



Clean Air for Asia

An Update on China-India-Japan-United States Cooperation to Reduce Air Pollution in China and India

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In the quest for sustainable development in the current century, no countries will be more central than China and India. By dint of the size of their populations and the scale of their need for energy development, the strategies and technologies they decide to adopt will be critical to their impact on both their own and the global environment. For both China and India, rapid economic growth is imperative to alleviate poverty, raise income levels and improve their citizens' quality of life.

Against this background, the Atlantic Council undertook a major project late in 2000 to conduct a dialogue among prominent experts in China, India, Japan and the United States that would address the prospects for economic growth, energy use, and the environment. The project has focused on the electric power sector and urban transport, and how cooperation among the four countries, especially on technologies for supporting clean air policies, might contribute to better energy development strategies.

Following the initial quadripartite seminars held in New Delhi in April 2002 and in Beijing in February 2003, a policy paper entitled *Clean Air for Asia* was published in July 2003 presenting the consensus recommendations of the participants in the dialogues. The policy paper focused on the challenge of formulating economic, energy and environmental policies designed to reconcile the drive for economic growth with the need for greater environmental protection, especially of air quality.

When the dialogues were initially undertaken, China's and India's impact on world energy markets and trade was much less than today, as both countries were still heavily dependent on indigenous energy supplies, mainly coal, for most of their energy needs. In both countries, indigenous oil production had tended to stabilize. In 2001, China imported 1.7 million barrels a day of oil (one-third of oil demand) and India imported 1.4 million barrels a day (two-

The July 2003 policy paper, *Clean Air for Asia*, made thirty-nine recommendations in the following seven broad policy issues:

- I. Strengthened government institutions
- II. Long-term strategy
- III. Electric power reform
- IV. Strengthened educational institutions
- V. Technical cooperation
- VI. Improved enterprise capability
- VII. Rural development

thirds of demand). Oil supplied 23 percent of total energy demand in China and 33 percent in India. Fuels other than coal or oil met only six to seven percent of total commercial energy requirements.

With energy demand expected to double over the next 25-30 years, the International Energy Agency (IEA) projects that China's petroleum imports could grow to 10 million barrels a day and India's to 5 million barrels a day; together, this would be almost one quarter of the world's projected increase in consumption. By 2004, oil imports into China had risen to 2.7 million barrels a day and India's imports had grown to 2.0 million barrels a day. By the end of 2004 the world had experienced significant price increases for oil as well as for coal and a number of

other commodities such as steel.

In this setting, the second series of dialogues was initiated with a November 2004 meeting in New Delhi focused on reviewing progress on the initial recommendations. One issue area, namely, Improving Enterprise Capability, was not reviewed as it covered a number of subjects that are under constant discussion in other formats. Instead, a session was held on discussing steps to improve environmental performance.

Status of Progress on the Seven Issues

Issue I. Strengthen existing institutions and create new entities that would support development of energy and regulatory policies to ensure the affordability, accessibility, and availability of energy supplies that result in less environmental damage and cleaner air.

In both China and India, considerable progress has been made in developing integrated energy and environmental policies, with better coordination among the relevant ministries at the central level. In both countries the responsibility for this activity has been elevated.

In China, an integrated coordinated energy policy has been drafted by the National Development & Reform Commission and incorporated into the Medium and Long-Term Energy Development Plan Outline (2004-2020). While more work needs to be done to detail policies further, this has been a significant step. In addition, a steering committee composed of China's Premier Wen Jiabao and high-level officials from the Ministry of Science and Technology, is being established to develop a National Medium and Long-Term Science and Technology Development Plan. Government agencies at both the central and provincial levels are also drafting 11th Five-

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Year Plans (2005-2010), which will include the National 11th Five-Year Energy Development Plan.

In India, the responsibility for developing a long-term energy strategy has been given to the Planning Commission, which will treat the energy strategy as an integral component of India's overall development strategy. The Planning Commission is also conducting a mid-term review of the 10th Five-Year Plan and is drafting the 11th Five-Year Plan (2007-2012).

Responsibility for regulatory policy in India remains diffused, and it may be time to consider creating greater cohesion among the regulatory establishments by having regulations for all energy sectors coordinated within the Prime Minister's office. If this were done, policy and regulatory development would be coordinated among the five ministries now dealing with energy. The five ministries would be focused on ownership and operational issues to meet both environmental and energy objectives.

In both countries, more emphasis is needed in building strong and credible regulatory institutions. If a viable energy system is to be established, regulatory systems must be independent, transparent, and viewed as fair.

Issue II: Develop long term energy strategies that balance the need for security of supply with environmental and economic concerns

The governments of China and India have both undertaken a number of new strategic initiatives. First, considerable attention is being given to the development of longer-term strategies that recognize the limitations of indigenous sources of supply. Both governments are acknowledging that new actions will be needed to meet growing energy requirement in an environmentally sustainable manner, even if indigenous resources such as coal, natural gas, hydro-electricity and renewables are fully utilized.

With oil production tending to stabilize in both countries, despite exploration efforts, major new initiatives have been undertaken to sign concession contracts with oil exporting countries. Supply diversification is also being enhanced through a number of pipeline projects involving oil and gas, and liquefied natural gas (LNG) tankers.

Both countries expect to increase their use of nuclear power. For example, China has an aggressive plan to raise nuclear capacity to a total of 40-50,000 megawatts (4-5 percent of total generating capacity) by 2020. In comparison, today's nuclear capacity of 8,750 megawatts represents only

India needs to develop and strengthen the State Regulatory Commission along the following criteria:

- ◆ Greater autonomy from the political process
- ◆ Independence established through adequate staffing with appropriate technical knowledge
- ◆ Stable policies in order to create credible institutions
- ◆ A clear policy on market structure that is consistent across states
- ◆ A transparent and consistent regulatory process

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1.3 percent of total electricity generating capacity.

Another major theme in the dialogues was the need to raise the profile of energy efficiency as a strategy for reducing the increase in energy requirements while allowing for economic growth with lower environmental impacts. Both countries are stepping up efforts to improve energy efficiencies, and China has a special Session of the China Development Forum scheduled for June 25-26, 2005 devoted exclusively to this subject.

Policies related to fuel pricing and the use of price controls and subsidies are still evolving. Although price controls on a number of fuels have been eliminated in both countries, the principles of market-based pricing need to be more broadly extended. This is especially the case where primary energy supplies are allowed to move with markets, but final energy outputs such as electricity and refined petroleum products are still controlled.

When politically and socially necessary, India and China should provide subsidies to consumers through direct governmental support rather than through pricing regulations that distort the financial performance of energy companies and thereby reduce the viability of investments. The problems caused by current policies are particularly acute in the electric power sector, especially in India.

Issue III: Establish and ensure the long-term viability of the electric power sector

In India, the electric power sector needs to become financially self-sustaining in order to attract investments.

In India, the electric power sector needs to become financially self-sustaining in order to attract investments. Current tariffs still do not reflect the cost of supply and continue to result in massive inefficiencies of usage. There remains the need to develop a transparent subsidy management program for well-targeted subsistence consumers. The subsidies should be provided from central/state government budgets to consumers directly.

The implementation of cost-based market pricing and increasing consumer efficiencies could reduce the need for subsidies to the power industry and could thereby greatly reduce state and federal deficits. This could free governmental funds badly needed for education, health and rural development.

The financial viability of the Indian electric power sector is also closely linked to the management, pricing and use of ground water in agriculture. Co-management of energy and water in the agricultural sector represents a major opportunity to improve the power sector's financial performance and to reduce the rate at which groundwater is being depleted.

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In China, substantial investments in the electric power sector over the last few years have resulted in a major expansion of capacity, but power shortages have occurred. This partly reflects too much emphasis on central planning and not enough emphasis on markets. Moreover, financial sector reforms are needed to ensure that the most efficient plants and transmission

lines are financed. In addition, the electricity sector should be further deregulated and opened for private investments and joint ventures to improve the sector's efficiency and effectiveness at providing reliable power.

The programmed rapid expansion of nuclear power in China suggests that this might be an appropriate time to undertake multilateral discussions on the transport, treatment and storage of nuclear waste at appropriate geological locations.

Issue IV. Establish or strengthen educational institutions to provide training in the analysis of energy issues from a holistic viewpoint that integrates social, technical and economic impacts

The major developments related to this issue revolved around an increased understanding of the requirements for educational institutions. While the earlier dialogues (2002-03) focused more on higher education, in the latest meeting (2004) there was recognition of the need at the primary and high school levels to establish a culture of conservation and recycling. Also, younger students should be introduced to the multifaceted nature of problems in order to help raise the general public's awareness of the complexity of energy and environmental issues.

The desirability of maintaining multiple educational institutions at the doctorate level to provide individuals trained in thinking holistically about energy and environmental issues was also reaffirmed. Individuals entering such institutions should have previously exhibited a disciplinary excellence at the master's level before attempting to develop the skills to work on multidisciplinary analysis and evaluation.

Funding for such centers of excellence could come from government, financial institutions and corporate sponsors. However, governmental organizations should not direct these institutions, as this would reduce the credibility of the institutions' technical analysis and diminish their effectiveness in developing policy recommendations.

Issue V. Encourage international cooperation, transfer existing knowledge, and increase cooperative R&D efforts so as to ensure the creation and implementation of technology that can lead to more efficient and effective use of cleaner energy supplies

International cooperation has both a technical and financial component. Developed and developing countries must identify key areas on which they should focus R&D efforts. India, China, Japan and the United States should identify and evaluate technologies difficult for individual countries to develop but possible to consider under a consortium approach.

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India, China, Japan and the United States should identify and evaluate technologies that would be difficult for individual countries to develop but would be possible to consider under a consortium approach.

Cooperation was seen as being most beneficial when R&D results can be widely applied across countries, in areas such as clean coal technology; transportation fuels like compressed natural gas (CNG), fuel cells and biofuels; traffic management; and fuel quality

In order to ensure that R&D is adding value, it was suggested that funding should be concentrated on marketable process that meet human needs. Further, the potential economic benefits of technology developments should be continually monitored.

The value of participating in multilateral conferences continued to be emphasized. It was specifically recommended that India consider participating more actively in the International Coal Conference, an annual event involving 16 countries.

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Issue VI. Improving environmental performance

In order to improve environmental performance, both India and China should be encouraged to adopt international standards wherever possible. In fact, they are already doing so for automotive transportation fuels. It was also recommended that both countries should adopt an integrated approach to monitoring and improving environmental performance on water, land and air.

Direct cooperation between China and India is especially helpful in the following areas:

- ◆ Experiences in encouraging clean technologies in industry
- ◆ The use of clean coal technologies in thermal power plants
- ◆ The modernization of open pit mining
- ◆ Information sharing on SO_x and NO_x and on particulate control policies and standards
- ◆ The reduction of coke oven plant toxic gases
- ◆ The management of fly ash
- ◆ Improving the financial viability of electric power distribution systems
- ◆ Mass transportation systems and traffic management
- ◆ Hydrogen and fuel cell development

In order to implement these recommendations, both countries should further strengthen training to reduce manpower limitations and to improve knowledge capabilities. This effort should be supported by increasing international collaboration on technology, with effective protection and management of international property rights.

The pace of environmental improvements will be accelerated by both countries' decision to utilize the Clean Development Mechanism in the Kyoto Protocol to encourage the use of more advanced technologies. Public pressure to improve environmental performance has continued to grow, which assists efforts to formulate and enforce environmental policies and regulations.

Issue VII. Improve air quality while reducing poverty through rural development and electrification

Both China and India have taken major steps to improve the distribution of electricity to rural

populations. In China, 99 percent of all households are now connected to the electric grid. This was accomplished with huge governmental support to expand the grid while recognizing the income limitations of the rural population. Even with this support, tariffs to rural households are higher than to urban users. While the availability and reliability of this power was initially poor, it is being systematically improved over time with the growth in generating capacity.

In China, the decision to expand the grid was undertaken because most renewables remain more expensive than grid power. However, in some of the most remote locations, the use of biogas technologies to produce gas and electricity, supported by micro financing at low interest rates, can be justified. Wind power is also being utilized, as its cost is currently only 15-20 percent higher than grid power.

In India, the government has set an ambitious goal of providing electricity by 2007 to the 125,000 villages currently without power. Recent experiences indicate that India has two financially sound options for meeting this goal. One would use the concept of rural cooperatives. As recommended in the 2003 policy paper (*op.cit.*), a U.S. delegation came at India's invitation to explain the U.S. experience with rural cooperatives. The Indians are considering expanding the concept beyond electric power to include other rural services such as roads, water and agricultural distribution. Cooperative boards would be independent and self-financing, as are their U.S. counterparts.

The second option is to expand the grid using a program recently introduced by a private enterprise to the west of New Delhi. The program entails the following critical components designed to change behavior and improve efficiencies while providing affordable and available power:

- Use supply side intervention by increasing access to electric power without the opportunity to steal so that reliable power can be provided at lower costs and tariffs can be collected based on the metering of all supplies.
- Use demand side intervention by applying commercial rates and providing energy efficient pumps such that consumer efficiencies result in 40 percent lower total cost.
- Use social intervention by having a separate non-governmental agency (NGO):
 - promote awareness of the program;
 - build consensus linked to 95 percent collection rates and seven percent losses;
 - sponsor village electrification committees to provide interface with consumers; and
 - provide a women's program for gender development and social enlightenment.
- Use administrative intervention by developing face-to-face contacts and consumer meetings on meter registration and billing policies.

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Both of these options allow for the generation of revenues based on full cost tariffs that eliminate the distortions in incentives inherent in the State Electricity Board's current tariff structures.

Next Steps

The second series of dialogues will be concluded with a November 2005 seminar in Beijing, during which the situation in China will be more fully discussed and India's progress will be updated. The output of both the 2004 and 2005 seminars will then be combined to prepare a consensus policy paper for publication in mid 2006 that will build on the 2003 initial recommendations.

Seminar on CLEAN AIR FOR ASIA

November 1 – 3, 2004, New Delhi, India

Agenda

Session I

- Update on energy outlook:
 - Indian economic energy environment outlook
 - Indian electric power outlook
- Brief discussion of recommendations previously published in 2002 Policy Paper
- Competition in the evolving power market in India

Session II

- Strengthening existing institutions and creation of new entities to support the development of energy and regulatory policies to ensure affordability, accessibility and availability of energy with environmental responsibility
- Development of long-term strategies to ensure long term energy security with economic and environmental responsibility

Session III

- Long term viability of the electric power sector
- Strengthening educational institutions to analyze energy issues integrating social, economic and technological impacts

Session IV

- Review of international cooperation on R&D and technology transfer to promote cleaner air
- Improving environmental performance
- Improving air quality while reducing poverty through rural development and electrification

Session V

- Plenary session: Overview of issues
- Group discussions, followed by rapporteurs from each group highlighting group conclusions.
- Next steps: Review of future work

Participants in the New Delhi Seminar (November 2004)

United States Delegation

<p>General Richard L Lawson, Vice Chairman, Atlantic Council. <i>Seminar co-chair.</i></p> <p>Mr. John R Lyman, Consultant; former Vice President, Amoco Oil Co. <i>Principal rapporteur.</i></p>	<p>Mr. Nelson Rekos, National Energy Technology Laboratory</p> <p>Mrs. Eliane Lomax, Associate Director, Energy Program, Atlantic Council</p>
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Indian Delegation

<p>Mr. N. Srinivasan, Director General, CII. <i>Seminar co-chair.</i></p> <p>Mr. V. Raghuraman, Senior Adviser, , CII. <i>Seminar co-rapporteur.</i></p> <p>Mr. V.S. Ailawadi, Adviser, Tata Teleservices. Former Chairman, HERC</p> <p>Mr. H.L. Bajaj, Chairman, CEA</p> <p>Mr. Dilip Chenoy, Director General, SIAM</p> <p>Mr. K. K. Gandhi, Executive Director, SIAM</p> <p>Mr. Gautam Ghosh, Deputy General Manager, Noida Power Ltd</p> <p>Dr. U. S. Hazra, General Manager, ONGC</p> <p>Mr. U. V. Ladsaongikar, Asst. General Manager, Tata Power Company</p> <p>Mr. P. Neogi, Chief Executive, Noida Power Ltd</p>	<p>Dr. Kirit Parikh, Member, Planning Commission, Government of India</p> <p>Dr. B. Sengupta, Secretary, CPCB</p> <p>Mr. Pawan Sharma, NTPC</p> <p>Mr. Neeraj Sinha, NTPC</p> <p>Mr. Harendra Singh, Chief Chemist, ONGC</p> <p>Dr. R.R. Sonde, Executive Director, NTPC</p> <p>Dr. Leena Srivastava, Executive Director, Tata Energy Research Institute</p> <p>Mr. Neeraj Sinha, NTPC</p> <p>Mr. Pawan Sharma, NTPC</p> <p>Mr. Sajal Ghosh, Energy Division, CII</p> <p>Mr. A.V. Naik, MASCON, CII</p> <p>Mr. Suman Kumar, Energy Division, CII</p> <p>Ms. Shruti Bhatia, Energy Division, CII</p>
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Japanese Delegation

<p>Mr. Shinji Fukukawa, Executive Adviser, GISPRI and Dentsu Institute. <i>Seminar co-chair.</i></p> <p>Mr. Kotaro Kimura, Executive Director, GISPRI. <i>Seminar co-rapporteur.</i></p> <p>Mr. Yoshiaki Ichihara, Tokyo Electric Power Company Research Foundation</p>	<p>Dr. Kaoru Yamaguchi, Group Manager, Institute of Energy Economics</p> <p>Mr. Kazuo Shimoda, Executive Director, Committee for Energy Policy Promotion</p> <p>Mr. Takao Kasumi, Deputy Manager, Committee for Energy Policy Promotion</p>
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Chinese Delegation

<p>Professor Mao Yushi, Tianze Economy Research Institute. <i>Seminar co-chair.</i></p> <p>Dr. Bai Quan, Energy Efficiency Center, Energy Research Institute. <i>Seminar co-rapporteur.</i></p>	<p>Mr. Yu Shengmin, Energy Research Institute</p> <p>Dr. Bao Xiaobin, Program Officer, South-North Institute for Sustainable Development</p>
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Observer

Mr. S. Padmanaban, Senior Energy and Environment Advisor,
United States Agency for International Development

CEA	Central Electricity Authority (India)	HERC	Haryana Electricity Regulatory Commission (India)
CII	Confederation of Indian Industry	NTPC	National Thermal Power Corporation (India)
CPCB	Central Pollution Control Board (India)	ONGC	Oil and Natural Gas Corporation (India)
GISPRI	Global Industrial and Social Progress Research Institute (Japan)	SIAM	Society of Indian Automobile Manufacturers (India)
		TERI	The Energy and Resources Institute (India)

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AUTHOR. March 2005.

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Military Force Transformation: Progress, Costs, Benefits and Tasks Remaining, *S.J. Deitchman*, AUTHOR.
December 2004.

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