



Emerging Markets Forum

Climate Change – Priority Agenda for Policy Makers and Opportunities for Business in Emerging Markets in Asia

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Discussion Draft

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“Climate Change – Priority Agenda for Policy Makers and Opportunities for Business in Emerging Markets in Asia”

A Discussion Note ^{1/}

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I. Introduction

1. By now, we are all very aware with the energy, climate change, and sustainable development issues facing the Asia and Pacific region and the world today. It is also to be emphasized that any development initiative to address climate change should be taken in the context of a long-term perspective and with an understanding of the global implications.

2. Asia is fast becoming a major source of greenhouse gas emissions (GHGs) as a consequence of rapid and carbon-intensive economic growth. Today, developing Asia accounts for 29% of global energy-related CO₂ emissions - three times bigger than its share 30 years ago. With an estimated \$6 trillion needed for energy investments by 2030, it is projected that Asia's share of energy-related emissions could rise to 42%.

A. The Science

3. The IPCC 2007 study has underscored that climate is changing in an unprecedented manner. If we are to continue our energy consumption patterns, by year 2100, carbon dioxide concentrations are expected to exceed 700 ppm and global average temperatures to increase between 1.4 – 5.8 degrees C by 2100. The impacts of these in Asia such as flooding, freshwater availability, increase in sea levels, changes in rainfall patterns, etc will put enormous pressure on sustainable development of most developing countries in Asia.

B. The Economics

4. The Stern Report and others have already highlighted the climate change issues comprehensively. In order to contain global warming below 2degrees C by 2050, the expected cost of stabilizing emissions consistent with 400 - 500 ppm carbon dioxide equivalent (CO₂e) ranges from 1- 5% of global gross domestic product (GDP). The annual cost of 1% of global GDP will only be possible if we start to take strong action now.

C. The Goal of Arresting Climate Change

5. While a range of actions will be needed, the slim hope for keeping atmospheric concentration of carbon dioxide equivalent within current levels (430 ppm) critically hinges on two key factors (i) priority policy actions on energy efficiency to be put in place by national governments, and (ii) a shift to a low carbon economy by putting in place policies that puts a price on carbon – whether in the form of a tax on emissions or in a cap-and-trade system as provided under the Kyoto Protocol.

D. Purpose of the Discussion Paper

6. This discussion note sets out some of the priority agenda for the policy makers of Asia's emerging markets, and opportunities for business. It seeks to identify key priority areas in which policy actions can be undertaken which will lead to providing ample opportunity for business investments in the near term.

II. Priority Policy Actions for Emerging Markets in Asia

7. Asian economies need to make large investments in energy conservation, energy efficiency, alternative energy sources, clean technology, and energy for the poor. In this context, some priority actions for the policy makers of emerging Asia and the opportunities for business in emerging Asia are mentioned below.

A. Energy Conservation and Efficiency

8. There is a need to promote energy conservation and efficiency in a wide range of applications – in buildings, appliances, industries and transport, including urban mobility. Residential buildings and the industrial sector account for 60% of global electricity consumption. Energy efficiency has the potential to reduce GHG emissions by 45% to 53% and there are known technologies that can make buildings 70% more energy efficient. Rail-based transport is 6.4 times more energy efficient (kcal per passenger-kilometer) than private vehicles and pollution levels go down.

9. Some 44 million people are being added to our cities each year. Asia has several mega cities (where population size is more than 10 million) but the lifestyle model of working in downtown, living in suburban areas, and shopping in malls does not seem sustainable over time. Improving energy efficiency in the transport sector is another priority. Options will also include looking at other modes of transportation such as hybrid vehicles.

10. Significant opportunities exist for expansion of energy saving companies (ESCOs) but more needs to be done to make these ventures more economically viable and sustainable in the longer-term.

11. Interestingly, a global survey showed a high willingness by the consumers of both developed and developing markets (such as India, China and Brazil) to change to stop climate change. Consumers are willing to use more energy-efficient appliances, recycle, and drive more fuel-efficient cars, adjust thermostat to use less energy and use public transportation systems more.

Priority Actions for Policy Makers and Opportunities for Business

12. Selected actions¹ policy makers can take could include the following:

- (i) Enhance the use of building codes to require better insulation and energy-efficient lighting systems in residential and commercial buildings.
- (ii) Implement regulations to enforce the 'negative' side of energy efficiency such as promoting the use of CFC-only and energy efficient appliances (such as by labelling).
- (iii) Review the minimum carbon emission standards of polluting industries (i.e., cement, steel plants) and vehicles with a view to change regulations to ensure that after an appropriate period of time, the licensing of new plants and the

¹ These selected actions are not meant to be comprehensive or exhaustive but rather are illustrative of some actions which can be taken in the near term.

renewal of certain licenses will only be issued after meeting certain minimum standards.

- (iv) Consider using tax and other incentives such as those in support of promoting hybrid vehicles.
- (v) To ensure a more sustainable lifestyle, there is a need to improve urban planning, including land-use plans. Well-planned mass public transit systems will be needed in major cities. These actions will have significant impact on the transport sector's energy efficiency by reducing travel demand while maintaining convenient access to work and services in the community.
- (vi) Access to long-term capital funds is a problem for the private sector ESCOs. Financial markets are pricing the energy efficiency projects at higher costs because of the inherent risks and other externalities. Policy makers can support these fledging projects by creating guarantee mechanisms and/or tax incentives, as appropriate, to help ensure project viability.

13. Some opportunities for business will include:

- (i) A majority of global executives regard climate change as strategically important but they have not translated this awareness into action. For example, by moving into energy efficient operations (insulations, lighting etc), the immediate cost savings in energy consumption will translate to higher profitability. In Germany, insulating buildings to a 7-liter standard from a poor energy efficiency of 25 liters of oil equivalents per square meter, helps to lower energy consumption dramatically, with a positive payback on the investment.
- (ii) The push for greater energy efficiency will make available attractive investment opportunities in the electronic components industry and will transform the automotive industry. Carbon emission regulations will hasten the early adoption of hybrid vehicles and will bring forward the production of plug-in hybrid vehicles. It is estimated that by year 2030, the number of hybrid or plug-in hybrid light-duty vehicles on the road globally will be close to 1 billion units. This would result in reduced total global oil demand by over 13%, and net decline in CO2 emissions of 39% from light-duty vehicles by 2030.
- (iii) With tighter carbon emissions regulations, it is also expected that the automotive batteries industry, and battery-management systems may benefit with the development and application of more powerful lithium-based batteries with a market potential of over \$150 billion.
- (iv) In the US alone, ESCOs have obtained more than 70% of their business from the public sector over the last twenty years. Clearly, the public sector is a prime attraction for energy efficiency projects. Assistance by multilateral partners to on-lending institutions are good channels for the delivery of financing owing to their familiarity with local government regulations, financing and accounting practices and the capacity to evaluate the credit condition of local borrowers.

- (v) Multilateral finance institutions (MFIs) can offer partial credit guarantees against the repayment of the private sector projects given that the risks inherent in these projects are externalities which the markets cannot or are not yet willing to absorb. For example, ADB's Energy Efficiency Multi-project Financing Program in the People's Republic of China (PRC) assists by providing credit guarantees as well as partnering with PRC banks in developing energy efficiency financing activities for local industries.

B. New Technologies and Renewable Energy

14. There is a need to adopt new technologies and invest in renewable energy. The cost of renewable energy is still higher compared to traditional sources of energy. Some countries like the People's Republic of China (PRC) and India have already approved enabling policies for renewable energy. In the case of the PRC, the Renewable Energy Law became effective in January 2006 and requires that 10% of total capacity addition to be renewable. In India, several states have committed a target of 6-10% of its energy sources from renewable energy by 2010. The renewable projects, ranging from wind turbines and solar and which eliminate greenhouse gases, receive carbon credits which the developed countries can buy to meet their carbon credit targets.

Priority Actions for Policy Makers and Opportunities for Business

15. Selected policy actions¹ could include the following:
- (i) Set priorities and targets which will require a certain percentage to be first purchased from renewable energy sources.
 - (ii) Set differentiated feed-in tariffs depending on the source of energy. As technology improves, these tariffs can be adjusted to reflect the lower costs of technology. Support by way of a government mandate is perhaps one of the strongest means to enable renewable energy technologies to come to a critical commercial volume. But, deregulation policies should also be promoted to support appropriate clean and renewable energy technology where it is most cost efficient.
 - (iii) Developed countries should assist in transferring new and better technologies to developing countries. Government-to-government and private sector sharing of knowledge are essential to harnessing the vast potential of new technologies. There also exists a growing pool of concessional funding provided by the donors and available through multilateral institutions which will make it possible to meet the huge investment financing requirement of renewable projects.
 - (iv) In addition, the relatively high cost of renewable energy technologies may require government financial support such as subsidies in the earlier stages of application. Historically, these technologies have generally penetrated markets only with well-calibrated government financial support.
16. Some opportunities for business will include:
- (i) The private sector drive for improved and new technology through research and development will play a vital role in efforts to address the climate change issues.

Demand is growing for low-carbon solutions and new business models that reward suppliers and end users in the power and transport sectors for consuming less energy will be as important as new technologies.

- (ii) Where negotiations for new technology transfers can be complex and where capacity of emerging Asian economies are weak for such negotiations, the private sector, donor partners and the governments can collectively be involved in such sophisticated processes. Capacity building efforts in governments resourced either internally or from donor partners will be critical.
- (iii) Multilateral financing institutions can offer policy advice and also products such as local currency financing. For example, ADB approved in March 2007 a 13-year loan of up to Indian Rupees (Rs) 3.52 billion (or approximately \$79.3 million) to support \$114 million 100MW wind energy facilities in Maharashtra, India. The state requires the electricity distributors to procure a percentage, ranging from 3 – 6%, of energy inputs from renewable energy sources. The feed-in tariff from wind power is not very high and the overall net impact on the consumer tariff is insignificant. The project is eligible for carbon credits and income from these credits will be around \$1.1 million per year. The project is both financially viable and economically sustainable. The reduced carbon emissions, sale of carbon credits and other economic and social benefits are projected to generate an economic return of 16%.

C. Coal – Using it Efficiently

17. Even with strong push for energy-efficient technologies and sources, it seems the aggressive build-out of renewable energy will not be sufficient to generate CO₂-free electricity to meet the global demand. Notwithstanding their clear advantages, renewable energy such as wind, solar, hydroelectric power will not be the cure for the world's addition to fossil fuels. Wind and solar power continue to have cost, reliability and transmission disadvantages and hydroelectric power is only available in limited locations.

18. We shall continue to rely on coal-burning power plants in the foreseeable future. Where there are no regulations that directly or indirectly impose a cost on carbon emissions, coal-based power plants will remain to be the cheapest source of electricity. However, once regulations impose a cost of even at least \$12/tonne of CO₂ emissions, the cost dynamics will shift the preference to other power sources. At a cost level of \$50/tonne of CO₂ emissions, some projections inform us that it would be more economically rational to build coal-capture power plants and to pay for transport and storage of the CO₂ emissions, than to build coal or natural-gas plants that emits carbon. Thus, carbon capture and storage is an important strategy for abating carbon emissions. Even as the technologies are in the nascent stages, new coal plants should aim to capture carbon as it appears likely that the technology to sell these captured carbon will be possible in future. The choice of technology is important as a coal fired power plant built today is likely to last about 50 years.

19. There is need to adopt available cleaner technologies for coal plants such as fluidized bed combustion, super and ultra-critical boilers and integrated gasification combined cycle (IGCC) plants. There are presently around 18 IGCC power plants in commercial operations globally, representing less than 1% of total coal-power plants. Around 27 new IGCC and carbon-capture-capable plants are planned from 2009 to 2016.

Priority Actions for Policy Makers and Opportunities for Business

20. Selected policy actions¹ could include the following:
- (i) Putting in place implementing regulations that set the minimum efficiency standards of coal fired power plants. In PRC and India, governments are shifting support away from sub-critical coal plants. In PRC, the government is shifting away from the 30-60MW power plants to carbon capture-ready plants.
 - (ii) A clear policy on the use of coal is needed to lower carbon emissions effectively. The key factor here is an understanding of the most efficient and appropriate technology for each country at a particular point of time. To illustrate, the Mong Duong 1 Thermal Power Project in Viet Nam (and in which ADB has approved an assistance package of \$931 billion equivalent) has found the CFB (circulating fluidized bed) technology to be optimal and will reduce carbon emissions by 30,000 tons per year compared to using conventional pulverized coal technology. Although super critical boiler technology is well established, it is not suitable for the project given the relatively poor-quality domestic anthracite available at the project site. However, for new coal power plants planned in the south, Viet Nam will use super critical boiler technologies which have higher efficiencies.
 - (iii) Energy savings from efficiency power plants (EPPs) have multiple benefits such as (i) energy security improves as lesser new power supply capacity will be needed to meet future demand, and less coal will be used for power generation; (ii) the carbon emissions are lowered because of avoided coal use. Regulations can encourage the shift towards EPPs. It is estimated that an EPP can be developed at about half the cost of a coal-fired power plant.
 - (iv) IGCC technology has yet to take on a broader scope of support given its relative expensive technology, complexity of operations, and the current state of lack of standardization and economies of scale. However, with the increasing concern over climate change issues, some regional governments are beginning to favor IGCCs. Carbon regulation will decidedly give IGCC plants a big push forward. Donor partners can also make this happen by making possible the transformational changes through policy dialogue and advise and funding support.
 - (v) In building new coal-fired power plants, new and cleaner technologies, including carbon capture should be considered. To reap the full benefits of carbon sequestration, there needs to be a clear set of global legal framework and more research and development to fill in some of the knowledge gaps. The research and development leadership in this area in Asia remains weak.
21. Some opportunities for business will include:
- (i) The capital investments have begun to flow into new technology solutions, including on gasification technology for larger-scale applications. Annual spending on injection and storage of CO₂ is projected to reach \$1 billion by 2015 and \$80 billion by 2030.

- (ii) Opportunities exist for pipeline operators and owners in the carbon capture and transport industries with expected CO₂ capture and sequestration to be exceeding 7 billion cubic feet (bcf) a day by 2010 and 500 bcf a day before 2030 – roughly twice the amount of natural gas currently flowing through the pipelines. It is estimated that global spending for infrastructure to transport CO₂ will likely reach \$3 billion per year by 2020 and will exceed \$15 billion by 2030.
- (vii) The business opportunities for EPP projects could also increase. Very recently, ADB approved a \$100 million assistance to the Guangdong provincial government to provide financing to private sector EPP projects in Guangdong, People's Republic of China (PRC). The objective is to retrofit existing equipment with more efficient equipment which, in aggregate, will reduce the need to construct and operate a conventional coal-fired power plant. This clearly demonstrates that the private sector is keen to become involved but that governments and multilateral development organizations like the ADB have a role to play.

D. Tapping the Benefits of the Carbon Markets

22. Emerging market economies should actively participate in receiving the benefits of carbon reduction credits and look beyond the arrangements under the Kyoto Protocol (i.e., 2012). Last year, the carbon market was worth about \$64 billion, which has more than doubled from the \$31 billion market in 2006. Approximately, 550 million project credits were traded in 2006, and nearly 1 billion in 2007. If the US were to introduce carbon trading, the value would likely leap to \$3 trillion a year by 2020. The PRC alone can generate carbon credits between 150 and 225 million tons equivalent per year. This is equivalent to annual earnings of up to \$2.25 billion which can easily fund over 1500 MW of additional generation capacity in wind power every year.

Priority Actions for Policy Makers and Opportunities for Business

23. Selected policy actions¹ and opportunities for business could include the following:
- (i) The global community should create long-term policy certainty by promoting arrangements that look beyond the present 5-year period arrangements under the Kyoto Protocol to give confidence to governments and project developers, and to attract the significant amounts of investments needed in energy efficiency and alternative energy options.
 - (ii) Policy makers can take advantage of the multiple climate change initiatives supported by the donor community. Multilateral financial institutions can assist in advising the governments of developing Asia on the use of carbon funds. The World Bank Group has since 2000 contributed to the development of the carbon market and manages a number of carbon funds and facilities reaching over \$2 billion in value. In partnership with the European Investment Bank (EIB), the European Bank for Reconstruction and Development will establish the Multilateral Carbon Credit Fund to support the development of the carbon market. The EIB recently announced a "Post-2012 Carbon Credit Fund" in conjunction with four other European public financing institutions.

- (iii) The Carbon Market Initiative is one of ADB's new initiatives under its Clean Energy and Environment Program. The Asia Pacific Carbon Fund, a trust fund of around \$151 million, provides the crucial upfront cofinancing of future carbon credits through clean development mechanism (CDM) projects in developing member countries. ADB's Future Carbon Fund is the first fund of its kind to offer upfront payment on an unsecured basis for delivery of post 2012 credits.
- (iv) Policy makers should create the enabling environments through the appropriate regulations to enable a robust carbon market. Although carbon trading has been robust in Europe through the carbon exchange, governments can get together to envision possibly an Asian carbon exchange market as a long-term goal.
- (v) Although there are some criticisms that benefits of carbon market mechanism accrue to the carbon credit traders out of speculative trades and not the power generators, the carbon market mechanism remain as a very significant viable front loaded financing option to ensure financial viability of power generating companies.

E. Access to Energy and Regional Cooperation

24. Access to energy services is a vital prerequisite for poverty reduction. About 2.4 billion poor people in the world, mostly in rural areas, continue to rely on traditional biomass fuels. Further, 1.6 billion people have no access to electricity, and 1 billion of them live in Asia. These numbers are not expected to change much even by 2030, and giving the poor access to energy is another major challenge facing this region. The lack of such access severely affects productivity of the poor.

25. Asia needs to accelerate investment to increase poor people's access to energy. Clearly, the current efforts are not adequate. Meeting the minimum energy needs of the poor to enable them to share the benefits of economic growth is as important as a shift toward a low-carbon economy. Studies have shown that the average annual income of a connected household is 2.26 times greater than an unconnected household. Improvements are also observed in savings, literacy rates and household health. There is a strong correlation between per capita electricity consumption and the human development index (HDI) across countries. Further HDI-per capita electricity consumption rises sharply at lower electricity consumption levels but quickly tapers off above 4,000 kWh per capita electricity consumption levels.

Priority Actions for Policy Makers and Opportunities for Business

26. Selected policy actions¹ and opportunities for business could include the following:
- (i) To catalyze actions and improve progress monitoring, it is important that the Millenium Development Goals (MDGs) be supplemented with some energy-specific targets. These could include targets on the access to modern fuels for a certain proportion of those who at present use traditional biomass for cooking, off-grid renewable power generation, electricity per capita based on HDI, etc.
 - (ii) Policy makers may also choose to offer targeted subsidies for rural electrification and renewable rural electrification. When deciding on bids from private firms for

rural electrification, policy makers can give a margin of preference to firms proposing renewable energy in the bidding.

- (iii) Development partners play an important role of providing policy advice and capacity building efforts through technical assistance as well as concessional funding to support rural electrification and access to energy for the poor.
- (iv) Policy makers can also look at a regional integrated approach to sustainable energy development. In a recent study by the ADB on Building a Sustainable Energy Future for the Greater Mekong Subregion (GMS), a simulated modeling of discounted total costs of power generation indicates that the GMS-integrated scenario would be around 19% lower in cost than the existing agreements and project investments, and is estimated to be an equivalent of \$200 billion in cost savings. Regional integration will also reduce overall energy dependence by as much as 5.5% of total energy consumption. Further, analysis shows that when the external environment and social costs of energy choices are included in the base case scenario, the discounted total cost will equal to the cost of low-carbon scenario. This then makes the low-carbon economy viable.
- (v) Opportunities also exist for the private sector to enter into public-private-partnerships in support of rural electrification as part of its corporate social responsibility program to the local community.

F. Adaptation to Climate Change

27. Emerging market economies should integrate adaptation to climate change into future planning and investments. We need to focus on addressing the uncertainties connected with the future effects of climate change and corresponding adaptation needs, especially for the poorer countries.

28. There is the related question of “avoided deforestation” as a strategy for reducing carbon emissions. The Stern Report tells us that about one fifth of the total carbon emissions come from deforestation and is more than those from the global transport sector. Avoid deforestation is considered to be up to 30 times cheaper than reducing carbon emissions from fossil fuels.

Priority Actions for Policy Makers and Opportunities for Business

29. Selected policy actions¹ and opportunities for business could include the following:
- (i) Policy makers should take into consideration climate risk management strategies while planning for long-term investments.
 - (ii) Policies should be implemented in a clear and predictable way in order to mobilize the private investments.
 - (iii) Policy makers should seriously consider setting urgent priority actions, including providing financing to ‘avoided deforestation’ and the need to review the uncertainties associated with ‘avoided deforestation’ in the post-Kyoto Protocol years.

- (iv) There is a need to make detailed assessment studies on the impact of climate change and the needed adaptation strategies at the country and the local levels. Once such assessments are available, the opportunities for adaptation measures will be huge and significant investments will be required. Concessional funding such as those from the planned \$4.5 billion Climate Investment Fund and the existing Global Environment Fund from the donor community will be available for adaptation efforts.

III. Support from Donors and MFIs in the Climate Change Agenda

30. Clean energy and climate change impacts have become the center of discussions in almost all high level discussions such as in the G8 dialogues, the UN discussions and have become one of core programs of multilateral and bilateral financial institutions. There is a lot of commitment from the global donor community to push the dialogue further and help the middle income and developing countries to address the climate change issues. Some of these collective efforts include the proposed Climate Investment Fund initiated with funding from the governments of the UK, US and Japan (with the World Bank as trustee and the multilateral agencies as executing agencies). The fund size will be around \$4.5 billion and is intended to provide concessional financing, guarantees, and grants in support of climate change projects and capacity building.

31. As previously illustrated, there are various initiatives by MFIs in support of climate change. Some of the programs and initiatives of one of the MFI – the ADB – are mentioned here.

- (i) The recently approved Strategy 2020 and the Asian Development Fund (ADF) X replenishment include environment and climate change as one of ADB's core priority areas of operation.
- (ii) The Energy Efficiency Initiative (EEI) which sets a goal of clean energy investment target of \$1 billion per year starting in 2008 which was met in early June 2008.
- (iii) Establishment of the Clean Energy Financing Partnership Facility which is to help fund the clean energy and climate change projects.
- (iv) The Renewable Energy, Energy Efficiency and Climate Change or REACH program, consisting of several trust initiatives by the Governments of Canada, Denmark, Finland, and the Netherlands to promote investments in renewable energy and energy efficient greenhouse gas abatement technologies.
- (v) A Climate Change Fund of \$40 million, resourced from ADB's 2007 net income which will support both climate change mitigation and adaptation activities.
- (vi) The Asia Pacific Carbon Fund of around \$151 million and the Future Carbon Fund (with maximum fund size of \$200 million).
- (vii) Financing modalities to catalyze private sector investments, such as (a) the local currency loan which will address the inherent currency mismatch of long-term infrastructure projects; (b) partial credit guarantee which can assist in lengthening the loan tenors to extend beyond the usual 5-7 year tenors of local financing

sources; and (c) political risk guarantee which helps in mitigating country risk concerns by private sector financiers.

IV. Conclusion

32. The developing economies of the Asia and the Pacific region have an important role to play in responding to the global challenges of energy and climate change. The opportunity to make a difference within the global community is now. We must act with a great sense of urgency to keep these discussions with a forward-looking post-Kyoto Protocol planning horizon. The policy makers, the private sector, the civil service organizations, and the development partner agencies – have started to pool together the knowledge base and the financial resources, including grants and concessional funding, sound policy analyses to assist the emerging economies. The final global outcome will depend on the collective efforts of all to ensure a cleaner and safer world for our future generations.

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Emerging Markets Forum

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