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"India's Climate Change Initiatives: Strategies for a Greener Future"

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I wish to thank the Carnegie Endowment for the opportunity to acquaint informed public opinion in the United States of how India is tackling the challenge of Climate Change. This is also an area of substantial Indo-US collaboration already and many more opportunities are likely to open up, thanks to President Obama's decision to put Climate Change at the top of his Administration's agenda, including his 10-year, US $ 150 billion Renewable Energy initiative.

At the outset, let me put India's responsibilities as well as constraints, in respect to the challenge of Climate Change in its proper perspective.

It is often stated that India belongs to the category of large emitters which must take on carbon reduction commitments in order to mitigate global climate change. India is described as the third largest emitter after the US and China. The latest data shows that while US and China are each responsible for about 20% of global CO_2 emissions, India, with its billion plus population, generates only 4% of such emissions. Furthermore, as against a per capita CO_2 emission of 20 tonnes for the US, India's is a low 1.8 tonnes per capita. Therefore, to club India together with so-called major emitters is misleading and unfair.

I would also like to draw your attention to the fact that despite our low per capita emissions currently, our Prime Minister has declared that even as we pursue our goals of economic and social development, we will not allow our per capita emissions to exceed the average per capita emissions of developed countries. The significance of this commitment is not fully appreciated. India is after all still a developing country. Our per capita energy consumption is about 500 Kgoe against the world average of 1800 and there are an estimated 400 million Indians who do not have access to commercial energy. The developmental imperatives are huge and yet we are determined to meet them with a sense of ecological responsibility.

We also believe this can be done. Developing countries like India provide the world the opportunity to avoid additional GHG emissions. The reason is that we are still in the

process of building our energy, transport and industrial infrastructure. We can make investments in leapfrog technologies so that we can avoid polluting our planetary atmosphere. Our cities can be built with modern public transport systems. Our energy security can be pursued through local and distributed systems based on renewable and bio-fuels. And industries that are being set up can adopt the most energy efficient and least carbon intensive technologies.

Despite the growth of population and the need to ensure food security, India is increasing its forest cover and intends to raise it from the current 22% of total land area to 33%.India has also for the past several years severely restricted the conversion of forests in the country to other uses; as a result deforestation has been halted and reversed.All these actions amount to creating a huge carbon sink for absorbing CO_2 in the atmosphere.These forests are giving the world space to breathe clean air.The contribution India is striving to make to address the global challenge of Climate Change despite the developmental challenges which it faces and is attempting to address within a democratic polity should not be ignored when applying the principle of equal burden sharing in addressing climate change.

India draws upon its civilizational legacy in raising public awareness and promote community activism and initiative on Climate Change. Safeguarding the environment, looking upon Nature, not as a dark force to be conquered and subdued, but as a Mother, and a source of nurture, to be respected and preserved, is a concept deeply ingrained in Indian tradition. Let me quote from an ancient prayer in the sacred Hindu scriptures, the Vedas:

> Let there be peace in the Universe and in infinite space,
> Peace upon this earth and in the oceans,
> Let peace reign over plants and over trees,
> May the Gods enjoy peace; may the Creator, Brahma dwell in tranquillity,
> Let there be peace everywhere, but most of all Let Peace reside within our hearts.

Traditionally, the Indian world view has looked upon human existence as an integral part of Nature and in harmony with Nature's cycle of birth, growth, decay and regeneration. Modern industrial development and concepts of progress are linear in nature, not cyclical but today most of humanity is beginning to realize the wisdom of sustainability as the depletion of the planet's resources near their finite limits and the very sources of nurture i.e. earth, water and air are ravaged beyond Nature's power to regenerate. As a country most significantly impacted by Climate Change, India has already embarked on a strategic shift from a pattern of development that relies on an ever more generous consumption of resources to one based on sustainability. There is now a clear and compelling recognition in Government as well as in civil society, that India's growth story will soon hit a dead-end if we do not embrace sustainable growth. It is for this reason, that Climate Change has now been fully integrated into the national development process.

At the heart of this strategic shift to a strategy of sustainable development is accelerated change, from production and consumption processes that are based on carbon fuels to those based on renewable sources of energy. For India, the climate change argument and the energy security argument have come together in compelling fashion. If a growth rate of 8% to 10% per annum in our GDP is essential to eradicate poverty in our lifetime, then India must overcome the energy constraint on its growth and must do so in a global environment of increasingly finite and depleting sources of energy. Today, over 70% of our oil requirements are met through imports. It is likely to exceed 90% by 2030. This is no energy security.

India announced its National Action Plan on Climate Change on June 30, 2008. In launching the Plan, Prime Minister, Dr. Manmohan Singh said:

"Our people have a right to economic and social development and to discard the ignominy of widespread poverty. For this we need rapid economic growth. But I also believe that ecologically sustainable development need not be in contradiction to achieving our growth objectives. In fact, we must have a broader perspective on

development. It must include the quality of life, not merely the quantitative accretion of goods and services. Our people want higher standards of living, but they also want clean water to drink, fresh air to breathe and a green earth to walk on."

This Prime Ministerial directive is what the National Action Plan seeks to translate into concrete policy interventions.

The Plan has identified Eight broad areas for focussed action, encompassing both mitigation and adaptation. These National Missions are:

1. National Solar Mission
2. National Mission for Enhanced Energy Efficiency
3. National Mission on Sustainable Habitat
4. National Water Mission
5. National Mission for Sustaining the Himalayan Ecosystem
6. National Mission for a "Green India"
7. National Mission for Sustainable Agriculture
8. National Mission on Strategic Knowledge for Climate Change

Each of these Missions has a technology development and R&D component, while the Mission on Strategic knowledge seeks to fill the many gaps that continue to exist in our understanding of climate change phenomenon and its impact specifically on India and our region. India is already using its Space capabilities for this purpose and future plans include using indigenously developed Automatic Weather Station (AWS), Agromet Towers, Doppler Weather Radars and GPS applications for more detailed climate studies and developing simulation models.

Currently, each of these Missions is being elaborated through a very wide-ranging consultative process involving all stakeholders, including Central Ministries and agencies, State Governments, business and industry, civil society and community level organisations and representatives. We want each of the Missions to proceed with what

may be called PPP or public/private and people partnerships. The elaboration of these Missions is taking somewhat longer than we had envisaged, but the results, we hope, will be to deliver an ambitious but effective, visionary but realistic strategy for India's sustainable development.

Let me give you an update on a few key National Missions so that you can get a sense of where we are headed.

The National Solar Energy Mission has been given the pride of place in the National Action Plan. This is the centrepiece of our plan to move significantly towards renewable energy. The Solar India project takes into account India's advantage in having a high degree of solar insolation or the intensity of solar energy available across the country. It also tries to leverage the fact that the country has the potential for rapid and large-scale expansion that could lead to significant cost reductions. Solar Energy rates high in terms of security since it can be sourced locally. It is also a zero-carbon source of energy. Our strategy is to scale up existing solar applications through a supportive regulatory and incentive framework, to achieve a sharply declining trend in generating costs upto 2020. If we can achieve grid parity by that year and aim at coal-based thermal generating parity at least by 2030, then market forces could deliver a very large expansion in solar power by 2050. This could be as high as what we expect nuclear power to deliver by that date.We know if we succeed, the world, too, will benefit.

We plan to put in a place an ambitious R&D programme as well, to deliver cost-saving and efficiency-enhancing technological innovations. A longer term goal is to pursue disruptive technologies, particular in storage of solar power, to enable a transformation in our energy generation and use.

As you can see, there is an obvious convergence in our goals for promoting renewable energy, in particular, solar power, which we should fully leverage as part of President Obama's Renewable Energy Initiative.

For our developed country partners who attach particular importance to reducing current GHG emissions, India's solar energy project should be of special significance. We have currently over 400 million Indian citizens who do not have access to commercial energy services. Whether their requirements are met through fossil fuels or through solar energy, would have a major impact in terms of global mitigation.

Another major Climate change initiative is the National Mission on Enhanced Energy Efficiency. This, too, can be looked upon as an important mitigation measure, since improving energy efficiency will also reduce the carbon intensity of our industrial growth. India has actually done quite well in this regard. Since 2004, a mere 4% per annum growth in our energy use has delivered 9% per annum growth in our economy. The energy intensity of our growth today is comparable to that of the European Union at 0.17 kgoe per dollar of GDP in PPP terms.

These gains in energy efficiency are not accidental. Energy prices in India are amongst the highest in the world. Today, Indians face the highest energy price relative to their incomes, compared to their counterparts in virtually every other country. According to the data from the IEA, the ratio of the price of 1 million kWh of electricity to per capita GDP is nearly 100, compared to 3 for the US and 5 to 10 for most West European countries. Similarly, the ratio of the price of 1000 litres of gasoline to GDP per capita is nearly 2000 in India, compared to 20 in the US and 60 to 100 in most West European countries. Nominal data can, therefore, be misleading.

Nevertheless, we believe we can further increase efficiency in our energy intensive industries to deliver a further 20% and save over 10,000 MW of power. This translates into annual avoided emissions of nearly 50 million tonnes of CO_2, which we hope to achieve by the end of our current 5-year Plan period, i.e. by 2012.

India already has an Energy Conservation Act, which has identified nine energy intensive sectors on which Government and industry will focus, in order to significantly raise efficiency levels. These include, inter alia, Iron and Steel, Cement, Power, Paper

and Pulp, Chlor-Alkalis, Aluminium,Textiles and Railways. The Act empowers Government to lay down efficiency benchmarks for each of these sectors through compulsory energy audits. The National Action Plan introduces a market mechanism to encourage higher efficiency standards through trade in Energy Efficiency certificates.

Linked to the Energy Conservation Act is the Energy Conservation Building Code, launched in May, 2007, which seeks to reduce energy consumption in existing large commercial buildings and encourages the design of more efficient new buildings. The Green Building movement in India which began with a footprint of 1858 cubic metres in 2003, now covers 17 million cubic metres today. These green rated buildings deliver upto 30% savings in energy consumption, a sizeable mitigation effort, considering that commercial real estate is one of the fastest growing segments of India's economy.

It would interest you to know that the Energy Conservation Building Code of 2006 was developed with the strong technical support of the United States through the ECO programme of USAID. This programme continues to support the training of architects and building engineers in the use of ECBC and in the incorporation of building energy as part of the curriculum of architecture schools. A few weeks ago, based on building energy benchmarking carried out under this programme, we have launched a star rating programme for office buildings so as to create a "demand pull" for energy-efficient buildings.

The retrofitting of existing commercial and government buildings to make them more energy efficient and enforcing advanced norms for new construction is spawning a rapidly growing number of energy saving companies in India. This is becoming a significant economic activity, which not only contributes to energy consumption but also reduces the carbon footprint of the construction sector. It is estimated that the current market for this business is about US $ 3 billion with a significant growth potential. We would welcome US ESCOs to participate in this new market.

There is currently a major drive in the country to popularise the use of CFLs, whose total sales have increased from about 20 million in 2002 to over 200 million in 2008. The CFL is 80% more efficient than incandescent and therefore energy saving is substantial. The Government is implementing an Economy Lamp Project by making available CFLs to households, where penetration is still low, at 30 US cents as against the market price of US $ 2. The price differential is sought to be recovered through the sale of carbon credits. If the project target of replacing a minimum of 250 million incandescent bulbs with CFLs is achieved, then it is estimated that approximately 15 million tonnes of CO_2 emissions per annum would be avoided.

While popularising CFLs, India is already moving towards the next generation of energy saving lighting devices, the LED Bulb. The LED bulb is not only more efficient than the CFL but since it does not contain toxic mercury, it is preferable on this count as well. The LED is 90% more efficient than the incandescent and in India, several innovations have been introduced in the original Dutch design, to make it suitable for space lighting, and at lower cost.

Among the other National Missions, I wish to pick up one which is essentially on Adaptation project. This is the Mission to Safeguard the Himalayan Ecology. The Himalayas are not only a civilizational and a sacred asset in the Indian mind, it is also the source of sustenance and livelihood of hundreds of millions of people in the Indo-Gangetic plains. The Himalayan glaciers sustain these major riverine basins in the north, including the Indus, the Ganges, and the Brahmaputra. There is anecdotal evidence that some of the Himalayan glaciers are retreating and if this were confirmed through scientific investigations that have recently been initiated, it is likely that the perennial flows of our major rivers may be adversely affected. The National Mission seeks to fill the gaps in our knowledge about the fragile ecology of the Himalayas. It is also engaged in developing a detailed set of guidelines to arrest and reserve the degradation of the Himalayan zone, which both the Central and the State Governments would jointly enforce. This degradation is taking place as a result of population pressure, increased urbanisation, road building activity, degradation of forests and water stress virtually all

along this ecologically sensitive zone. Climate Change would further exacerbate these stresses.

What is particularly encouraging is the very large number of community based and grass-root level projects that are currently emerging across the country to meet the challenge of climate change. Several villages in Andhra Pradesh in the South have now switched from a high input-based intensive agriculture, which utilises large amounts of water, chemical fertilizers and pesticides and hybrid seeds to a strategy based on a more diversified cropping pattern, use of organic manures and bio-pesticides and local endemic seed varieties. This more sustainable strategy also uses much less water and is fully integrated with animal husbandry and agro-forestry activities which can also provide a degree of livelihood insurance to farmers. As a result of a significant scaling up of this new strategy, GHG emissions from agriculture will decline substantially, even while it improves the adaptive capacity of Indian agriculture.

In these days of a global economic meltdown, every major economy is being urged to adopt significant economic stimulus packages to boost economic activity and employment. The UN Secretary General and several other international leaders have also called upon countries to use part of the stimulus package to invest in climate-friendly activities. In India, we have been running for the past couple of years, an ambitious rural employment scheme under the National Rural Employment Guarantee Act or NREGA. This is, in effect, a classic counter-cyclical stimulus measure, since it provides every rural household guaranteed employment for 100 days for one adult member at a minimum wage fixed by the State. The works which can be undertaken under this scheme include several which help adaptation to climate change such as water conservation and harvesting, drought proofing through afforestation and tree planting, renovation of traditional water bodies and flood control and protection works among others. During the current financial year, the Government has provided US $ 6 billion for the scheme, which has, by and large, been a great success, though in the initial phase, a number of systemic lapses have been reported. These are being addressed through a community-based monitoring and evaluation mechanism.

India's main interest in the multilateral negotiations leading upto the 15th Conference of Parties in Copenhagen in December this year, is to ensure the emergence of a global regime, under the UNFCCC, which would be development-oriented and supportive of our own ambitious national efforts on Climate Change, both in Mitigation and in Adaptation. We also expect, as do the overwhelming majority of developing countries, that the Copenhagen outcome will be fair and equitable, with developed, industrialised countries assuming significant GHG emission reduction targets, while supporting sustainable development in developing countries through transfers of financial and technological resources. The United States, of course, will be a key driver of this process, not only because its GHG emissions are the largest, but more so because it is the chief source of technological innovation and creative entrepreneurship, elements critical to finding and disseminating climate solutions.

As part of the Indo-US Energy dialogue, our two countries have been collaborating on a number of energy efficiency and clean energy projects. These include a Methane to Market Partnership for the commercial utilisation of coal-bed and coal-mine methane, landfill methane and methane from agriculture which would not only increase energy supplies but also reduce GHG emissions.

Similarly, since both India and the US use significant quantities of coal for generating power, there is much useful work taking place in increasing efficiency of coal-based generation while reducing harmful emissions. We have a Joint Task Force on Integrated Gasification Combined Cycle and joint work on Coal beneficiation technology. India was a partner in the US led Future Gen project to develop a zero-emission coal based thermal power plant, but this was wound up some time back. I understand it may now be revived which is good news.

We believe that CO_2 in the flue gases from coal-based power stations could be used effectively to create methanol which can then serve as a transportation fuel. The US was a world leader in the development of methane technology until low oil prices led to

its neglect. This may be the time to resume aggressive R&D on methane technology, assess its technical and economic feasibility, offering prospects not only for reducing CO_2 emissions from coal-based thermal power plants but also augmenting the availability of transportation fuels from indigenous sources.

As you may also be aware, India has been an active participant in the Asia-Pacific partnership, initiated by the US to explore technological solutions to the twin challenges of Climate Change and Energy Security.

This positive experience we have in working together on energy and climate related issues over the past several years and the successful conclusion recently of the Indo-US Civil Nuclear agreement, enable our two countries to plan a much more ambitious agenda of collaboration under President Obama's Renewable Energy Initiative. But we also need to work together on building a multilateral framework which is fair and equitable and helps us make an early transition to a carbon free economy. We need to see U.S. leadership in this regard.

Let me sum up my presentation. India is committed to an ambitious National Action Plan on Climate Change, covering both Mitigation and Adaptation. The eight National Missions which comprise the Plan, are currently in the final stages of elaboration, and taken together, will constitute India's strategy for ecologically sustainable development. A key element of this strategy is to bring about a strategic shift in the country's production and consumption processes currently based on fossil fuels, to renewable sources of energy. The co-benefit is enhancement of the country's energy security. We believe that the US has a similar approach and its ambitious Renewable Energy Initiative offers many opportunities for our two countries to work together, building upon the success of the Indo-US Civil Nuclear agreement and the positive experience of collaboration in several energy and environment related areas. It is our hope that the 15th COP in Copenhagen will deliver a fair and equitable, but also an ambitious outcome based on the UNFCCC and the Bali Action Plan. India is prepared to work together with the US towards this objective. This will provide a supportive global

environment for not only the successful implementation of our Action Plan but to enable its significant scaling up. However, the bilateral track with the US has been and will continue to be a productive avenue for both our countries to meet the twin challenges of Climate Change and energy security.

Thank you.