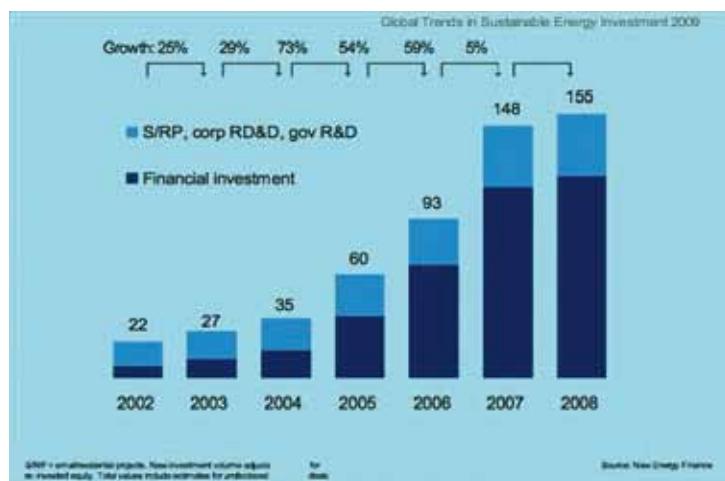
First of all, the scale of investment in renewable energy has grown enormously over the last 4-5 years. It plateaued a bit in 2008 and it will again in 2009 due to the financial crises and the lack of availability of capital, but it now represents a 20-25% of total investment in energy infrastructure.

It is now clear that the renewable energy sector is no longer a marginal part of the energy industry

The distribution of that, like many things on Earth, is not even across the world. Europe has been the leader for a long time, North America has played a large role on and off, but certainly the most rapid growth has been in Asia, and we expect that to continue. Looking at the total renewable energy generation capacity that is available in the world, you would be maybe surprised to see that although the EU-27 is the leader, the leading country as a single nation by far is China, and India is also in the top five.

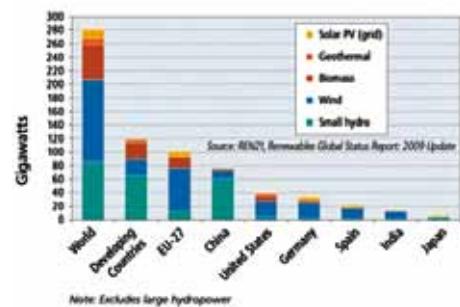
Further to Graph 1 about the scale of renewable

Graph 1. Global New Investment In Sustainable Energy: 2002-2008 (\$ Billions)



3. Sustainable Policies of Energy Policies of the Main Asian and African countries

Graph 2. Renewable Power Capacities, Developing World, EU And Top Six Countries, 2008



Source: REN21. 2009. Renewables Global Status Report: 2009 Update (Paris: REN21 Secretariat).

energy investment, it is worth pointing out how much electrical power is being generated by new renewables (excluding large hydro) and also where they fit as a percentage of total global power capacity (see Graph .3). The top range of numbers in Figure Graph.3 represents the level of investments over the last five years, and it is shown that the investment as a percentage of total investment in new energy capacity is growing rapidly.

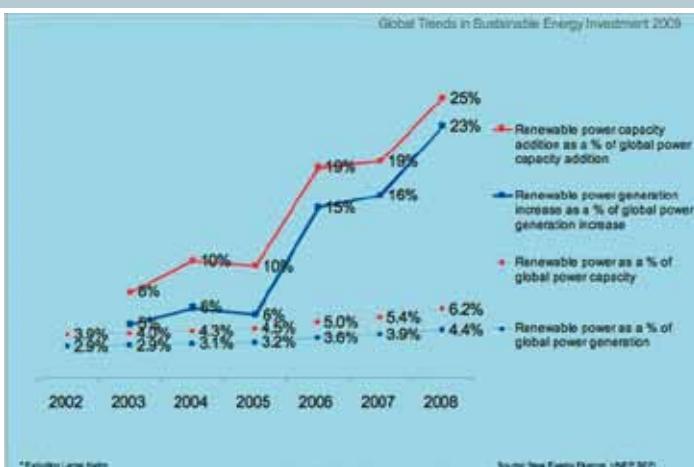
Within the new renewable energy market, wind power was the number one energy technology installed in the USA, supplying 42% of all new capacity. Wind power installations had a slightly smaller percentage in Europe, but combining them with solar PV installations, it appears that in 2008, the majority of new installed power generation capacity was renewable for the first time ever in Europe.

Regarding the wind market (Graph. 4), the development of the installed capacity over the last 12 years shows an average annual growth rate of 28%, and in 2008 it was about the same, a 28.7%. It will slightly decrease in 2009, but nowhere near as much as some of the pundits projected earlier this year.

Annual markets do allow a smooth projection given the on and off nature of the support structure in the US. The annual market size plateaued a couple of times early in this decade due to changes on an almost annual basis in US policy (see Graph. 5).

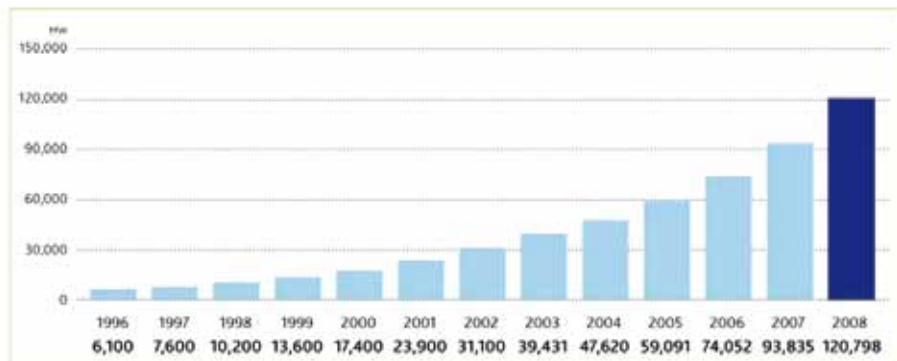
On global market leaders, the US has just recently overtaken Germany as the number one country in installed wind power this past year and in 2008, for the third year in a row, it was the number one market. But we are going to have a new leader in 2009, China, which will be the largest wind market

Graph 3. Global Renewable power * Generation and Capacity: 2002 – 2008 (% share)



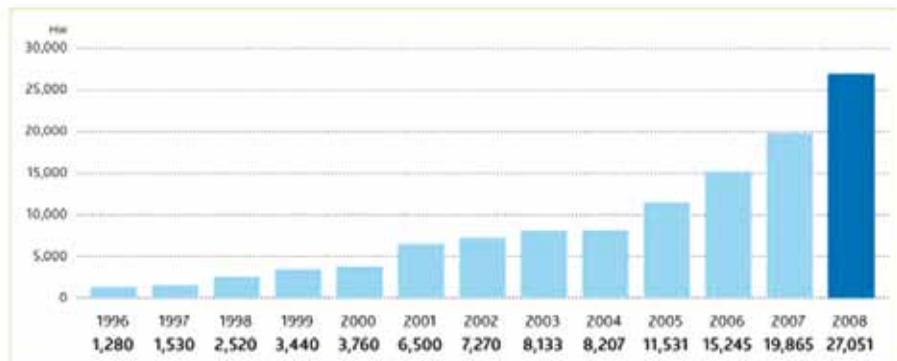
Graph 4. Wind Power: Cumulative Installed Capacity

GLOBAL CUMULATIVE INSTALLED CAPACITY 1996-2008



Graph 5. Annual installed capacity

GLOBAL ANNUAL INSTALLED CAPACITY 1996-2008



in the world by far. Graph. 6 shows, on the one hand, a very positive development over the last 4-5 years. By 2003-2004, the market was almost completely dominated by Europe. In 2009, there are three major markets: Europe, North America and Asia. Looking at the right hand side of Graph. 6, however, is not so encouraging although there are possibilities that the international climate regime can help build up those numbers in Latin America, Africa, the Middle East and in the Pacific.

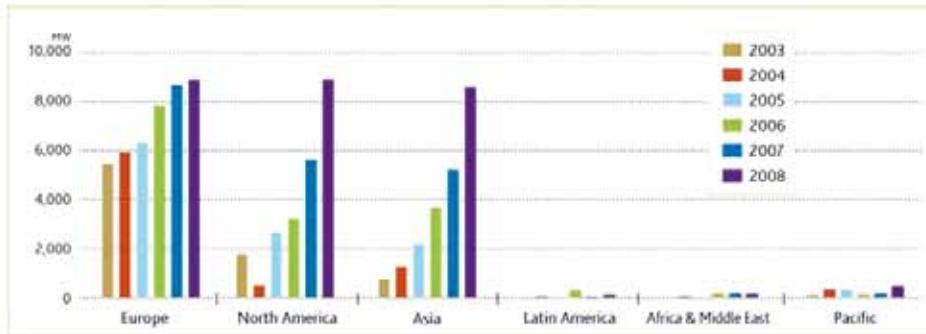
China has come in a very short time to dominate the market globally. It is now the largest manufacturing country as well as the largest annual market and we expect it to become the number one in overall accumulative installed capacity by the end of 2011, or the beginning of 2012.

The European market has stabilized quite substantially but we expect a new boom over

3. Sustainable Policies of Energy Policies of the Main Asian and African countries

Graph 6. Annual installed capacity: regional breakdown

ANNUAL INSTALLED CAPACITY BY REGION 2003-2008



the next 5 to 10 years as the EU countries, particularly in northern Europe, seek to meet their emissions reduction targets as well as their target of 20% of final energy from renewable sources. This target will be reached mostly through the development of offshore wind, and that is really just getting underway in earnest now.

Going forward, the projection for the markets over the course of the next 5 years it is shown in Graph 7. When we made our projections of a 12% growth in early 2009, wind industry was one of the only manufacturing industries that was projected to grow in 2009. In actual facts, those numbers now appear to be a bit conservative; we have in fact exceeded those numbers for 2009.

The market projection broken down by regions can be seen in Graph. 8. You can see that Asia is far and away the fastest growing region. It will have the highest annual market consistently over the next period, and at the end of this period, we would expect that Europe and Asia are about tied in terms of cumulative installed capacity, with the US being the other major region, but still lagging somewhat behind.

Switching on to the climate issue, what do we need to do?

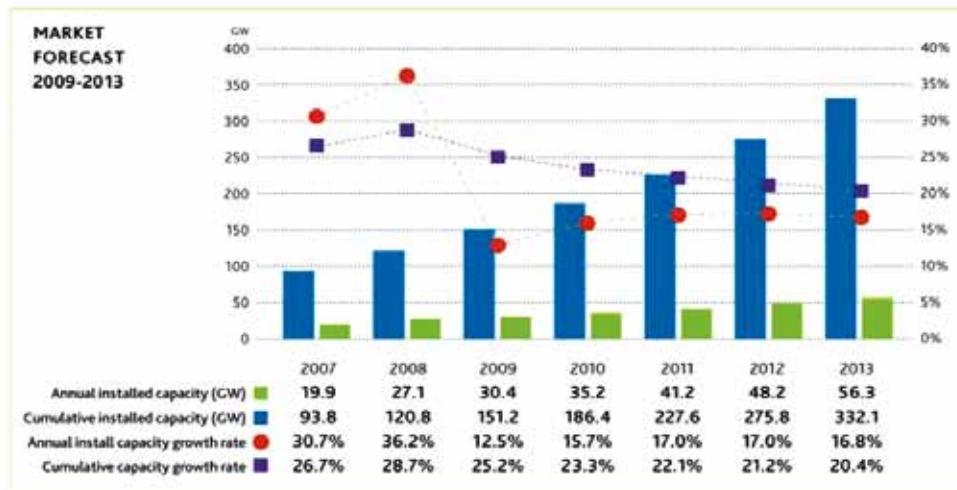
There are four main pieces of the Bali Action Plan, which governments are trying to fulfill.

The first one is to reduce emissions in industrialized countries by somewhere in the range of 25 to 40%, plus a significant deviation from baseline from particularly the large developing countries like China and India, which would be the substance.

Second, and equally important, is the fact that climate change impacts most heavily and earliest on those who are least able to adapt to that climate change, so the climate regime needs to maintain and strengthen and dramatically increase support for, particularly, countries in Sub-Saharan Africa, South Asia, parts of South East Asia and South America, that are already feeling the impacts of climate change quite dramatically.

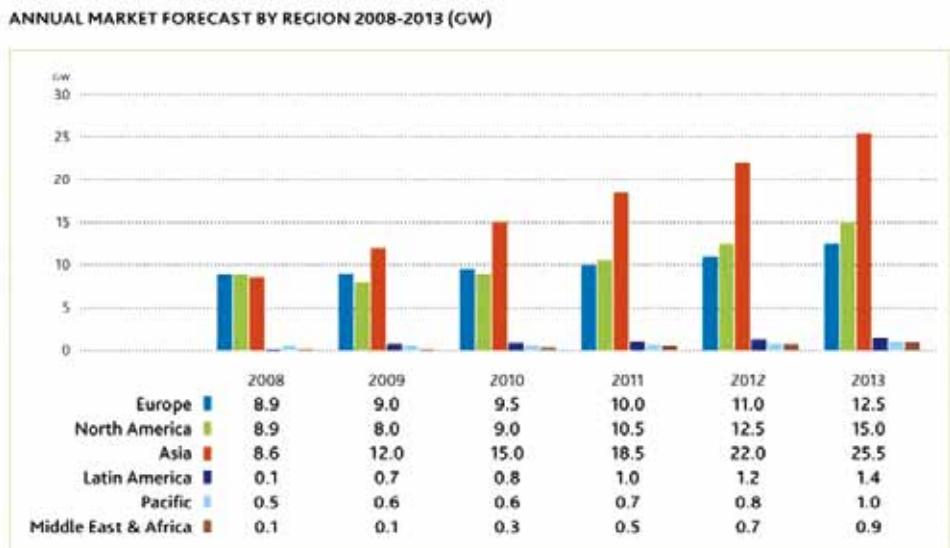
Third is technology, which is a complicated and uncertain discussion. Promises made by the rich countries in 1992 when the UN Framework Convention on Climate Change was first agreed will need to be fulfilled somehow, in order to facilitate the transfer and diffusion of technology to help mitigate and adapt to climate change. One of the interesting things now is that in both solar PV and in wind power, China, which is still classified as a developing country, is the technology leader, at least in terms of volume. So that is a bit complicated.

Graph 7. Projections to 2013



Source: Global Wind Energy Council.

Graph 8. Projections 2013 by region



Source: Global Wind Energy Council.

3. Sustainable Policies of Energy Policies of the Main Asian and African countries

Fourth is, of course, money, which nobody likes to talk much about these days, especially money coming from public budgets. But nevertheless, it will have to be a fundamental part of the agreement.

Critically for the carbon markets, what needs to be done is to establish new arrangements for the period post-2012, in time for countries to implement them before the current arrangements under the Protocol run to their end in the end of 2012.

The power sector is still the largest source of emissions globally, about 40% of CO₂ and 25% of the overall greenhouse gas emissions. To make a big difference in this area in this critical period up to 2020, when global emissions must peak and begin to decline if we are to have any reasonable chance of avoiding global mean temperatures going higher than 2°C over pre-industrial levels, there are really only three things that we can do: firstly and foremost, and as we have been saying for 35 years, efficiency; second, fuel switching from coal to gas; and third, renewable energy, which in this time frame means mostly wind power and hydro. In fact, wind power is the most cost effective and fastest to deploy option in that time period.

The carbon markets have developed and played a substantial role since the Protocol entered into force in 2005, and now the carbon market totals somewhere around 125 billion dollars/year. This number will increase substantially in 2009. Carbon markets do not do everything that needs to be done by a very long way, but they are a good means for facilitating private sector investments in cleaner energy technologies.

The establishment of wind power installations through the Clean Development Mechanism (CDM) has been very successful. There are 32000 MW of wind power projects in the CDM pipeline, either with projects that are already approved and generating credits, or other ones that we hope will do so in the not so distant future. However, they are distributed rather unequally; two thirds of them are in China, and most of the rest are in India, and we need to

improve the distribution on that.

The future for wind power is looking very promising. Overall, during the emissions period between 2008 and 2020 wind power will contribute about 28% of the EU's emissions reduction effort.

The EU-27 Kyoto target is actually a little higher than 7% because of the 12 new countries that joined after 1997, and wind power is going to supply about 32% of Europe's efforts to meet its Kyoto target in 2012. If the UNFCCC maintains the commitment to 20% emissions reduction for 2020, then wind power, on its current trajectory and in accordance with the legislation that is already in place, will supply about 28% of that emissions reduction effort. In 2008, wind power was supplying 20% of the emissions reductions required under the Protocol; in 2012, the supply will raise to 32% and going forward to 2020, it will be somewhere between 28 and 29% of the 2020 target.

From a global perspective, these are current pledges on emissions reduction targets that Annex 1 countries have on the table. The situation is complicated for a wide variety of reasons, mostly surrounding the US and other countries attempting to shift the baselines to make their own situation look better when actually they have not done anything in the last 15 years.

Nevertheless, the aggregate emissions reductions that are on the table now are somewhere between minus 11% and minus 18% compared to 1990 levels.

With the current trajectory of wind power, 16% of the overall emissions reduction target would be met through wind power in 2008, and 44% in 2012

If the UNFCCC go to the upper end of that range, that is, a pledge for minus 18% compared

to 1990 levels in 2020, we are looking at wind power supplying about half of the energy needed, in terms of emission reductions, which tells us two things. One is that wind power is going to play a substantial role in reducing emissions going forward in the next period as it is doing already. Furthermore, it also shows that the current emission reduction targets for industrialized countries need to be increased dramatically. That is what science demands if we are to avoid the worst impacts of climate change.

Take the US for instance, with their current proposal. We will be looking at supplying 28% of their GHG emissions reduction effort through wind power; for China, -although this is a movable figure because we are not talking about absolute emissions but dependent upon growth economy projections-, wind power would be providing somewhere between 20% to 26% of China's GHG emissions reductions over the period between 2008 and 2012.

Finally, the numbers in India are even more dramatic; if the Indian government is persuaded to commit to GHG emissions reductions, and depending on the rate of GDP growth, wind power can contribute up to 46% to 74% of India's GHG reductions.

So to conclude, the energy revolution is underway, but will it be in time to protect us from the worst ravages of climate change? This is the most relevant question. Asia has become dominant, and in fact is dominant in wind and other renewable energy markets. Wind energy can deliver a major share of the reductions that are needed in the period going forward, but we need to do an awful lot more than that. Particularly looking at the Annex 1 countries, their level of ambition is pathetic, pitiful and nowhere near what it is needed at present.

4.

Business Cooperation in the Renewable Energy Sector

FOURTH PART

Page

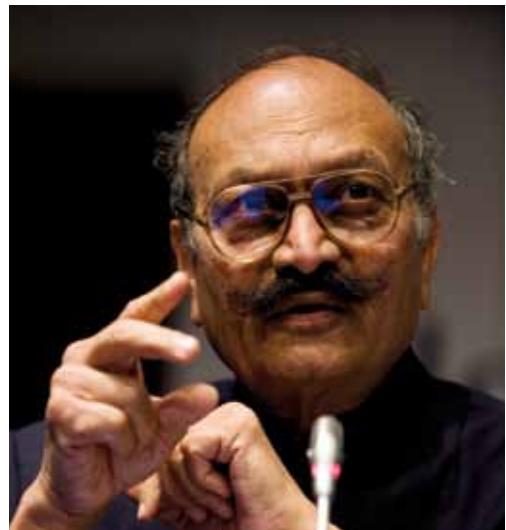
104	Anil Kane President of the Indian Wind Energy Association
114	José Donoso Director of Sector Development of Gamesa Energía
120	Manuel Cendagorta-Galarza Managing Director of the Instituto Tecnológico y de Energías Renovables (ITER)
124	Ajay Prahbu .Chief Operation Officer, Quest

The necessary clean technologies already exist to cover, for example, the sustainable development goals of EU member states, but we need to continue to promote and generalise their use in emerging Asian and African countries. In this respect, the private sector can also contribute technologically to the development of a sustainable economy in Europe beyond the date mentioned, but above all, it can contribute towards extending the use of renewable energies in countries on other continents.

This part analyses the role of international business cooperation in the energy sector. More specifically, it analyses the possibilities that exist within the framework of business cooperation in the wind and solar power sector, where Spanish companies such as Gamesa Energía, Abengoa Solar or Endesa can offer their technological expertise.

Anil Kane

*President of the World Wind Energy Association,
Chairman of the Indian Wind Energy Association.*



Doctor Anil S. Kane is president of the World Wind Energy Association and also Chairman of the Indian Wind Energy Association. He has been linked to the wind energy sector for over 25 years and has over 45 years of experience in the negotiation of contracts, carrying out technical and economic assessments of projects and selecting locations, technologies and equipment in the energy industry. He is a member of the Gujarat Coastal Area Development Board. He is part of the arbitrator panel of the Indian Council of Arbitration and also of the panel of the Federation of Indian Chambers of Commerce and Industry (FICCI), of the Arbitration and conciliation Tribunal. He is a member of the International Council of Consultants (ICC) and the Magenn Power Inc Advisory Board. Doctor Kane also worked as vice-chancellor of the Baroda Maharaja Sayajirao University.

An overview on wind energy opportunities

In the face of climate change and the need to reduce greenhouse gases (GHG), the time has come to state what are the necessities on which we need to concentrate. Regarding windmills development, one can find nowadays windmills right up to 6 MW, and even beyond: windmills up to 10 MW are being designed. But somehow, the following three things have not been given proper attention yet: accessible small wind turbines, cheap and reliable electricity storage systems, and the necessary infrastructure.

The first thing is small wind turbines, as they have not yet received enough attention. For example, every house in China has got a solar water thermal system, but no house has got a small wind turbine. About 30% of the total power consumption in a household can be met by the production of a small wind turbine; just a small one of 1 kW·h or 2 kW·h or 5 kW·h would be enough to meet the requirements of a particular house. If this is achieved, a dramatic reduction will take place in the amount of electricity needed from non-renewable energy sources.

This is not happening today because of two reasons; the first is that small wind turbines are very costly, and the second is that the infrastructure needed to feed the generated power into the grid system at a low voltage is still not available.

If the infrastructure to manage electricity at a low voltage level was available, one could import the energy to cover domestic needs at any time and export the surplus of energy generated by your house top turbine to the low voltage grid. Whatever is the difference, either positive or negative, one would be paid or pay money. No incentives would be required, and governments should only do this.

Looking at the whole world at night, there is a considerably large dark area (Map 1). In this world map, all the lighted areas have got electricity, and all the areas in darkness have no electricity. Indeed, the dark area is very large.

The second technology we need to focus on is stand-alone systems. In most of Africa, with the exception of the north and South Africa, there is hardly any electricity grid connection. The same situation is found in Australia, eastern Asia and western South America; these are very populated areas without grid connection and stand-alone systems are highly necessary to supply electrical energy there. For example, a very small village needs a total of 100 kW·h. But for 100 kW·h it is not economical neither practical to lay a line for 200 Km, so there they must have a stand-alone system independent of any grid.

In order to use a stand-alone system, and given that the wind is an intermittent source of

Map 1. World map



power - systems only produce power when the wind blows-, the installation must have storage capacity. So to have practical and widespread stand-alone systems, it is a precondition that a cheap and dependable storage capacity is developed and becomes available. Nowadays, storage is very costly. Fortunately, a lot of research is undertaken to reduce the cost of storage and to enlarge its proportion.

Looking at Figure 2 from the Archer and Jacobson study (2005), areas are classified according to their wind velocity. The darkest dots indicate where energy can be produced economically, as wind velocity reaches 7 metres per second or more, and it gives 300 to 400 watts per square meter. If wind velocity is lower than that, it is not really economical to produce wind power.

In most areas of Europe, except in the North Sea Rim, there is not much wind. Looking at America, it is very well placed. In Asia, with the

exception of a few locations in the east of Japan and east of China, wind velocity is not adequate to produce electrical energy economically. In Africa there is hardly any place with good wind velocity. It is the continent with the highest demand, but it is not being met. In Australia there is the same situation. In fact, dark dots are only found in the South. In South America, only the tip of Argentina has a very good wind velocity. Last year when I was there, I made the prediction that within 10 years Argentina is going to be the first country to have 100% renewable energy. The statement was made because Argentina has a huge capacity for hydro and wind, which together can work very well. Wind energy will go up and go down, as the wind velocity changes, but hydro can maintain the pressure and frequency of the grid system. Hydropower can easily go up and go down by opening and closing a valve, which cannot be done in a thermal station or another power station. So a combination of hydro and

wind can work miracles, and this is why I have predicted what will be happening in Argentina within 10 years.

The study by Archer and Jacobson (2005), concludes that if only the areas having an annual average wind velocity greater than 7 m/sec are taken into account, wind worldwide could produce approximately 72 trillion kW·h of electrical energy per year. This is equal to roughly 54 billion tonnes of oil. Even if only 20% of this power is captured, it is more than the total energy requirement of the entire world for all purposes. If we consider just the electrical energy requirements of the entire world, this potential is seven times what the world needs, which is 1.6 to 1.8 trillion kW·h.

If we take into consideration those areas, which have a wind velocity lower than 7m/sec, and the offshore potential, the figure will be astronomical. Wind energy is enormous and it can meet the entire world requirements. The wind sector is growing at a rate of 29%, and this percentage might increase. Up until today, all of our predictions have proven to be conservative; the wind sector has always grown more than what we had predicted. We have predicted that wind power production is going to reach 1.6 million MW in 2020. Today we are at a figure of 130.000 MW and it is now growing exponentially.

This is what African governments and all the people working in Africa should do, a survey on the entire continent to determine where the good wind is. There has to be a mast and measure the velocity, the direction of the velocity, the duration. If all these things are measured for a full year and then drawn, a graph will show where there is a good location for putting up a wind farm. This survey needs to be done in all the African countries who want to get into wind energy production.

In electric power transmission, there are two systems: one is called wheeling and the other one is called banking. For example, a factory in Madrid cannot be supplied by a wind farm in Madrid itself, it needs a wind farm somewhere where there is a good wind velocity, so whatever energy it is produced there it is fed into

the grid, and it can be wheeled and used there. This arrangement is now acceptable to all the countries in the world.

For banking also, as energy is needed upon requirement but wind may not produce energy when needed, whatever renewable energy is produced will be fed into the grid and accumulated on account to be used when necessary. This is now universally accepted.

For many centuries carbon dioxide concentration was fluctuating within a narrow range, but in the last century it has taken off almost vertically, and this cannot be allowed to happen. Developed economies take the lion's share of electricity consumption; see the amount of energy that Canada, USA or Australia consumes (Graph.1). India consumes about 600 kW·h per person per year, while Canada consumes 30 times more. This is exorbitantly high. People in Bangladesh consume even less than India, one third of 600 kWh that is 200 KWh per capita per annum.

All people have a right to improve their quality of living, and that means more and more electrical consumption. So what wouldit happen if China, India, Bangladesh etc. were to be consuming at the rate of US or Canada?

A tremendously high electrical energy supply would be required, and if all this energy was produced by fossil fuels we would not be able to breathe. So all developing countries have to do something starting right now, so they do not follow the footsteps of Canada and USA. On the contrary, Canada and USA will have to take their consumption down. They should not be allowed to consume so much energy.

How is power produced today? It is still produced mainly from oil, coal, natural gas, etc. What is driving the growth of wind power? It is mainly climate change and the energy security matter, because we are not going to have fossil fuel energies forever. See the main drivers for wind energy in the following schemes (Figures 9, 10, 11).

Furthermore, the operating and maintenance cost of wind energy is the lowest (operating cost means only the fuel cost). Nuclear power is 1.8 cents per kW·h, coal is 2.3 cents, natural gas is 3.6 cents and wind is less than one.

4. Business Cooperations in the Renewable Energy Sector

Figure 2. Evaluation of global wind power – Europe

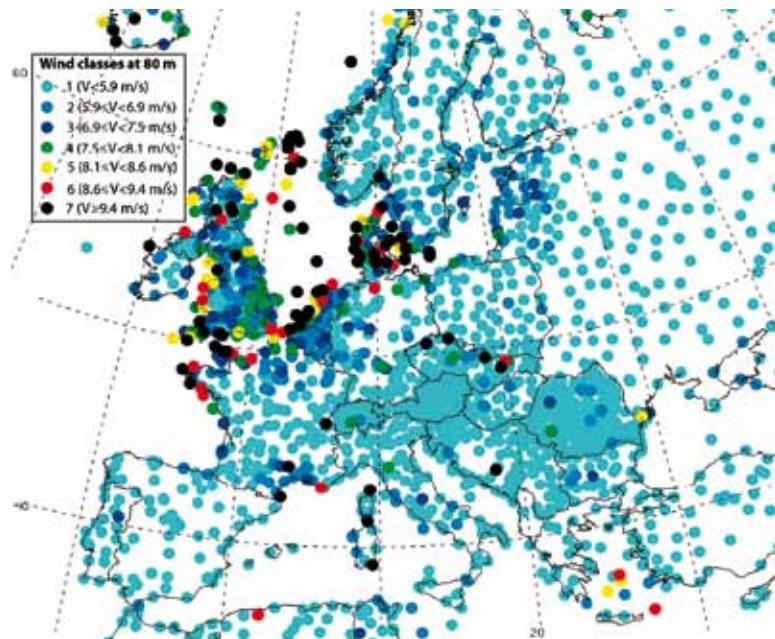
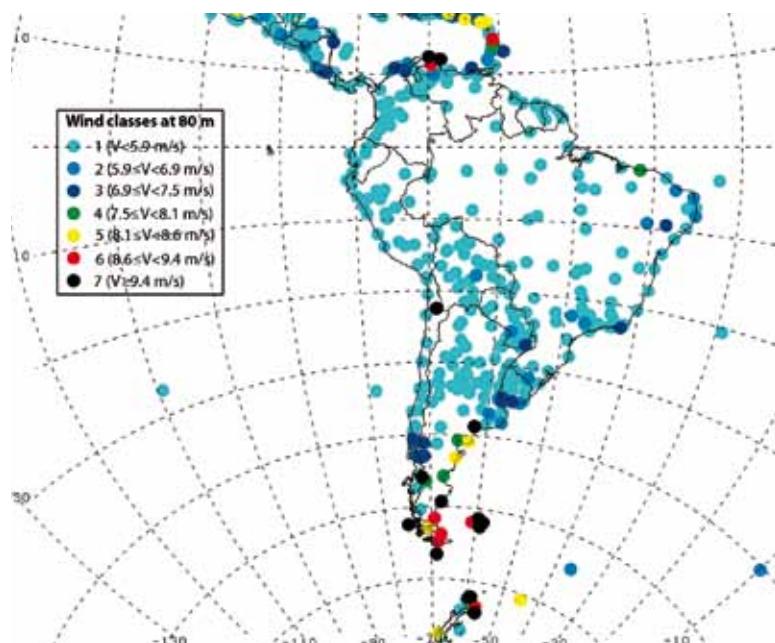


Figure 3. Evaluation of global wind power – South America



Source: Archer and Jacobson (2005), Evaluation of global wind power, Journal of Geophysical Research – Atmospheres. American Geophysical Union.

Figure 4. Evaluation of global wind power – Australia

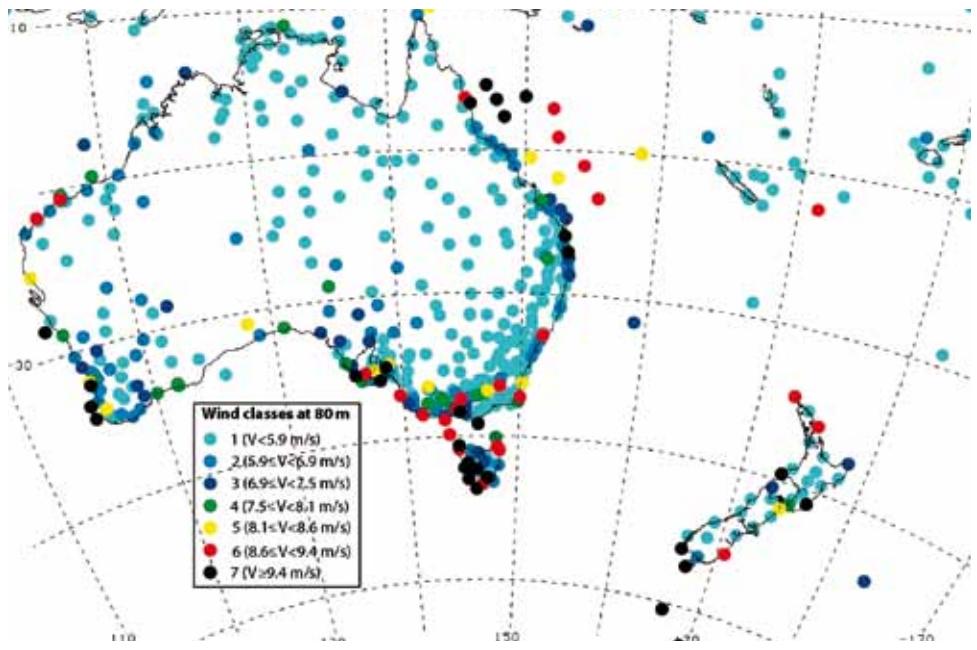
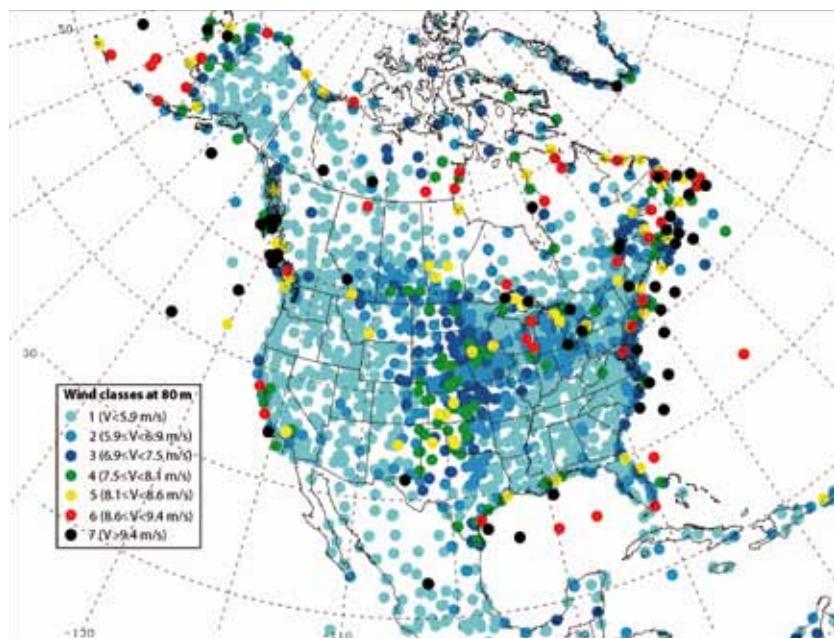


Figure 5. Evaluation of global wind power – North America



Source: Archer and Jacobson (2005), Evaluation of global wind power, Journal of Geophysical Research – Atmospheres. American Geophysical Union.

4. Business Cooperations in the Renewable Energy Sector

Figure 6. Evaluation of global wind power – Asia

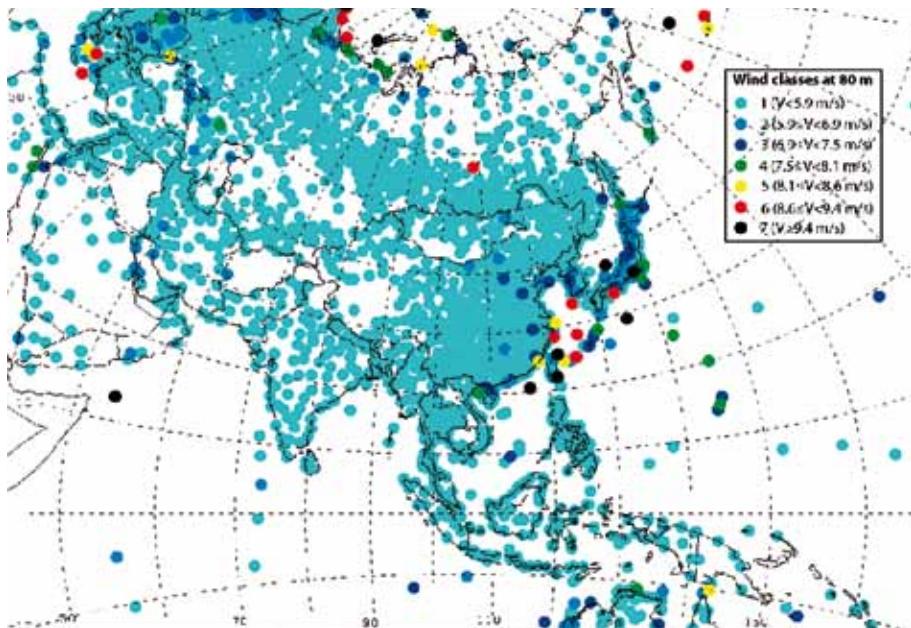
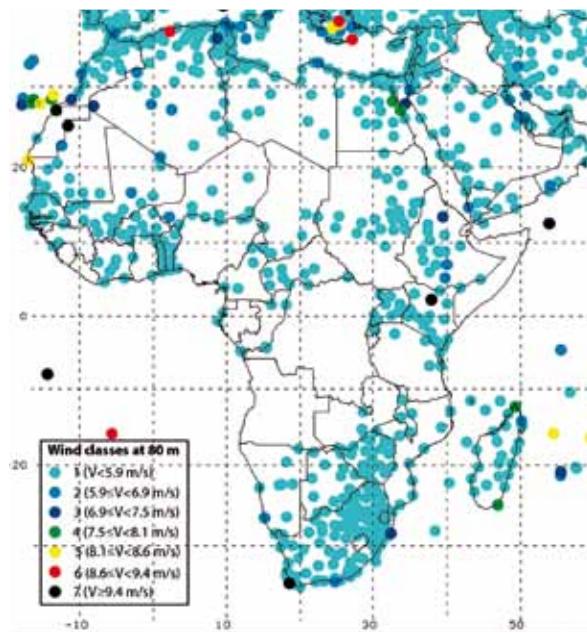


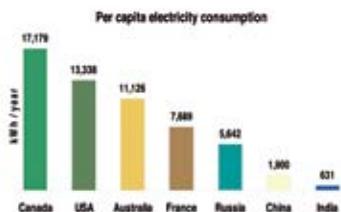
Figure 7. Evaluation of global wind – Africa



Source: Archer and Jacobson (2005), Evaluation of global wind power, Journal of Geophysical Research – Atmospheres. American Geophysical Union.

Figure 8. Per capita electricity consumption

Developed economies take lion's share in energy consumption



Source : International Energy Agency

Figure 11. Main drivers for wind energy 3

Key growth drivers for wind energy - III



Source : American Wind Energy Association
ETM Consult ApS World Market Update 2009

Figure 9. Main drivers for wind energy 1

Key growth drivers for wind energy - I



Source : American Wind Energy Association
ETM Consult ApS World Market Update 2009

To sum up, three things are required; cheap small wind turbines are to be produced, cheap and reliable electricity storage systems have to be developed, and the necessary infrastructure needs to be erected

Electric energy storage projects for large capacities have started to appear. For example, there have been various studies on sodium-sulphur batteries. There is a plant in Japan already producing 35 MW of storage. Before it was not possible to conceive MW size storage, but now it has become possible. Moreover, progress is taking place in lead-acid, vanadium redox, nickel-cadmium and nickel-metal hydride batteries.

Figure 10. Main drivers for wind energy 2

Key growth drivers for wind energy - II



Source : American Wind Energy Association
ETM Consult ApS World Market Update 2009

To produce power in a region of lower wind velocity, a Canadian company has designed a balloon that is lighter than air -filled with hydrogen- and it can be taken up anywhere (Figure 12). This balloon will rotate, so even if the velocity at ground level is not very good, it will go up to 1000 metres or 2000 metres where there is much more velocity to produce power, which can be brought down and used. If velocity becomes double, it can produce eight times more energy, so this is certainly becoming very attractive.

4. Business Cooperations in the Renewable Energy Sector

Figure 12. Balloon

MAGENN Power,
Wind Power Anywhere

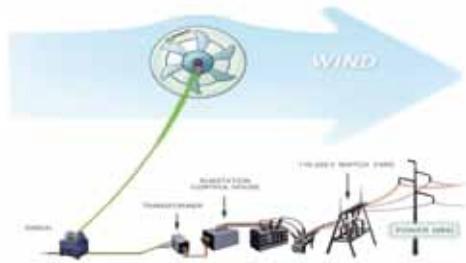


Figure 13. Windmill in the sky

Wind Mills in the Sky
(Autogyro) - USA



Groups working in the US, Netherlands and Canada are readying to set up wind farms 9 kilometers up in the sky. This is where we have the so called jet stream, or走廊 of high velocity winds, which high altitude aircraft make use of while flying eastwards.

There are other interesting devices to generate wind power that are being developed. One device is based on the autogyro principle and it produces 160 kW·h. The motors take it up and it goes up to 10,000 feet, where it becomes an autogyro and the motors become generators. (see Figure 13).

The Russians have developed the concept of an enormous machine which has about one kilometre in diameter. It rotates and produces power. (see Illustration 2) I am also working on this device based on the linear motor principle, which will rotate and produce power. The frame itself is the conductor.

In conclusion, wind energy is progressing very well and is definitely coming to the rescue of mankind. In my opinion, this is the only source, which is in abundance and it can be economically exploited without disturbing the balance of the Earth.

Figure 14. Wind energy marine unit

Wind Energy Marine Unit (WEMU) Being Developed in Russia



Indian Wind Energy Association



José Donoso

President of the Spanish Wind Energy Association (AEE) and Director of Sectorial Development at GAMESA ENERGÍA



Donoso has worked at Gamesa Energía since 2001 as the Director of Promotion and Director of the European Business Unit. He previously worked for the Institute for Energy Diversification and Saving (IDEA) as Director of the International Department. He has teaching experience as a lecturer at the course on Development Cooperation at the Complutense University of Madrid, and the post-graduate course "Advanced Wind Power Systems" at the Carlos III University of Madrid, "Renewable Energies" at the School of Industrial Organisation and the renewable energies master's degree of the CSIC (Scientific Research Council). He has offered a large number of speeches at congresses and seminars on energy.

The wind energy sector: new opportunities and challenges

In order to understand the energy market it is essential to understand that the energy markets are the result of a political decision. Energy is not a superficial good but a basic one, with exchange prices that do not correspond to an offer and demand situation, as explained by classical economy, but rather to political will. This political will is what shall condition the energy model and it is a will created by all of us through our opinions, which influence politicians, created through lobbies, NGOs and pressure groups who want and desire for their country a certain energy model.

Wind power

Wind power has various advantages:

- It is a mature and competitive technology.
- It helps to satisfy the growing demand of energy.
- It contributes towards guaranteeing the supply of electrical power.
- It is natural and reduces energy dependence
- It offers stability as opposed to the volatility of oil and gas prices.
- It is a variable though predictable resource.
- It is a source of economic development and employment.
- It does not generate contaminant waste.
- It is necessary to fight climate change.

- The “fuel” for wind power is free, clean and inexhaustible.

In view of the criticism raised, it is important to focus on some of these advantages. First of all, it is true that wind power is a variable source of energy, but this is not due as much to the characteristics of wind power itself, but rather to the infrastructural deficiencies of the Spanish power grid network. If Spain were to have good interconnections with the rest of Europe, wind power would not necessarily have to be a supporting source of energy. In fact, one of the key factors related to this problem are the energy storage systems which in Spain suffer from a considerable lack of development with respect to the rest of Europe, where there is an interconnected system without back-up problems or without the need to research storage systems. Therefore, we have to discern between what problem is motivated by the energy source itself and what problem is caused by deficiencies in infrastructures.

The problem concerning birdlife is an issue that has been magnified. The impact of wind farms on birdlife exists, but it is very small in comparison with most human activity. There have been some problems with specific species, but they have been solved. Everyone knows that millions of birds fly past Tarifa and the incidence is practically zero.

Wind power has a very powerful present and an even more promising future. Its environmental impact, basically aesthetic, is subjective. As other speakers have pointed out, in Western films, it was nice to see the wind generators: in La Mancha, windmills are now being restored. In short, nothing can be decided when it comes

4. Business Cooperations in the Renewable Energy Sector

to aesthetics, some people like it and some do not. In any case, we must admit that it is a fine, clean and good-looking design.

Wind power in Spain

In Spain, one of those countries where there has been political will to promote renewable energies, wind power has seen stable and continued growth, which has made us a leading country on a worldwide scale as regards wind power. Last year 16,800 MW of installed wind power were reached and next year it will increase to 20,150 MW, a level that is not surpassed due to the limitations of current legislation, not because of a lack of capacity.

This is the result. Clean and effective energy is being produced, but it is said that wind power is expensive. Gamesa has carried out a socio-economic study, the second update of which was presented in November 2009, that can help those countries that are considering whether or not to promote wind power in their territory. In Spain, in 2008, the wind power sector received premiums to the value of 1.138 billion Euros. In exchange, imports of fossil fuels have been reduced by 2.2 billion Euros (for each euro invested, two Euros have been reduced in fossil fuel imports); a contribution

of 5 million Euros to GDP (direct and indirect); 40,000 jobs have been created, 50% of which for qualified workers; a technological sector that has invested 189 million Euros; and exports to a value of 2.9 billion Euros. These are the facts that should guide the decisions of politicians when deciding whether they want to implement one or another energy model in their country. Of course, what we must never forget is that we have to consume energy in a cleaner way and with less impact on the environment.

Gamesa, world leader in sustainable energy technologies

This technological development in Spain has enabled the emergence of a series of companies that are leaders on a worldwide scale, and one of them is Gamesa. Gamesa is among the top three manufacturers in the world and has installed over 16,000 MW around the world with its wind turbines; in addition, it is the world leader among independent promoters of wind farms, as the installed capacity of wind farms promoted by Gamesa amounts to 3,000 MW connected to the power grid.

Gamesa's business model is an integrated model; on the one hand it manufactures, develops R&D and sells to operators and on the other

Figure 1. Wind power installed in Spain



it promotes wind farms. In addition, part of Gamesa works on energy solutions. On a global level, it is focused on three industrial productive areas: Europe, the United states and Asia.

What are the requisites to make it interesting to develop wind energy in a certain country and what are the requisites that an investor analyses before starting an activity in such a country? First of all, the existence of a grid. The grid is a limiting factor of the possibilities of evacuation from the wind farms. Second, the resource, though not because there are countries without wind resources, but due to the third variable factor: regulation. Depending on what a country is ready to finance or incentivise there will be a larger or smaller resource. These are the three requisites in order to develop wind energy. But, in addition, we have to analyse the risk of the country, the stability it enjoys, and in some cases, we also have to bear in mind the receptiveness of the public, which in some cases conditions the political decisions that were mentioned at the beginning. Public receptiveness can lead to a situation where, even if the first three requisites are met in a country, there is a negative perception among the public concerning wind power, and projects cannot be carried out.

Helanshan Wind Farm



Barriers of the wind market in Asia and Africa

In the case of Asia and Africa, there are a number of barriers for the wind power market, mainly derived from the regulation frameworks in which investments in electrical infrastructures take place. Developing countries normally have very immature electricity markets, with unclear rules of operation, insufficient infrastructures -the impossibility of evacuating the electricity produced-, opaque electricity prices controlled by state-owned companies and national consortiums. All this makes investments in new electrical plants very complicated. This means that investments in wind farms are concentrated in very few countries -China and India in Asia, Morocco and Egypt in Africa-, while large parts of the planet, with very interesting wind conditions and in need of electrical infrastructures, are excluded from the process. In Sub-Saharan Africa, the electricity market is theoretically liberalised in many countries, but it is opaque and entails much insecurity for the private investor. They are countries with a high risk, low income and uncertain future perspectives. The electrical infrastructure and other types of infrastructure are very deficient. Some countries have plans for the penetration of renewable energies, but except in the case of South Africa, they are not accompanied by economic incentives.

Conclusion

Copenhaguen is a very important milestone and we have to achieve emission reduction objectives that are as high as possible. Within these objectives, we need to recognise the important role that wind power can play in reaching these goals.

The Clean Development Mechanisms (CDM) must be reformed as they have not been a useful instrument to promote wind power in third countries. Except in countries where the basic requisites mentioned above are met, and which have regulations that make CDMs feasible, their efficacy has been practically non-existent. We have to rethink the CDMs and provide them

4. Business Cooperations in the Renewable Energy Sector

with conditions that may allow wind power to play an important role and be supported.

Second, we are going through a situational crisis that has brought a drop in the demand for energy and a fall in prices in relation to previous years. This could lead us to a false interpretation whereby the demand will continue to drop and could lead politicians to reduce their support for renewable energies or to delay it. We must bear in mind that energy is a structural necessity, that the current crisis may seem to be very critical but it is situational, motivated by financial issues; it is not an energy crisis. The real structural crisis and the real energy crisis was what we were going through before; the crisis in which countries such as China, India and new emerging countries such as Brazil, will increase their energy demands. According to the International Energy Agency, the worldwide demand for energy will have increased by 40% in 2030, maybe even more.

Wind power guarantees competitiveness and that, in the face of a future with high oil prices, there will be sources of energy with stable and low prices for the countries that decide to implement it. In Spain, two years ago, wind power was competitive and will be again when oil prices recover. Politicians need to have a long-term vision. A commitment to wind power is a commitment to energy independence, economic independence, and in the end, political independence.



Manuel Cendagorta- Galarza

*Managing Director of the
Institute of Technology and
Renewable Energies (ITER)*



Manuel Cendagorta is a Telecommunications Engineer and Industrial Technician, and has over 25 years of experience in the field of renewable energies. Since its creation in 1990, he is the Managing Instituto Tecnológico y de Energías Renovables (Institute of Technology and Renewable Energies), which is located in Tenerife, Spain. It is a public company that depends on the island's Council and that is dedicated to the research, development and promotion of renewable energies and other activities of interest on the island.

Research and development of wind and solar energy

Wind energy in Asia and Africa poses a series of problems that must be taken into account. In Europe, after having adopted a series of very clear regulations and -now quite old- political decisions, wind energy has been developed in countries that have clearly assumed these decisions and with enough time in advance, because there are always many administrative processes and opinions that are opposed to the development of these energy sources.

In Asia and Africa, most countries have not made these political decisions nor the necessary agreements to generate renewable energies. Therefore, when we compare emerging countries in Asia or Africa with Europe or the United States, we must not deceive ourselves; legislation is fundamental. Market regulation is the first step towards continuing with energy development.

In addition, in the case of Africa, the development of wind energy requires a power grid with appropriate capacity and power. In some countries power grid capacity is very low. Thus the difficulty of having large wind energy installations in many African countries. Despite this, we support wind energy and renewable energies in general. In Africa, or in the case of rural areas in general, it is possible that there are solutions that are better suited to the situation. Wherever there is a considerably sized city, there is normally a grid with a reasonable amount of power, and such a city would allow for the installation of wind farms around it. In Europe, all countries are interconnected, meaning that in any part of Europe, like in any part of the United States, it is possible to install a wind farm provided it is close to a power grid. Thus the generalisation whereby wind energy

is currently not perfectly applicable in many countries, particularly in rural areas which do not have sufficient grid capacity.

The dispersion of population in rural areas of developing countries is much clearer than in industrialised countries, leading, as has been mentioned, to the limitations of the power grid network.

We should also bear in mind the issue of the wind energy resource itself: there are areas, mainly close to the equator, where wind is scarce, meaning that the installation of wind farms is more difficult. For example, in the development of a project by ITER in Bolivia, South America, with a hybrid wind and photovoltaic (PV) system, Bolivians said "there is no wind here. We are at an altitude of 4000 m, we have sunshine throughout the year, but we don't have any wind". In effect, wind resources obviously have to be closely studied.

Another factor to be taken into account is that wind energy has always been, and still is, much cheaper than PV energy. Meaning that the comparison between wind and PV always favours wind energy. The reference prices in Europe, though they may vary depending on the country, could be of one euro per Watt of wind energy installed, as opposed to five Euros per Watt of PV energy installed.

Right now, wind energy is staying at its reference prices, but the price of PV energy, due to the crisis of the sector and in a general context, has fallen by close to a third in less than a year, causing a huge impact on all structural plans. Its accessible price, in fact, opens the door to those small applications that are significant not in



terms of MW, but rather in terms of the number of people who use them.

What makes PV energy so cheap today? The financial support and subsidies from international programmes, that help bring small installations closer to being feasible.

In the case of Europe, PV energy has a small advantage over wind energy. Its ability to integrate itself in buildings - on roofs and terraces - does not produce a visual impact. Another small advantage: the production of PV energy is slightly better adapted to the population's average consumption, as it is greater during the day than at nighttime. That is, PV energy can help with the storage or regulation needs that wind energy has. However, this is not the typical case in Europe, where PV installations are large arrays with tens of MW which compete with wind energy in the network. Small installations are suitable in the case of rural areas, isolated locations or developing countries. This small amount of energy has a multiplying effect much greater than what it could have in a developed country. In spite of the advantages of wind energy, it is true that in some cases, such as in Africa, the installation of large wind farms is very complicated.

In conclusion, wherever there is a sufficiently large urban buildup, and there is therefore an electrical grid, the installation of wind farms will be possible. Where there are weak electrical networks or in rural areas, wind energy faces great difficulties and in these cases, PV energy has more advantages.

During recent years ITER has been dedicated to large PV and wind projects and currently, in addition, ITER participates in the EUROSOLAR project, which consists of the installation of 600 hybrid systems in eight countries in South and Central America. They are small systems with a small wind turbine or a PV of just one kW, but capable of bringing the Internet to rural areas.

As for all this energy, what is it used for? Mainly for communications and computers; this is the value of the watt, it is the energy we should invest in and which is the most feasible. A 100 watt bulb gives us light. With 100 watts we

could have five computers connected and we increase all kinds of capacities as we all know in these countries.

ITER has currently developed a kit for small communications systems for the EU and is also working on other small projects in the desert, where there are obviously no electrical grids, such as the Hyress project. In Senegal, we are developing a number of projects with the application of large-scale isolated systems; that is, projects with a large quantity of energy generation points, as the solution is not to integrate them in a network that does not exist.

In short, wind energy needs a good network. For example, in the case of the island of Tenerife, ITER is creating a programme of reversible hydraulic plants for storage systems on the island in order to be able to continue integrating wind energy and PV energy. Right now, the island has 800 MW of installed power: 80 MW of PV projects installed, 40 MW of wind projects, in addition to projects awaiting installation that will add up to 170 MW of wind power and 100 MW of PV. That is, when all these projects are completed, there will be a large amount of wind and PV power installed and the electrical grid company has said that it will be necessary to install storage plants and systems, that could be electric cars with their batteries or other types of batteries, or hydraulic systems. Any storage system will be important in order to regulate the power grids and continue to increase the use of renewable energies.

Ajay Prahbu

Chief Operation Officer, Quest



Doctor Ajay Prabhu is the Chief Operation Officer at Quest Global, a leading engineering and manufacturing services provider for the aerospace industry, the energy and the industrial sector. Ajay joined this company in 2002, when he took charge of the India Delivery Centre, and since then the organization has grown from 200 employees to 1600. He later moved on to heading P&L for Aerospace business and has played an integral role in QuEST Global's foray into the aerostructures domain, which has led to some major successes, such as winning the EADS E2S Project Engineering Services Synergy Award in 2008. Under Ajay's leadership, Quest has increased its global outreach and has created centres in a number of cities in the USA, Italy, Japan, United Kingdom, Germany, France, Spain and China. His work has resulted in recognitions for Quest such as the AS9100, ISO 9001:2000, ISO 27001 standards or ACE Silver, and has been a key factor in bringing the organisation close to achieving the PCMM and CMMI recognitions.

Business opportunities in India

Climate change is raising a number of issues and there really needs to be a global effort to leave this Earth to the next generation in a better shape than we inherited it. Of course, what that means is that a whole bunch of resources need to be dedicated to bring about a change, and resources basically involve a lot of business opportunities. My contribution to this conference is focused on these business opportunities, particularly in India and generally in Spain. Moreover, I have a concrete and simple message and a proposal for how the business cooperation can get started between the two countries.

In 2050, India will be the most populated country in the world, with close to 1.6 billion people, and its income is going to multiply by 16. That is a lot of income, so when that happens there will be a lot of spending power, and a big demand for power and energy. There is already a significant amount of investment happening in India and there is going to be a lot more, so India as a market has a lot of business potential.

Today one third of Indian power comes from renewables, if we include the large hydro. If we exclude that, the percentage is less than 10%, so there is a huge potential for increasing that. About two thirds of the renewable energy that we generate today is coming from wind power, and that is only because wind generation has really gone beyond the grid-parity point. With this progress, the capital expenses are much lower, and so wind power has been accepted by the Indian industry. Indeed, there are lots of investments in wind power. We can not really say the same about solar power. India has a lot of potential for generating solar power, an estimate is that around 700GW can be generated, but today very little solar power is being generated in India, because the cost of generating it is much higher.

India has a lot of opportunities for distributed power - generation and use -. In India there are examples of small scale industry developed by women on small solar panels.

They make solar panels which basically generate just enough light for one family for one evening, from sun setting to the time the family goes to bed; that is how much these small solar panels can generate. India emerged in 2008 as a major producer of solar PV, with new policies leading to \$18 billion in new manufacturing investment plans or proposals by a number of companies⁴.

That is the kind of opportunity that does exist in India, and it is a huge market.

India today is leaping into the future. About 20 or 30 years ago, India was an agriculture-based economy and it has made a transition into the services industry without necessarily going through the manufacturing sector, though what is happening today is that after being very strong in services more of the economy is going into manufacturing.

On the Telecom side we can identify a similar situation; we have switched from a postal, mail man and telegrams type of set-up to significant acceptance of the mobile units. India is selling huge amounts of mobile units. Not many families have land lines and they will never have them. They have switched and jumped into the next generation of technology.

The same possibility exists in the energy sector; today one third of the population is not connected to the grid and they can definitely use a lot of distributed type of power sources. In

REN21: Renewables Global Status Report 2009. In: <http://www.ren21.net/globalstatusreport/g2009.asp>

4. Business Cooperations in the Renewable Energy Sector

Figure 1. World map:
World electricity producers



Source: Indian Wind Energy Association

this respect, the most important thing is that the cost of such options has to be very low. Climate change is a very crucial and urgent issue that should be among the top priorities of business in India. Many Indian companies are beginning to look ahead and invest in clean energy, energy saving and efficiency, intelligent buildings and products⁵.

The Indian business community is who is setting the pace to address climate change in India; many business people are beginning to deal with climate change directly as a business matter⁶

For countries like Spain, India has a lot of potential. Significant business can be made, and it is a must-have market. The question now is: how to take advantage of that market?

Just to give one example, I will talk about the automotive industry, which started establishing itself in India about fifteen years ago. Before that time, there were hardly any automotive options for the Indian population. The foreign companies started establishing themselves, with Suzuki and Honda as pioneers, and now all the automotive companies are operating in India.

This last year of recession, when the automotive industry is taking a beating in other parts of the world, in India everything is looking great. The market is growing at 20% per year even through this downturn and these companies are today generating an increasing percentage of their revenue and profits in the Indian market.

For renewable energies, I believe the time is right for foreign companies to enter the Indian market and take advantage of its opportunities over the next 20 years, like in the case of the automotive industry. So, how to succeed in the Indian market? India is and will continue to be a very cost-conscious market so to do business in India you really need to operate in India. You need to localize the product, make it locally with local manufacturing, local engineering. This is the only way to reduce the cost of the product and make it affordable.

Spanish companies have a great advantage, especially in the renewable energy sector. I think the developments in the last ten, even five years, position Spain in a very premier sweet spot to be able to take advantage of the opportunities in this sector. But the cost of doing things from Spain would be something that does not really fit into the Indian market, so that is a disadvantage and it is what the Spanish entrepreneurs and business leaders have to figure out how to overcome.

The whole issue of cleaning the climate and generating the power that the world is going to need means a great deal of engineering. When all the policies are set and the funds are available, a lot of engineering will be needed, not only to

clean up the environment, to decommission the existing fossil fuel based power generation units and also to improve the products and reduce their cost. Engineering is what I think India can offer to the world in order to fight the crises that we are facing.

So my proposal is that you start in India and become local, by building an engineering team. In India, there are plenty of very talented engineering human resources. This will give you immediate cost excellence advantages, which is definitely useful for you to succeed in your global market, and also it starts positioning you for tapping into the Indian market whenever you believe the time is ripe.

So the key message is; come to India for engineering and stay on for business.

In fact, there has been a steady increase of the number of engineering colleges, and also in the graduation of engineers. Concretely, today India is producing close to 400,000 engineers every year. That is a big pool of engineering talent that is available. India's population is young; the average age today is 27, so this is a demographic advantage; a big portion of the population is yet to go into colleges and youngsters are very much attracted to go into engineering because there are lots of better paid jobs to be found.

There are many different ways in which you can start building your engineering team there; the options are there for you to establish yourself as a company and start building your own engineering team within your company. Another option would be to go into a joint venture with an established player, or you could get into a build-operate-transfer type of model with engineering firms who will build it and operate it for you, and whenever you feel you need to take over you can make the transfer, or engage the services of a global engineering service provider like my own company: QuEST. There are many advantages of doing this and it is the quickest way to get started in India.

This is what we have been doing. QuEST started about 12 years ago; it started out as a US company and very quickly we established ourselves in India. Over the last twelve years

we have grown tremendously. Over the last five years we have been growing at a rate of 40 % a year by supporting several of the marquee customers in globalizing their engineering.

These are the kind of companies we work with. I have some pictures of ourselves with the CEOs of GE, Pratt and Whitney, Rolls Royce... These are the kind of companies that we have started supporting in doing exactly what I was proposing. I think Spanish companies can look at taking advantage of a similar set-up.

A quick overview: QuEST is into power generation, oil and gas, and industrial. We are also into manufacturing. We have just been promoting something called "special economic zone". The Indian government has recently come up with an export oriented policy for certain areas, and there are many tax advantages here. There is no income tax for several years if you operate in such an area. Today our global customers are taking advantage of this option.

So sum up, the climate issue is really a business issue, and a business opportunity to drive the costs down so that the market can accept the products, which will mean a great deal of engineering over the next several decades. Like ten years ago Indian engineers helped the world get over the year 2000 crises, so similarly I believe the Indian engineering pool today is poised and available to help the world get over the climate crises through reducing the cost of the product and increasing the adoption of the renewable energy sources.

I believe the optimal way of starting in India is: initially build your engineering team, and then look for an easy and safe way to enter the Indian market. Once you have established that, become local, start introducing your products and enjoy the market potential that India has to offer.

5- *ídem 1.*

6- Mehra, M. (2009), "La India empieza a ocuparse del cambio climático", en The Worldwatch Institute: *La situación del mundo 2009. El mundo ante el calentamiento global*. Icaria Editorial, 2009.

Appendix

renewable
energy

ASEFUAN Dialogue on Climate Change and Sustainable Development 'Minimums and Recommendations'

On the sidelines of the International Conference on Climate Change and Renewable Energies in Asia and Africa organized jointly by Casa Asia and Casa África, the Asia-Europe Foundation Alumni Network (ASEFUAN, AISBL) held its annual ASEFUAN Dialogue, on the topic of Climate Change and Sustainable Development which gathered sixty participants from ASEM member states. The goal of the ASEFUAN Dialogues is to provide participants with the opportunity to exchange their views on the topic, not only among themselves but also with relevant actors. As part of the programme participants were invited to prepare a set of recommendations, with their minimums and expectations for the then upcoming COP15 in Copenhagen. The following is a summary of the outcome of the four working groups of the workshop.

Working Group on Mitigation

Group Members:

Mr. Bram Buijs (The Netherlands), Mr. Miriam R. Delos Santos (Philippines), Pekka Huima (Finland), Ms. María Cuiñas Insua (Spain), Mr. Mike V. Medina (Group Leader - Philippines), Mr. Conor O'Brien (Ireland), Ms. Anna Sochocka (Poland), Ms. Johanna Schut (Netherlands), Ms. Elina Tenho (Finland), Mr. Timo Uustal (Estonia), Ms. Inari Virkkala (Finland) and Ms. Reeta Wang (China).

The starting point of the group's discussion was

the concept of mitigation and the key factors involved in its process. As far as mitigation is concerned, the great variety of knowledge and experiences from the participants resulted in a wide range of ideas, some of them being realistic, others much more ambitious, though still leaving some room for idealistic approaches. To address a significant reduction in CO₂ emissions, the group identified six issues, namely: operating mechanisms; infrastructural changes; technological advances; economic tools; urban and rural areas rehabilitation, and ecological footprints..

Key Issues

Operating mechanisms refer to the workflow process of getting things done. This can be in the form of plans, policies or procedures that serve as guidelines for the normal process in an activity to continue. Aspects tackled in this issue range from answering to what extent or in what manner a particular situation will be undertaken to identifying certain aspects of a problem or situation. There is a need for a sound operating mechanism of how to go about realizing mitigation strategies. Furthermore, there should be clear guidelines integral with efficient and transparent sustainable policies, plans and

1. ASEFUAN (<http://www.asefuan.org>) is an association of former participants of the Asia-Europe Foundation University, a two-week intensive scholarship programme for undergraduates at venues alternating between Asia and Europe. The ASEF University programme, which has been running since 1998, is a flagship project of the Asia-Europe Foundation. ASEFUAN organises activities to maintain and reinforce the relationships forged among participants of the ASEF University programme and undertakes projects to promote a meaningful intercultural dialogue between Asia and Europe, particularly among the younger generation.

2. A full version of the report can be found on ASEFUAN's website.

control that follow the locally- or national- and regionally-agreed approaches. Even if governments at the national or institutions at the regional level play a regulatory role in the operating process, the process itself should be participatory and multi-stakeholder interactive that involves the other key players.

There should be efficient government regulations that specify the required results and force action. These regulations should offer flexibility to encourage innovations and competitiveness. In order for a government regulation to be feasible, it must have the appropriate political and legal backing so that it is effectively implemented. To translate this in the Copenhagen Summit, a framework should be developed that should address issues of efficient and transparent sustainable policies, plans and control at the local, national and regional levels that do not have any overlap of functions and power struggles. This framework should also be equitable and free such a manner that developing and least developing countries are able to customize and integrate it to their own regulations.

To achieve the mitigation goals as outlined by the IPCC's Assessment Reports on Climate Change will require a large and influential change of the way people live. Infrastructural change is an important element for this. In general, it will entail maximizing improvements for carbon emission reductions and optimizing energy use. The basic need and goal concerning infrastructure is to facilitate all other developments leading to a low-carbon economy and society, and allow for sustainable development.

Non-government organizations can have a role in promoting infrastructural change across all different levels of society. This can include: promoting the development of stand-alone systems of energy on rural areas, the deployment of electric vehicles and other means of low-carbon transport, improving public transport facilities, enhancing waste recovery and efficient resource usage. Individuals are the users of infrastructure, and their main role should be to demand infrastructural change related to mitigation efforts, and

make use of 'green' infrastructure as far as available. Perhaps the largest role concerning infrastructural changes is hinged on the public sector. Governments are the most important in supplying and arranging all infrastructures, and setting the regulations and policies which guide its development. To change current systems, the public sector will need to take strong initiatives, in order to implement technological advances in various fields, such as supporting policy to introduce electric cars, improving public transport, accommodating electricity generated by alternative energies (smart grids and smart meters), and implementing systems for segregated waste recovery... Another very important infrastructural role for the public sector is in the field of urban planning and building codes, given the large share in current emissions. The private sector's main role is to implement the above goals utilizing the above methods by commercial means insofar as possible. This would mean focusing on sustainability, such as 'green' building design (energy-independent buildings, or buildings implementing green facades). Other methods are developing low-carbon modes of transport, power generation, waste re-use, etc. and bringing these to the market.

Technological advances offer a very broad opportunity for mitigation strategies. However, it is also necessary to streamline the best and most appropriate technology that would meet the standards set to reduce carbon and ecological footprints associated with climate change. The issue of the capacity to buy and implement technology strategies lies on disadvantaged individuals, societies and countries. Hence, there is a need for better access of the best and most appropriate technologies and its corresponding use of technical know-how through training and education. There is also a need to upgrade regulations and planning policies especially for developing and least developing countries since regulations and current planning policy and its application often serve as a significant brake on the deployment of low-carbon and alternative renewable energy technologies. Since the primary goal is to minimize the carbon output into the atmosphere, it is also a need for collaborative research and

exhaustive exploration of possible and potential applications of current technologies. Lastly, there is also a need for alternative incentives not tied to capitalist economics that encourage a much wider and equitable research and development of potential and feasible technologies.

To benefit developing countries, both the public and private sectors should develop a framework for technology research and development sharing between them. If this research and development is at the scoping level, such projects should be transparent and shared to a wider number of stakeholders. Moreover, developing and least developing countries that are part of a regional bloc that is also part of a much wider bloc such as the UN, should also streamline central funding to an easily accessible database complete with all the necessary materials. There should also be standardizations of project processes and procedures to limit confusion and overlap of responsibilities.

Current behavior especially in developing and least developing countries suggests that there are only a few, in both the public and private sectors who take climate change into account when forecasting economic trends. Hence, there is a need to change this behavior by incorporating climate change in using the various economic tools; an alternative economic paradigm should also be proposed to address reckless profit-driven production and grossly excessive consumption. Another need that should be addressed is the imposed international regulations and policies in relation to carbon reduction and offsetting, which place developing countries at a disadvantage by allowing rich countries to offset their reduction obligations without necessarily reducing their consumption. Unfair bilateral and multilateral trade agreements by developed countries and global and regional institutions, only increases further natural resources extraction and increases dependence of developing and least developing countries on these organizations and institutions. There should also be an equitable tax on carbon emissions with the revenues used to compensate or contribute to finance mitigation strategies.

“Rurban” (urban and rural) areas are the epicenter of the various activities of the communities. Exponential population growth has placed new pressures to these centers resulting in its deterioration and exploration for new developments. These responses also placed pressure on the carrying capacity of the environment. Rehabilitation and new developments of rurban areas present an opportunity for the implementation and application of new approaches that integrate green design/technology to address climate change impacts. The primary goal is to improve the carbon footprints of rurban areas through rehabilitation or redevelopment. There is a need for land use to take into account sustainable use of natural resources, improve existing infrastructure and promote the use of alternative renewable energies and energy efficient technologies for rehabilitation and new developments. There is also a need to promote open spaces in urban centers that could be used for urban forest development.

Regulations and policies emphasizing green development should be made available for implementation. For example, the public sector, in agreement with the private sector, can directly invest in public transport and public transport infrastructure (e.g. bus and train systems and non-motorized infrastructure like pedestrian and bike lanes and parking spaces) to make existing rurban areas public transport-centered or prioritizing open spaces for urban forests and parks that can serve as localized carbon sinks. This would encourage activities such as rehabilitation for older buildings and construction of new buildings that are energy efficient. Copenhagen needs to lead to a reduction of the overall ecological footprint of the entire humanity which in 2005 was estimated to be around 1.3 times the capacity of the planet Earth (Ewing 2008).

Ecological footprint is a clear and useful tool in being aware of one's own actions and their consequences and thus everyone should be aware of the existence of this tool. There is also a need to address the conditions at the ecosystem level such as diminishing supply of biodiversity and resources (i.e. water). In



ASEFUAN Dialogue on Climate Change and Sustainable Development.



ASEFUAN Dialogue on Climate Change and Sustainable Development.

order for people and organizations to start improving their actions they first need to be aware of their current situation and the means to measure it. That is why the group considered it important the promotion of, and openness about the ecological footprints of different actors. The role of the NGOs in this battle is mostly promotional. NGOs have the best possibility to provide objective opinions and guidelines about the issues and promote these to all the key players. At the individual level, reducing his/her ecological footprint would entail simple behavioral changes such as selecting more environmentally-friendly means of transport, changing a diet to a more vegetarian one or changing consumption and disposal habits. The difficult part in this is to convince the majority of the population about the importance of these actions. Individuals also need to convince both the public and private sectors about their interests and needs for an environmentally-sound lifestyle. It is also extremely difficult to make the private sector to do their share in reducing their ecological footprint since their activities are more often profit-oriented. This is also the reason why it is extremely relevant to convince the private sector about the importance of environmentally-sound and sustainable choices. The consumers should be able to compare companies and products based on their ecological values in addition to the economical values that are so clearly visible in the stock market. A 'green stock'-system should be introduced. The green stock would list companies according to their ecological footprints and environmentally friendly.

The negotiators in the Copenhagen summit should not only be able to make equitable decisions and recommendations on all fields that form the ecological footprint of the humanity but also decisions that would promote the common awareness of the present ecological footprint and ways to reduce it. It is also the right forum to provide alternative resource management strategies that should address carrying capacity issues, mechanisms for monitoring, surveillance and control and stewardship. This is a critical issue that should be given a resolution to avoid further conflicts between developed and developing and least developing countries.

Working Group on Adaptation

Group Members:

Mr. Nadeem Ahmad (Pakistan), Mr. Ceri Beynon-Davies (United Kingdom), Mr. Francis de Guzman (Philippines), Ms. Ai Farida (Indonesia), Ms. Dimitra Gavrilaiki (Greece), Ms. Helena Lim (France), Ms. Andreia Oliveira (Portugal), Ms. Alina Pathan (Finland), Mr. Michal Sládek (Slovakia), Ms. Tamara van 't Wout (Netherlands), Mr. Tom Van den Steen (Group Leader - Belgium), Ms. Krystle Wong (Malaysia)

Adaptation with regard to climate change can be divided into two areas: 'hard' adaptation dealing with technology transfer and finance, and 'soft' adaptation focusing on implementing the changing realities with which the climate confronts us in our societies. Whereas it is impossible to draw a neat line between these two areas, the WGA has mainly focused on the 'soft' side of adaptation, referring to the 'hard' side where appropriate. Since the Rio Summit in 1992 established the UNFCCC, much research has been published analysing the causes, effects and future scenarios of climate change. But in many countries, notably in the developing world, there is still a significant lack of data on the impact of climate change both on man and on nature. In order to be able to adapt properly to these changes, *it is paramount that data are gathered, analysed and assessed in a correct manner*. All countries should, thus, step up their efforts in this regard and contribute on a regional and international level to adaptation oriented research, exchanging expertise, pooling knowledge and using it to develop more effective adaptation strategies.

These strategies cannot be effective if they cannot count on wide-spread support in society at large. It is quite remarkable, in this regard, that there still are politicians that question the impact of mankind on the climate and the rationale behind adaptation strategies. The fact that they do so, can only mean that there is still a considerable part of the population that is

unaware, or falsely aware, of the very alarming nature of climate change and its possible impacts on this planet and our societies. *Key to creating a better informed society is education, both formal and informal.* Through this process, climate change (and our adaptation to it) should be mainstreamed at all levels as a presently occurring phenomenon affecting most, if not all, aspects of our daily life, wherever one may live. Given the sheer scale of adaptation processes, our efforts would benefit from a more harmonised co-ordination at the various decision-making and implementation levels. The complexity of institutions, departments, funds and offices at a national, regional and international level inhibits a coherent approach that maximises adaptation processes in a transparent and effective manner. An overarching body would be able to better oversee the myriad of processes and initiatives, avoiding work unnecessarily being done twice and improving communication between subsidiary bodies.

Key Issues

Developing and implementing adaptation measures in a sound and effective way requires a scientific foundation based on empirical data and subsequent assessments of these data. Many countries, however, do not have the institutional, financial or intellectual capacity to fund such research. A clear need can, thus, be identified to develop these capacities in individual countries. In addition, this effort should be accompanied by regional and international platforms to share expertise in all three areas. The WGA suggested that a clearer distinction between human and natural climate change effects and impacts should be made. Too often these two areas are conflated into one, which puts too much focus on the human aspects of climate change. This makes it harder for people to compromise parts of their current lifestyles without much direct benefits in the short run, while benefiting nature in the long run and, consequently, their future lives. A better conceptual division would allow scientists to operationalise their research into two distinct areas, facilitating a better understanding

of both and creating common ground for more nature-centred adaptation strategies. Region-wide research centres can play a significant role in pooling resources, knowledge and know-how as climate is not limited to state boundaries. Therefore, it is useful to exchange research results and analyses across these boundaries to learn from each other and assess adaptation strategies on a wider scale.

Regions alone, however, should not be expected to provide the silver bullet when it comes to adaptation strategies. It is undisputed that the so-called ‘developed world’ is responsible for the brunt of mankind’s impact on climate change, and should make significant technological and financial resources available within their own countries. In particular, the availability of these resources should extend to those regions most affected now. This would generate analyses that are relevant for the affected regions’ strategies, in addition to establishing greater research capacity within those regions.

For many countries, ‘developing’ means ‘being able to copy the lifestyles of the West’. The status that this generates exceeds by far the unsustainable character of this kind of lifestyle. The only way of changing this perception is to make everybody understand the impact of the Western way of life, with its huge carbon footprint and fossil fuel consuming economy, without compromising every country’s right to development. The WGA identified a key role in this regard to formal and informal education. It has the great potential of changing the state of mind while contributing to the intellectual capacity of a society. States should, therefore, invest human and financial resources in this area, in addition to creating frameworks that would allow the spread of knowledge at the grassroots level. Within formal education, environmental education should be more integrated into the curriculum of primary and secondary level education. Adaptation to climate change should be part of formal education in order to incorporate the science of climate change and what we can do to mitigate its effects or adapt to them. Governments should, therefore, invest in an effective education system which targets information gaps in the present system. Co-operation between developed and developing

countries, as well as between developing countries, should be enhanced in terms of knowledge availability. If not physically exchanging professionals, innovative projects could be shared on an online forum.

Awareness of informal education should be raised through public campaigns, highlighting its potential and value in adaptation strategies as a catalyst of change in people's lifestyle. Governments have a big role to play in making the resources available for these campaigns and for training people's skills to use the potential of informal education to its fullest extent. Enhanced support in capacity-building among different stakeholders will not only stimulate the development of local strategies for adaptation in the planning and implementation of projects, but also generate the support necessary to push through bigger projects, at a national, regional and international level. Due regard should be devoted as well to traditional knowledge, adaptation strategies and the experience from local communities. Although these communities have become increasingly embedded in the space of flows that characterizes present day society, it is not said that their knowledge is being applied, shared or used to its full potential. In addition, such knowledge will most likely reach its optimal implementation if it is shared on a small community basis.

Adaptation to climate change requires the transfer of technology, knowledge, infrastructural capacity and financial/aid flows between developed and developing countries and hence such efforts will inevitably require international and regional co-operation in order for the effective implementation of adaptation strategies. Furthermore it will also require cross-collaboration between many organizations, businesses, NGO's and UN. Presently, there is no single, overarching institution that coordinates relations between all these agencies. In the WGA, it was suggested that such problems could be ameliorated by the creation of a World Environmental Organization, which would help to streamline, monitor and harmonize cross-cutting relations and funding between numerous actors in the climate change sphere. However it was felt that the creation of another environmental organization would

only add to this complex conglomerate of numerous environmental institutions. Under these circumstances it was proposed that the UN Framework on the Convention for Climate Change (UNFCCC) should be the responsible organization for co-coordinating relations between UN agencies working within the sphere of climate change. There is increasing remit for climate change issues to be incorporated into the work and activities of regional organizations to share experiences and knowledge amongst societies and communities that encounter similar problems (UNFCCC 2007a: 48). This would help to promote and improve regional synergy in adaptation measures (UNFCCC 2007b: 18). South-South collaboration becomes just as important as North-South in this context.

In addition to the requirements of inter-governmental collaboration, the issue area necessitates consistent intra-governmental efforts to build adaptive capacity. Concomitantly therefore, this inevitably requires the integration/incorporation of climate change and adaptation strategies into national government policy frameworks, planning and budgeting in all levels of decision making (UNFCCC 2007a: 29) and incorporating sustainable development into long-term governmental planning frameworks in sectors including, water management, coastal protection, food security and agriculture (Parry 2007: 19). A further important element of such practices would be the integration of disaster-risk reduction strategies into climate change adaptation measures. However as noted by the UNFCCC (UNFCCC 2007a: 29), many developing countries face difficulties in incorporating climate change concerns into their national policies due to a lack of resources and institutional capacities.

In the WGA, the idea of an 'Adaptation Index' emerged, analogous in part to the Human Development Index. Essentially, the index would rank countries on a scale based on a number of factors such as, their methods and concrete actions being undertaken to adapt to climate change, and their willingness to co-operate and engage with inter-governmental and regional adaptation efforts. The index would allow for developing nations to gain creditworthiness in their actions towards building adaptive capacity against climate change and would improve the

transparency and accountability of technology, knowledge and financial flows/assistance between developed and developing countries that scored highly on the index. This would enable such partners to build reciprocal trust and develop relations in this sphere and also help to reduce potential corruption stemming from the transfer of financial flows.

Working Group on Finance

Group Members:

Mr. Monchi Roderos (Group Leader - Philippines), Mr. Mark Grassi (Italy), Ms. Diana Cakule (Latvia), Ms. Claire Mak (Singapore), Mr. Fadly Haley Tanjung (Indonesia), Ms. SooYeon Kwon (South Korea), Mr. Sebastian Trenner (France), Ms. Alejandra Chapa (Spain), Mr. Andreas Wiese (Germany), Mr. Henrik Lindbo Larsen (Sweden) and Mr. Martin Stavenhagen (Germany)

Developed countries have long enjoyed economic prosperity without taking the environmental cost into account. The Stern Review predicts that not acting to adapt to climate change will be far more expensive than acting now. A sacrifice of 1% of developed nations' GDP in order to retain CO₂ at 500ppm in the atmosphere by 2050 (and thereby retain the Earth on schedule to only experience a 2 degree change by 2050) should therefore be seen as a bargain when the healthcare costs of dealing with effects of man-induced climate change are taken into account. Current climate change financing (three quarters of which support mitigation) is estimated at 7.345 billion euro through the Global Environmental Fund, Climate Investment Fund of the World Bank and Clean Development Mechanism amongst others. The current web of funding, with 14 new mechanisms announced in 2007 alone, however, could be dispersed more efficiently. There is a need of reviewing the existing mechanisms and Funds, considering the merging of some of them in order to achieve the instruments' efficiency in a long term. As it is difficult to establish only one fund, the most

reasonable approach would be keeping funds according to the target, for example, adaptation, mitigation, technology. The streamlining of these funds to pursue a common goal is justified. The question of the need to balance public intervention in order to establish a price for carbon whilst ensuring incentives for going Green also exists, supporting the setting-up of regional carbon markets estimated at increasing global welfare. Increasing the ownership of funding mechanisms for developing countries, having more voice in the decision-making and implementation processes, is crucial to retain legitimacy. Different concepts of development and national sovereignty must still be respected and equally-weighted negotiating groups regarding mitigation and adaptation commitments should be set up.

Funding should be provided not only according to emissions produced but those emitted per person, as well as taking GDP into account. A mechanism should be put in place to calculate funding exigencies taking these 3 factors into account. Education of citizens as regards the effects of climate change and the effects of unsustainable consumption remains crucial in both the developed and developing world, as well as increasing awareness as regards policymakers. The EU is currently on a 'business as usual' state of emissions when you take away cuts made overseas through the CDM and the Assigned Amount Units carried over from the de-industrialization of Eastern European states since 1990 into EU-wide averages. China and India's commitments to reducing CO₂ emissions remain too vague to provide inputs to the discussions. The US' current 17% reduction aim by 2020 compared to 2005 levels is insufficient. Targets should be set in line with limiting the increase in global surface temperature to 2 degrees by 2050.

Measures must be taken to stop subsidizing fossil-intensive industries and transfer this money into making loans to increase investment in green technology more affordable. Greater investment into climate change R&D must also be implemented with technology transfer occurring. A clear method of calculation for what proportion of a climate adaptation fund for developing countries is to be provided by



ASEFUAN Dialogue on Climate Change and Sustainable Development.

the different parties of the developed countries should be chosen. The best way is to introduce the global contribution key for all parties, according to which each party is contributing, without exception. As mentioned earlier in the text, governing parties could make appropriate arrangements to set priorities and ensuring the financial flows to the targeted funds, which are more needed. These funds should be streamlined to combine both bilateral and multilateral sources. An international body may identify mitigation and adaptation potentials for the relevant geographical areas. Greater transparency must be reached regarding the mechanisms of evaluation defining the standards on which funds are granted. These should be clearly accessible to ensure their accountability.

There is recognition that developing countries lack the adequate capital needed to successfully avert climate change. This is largely based on two reasons: their economies are not as big as developed countries and they have other budget priorities other than climate change. The first reason would be that climate change does cost a lot of financing. There are varying estimates on how much money is needed to have a clean world. To keep the temperature at 2°C target, according to the International Energy Agency the world needs \$1 trillion while the World Bank says \$475 billion (Economist 2009: 20). Huge sums that developing countries obviously cannot afford. The second reason would come from the fact that, aside from the meager budget that developing countries possess as compared to developed countries, they also have other budgetary priorities. Developing countries have other priorities. The goal for public finance in developing countries, broadly speaking, is to re-allocate funds from other non-essential areas and to increase transparency in governance.

Most of the developing countries place a huge emphasis on the need for development (including industrialization). The need to allocate a significant percentage to industrialization can be explained by how developing countries are striving to gradually be on par with developed countries, so as to be able to firstly, create more jobs for the country, and secondly, to become more independent and sustainable. Hence, even though developed countries

may call for developing countries to reduce their industrialization efforts, it is our opinion that the industrialization efforts by developing countries are minimal compared to developed countries; and the developing countries are only undergoing industrialization so as to meet their basic needs. Hence, while it is undeniable that industrialization does lead to a huge amount of pollution (due to the emission of harmful gases) developing countries can still allocate a percentage of their budget to this aspect.

After reviewing all the areas that developing countries are spending, we feel that if we had to select an area of expenditure that could be significantly reduced, it would have to be the defense expenditure. In the examples given above, both India and China are spending a significant amount on defense, and this amount given in terms of percentage is even expected to grow in the following years. Both developed and developing countries are spending a significant sum on military. This trend may be due to the fact that developing countries feel the need to increase their military; however, in our opinion, it is unnecessary to allocate such a huge percentage to building up ammunition, and this sum of money could have been channeled to environmental issues instead. As we all know, climate change is one of the biggest threat to humanity, regardless of race or socio-economic status.

Although developing countries do not share the same burden of responsibility as developed ones, we feel that everyone must do their part since the whole world is at stake. Thus a re-prioritized budget recognizing environmental responsibility is essential for developing countries. We re-emphasize that basic needs must be met such as agriculture, education, housing, health and other social services must still have huge amounts. The re-allocations must come from non-essentials such as those for military purposes. It is quite irrational when the world is about to irrevocably change and yet we still stockpile on huge amounts of weapons. The other expectation we have is to increase in transparency and governance. We believe that the people should be given a chance to see how their money is being spent. This would lead greater credence to developing countries

efforts in combating climate change and even more economic activity since it correlates with well-governed countries.

With the needed investment of \$1 Trillion a year for climate change efforts, some wonder if public finances can accommodate all efforts. With rich governments currently being battered by the economic downturn and the huge amount needed for their responsibility for climate financing, can they solely afford to answer the amount of \$1 Trillion? In fact some estimates range that accounting for all public/government climate financing efforts, there is still a \$60 Billion that needs to be answered (Economist 2009: 20). The answer to this question is private financing. Private finance or private sector capital come from businesses who want to invest in clean technologies or from philanthropists who want to invest in a greener future. Understandably, developing countries are suspicious of such efforts reasoning out that it shirks the responsibility of developed countries and some developing countries would rather receive financing directly in their public coffers. However, we believe in the efficiency that the private-sector investments offer. Thus we propose that the private sector continually invest in clean technologies. But this can only be achieved if there are good policies which are conducive to green investments.

Carbon-pricing through initiatives such as taxes and/or cap-and-trade system seems to be the most direct and efficient way for businesses to invest in clean technology. Taxing the greenhouse gas emissions would pressure businesses to invest in clean technologies. This also has the benefit of giving businesses a free rein on reducing their carbon emissions by keeping out government in management decisions. Cap-and-trade should also be improved by setting the prices high enough. These carbon-pricing-mechanisms would ensure that businesses have to consider carbon emissions in their investment decisions. In addition, having private capital investing in clean technologies would also pressure developing countries to speed up their governance structures. One of the main reasons why private capital investing in developing countries is because of the economic, political and currency risks normally associated with them. Thus, for private capital

to enter developing countries, it needs to show that their investments will not be put at risk. In addition, this private money can also be insured with public sector funds. This is to protect the investments made by private capital.

We expect that the business community continue and increase their investments in clean technologies. These are done through investing both in the developed and developing countries. Investments in renewable energy industries or in green funds which solely cater to clean technologies are but some of the examples that the private-sector can accomplish. They should also gradually phase out their high carbon emitting and polluting business interests. We also recognize that good frameworks conducive for private capital must be successfully implemented. These frameworks should include carbon-pricing and good governance structures to secure investments especially in developing countries.

Working Group on Technology Transfer

Group Members:

Mr. Christoforos Pavlakis (Greece), Mr. Ciarán O'Brien (Ireland), Mr. Daniel Vamos Fecher (France), Ms. Ida Maegaard (Denmark), Mr. Ihtiar Nur (Indonesia), Mr. Jonas Christensen (Denmark), Mr. Jussi Lehmusvaara (Finland), Ms. Kaori Kume (Japan), Ms. Llanos Martinez (Spain), Mr. Luke Miller (United Kingdom), Ms. Manuela Certan (Romania), Mr. Mihails Kozlovs (Latvia), Ms. Mireia Paulo (Spain), Ms. Sarah Hempel (Denmark), Mr. Winson Kang (Malaysia), Ms. Zlatimira Colova (Bulgaria)

Technology transfer (TT) has been identified by the UNFCCC, scholars and practitioners alike as one of the essential processes for mitigating the threat of climate change and the resulting environmental damages we face globally: “environmentally sound technologies (ESTs) for mitigation and adaptation are central to mitigating climate change and to increasing resilience to climate change impacts”. The IPCC has also noted how “without TT it may

be difficult to achieve emission reduction at a significant scale.” As a topic TT may convey varied connotations under different contexts, however, for the purpose of this paper it has been defined following the IPCC as “a broad set of processes covering the flows of know-how, experience and equipment for mitigating and adapting to climate change amongst different stakeholders such as governments, private sector entities, financial institutions, NGOs and research/education institutions” (Copenhagen Consensus Centre CCC 2009). To add clarity, flows between actors can be divided into primary and dual where the primary flow refers to tangible technologies or intangible “know-how” from developed countries to developing countries and the dual flow is the money that finances the TT.

TT was identified as an important topic of discussion from the onset of the COP, and the first dialogues concerned facilitating TT financing, networks of centres, and the adaptation of technologies themselves. A consultative process was initiated at the COP4 (Buenos Aires 1998), whereby regional workshops took place in Asia, Africa and Latin America and the Caribbean. These workshops aimed to gather local perspectives, concerns and goals regarding TT in order to craft relevant and functional strategies. Following this, at the COP7 (Marrakesh 2001) parties were able to reach an agreement to work together on a set of technology transfer activities, grouped under a framework for meaningful and effective actions to enhance the implementation of Article 4.5 of the Convention. This framework has five main themes including technology needs & needs assessments, technology information, enabling environments, capacity building, and mechanisms for technology transfer (UNFCCC). Furthermore, the Marrakesh Accords provided for the establishment of an Expert Group on Technology Transfer (EGTT), nominated by the Parties, which the COP at its thirteenth session agreed to reconstitute for a further five years. The Expert Group comprises 19 experts, including three members from each of the developing country regions (Africa, Asia and the Pacific, and Latin America and the Caribbean), one from the small island developing states, eight from

Annex I Parties, and one from other non-Annex I Parties. The objectives of the Expert Group are to advance technology transfer activities under the Convention and to make recommendations to this regard.

Key Issues

As we approach the COP15 the status of the work of the EGTT can be summarised by reflecting on the EGTT strategy paper for the long-term perspective beyond 2012 drafted at the Bonn Climate Change Talks in March 2009. Aiming to facilitate the development, deployment, diffusion and transfer of technologies under the Convention the EGTT defined a long term vision based on three pillars: accelerating the innovation of environmentally sound and affordable technologies for mitigation and adaptation in all countries and regions; scaling up the development of environmentally sound and affordable technologies for mitigation and adaptation (especially in developing countries); and speeding up the diffusion of environmentally sound and affordable technologies for mitigation and adaptation (especially in developing countries). The report also focuses on four distinct elements of TT including expanded research, development and demonstration of new technologies; enhanced enabling environments; increased financial facilitation; and integrated sectorial planning and cooperation.

It has been agreed that in order to prevent and mitigate against climate change with the necessary speed it is essential that environmentally sound technologies (EST) are implemented globally across all sectors. It has also been recognized that the current Intellectual Property Right (IPR) regime, although proposing to stimulate innovation and financing, in actuality often acts as a barrier to the transfer of technologies to developing countries, creating a bottleneck which either slows or stops adoption and implementation. Developing countries are concerned about the prohibitive cost of procuring low carbon technologies strongly associated with patents. On the other hand private firms from developed countries demand remuneration for R&D efforts and refuse to license some ESTs due to fears of

competition from local manufacturers in more competitive less developed countries (LDCs). There have been instances in the past where IPR regimes have been overthrown by governments, such as when the US government ceased the patents of airplanes in order to make their production possible during the first World War, and when the Canadian government decided not to respect the claimed patent rights of an American pharmaceutical company for a gene connected to breast cancer. The diffusion of green technology is every bit as important as any of the above-mentioned cases. It is therefore hoped that the COP15 will see developed and developing nations to come to an agreement regarding IPRs which enables all stakeholders to work together towards achieving the common goal of environmentally sustainable development. In order to achieve the above stated goals the foremost need is to establish an overarching system of mechanisms and understandings which balances the requirements of developing and developed nations. Under such a system, the IPR mechanisms and tools will need to both motivate and reward the innovation process and development of new ESTs by protecting intellectual capital while also making access to the ESTs possible for other stakeholders. It is also important to enable an open and honest evaluation of the motives and effects of the IPR system.

One possible tool for solving the problem of making private companies transfer their technology is to create a UN agency funded by all members. It would be this agency's mission to acquire the patents for inventions that are deemed to be essential for green technology. The acquisition should be through a money transfer between the agency and the company which holds the patent. The price has to be considerably lower than the market price, but it would still have to remain high enough to present an incentive for companies to invest in research and development. This would be a price system where the inventor is awarded once instead of perpetually during the next 10-20 years to come depending on the type of invention. The system would also leave the technology to be used by all hence making use of the market forces for the distribution of it rather than what is today the case: leaving

one firm in a monopolistic situation creating inefficiencies on the market. Another approach could be a re-structuring of the current IPR regime, for instance by shortening the 20-year duration of patent protection, or a relaxation of standards which would give more opportunity for developing countries to purchase the technology themselves. Governments also have the option to deem ESTs a "public good" following the approach taken to HIV/AIDS medicine or to enforce compulsory licensing, although this approach would demand a very high level of commitment by all stakeholders to mitigating climate change. Perhaps EST transfer should look into strengthening national regulatory structures that will attract and channel investments into ESTs, allowing the market mechanisms to function in favour of technology transfer.

To achieve consensus in Copenhagen on the issue relating to intellectual property rights, developed and developing country Parties must cooperate in identifying the key technologies required in each developing country Party and ascertain the role of and potential impacts of IPR in the development and transfer of such technologies; that should IPR prove to be a barrier, Parties should be more open in examining how a flexible IPR regime can facilitate the adoption and dissemination in developing countries without jeopardizing the right of innovators. In addition, it must recognise that availability and affordability of low or no-carbon emitting technologies will be key in significantly reducing greenhouse gas emissions in developing countries.

The UNFCCC Executive Secretary Yvo de Boer stated in October 2009 that around €6.7 billion is urgently required to help developing countries move quickly enough. The number and variety of stakeholders this statement is directed towards is high: financial institutions, governments, NGOs, IOs and private sector actors across the globe are currently involved in projects and programmes spanning from regional action to business to business transactions. This effort is insubstantial while commendable as an initial offering, the exact recipients and results are highly unpredictable. As projects and programs, organizations and offices complete their

respective terms, the continuity and stability of funds is threatened. In addition, the financing of technology transfer focuses on paying for the research, development and diffusion of technologies and know-how while important areas such as improving the absorptive capacity of recipient countries through general education and capacity development are perhaps left overlooked. Without a broader financing programme, or effort to increase developing countries' abilities to invest in essential infrastructures and human capital, transferred technologies may be lost or left inutile. It is thus important that the efforts to finance TT take a holistic and coordinated approach, ensuring the effective use of resources.

To tackle technology transfer we identify stable market conditions essential to enable the effective transfer of technologies. The multitude of projects, stakeholders and time-spans makes involvement risky for investors, unfortunately deterring funds from the potential environmental and economic gains to be found in clean technologies and emerging markets. Secondly, in agreement with the recommendations posed by the EGTT during the Bonn Climate Change talks in March 2009, we propose that capacity development for developing countries is a first need to enable the effective implementation of financing efforts for technology transfer. This will require stable political development and regulation on the part of developing countries, as well as a continued effort to build trust on the back of regulatory reform between donor and recipient governments.

Following this capacity development, it is essential that the term technology transfer is not restricted to tangible machineries or processes but emphasizes equally the transfer of know-how and the necessary mindsets to make environmentally friendly industrial and community development possible and desirable for developing countries and their citizens. Finally, it seems that a system for recipient countries to identify and measure their progress and needs on a continuous basis is lacking and needed. In order for investments and projects to be properly evaluated a common set of measurement tools should be developed.

Through an agreed upon set of criteria, objectives and measurement tools countries and investors will better be able to dialogue and direct current and future effort and financial flows.

Carbon market backed by the clean development mechanism under the Kyoto protocol, voluntary carbon market, foreign direct aid and carbon taxes implemented by governments are acknowledged as functioning tools to promote stable markets for investors in clean technologies and these should be continued and expanded. This is conditional on the implementation of carbon tax systems, as they may be directed to developed economies in less need of TT. The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD Programme) represents a possibly effective tool to pool resources and provide financing to protecting forests whose destruction is estimated by the IPCC to contribute to close to 20% of the overall greenhouse gases entering the atmosphere. We hope to see such a tool not only providing the appropriate revenue streams to the right people at the right time to make it worthwhile for them to change their forest resource use behaviour, but also help to channel funding to less 'attractive' and smaller developing countries who are often left out of financiers' focus. This should be auctioned not as an aid model but proportional to behavioural change in the context of forestry management.

Additionally, mechanisms which target knowledge and innovation transfer can help to develop the CDM tool, to which stricter regulation can also be applied. Finally, a tool in the form of a working group or universal methodology for the identification and measurement of needs and progress in developing countries is needed to ensure effective technology transfer. Partnered with this, a measurement system for outcomes achieved by investment on previous projects in context for monitoring is needed. These do not need to be at national levels but they should be in transparent and accountable format. As a minimum the COP15 must present the urgency of climate change as the basis for dialogue. The tools to realise TT need to be further developed while the outcomes must send clear signals and motivations to the private sector. Stable political commitment is a must as is

a renewed cap and trade agreement. We expect also to see more finance directed to local capacity enhancing activities in LDCs as well as developing nations to come up with ideas how they will contribute to stability, trust and measurement mechanisms. We also find the current system which subsidises non-renewable energies to be intolerable in light of the current state of climate change, and hope to see a collective agreement to stop such subsidies at the COP15.

Lack of environmental related knowledge and information, particularly among the populations in the developing countries, correlates and corresponds strongly to the current unacceptable low levels of environmental protection awareness in these societies. Education lays the foundation for awareness and conscience creation and it's only through this that the unknowingly damaging acts towards the environment can and will be mitigated, if not completely eradicated, at the fundamental founding levels-individual and societal. It's also with proper and strong education that green energies transferred into the concerned countries will have long lasting preferred effects and meanings in every sense of the word. A second need is a financing mechanism which enables technology transfer and adoption by as many global stakeholders as possible.

A key need for successful technology transfer between developing and developed nations is the implementation of enabling environments in developing countries. Decision makers in developing countries need to be well informed to create these enabling environments that will accelerate the transfer of technologies. A central, respected expert group such as the UNFCCC must get more actively involved in advising and informing policy makers in developing countries so that mistakes of the past are not repeated. A framework for this engagement is required. There is a need for climate change risk management to be included in national development strategies. The vast majority of technological developments and patent applications come from developed countries. Thus it is also required to assist the diffusion of new climate friendly technologies to developing countries. Legal frameworks protecting IPRs and patents must be in place in developing countries

to promote this diffusion.

Specialized and trained individuals and organizations from developed countries have been and are brought into the developing countries for execution of highly sophisticated green technologies. At the very same time, opportunities should be tapped to provide and spread environmental knowledge via these qualified entities to the communities. Today populations in regions such as the EMEA more often than not have the slightest ideas of how their daily actions could possibly have adverse consequences on the environment. Funding efforts for education in these countries calls for the need to be intensified and at the same time carried out more intelligently and transparently. Governments from both developed and developing countries should work in tandem, for example through exchange programmes involving professors and students among universities and setting up mutually recognised and supported environment agencies in each country to disseminate educational information to individuals leading up to societies as a whole. Other potential approach could include a more encompassing Public-Private Partnership (capacity building) project where educational activities could be incorporated while creating the desired deliverables.

Having intellectual capability in environment and technology related areas will help decrease dependency of developing countries on the developed ones and this is instrumental in benefiting both parties on a long term basis. When experts from developed countries leave behind the created technologies, developing countries will have their own qualified personnel to ensure their continual existence and effectiveness to reach the final goals. A micro-credit system should be set up in regions to promote entrepreneurial spirits of individuals who aim to contribute their parts in curbing climate change. Even a simple business or trade, e.g. one that involves loans and sales of solar lamps in a village to replace traditional Kerosene lamp requires some start-up capital. Individuals should be supported financially by first getting the chance to loan out capitals via this specially targeted crediting system at a lower interest rates or rates that suit their ability to repay the

loan. Those who do not run the business should get the chance to loan money to better reach environmentally friendly appliances. Based on the example above, it is obvious that this will subsequently help to widen the coverage of environmentally friendly technologies and lifestyles to increasingly expanding scales: individuals, families, societies and nations.

Targeted policies and measures at national and international level can be used to encourage development of an enabling environment. Tools such as patent pools of relevant technologies can be created to simplify how countries can get relevant licenses. A central fund that purchases patents and licenses for key technologies would aid diffusion and reduce barriers to technology transfer. The traditional mechanisms of trade and investment that have been used for centuries can also help. Global organisations like the WTO have assisted trade between countries by facilitating agreements. Introducing multilateral pacts to share technologies and increase FDI (Foreign Direct Investment) should also be enforced. The Clean Development Mechanism is the most obvious example of an existing global mechanism assisting technology transfer. This framework must be streamlined to make it easier for developing countries to take part. International policy must also recognise that countries on the front line of climate change such as Bangladesh and low lying islands will require more help in adapting and mitigating the effects of climate change. Targeted technologies must be transferred to these countries to assist them in their climate change adaptation and mitigation.

An independent and international technical body should be created to offer advice and assess the future plans and current initiatives regarding meeting measurable technology transfer. The scale and depth of the challenge of climate change demands many approaches to transferring technologies. Novel methods must be used to complement the educational, financial and policy tools already discussed. Using an open source model in the development of climate change technology would avoid patenting and licensing issues. Its successful expansion in the software industry can act as a model. The creation of regional Technology

Transfer Centres as one-stop-shops would allow vendors and prospective clients of new technologies to meet. These centres of excellence would have skills in project design, program management, and policy advice and capacity development. The minimum is that developed countries support capacity building in developing countries that will help establish enabling environments and existing mechanisms must be enhanced to greater scale. Agreements must be reached in key sectors such as power generation and transport.

Overall Conclusions

Climate change encompasses changes in the different components of the ecosystems, i.e. air, land, water and life, which may alter the capacity of the planet to sustain life. To lessen the impacts of climate change through the reduction of carbon output, it is necessary that mitigation becomes a local, national, regional and global response, since any carbon and other greenhouse gases emitted in one area still significantly contribute to the global, regional, national and local climate changes. Cooperation among all stakeholders and among countries is an important function to produce a semblance of success in implementing mitigating strategies to abate the impacts of climate change. Whereas mitigation provides communities with short term solutions to problems presented to them because of the changing climate, adaptation holds the key to longer term, sustainable solutions that will allow communities to cope with climate change and at the same time keep their own impact on climate to a minimum. The WGA full-heartedly agreed that present adaptation strategies are insufficient to meet the challenges ahead.

It is striking, to say the least, that a Belgian politician can openly declare that, when his son learnt in school to close the water tap while brushing his teeth, he immediately told his son to forget about this 'bullocks' because there is plenty of water in rain-rich Belgium. Such a statement defies the whole concept of a concerted effort of all countries, with shared but differentiated responsibilities, to adapt their societies in order to meet climate change's challenges to mankind. Moreover, it shows

how wide-spread misunderstanding of climate change and its impact on our lives still is. If we would all be fully aware of this impact, no politician would dare to make above statement publicly.

The WGA identified and discussed three key issues in this regard: research, education and harmonisation. Intensified data collection, research and analysis would provide more ground on which to base and improve adaptation strategies. The knowledge gained with research should not remain limited, however, to an academic and policy-making environment. It should be shared with society at large, by educating people both formally and informally about climate change, its direct and future impact on our society and different adaptation strategies. Increasing educational capacity and sharing adaptation practices globally and locally have the potential to yield very big results.

In battling climate change, there is a “common but differentiated responsibility” and this is the premise on which the UNFCCC is based: everyone should do their part in saving the environment but some countries have a bigger burden than others. However, this does not mean that only developed countries should solely act but we also recognize that developing countries also must play out their part since everyone is at stake. Any future deal on climate change public finances from the developed countries should first stop subsidizing polluting industries, a greater investment on technology transfer, a clearer method for calculation of funds. These funds should be streamlined into one big and organized fund with an increase in accountability, transparency and therefore legitimacy. The private sector funds should not be left out but should be improved through developing frameworks conducive for private capital and a considerable increase in their investments in clean technology.

The issues and perspectives surrounding the development and diffusion of environmentally sound technologies are complex and involve overlapping needs and tools as well as diverse stakeholders. The discussions surrounding technology transfer revealed that two issues are crucial to move forward. First, it is important to

have mutual respect and understanding between countries at different levels of economic, industrial and social development, as well as between public and private actors. Second, this must be accompanied by a willingness to engage in open and honest dialogue. It is our hope that COP15 will demonstrate commitment and dedication of leaders across the world to take necessary actions to curb climate change and work towards a new model of growth which works to serve the well being of our shared planet and its inhabitants. The fear of the loss of economic gain should never stand in the way of doing the right thing, as history has shown that the creativity of humankind will always lead to new opportunities and new solutions.

Consolidated References

British Council. 2009. Jezersko Principles for Climate Action. Available at <http://challengeeurope.britishcouncil.org/index.php/advocate-news/452-jezersko-principles-for-climate-action>

“Closing the Gaps”, A Special Report on the Carbon Economy, The Economist, Oct. 5-11, 2009

Ewing B., Goldinger, S., Wackernagel, M., Stechbart, M., Rizk, S.M., Reed, A. and Kitzes, J. 2008. The Ecological Footprint Atlas 2008. Oakland: Global Footprint Network. pp 8/18. Available at http://www.footprintnetwork.org/en/index.php/GFN/page/data_sources/

Magicc 5.3, OECD ENV-Linkages model and IPCC (2007), AR4 In OECD. 2008. Climate Change Mitigation: What Do We do? Available at www.oecd.org/dataoecd/30/41/41753450.pdf

Metz, B., Davidson, O.R., Bosch, P.R., Dave, R. and Meyer, L.A. (eds). 2007. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press. Available at http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wg3_report_mitigation_of_climate_change.htm
Parry, M.L. (et al). 2007. ‘IPCC, 2007:

Appendix

Summary for Policymakers' in: Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental, Cambridge, Cambridge University Press: 7-22.

Shackley, S., Wood, R., Hornung, M. Hulme, M., Handley, J., Darier, E. and Walsh, M. 1998. Changing by Degrees: The Impacts of Climate Change in the North West of England (Technical Overview).

United Nations Framework Convention on Climate Change (UNFCCC) (2007a), 'Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries', available at: http://unfccc.int/adaptation/implementing_adaptation/items/2535.php, accessed 08/12/09

United Nations Framework Convention on Climate Change (UNFCCC) (2007b), 'Synthesis of outcomes of the regional workshops and expert meeting on adaptation under decision 1/CP.10', available at: http://unfccc.int/documentation/documents/advanced_search/items/3594.php?rec=j&priref=600004229#beg, accessed 08/12/09

Casa Asia Consortium



Casa Asia Board of Trustees



Companies collaborators



Casa África Consortium



GOBIERNO
DE ESPAÑA



MINISTERIO
DE INDUSTRIA,
TURISMO Y COMERCIO

aecid



Gobierno de Canarias



Ayuntamiento
de Las Palmas
de Gran Canaria

Casa África Board of Trustees



GOBIERNO
DE ESPAÑA

MINISTERIO
DE MEDIO AMBIENTE
Y MEDIO MARÍTIMO



GOBIERNO
DE ESPAÑA

MINISTERIO
DE EDUCACIÓN



GOBIERNO
DE ESPAÑA



MINISTERIO
DE INDUSTRIA,
TURISMO Y COMERCIO

ICEX
INSTITUTO
ESPAÑOL
DE COMERCIO
EXTERIOR



cámaras



CESCE
Seguros de Crédito



sgae BinterCanarias



ABENGOA



BOLUDA
CORPORACIÓN MARÍTIMA



SATOCAN

Climate Change and Renewable Energies in Asia and Africa

Casa Asia and Casa África present the conclusions of the International Conference on Climate Change and Renewable Energies in Asia and Africa organized in collaboration with the Spanish Agency for International Development Cooperation AECID, the Obra Social Fundación "la Caixa" QuEST, ACS Foundation and Técnicas Reunidas.

The subjects discussed in the publication include multilateral programmes for sustainable development concerning energy, regional and global policies in the struggle against climate change, strategies for the use of clean energy in Asian and African countries, and entrepreneurial cooperation in the renewable energy sector between Africa, Asia and Europe.

Edited by:



Supported by:

