

**United States Agency for International Development
Greenhouse Gas Pollution Prevention Project
Climate Change Supplement
(GEP-CCS)**

**Policy Level Exchange Visits between
U.S. & Indian Counter-Parts**

**Task 6A
Policy Exchange Visit Report
Dr. Chandra Mohan, Deputy Municipal Commissioner,
Corporation of Chennai
April 2-12, 2001**

By:

**The Louis Berger Group, Inc.
C-6/7, Safdarjung Development Area
New Delhi 110 016**

May 15, 2001

I. EXECUTIVE SUMMARY

"Landfill Methane Recovery is on the forefront of acting as the leading supplemental energy source for municipalities"

- California Integrated Waste Management Board

As part of the Greenhouse Gas Pollution Prevention Project- Climate Change Supplement, one of the strategic foci areas is to catalyze linking urban development with climate change initiatives. In support of these programs, LBG is working with select Indian municipalities in evaluating planning and technology options for methane gas recovery and exploring potential reuse strategies.

The Corporation of Chennai has taken active steps in modeling their solid waste management programs; services and landfills to complement the traits of internationally recognized waste management practices. Dr. Mohan, Deputy Commissioner of Health and Solid Waste Management has been amongst a cadre of progressive municipal leaders continually identifying innovative solutions to provide optimal waste collection, and a broad range of services.

Upon the conclusion of the LBG meetings with the Corporation of Chennai in February, it was mutually decided that a representative should travel to the U.S. to see "hands-on" the innovative landfill practices and explore relevant landfill design and engineered planning for methane recovery.

Dr. Mohan visited the U.S. from April 2-12, 2001 in which he first had the opportunity to attend Waste EXPO the largest solid waste management conference in the world. The EXPO provides a number of trainings and includes an exhibition hall that covers technology supplies and specialized consulting firms from all backgrounds.

The visit continued with four landfill site visits in Chicago, IL and in the general San Francisco Bay area. The landfill tours provided an overview of a variety of key methane recovery and reuse issues ranging from initial monitoring and testing of potential methane gas to maintaining horizontal and vertical pumping systems.

Dr. Mohan had an opportunity meet with representatives from the California Environmental Protection Agency-California Integrated Waste Management Board to discuss design, monitoring and compliance issues for California landfill sites. The tour was completed with meetings with the U.S. Environmental Protection Agency. The USEPA is currently implementing a Landfill Methane Outreach Program.

The visit provided Dr. Mohan an opportunity to meet with municipal representatives and private sector firms and to understand the essence of public-private partnerships. Upon the conclusion of the policy exchange there were several themes that were discussed with Dr. Mohan in regard to targeting LBG technical assistance for optimal intervention.



THE Louis Berger Group, INC.

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Contract No. 386-C-00-00-00058-00
Sandeep Tandon, CTO

The Corporation of Chennai is interested in the concept of landfill methane recovery, however understands that the design is a long-term objective. In order to achieve the end goal, the critical path of development will entail the design of an integrated waste management plan. The plan would serve as a concrete planning tool that enables the city to articulate how and under what conditions solid waste will be managed in a comprehensive manner. It would include planning and design to incorporate a methane capture and reuse project into existing and or future appropriately engineers landfill sites.

It was concluded that the Corporation of Chennai would like to continue to expand its portfolio of internationally recognized waste management practices. The first series of trainings planned for delivery to Chennai on methane capture and reuse will be designed to complement the needs of the Corporation, which presently are focused on treatment and disposal.

II. OBJECTIVES

The goal of the policy exchange was to provide the Corporation of Chennai an understanding of the critical path, including the obstacles and barriers, in designing and planning for a sanitary landfill to ultimately capture methane gas. The primary approaches for achieving this goal were expand:

- i) Exposure to innovative solid waste management technologies and practices
- ii) Understanding of Landfill Methane Recovery Design and Planning
- iii) Understanding and of Integrated Waste Management Planning

III. LINKAGES WITH THE LBG/GEP-CCS PROGRAM

One of GEP-CCS's strategic program purposes is working with select Indian municipalities to evaluate the potential for methane capturing and recovery from waste disposal sites in a variety of municipalities.

In February 2001, the Louis Berger Group, Inc. in collaboration with Global Energy Partners, LLC, led a Training Needs Assessment (TNA) mission to 5 short-listed Indian municipalities. The cities were selected using a series of criteria that considered a number of key variables.

The team traveled and met with municipal officials and with Dr. Chandra Mohan. The city of Chennai is aggressively seeking to plan for an implement internationally accepted solid waste management practices. Upon the conclusion of the TNA mission meetings it was expressed by Dr. Mohan that the concept of landfill methane was of interest and that the city would appreciate the opportunity to explore the concept in more detail.

IV. POLICY EXCHANGE SCHEDULE

The policy exchange visit was anchored by Dr. Mohan's visit to Waste EXPO in Chicago, IL and plans to meet with a number of solid waste management/methane capture and reuse focused experts and institutions, including state, local and federal governments. The schedule included visits with the following institutions:

Monday – Thursday, April 2-5, 2001

- WasteEXPO, McCormick Center South Convention Center
 - Customized Training Sessions
 - World-Class Exhibits and Displays on Solid Waste Management Technologies and Practices
- Settlers Hill Refuse and Disposal Center – Operated by Waste Management and Kane County

Monday, April 9, 2001

- Sonoma County Central Landfill Facility
- Global Energy Partners, LLC
- Yolo County, Office of Solid Waste Management and Planning

Tuesday, April 10, 2001

- California Environmental Protection Agency
 - California Integrated Waste Management Board
- Keller Canyon Landfill, Allied Waste Management Services

Thursday, April 12, 2001

- U.S Environmental Protection Agency
 - Landfill Methane Outreach Program

V. OVERVIEW OF MEETINGS

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts
Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

Settler's Hill – Recycling and Disposal Facility

- Lynn Farris – Administrator

The Settler's Hill Recycling and Disposal Facility is a municipal solid waste disposal site that incorporates a comprehensive system of internal and external checks and balances to achieve the highest standards of environmental protection. Every step of its operation, from the internal site development, and operation through the carefully planned recreational end use, reflects the commitment of Waste Management and Kane County.

The Settler's Hill Facility functions as both a multi-purpose recreational area and an environmentally sound disposal site. The approximate size of the landfill is 400 acres with 300 acres permitted for land filling. The site accumulates daily volume levels of 7,500-8,000 cubic yards per day of operation.

The facility is committed to utilizing landfill gas as a source of energy. Approximately 4.3 megawatts of electricity are generated using extraction wells that are then connected to a comprehensive piping system for compression. The electricity is sold to the local utility and serves over 7,500 homes and commercial businesses. The recovery facility has an expected lifespan to the year 2020.

Sonoma County Waste Management Agency Refuse and Disposal Site – Central Landfill

- Ms. Donna Caldwell, Integrated Waste Specialist
- Mr. Damian Schmitt, Sonoma Phase II Plant Manager – Landfill Gas Systems, Inc.

The Sonoma County Waste Management Agency, formed in 1992, is the joint powers authority of nine cities and the County of Sonoma. The specific focus of the Agency's efforts is the implementation of regional waste diversion programs in the following categories: Wood Waste, Yard Debris, Household Hazardous Waste, Education and Planning.

The Sonoma County Central Landfill has been in operation for the past 50 years. The landfill currently receives over 1,300 tons of trash/waste per day. The landfill design is unique because it has an extensive segregation facility that focuses on appliances/hard metals, industrial waste (concrete, re-bar). These segregation facilities provide additional revenue stream for the facility aside from the basic waste service/collection fees collected from industry and households. The Central Landfill is classified as a Class A site, which collects both industrial and limited amounts of low-hazardous industrial waste materials.

The central landfill site is 3,000 acres in total size, with a planned extension of 1,000 acres into nearby localities. The county began initial testing and monitoring for methane in 1990, and commenced capturing of gas in 1994. The site contains over 140 vertical and horizontal pumps. The landfill utilizes a cogeneration facility, which produces 6 MHW that is sold to the local grid, providing power to 4,000-5,000 homes and businesses in the Sonoma and Napa County areas.

The operators strongly encouraged the integration of an onsite waste segregation system. This approach has provided the county a mechanism to raise the appropriate funds and resources to explore the methane recovery opportunities.

Global Energy Partners, LLC

- Mr. Greg Wikler, Principal

Global Energy Partners, LLC (Global) helps consumers, businesses, industry, government and others make the best decisions about energy use in an effort to grow the design and use of high productivity, environmentally friendly technologies in a restructured industry. Global Energy Partners was established in 1998 as a strategic alliance between three energy technology leaders: EPRI, the Gas Research Institute (GRI), and Daniel, Mann, Johnson and Mendenhall (DMJM). EPRI and GRI bring to Global world-renowned expertise in energy technology development and commercialization, energy market analysis, and energy use across all energy sectors. DMJM, one of the world's premier engineering construction companies, adds critical expertise in managing major public and private energy-related programs.

Global Energy Partners, LLC is the lead technical assistance provider and partner to the LBG "Greenhouse Gas Pollution Prevention Program-Climate Change Supplement" on the landfill methane emissions work.

Dr. Mohan met with Greg Wikler, Principal, Global Energy Partners, LLC. (Global). Global is the lead technical assistance contractor to The Louis Berger Group, Inc. team for the methane recovery work and led the TNA team in February. Dr. Mohan presented a multi-media presentation to Global, so as to frame the discussion on training needs for Chennai Municipal Corporation.

Mr. Wikler discussed current related legislation and the history of SRWC – Standard Regulatory Waste Characterization Report. The SRWC is now a mandatory reporting process established by Cal-EPA, which requires landfill facilities to adopt optimal operational design practices and plan future development actions.

County of Yolo, Planning and Public Works Department, Division of Integrated Waste Management

- Mr. Ramin Yazdani, Solid Waste Division Manager / Director
- Mr. Don Augenstein, Director, Institute of Environmental Management – Primary Yolo County Technical Assistance Provider

The Yolo County Central Landfill is demonstrating an innovative landfill management strategy called "enhanced or controlled" land filling to manage solid waste. Controlled land filling has the potential to provide reliable energy generation from solid waste, as well as significant environmental and solid waste management benefits.

There is something new going on at the Yolo County Central Landfill that could change the direction of solid waste management. The concept is to accelerate the decomposition process of the waste through controlled additions of liquid and through leachate recirculation, which enhances the growth of the microbes responsible for solid waste decomposition. Conventional land filling practices are designed to keep the waste as dry as possible, which prolongs the decomposition process for long periods of time, often many decades. The goal of the project is to show that landfill waste can be decomposed or "stabilized" in 5 to 10 years. The project consists of two demonstration landfill cells; each is filled with about 9,000 tons of curbside garbage. One cell receives controlled liquid additions and recirculated leachate, while the other cell serves as a control to represent a conventional landfill. The cell that receives liquid additions is called the "enhanced" cell. This land filling approach has enhanced energy generation, pollution prevention, and reduced methane generation and recovery benefits relative to conventional landfill approaches.

Ramin Yazdani and Don Augenstein, Institute of Environmental Management (IEM) provided an overview of the Yolo County site during the tour of the facility. The Yolo County facility serves the greater Sacramento, Davis area and receives over 1,000 tons of waste per day. The site is currently operating a 2 MHZ cogeneration facility with energy sold to the local utility. The Yolo site is currently piloting a Bioreactor project, which is an innovative process of adding additional water to the waste to catalyze decomposition. The process has proven to provide a higher quality, richer methane, however over a short duration of 10-15 years compared to the 30-40 of most conventional methane recovery systems.

California Integrated Waste Management Board - Division of the California Environmental Protection Agency

- Ms. Theresa Bober, Integrated Waste Management Specialist
- Ms. Susan E. Sakaiharu, Bay Area Section Supervisor

The six-member Integrated Waste Management Board is responsible for protecting the public's health and safety and the environment through management of the estimated 60

million tons of solid waste generated in California. The Board works in partnership with local government, industry, and the public to reduce waste disposal and ensure environmentally safe landfills. California reuses and recycles approximately 42 percent of its solid waste. The Board is one of six agencies under the umbrella of the California Environmental Protection Agency. The California Integrated Waste Management Board is responsible for managing California's solid waste stream. The Board is helping California divert 50 percent of its waste from landfills by 2000 by:

- Developing waste reduction programs.
- Providing public education and outreach.
- Assisting local governments and businesses.
- Fostering market development for recyclable materials.

The Board also protects public health and the environment by:

- Encouraging used oil recycling.
- Regulating waste management facilities.
- Cleaning up abandoned and illegal dumpsites.

Keller Canyon Landfill Site, Operated by Allied Waste, Inc., and Pleasant Hill Bayshore Disposal

- Mr. Curtise G. Fujii, P.E., Environmental Manager – *Northern California Districts Subsidiaries of Allied Waste Industries*
- Ms. Susan Hurl, Community Affairs Manager

The Allied Waste Company, in association with Pleasant Hill Disposal Services, currently operates the Keller Canyon Landfill. The Keller Canyon Landfill opened in May 1992 as a Class II Landfill receiving household and small amounts/levels hazardous waste. The Keller Canyon Landfill supports 7.21 acres of wetlands within the 2,600 acres of the Keller property. The objective of the program is to increase the total amount of available habitat on the property by constructing new wetlands.

The Keller Canyon landfill facility is one of the few privately owned landfill sites in Northern California. The facility currently receives over 3,000 tons of segregated waste per day. The facility is currently in the planning, zoning and testing process for landfill gas opportunities. The Keller facility has undergone extensive regulation and monitoring from the Cal Integrated waste Management, as it is a privately held facility.

The Allied Waste representatives discussed the regulatory and reporting process for establishing landfill gas pumping devices within the facility. The landfill will undergo a 10-year testing period, where the result will be the intensive planning and conversion of the 29 positioned testing monitors into innovative, horizontal gas pumping systems.

The Keller Canyon facility provides a unique model for community awareness and the participatory model. The community elects representatives on a bi-annual basis to the Keller Canyon Board of Directors to ensure that the community concerns and voice are expressed and incorporated, when possible into the design aspects.

USEPA - Landfill Methane Outreach Program

- Ms. Shelly Cohen, Director of International Programs

The Landfill Methane Outreach Program (LMOP), created as part of the Presidential Climate Change Action Plan, is a voluntary program designed to encourage and facilitate the development of environmentally and economically sound LFGTE projects across the United States. The LMOP does this by educating local government and communities about the benefits of landfill gas recovery and building partnerships between state agencies, industry, energy service providers, local communities, and other stakeholders interested in developing this valuable resource in their community. Accomplishments since program launch in 1994 include the following:

- The LMOP currently has 222 Allies and Partners that have signed voluntary agreements to work with EPA to develop cost-effective LFGTE projects, including every major landfill gas project development company.
- The LMOP has developed profiles for over 1,300 candidate landfills in 31 states.
- There are over 270 operational LFGTE projects in the United States. In addition, approximately 60 projects are currently under construction and at least another 95 are exploring development options and opportunities. To date, the LMOP has assisted in the development of over 120 landfill gas utilization projects – 49 projects in 1998 alone. Together, these 120 projects are responsible for significant reductions in the emission of methane, a potent greenhouse gas. They also are preventing the emission of other greenhouse gases, including carbon dioxide, since using landfill gas for energy offsets the need to use other, more polluting fuels. Currently, LFGTE projects have prevented the release of 1.5 million metric tons of carbon equivalent (MMTCE, the basic unit of measure of greenhouse gases) into the atmosphere. This reduction is equivalent, in pollution terms, to removing 1.1 million cars from the road.

Ms. Cohen provided a thorough overview of the LMOPs programs, highlighting those successful activities launched on the international sphere. The program has two highly successful projects in Kazakhstan and in Thailand, that are currently utilizing landfill gas as an alternative energy source for the local communities and for an academic institution.

VI. Next Steps/Follow-up

The overall tour provided Dr. Mohan with a "menu of options" and models to be replicated within the Corporation of Chennai. Upon the conclusion of the tour, it was

discussed that the appropriate approach would be to proceed with the tailoring a customized training and demo project that will work towards developing an integrated waste management report. The integrated report will provide the Corporation of Chennai a detailed reporting and monitoring plan.

In order to provide the appropriate tailored assistance to Chennai, LBG will utilize information and services provided by a number of the organizations visited during the exchange including:

- *Sonoma County*- Provide a "Recycling and Composting Guidelines"
- *California Integrated Waste Management Board* – The Board will be providing a series of the SRRC reports. These will provide a representative model illustrating the process of report planning
- *U.S EPA Landfill Methane Outreach Program* – LMOP will provide a copy of the "Landfill Gas Project Development Guide" and of the "Sanitary Landfill Management Practices Handbook"
- *Global Energy Partners, LLC and the Institute for Environmental Management* – Global and IEM are the lead technical assistance providers to the LBG/GEP team. Over the course of the next month, they will begin developing detailed training materials to support training planned for a minimum of five municipalities, including the Corporation of Chennai.

APPENDIX A.

CONTACT INFORMATION

<p>Ms. Cindy Warner Manager, Member Services SWANA 1100 Wayne Ave, Suite 7000 Silver Spring, MD 20910</p>	<p>Ms. Joyce Manic, P.E Manager, Bureau of Land Illinois EPA 1021 North Grand Avenue, East P.O. Box 19276 Springfield, IL 62794-9276</p>
<p>Ms. Lynn Farris Administrator Settler's Hill Recycling and Disposal Facility Waste Management 1031 E. Fabyan Parkway Batavia, IL 60510</p>	
<p>Ms. Donna Caldwell Integrated Waste Specialist County of Sonoma - Public Works 575 Administration Drive, Room 117A Santa Rosa, CA 95403</p>	<p>Ms. Susan E. Sakakibaya Section Supervisor California Integrated Waste Management Board - Diversion, Planning and Local Assistance 1001 I Street P.O. Box 4025 Sacramento, CA 95812</p>
<p>Ms. Theresa Bober Integrated Waste Management Specialist California Integrated Waste Management Board - Diversion, Planning and Local Assistance 1001 I Street P.O. Box 4025 Sacramento, CA 95812</p>	<p>Mr. Don Augenstein, P.E. Director Institute of Environmental Management 4277 Posson Avenue Palo Alto, CA 94306</p>
<p>Ms. Susan Harl Community Affairs Manager Pleasant Hill Bayshore Disposal Services 441 N. Buchanan Circle Pacheco, CA 94553</p>	<p>Mr. Curtis G. Fujill, P.E. Environmental Manager Allied Waste Services 901 Bailey Road Pittsburg CA, 94565</p>
<p>Ms. Shelly Cohen Director, International Programs USEPA - Landfill Methane Outreach Program 501 Third Street, NE. Washington D.C., 20001</p>	<p>Ms. Julie Haines Vice President Global Environment Team The Louis Berger Group, Inc. 1819 H street, N.W. Suite 900 Washington D.C. 20006</p>



**United States Agency for International Development
Greenhouse Gas Pollution Prevention Project
Climate Change Supplement
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**Policy Level Exchange Visits between
U.S. & Indian Counter-Parts**

**Task 6A
Study Tour Report on
Climate Change Policy and Funding Mechanisms
Study Tour to the U.S.
September 14-22, 2000**

By:

**The Louis Berger Group, Inc.
C-6/7, Safdarjung Development Area
New Delhi 110 016**

May 15, 2001

11

EXECUTIVE SUMMARY

This first LBG/GEP Study Tour proved to be a major success. As the first tour, this activity was important in establishing involvement of diverse stakeholders in climate change issues in India with the LBG/GEP project. Hence, its purpose was to introduce these diverse interests to a range of U.S. experts and institutions that could give them a solid overview of key technical, financial, policy and regulatory issues in the climate change arena. The outcome was an extensive exchange of information and ideas between the U.S. and Indian participants. The exchange has given the India side a valuable interdisciplinary perspective on how to transfer current thinking in the U.S. to India. Conversely, the U.S. participants now have a much better idea of the context for climate change activity in India and of activities that can be conducted jointly to raise the ability of both sides to tackle this global issue.

LBG/GEP selected five participants for the first Study Tour. The participants included: Ms. Nalini Bhat, Additional Director Ministry of Environment and Forest; Mr. Arun Kumar Gupta, Director, Central Electricity Authority; Mr. S. Khasnobis, General Manager, ICICI Ltd.; Mr. Rahul Kshetrapal, Executive Officer, Energy Division, Confederation of Indian Industry; Mr. Pradeep Madan, General Manager, Kirlosker Electric Co. Ltd.; Dr. Ram Tyagarajan, Chairman and Managing Director, Thiru Arooran Sugars Ltd.; and Mr. George Varghese, Vice President, Development Alternatives.

The Study Tour group visited the U. S. during September 14 – 22 and met with organizations in Washington D. C. area. The remainder of this Study Tour report describes whom the group met with, subjects discussed and general outcomes of the meetings.

I. OBJECTIVES

The primary goal of the study tour was to expose the participants to the emerging trends and evolution of climate change policy and to U.S. based funding mechanisms for climate change initiatives. This was achieved by:

- Facilitating linkages with climate change funding mechanism fund managers and enabling participants to gain a better understanding of the obstacles and barriers to achieving financial closure on projects;
- Fostering dialogue with U.S. Government officials and respected research and NGO institutions;
- Building participant understanding of the framework and duration of the project development cycle for climate change mitigation projects.

II. LINKAGES TO THE LBG/GEP-CCS PROGRAM

As international climate change negotiations evolve, it will be critical for the Indian stakeholder community to be familiar with the emerging policy, technological and research issues regarding clean energy technologies and their potential for mitigating climate change impacts. LBG promoted this study tour to enable key players in India's climate change community who have the ability to facilitate LBG/GEP activities, to build cooperation with U.S. experts and to understand policy and technology approaches for addressing India's climate changes issues. The following list of participants represents a diverse cross-section of these players and comprises a core group of LBG/GEP partners that can be called on to help facilitate LBG/GEP goals in several CLINs:

STUDY TOUR PARTICIPANTS

MS. NALINI BHAT
Additional Director
Ministry of Environment and Forestry

MR. ARUN KUMAR GUPTA
Director,
Central Electricity Authority

MR. S. KHASNOBIS
General Manager
ICICI Ltd.

MR. RAHUL KSHETRAPAL
Executive Officer, Energy Division,
Confederation of Indian Industry

MR. PRADEEP MADAN
Senior General Manager
Kirlosker Electric Co. Ltd.

DR. RAM TYAGARAJAN
Chairman and Managing Director
Thiru Arooran Sugars Ltd.

MR. GEORGE VARGHESE
Vice President
Development Alternatives

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts
Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINs + 2 policy exchanges

III. STUDY TOUR PROGRAM SCHEDULE

Thursday, September 14, 2000

- Materials Development Corporation

Friday, September 15, 2000

- The Louis Berger Group, Inc.
- Indo-U.S. Business Dialogue on Clean Energy – co-hosted by the United States Energy Association and the Confederation of Indian Industries

Monday, September 18, 2000

- World Resource Institute
- Natsource, LLC

Tuesday, September 19, 2000

- Environmental Enterprises Assistance Fund
- International Finance Corporation
- International Institute of Energy Conservation

Wednesday, September 20, 2000

- Econergy International Corporation
- U.S. Export-Import Bank

Thursday, September 21, 2001

- Business for Social Responsibility
- Lawrence Berkley National Laboratories

Friday, September 22, 2001

- Electric Power Research Institute
- Global Energy Partners, LLC

IV. OVERVIEW OF MEETINGS

Materials Development Corporation

- Mr. Charles E. Parker, President
- Mr. Sheldon M. Wool, COO

Materials Development Corporation (MDC) is a venture capital / consulting firm that works with international project developers and sponsors in developing strategies for climate change mitigation projects. MDC has pioneered a project development cycle, which enables the project developer to secure and monetize carbon credits on the internationally recognized market.

MDC suggested a possible model for securing and monetizing carbon credits from climate change mitigation projects. They discussed an approach in which various stakeholders could work in tandem to develop GHG reduction projects and shared their recent experiences in other countries like Kazakhstan and Saudi Arabia. Pending resolution of several issues that are currently hampering the development of the markets for the carbon credits, they felt that this was the most pragmatic way for project development. The approach essentially involves agreements between Buyer-Seller for sharing of credits, arrangement for third party verification of the credits, certification of the third party by an independent accreditation agency, letter from the national government stating that the project meets the policies and current stand of the Government on the climate change issues and an all floaters insurance policy to cover any residual risks. Mr. Parker informed that with the above model, a number of investors are ready to invest in projects like the clean fossil use projects, renewable energy projects etc. The Study Tour participants showed a great deal of interest in the model as it provides a way in which projects especially, in the fossil fuels and renewable energy sector, might integrate carbon off-set approaches into their development cycle.

Indo – US Business Dialogue on Clean Energy

U.S. Energy Association and Confederation of Indian Industry

- John Hammond, Program Manager-India, USEA
- USEA, Tricia Williams, Program Coordinator, USEA
- V. Raghuraman, Sr. Energy Advisor, CII,
- Robert Randolph, Assistant Administrator, USAID

In response to the March 2000 visit by President Clinton to India and the subsequent establishment of the Joint Indo-US Private Sector Trade and Investment Working Group on Clean Energy & Environment, USEA and CII are organizing the Indo-US Business Dialogue on Clean Energy. Over 35 business leaders from India will participate in the Dialogue. The purpose of the Dialogue is to foster Indo-US trade and investment partnerships for commercially viable clean energy projects, including clean coal and gas

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

power generation, other clean coal technologies, renewable energy, energy efficiency, and demand side management.

The members of the Study Tour participated in the dialogue held as a part of the visit of Indian Prime Minister Mr. Atal Bihari Vajpayee to the US. At the dialogue, which was attended by a large number of Indian Industry representatives, Indian and U.S. government officials, two major agreements were signed. These agreements, one between the two governments and another between CII and USEA would enable co-operation between the India and U.S. governments and industry, respectively. The dialogue provided an opportunity to the members of the Tour to interact with several Indian and US stakeholders. The agreements signed between the counterpart organizations provide an opportunity for active co-operation between various agencies.

World Resources Institute

- Kevin Baumert, Associate
- Crescencia Maurer, Associate
- Ruchi Bhandari, Program Analyst
- Navroz Dubhash, Senior Associate

World Resources Institute (WRI) is an internationally recognized policy research organization with broad goals to support sustainable development. One of its four programmatic focal points is climate change. WRI's climate change programs aim to identify opportunities to reduce the risk of global climate change in ways that promote sustainable economic development worldwide. WRI's core climate efforts are clustered around three strategies:

- **Engaging the Private Sector-** WRI's Climate Protection Initiative (CPI) works to accelerate the business community's acceptance of climate change as a real, manageable problem as well as encourage innovative private sector solutions.
- **Developing country partnerships -** WRI works to contribute to developing countries' effectiveness in negotiating and implementing the climate treaty;
- **Reducing the energy and carbon intensity of their development paths to gain benefits from reduced local and regional air pollution and increased economic and energy efficiency, and capturing benefits of carbon sequestration, through sustainable forestry and agricultural practices;**
- **Rules of the game -** WRI identifies and promotes new rules of the game for financing sustainable development and for climate treaty implementation, particularly in the creation of innovative and effective policy mechanisms such as emissions trading and the Clean Development Mechanism of the Kyoto Protocol.

WRI has been working with organizations in many developing countries, including India, on various mechanisms for evolution of climate change projects, public participation and engaging the private sector, policy coherence on GHG reduction and institutional design for work under international climate change regimes. WRI also elaborated on their efforts to elucidate issues regarding baselines, additionality and sustainable development and the interventions at various stages of the project cycle. WRI disseminated the findings

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

5

of their report on role of export credit agencies in financing climate change mitigation projects.

Most of the participant questions revolved around the issues of baselines and additionality. These seem to be important topics on which additional information is

needed by Indian stakeholders. The concepts behind both topics were discussed, with WRI framing summarizing its efforts to push policy that makes these issues more transparent and operational.

Natsource, LLC

- Matthew Varilek, Director, Advisory Services
- Neil Cohn, GHG Broker

Natsource is a leading broker of energy related products, participating in the power, natural gas, coal, SO₂ emission allowance, NO_x emission credit, Greenhouse Gas, and weather hedging markets. Natsource has taken a leading role in developing markets to serve its client base, which includes over 800 global companies who are leaders in the utility, coal, oil, and natural gas markets, and the investment banking community. Natsource is the highest volume broker of emissions allowances with over 5,000,000 tons of SO₂ emission allowances transacted representing over \$2 billion in underlying value.

The company has recently been selected by the Netherlands Ministry of Economic Affairs to do a comprehensive consultancy project on the establishment of a domestic emissions trading system. Natsource is also very involved with the current work being undertaken by the UK Emissions Trading Group and has been working in unison with several international governments including Colombia and Portugal to run GHG educational workshops.

Natsource discussed the status of the worldwide markets for carbon credits, particularly the recent developments and likely scenarios evolving from the international climate change negotiations. Natsource provided the Study Tour members a model of the emission trading markets, which would increase the viability of the carbon-offset projects in the long run. Natsource highlighted the need for marketing for carbon offset projects in view of the current state of the international climate change negotiations. Variables in the functioning of the carbon market and the viability of various types of projects for capturing carbon off-sets were also discussed.

Environmental Enterprises Assistance Fund (EEAF)

- Brooks Brown, President
- Marion Hecht Clay, CFO

Environmental Enterprises Assistance Fund is a non-profit organization that operates as a venture capital fund, providing long-term risk capital to environmental businesses in developing countries. EEAF has made over 20 direct investments and manages for-profit

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

6

funds for Latin America. Through the mobilization and distribution of capital, EEAF has become a leading implementer of sustainable development.

The EEAF business portfolio framework is shaped accordingly:

- **Industry:** EEAF invests in businesses engaged in agriculture, forestry, aquaculture, tourism, renewable energy, energy efficiency, and pollution abatement and recycling.
- **Financing offered:** \$100,000 to \$2 million in debt, equity or a combination. EEAF will syndicate for investments in excess of these amounts.
- **Investment stage:** Later stage preferred, but start-up investing considered.
- **Management requirements:** Entrepreneurs must have their own capital at risk, a proven track record, and near term profitability.

EEAF has been recently created as one of the agencies to extend assistance to environmentally benign projects with a funding support under the IFC's REEF program and some private investors. EEAF makes minority equity investments in projects up to capacity of 7 MW under all energy efficiency improvement schemes. EEAF's criteria for considering projects are that the IRR should be more than 25%. EEAF could be ideal for renewable projects where the returns are high. EEAF provides a viable means of finance for RE and EE projects, which are high risk, but would offer high returns to the investors. The REEF project covers the entire spectrum of investment for renewable energy projects. The Study Tour participants enquired about the application procedure and the appraisal process followed by the agencies under REEF.

International Finance Corporation (IFC)

- Vikram Widge, Senior Project Officer
- Gunter Schramm, Consultant
- Peter Cook, Investment Officer
- Kirstine Damkjær, Investment Analyst

The Environmental Projects Unit (EPU) contributes to IFC's mission by accelerating market acceptance of technologies, products and operating practices that benefit the environment. The EPU seeks to identify, develop and structure innovative projects with environmental benefits, and to mainstream those investments within the private sector and IFC. The EPU also aims to integrate active consideration of environmental opportunities into each stage of IFC's project-processing cycle, thereby improving the sustainability of resource use ("eco-efficiency") in all IFC's investments. The EPU draws on IFC's own investment resources and, where appropriate, concessional funding from sources such as the GEF.

IFC extends loans to private sector project developers to the extent of 25% to 35% of the project cost. It also provides debt to these projects. IFC also gives assistance under the GEF, funds of the World Bank, under its REEF, Small and Medium Scale Enterprise Program, PV market Transformation Initiative etc. The GEF projects have to meet global objectives. IFC is looking for high quality private sector environmental projects and would be suitable to large projects of the private sector industry.

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

7

Study Tour participants and IFC staff had a dynamic discussion that covered a number of topics including: IFC's criteria for project applications, the project review process, timeframes for loan decisions, types of projects that receive priority consideration, dissemination of information to India project developers, and loan terms and conditions.

International Institute for Energy Conservation (IIEC)

- Nitin Pandit, Executive Director
- Denise Knight, Director, Asia/Pacific

IIEC, an NGO with over 16 years experience is involved in promotion of sustainable and environmentally sound energy projects in developing countries including India. IIEC has recently merged with the Civil Engineering Research Foundation and has offices in several countries including India. IIEC works on sustainable energy with concentration on integration of renewables, end use efficiency and finance. IIEC's finance program aims at creating tools to enable preparation of proposals on energy efficiency and renewable energy projects. It also helps in building capacity of local companies, ESCOs, developers and FIs.

Participants questioned IIEC about the scope of its work and how it could be applicable in India. The biggest link seemed to be in the energy efficiency arena. Participants were interested especially in IIEC tools for project development proposals in energy and renewables.

Ecoenergy International Corporation

- Michael Ashford, Director-Washington D.C.

Ecoenergy International Corporation (EIC), a technical, financial and economic consulting firm, serves clients in the energy and environment industries. Staffed with engineers, economists, financial and policy analysts, EIC provides clients in the U.S. and abroad with assistance in the areas of: Energy Efficiency and Sustainable Design, Project Finance and Financial Advisory Services, Distributed Power Generation, Carbon Management, Utility Restructuring and Strategic Planning and Analysis

EIC provides technical, financial and economic consultancy services for energy efficiency, project finance, distributed power generation, utility restructuring, and strategic planning and carbon management. EIC has experience in project baseline and carbon offset analysis and has worked on several projects. It has provided services to the World Bank, PCF, GEF, IFC carbon portfolio analysis, and IFC and EBRD Emissions inventory. It has advised cogeneration, ESCO projects in Philippines, Mexico, India etc.

Participant questions and dialogue with EIC focused on the project development cycle and on the carbon off-set/carbon credit issue. From the conversation, it was apparent that the participants were seeking to understand how the practical, accounting, and finance

components of developing projects with carbon off-sets in mind are operationalized. EIC's Project Finance Model, which helps analyze risks for a project, securing debt and other funding, and potential for carbon offsets, could be of help to partners and stakeholders of LBG/GEP because it is designed to operationalized concepts that Indian stakeholders have yet to experience hands on.

Export-Import Bank of the U.S.

- Craig O'Connor, Director of Strategic Marketing

The Export-Import Bank of the United States (Ex-Im Bank) is an independent U.S. Government agency that helps finance the overseas sales of U.S. goods and services. It provides guarantees of working capital loans for U.S. exporters, guarantees the repayment of loans or makes loans to foreign purchasers of U.S. goods and services. Ex-Im Bank also provides credit insurance that protects U.S. exporters against the risks of non-payment by foreign buyers for political or commercial reasons. To qualify for Ex-Im Bank support, the product or service must have at least 50 percent U.S. content and must not affect the U.S. economy adversely.

Two of Ex-Im's major goals are to increase the export of environmental goods and services, which are in strong demand among the developing nations, and to expand the number of U.S. small businesses using Ex-Im Bank programs. Ex-Im Bank assists the US companies for exporting their goods to other countries. It extends help to them directly and through some US banks in the form of credits and even debt. Ex-Im encourages investment in environment friendly technology and has recently approved US \$500 million assistance for clean energy projects on the Indian Subcontinent.

Study Tour participants were very interested in the mechanics of Ex-Im Bank's mission and how it operates. They were clearly looking to understand how Ex-Im resources could be leveraged for project development and technology transfer to India. Several participants utilized projects with which they are familiar to ask how Ex-Im could provide financial assistance in particular instances. Participants suggested that more project developers in India need to be made aware of how they or their partner FIs can collaborate with Ex-Im to solve equity and guarantee problems.



Group meeting with U.S. Ex Im

Group at meeting with ECAF

CLIN 6: Policy Level Exchange: Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

Business for Social Responsibility (BSR)

- Katherine O'Dea, Director, BSR Education Fund
- Michael Kobori, VP Continuous Learning
- JoAnna Bullock, Program Manager, USEPA ClimateWise
- Marya Glass, Senior Program Associate, Green Power Market Development

Founded in 1992, Business for Social Responsibility (BSR) is a US-based global resource for companies seeking to sustain their commercial success in ways that demonstrate respect for ethical values, people, communities and the environment. Through socially responsible business policies and practices, companies create value for investors, customers, employees, local communities and other stakeholders. BSR assists its members in creating that value by providing expert help as companies address the full range of corporate responsibility issues.

BSR's Climate Program offers several options for companies seeking to reduce or mitigate greenhouse gas emissions. Through the Climate Wise Initiative, BSR works with the US Department of Energy and the US Environmental Protection Agency to help 150 businesses implement cost-effective and productivity-enhancing measures to reduce the use of energy and other natural resources, minimize waste, and prevent pollution. The Climate Program also helps firms invest in projects that off-set greenhouse gas emissions, and is launching a Green Power Project to help companies purchase power produced by renewable resources and invest in cost-effective renewable energy projects at their own facilities.

The Study Tour participants had several queries about BSR and its climate change activities. Most questions focused on the financial assistance that BSR might have available for capacity building and project development in India. BSR discussed several quantitative tools it uses for looking at the energy efficiency/sustainability factors of proposed projects and the participants expressed interest in obtaining such tools.

Lawrence Berkeley National Laboratory

- Stephen Wiel, Head, Energy Analysis Department
- Jayant Sathaye, Senior Staff Scientist
- Ashok Gadgil, Senior Staff Scientist

LBL is a world-renown multi-program lab focused on research in advanced materials, life sciences, energy efficiency, detectors and accelerators.

LBL is a US Department of Energy (DOE) laboratory engaged in basic as well as applied energy research. Its Energy Analysis Division is conducting research in climate change matters especially on project development in the areas of Energy Efficiency, Renewable Energy, and Demand Side Management. It has recently carried out a country research project in Brazil, under which it studied the energy sector of the country and analyzed the cost of carbon offset over the business as usual situation in the country. LBL has also carried out research in India to study the energy end use in industry and domestic and

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

10

commercial sectors. The Study Tour participants, therefore, suggested that LBL could engage in research on similar activities in India that would help in structuring climate change issues

Electric Power Research Institute and Global Energy Partners

- Stanley Susman, Vice President, Environment Division
- Larry Williams, Program Manager, Integrated Assessment on Global Climate Change
- Gregory Wikler, Principal, Global Energy Partners

EPRI is an association of over 1000 public and private power utilities from the US and several other countries. EPRI is engaged in research on environmental issues from the use of electric power apart from the main research on the electric power technological research. Global is engaged in application of the research work of its promoters through consulting services. Its main focus is on reforming electric utilities abroad and in the US.

EPRI's Global Climate Research Program conducts analyses that integrate estimates of costs with benefits of carbon issues to help shape international carbon policy. EPRI is also developing integrated assessment frameworks for policy analyses cooperatively with several other high level organizations in the U.S. The Program is also involved in carbon cycle modeling activity for predicting future sources, sinks and atmospheric carbon dioxide levels.

Global Energy Partners, LLC (Global) helps consumers, businesses, industry, government and others make the best decisions about energy use. Global is a strategic alliance among three energy technology leaders: EPRI, the Gas Research Institute (GRI), and Daniel, Mann, Johnson, and Mendenhall (DMJM). Global provides a wide range of services that transform the market to make clean, efficient technologies attractive to energy users worldwide.

The Study Tour participants were most interested in how the analytical focus of EPRI's work could be made available to Indian researchers. Discussion on possible contacts in India took place and a number of questions were asked about the economic implications of climate change in India. The participants also found that Global's services are in need in India. Specific interest was expressed about Global's diversity and about its ability to transfer information about current clean energy technologies to India.

V. NEXT STEPS & PROGRESS

The Study Tour participants engaged in active discussions with the organizations visited. They sought to understand the applicability of the work of these organizations under the Indian scenario. At many of the meetings, follow-up actions were suggested. Some of these are listed below. LBG/GEP plans to follow up with the concerned as well as other important stakeholders on these issues.

The Study Tour participants engaged in active discussions with the organizations visited. They sought to understand the applicability of the work of these organizations under the Indian scenario. At many of the meetings, follow-up actions were suggested. Some of these are listed below. LBG/GEP plans to follow up with the concerned as well as other important stakeholders on these issues.

- Need to develop some key projects for monetization of credits from fossil fuel projects and interaction with the MOEF regarding the issue of letter of comfort as suggested by the MDC. Status:
 - LBG/GEP has moved forward with project development efforts in cooperation with DA and independent project developers.
 - Meetings have been held with MoEF on preliminary approaches for a process that would acknowledge MoEF recognition of carbon off-sets from clean energy projects.
 - LBG/GEP has had discussion with MoEF and understands that GOI would be interested in projects that meet the overall objectives of GHG mitigation and sustainable development
 - LBG/GEP and DA have identified over 15 projects, about 7 of which are more advanced.

- Follow up on the development under the international dialogue on climate change. Status:
 - LBG/GEP and the CCCs at CII and DA have been following the developments on the international dialogue. While that dialogue has not resulted in concrete direction, GEP-CCS is positioning itself and projects to take advantage of potential financial benefits from a market-based mechanism that would result from this dialogue.

- Follow-up on discussions with the WRI for extension of its research under the Research Forum activity of the GEP-CCS. Status:
 - WRI has been engaged as the host of the US Research Forum and several of its researchers are partnering with Indian researches to produce framing papers under the Research Forum activity.

- Follow up with Natsource, EIC, IIEC on Climate Change Mitigation Project development. This could also help LBG/GEP in the design of the project tracking system. Status:
 - All these organizations are or may become partners of LBG/GEP. Natsource has been involved in the TNA and training of the financial institutions on clean energy project development and structuring. EIC also participated in the FI training and is working closely on activities like project development and computational toolkit development. IIEC will participate in research activities and provide technical assistance for the CLIN 7 activity.

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

- Follow up with EIC, IIEC, LBL and Global for development and with EAAF, IFC, and US Ex-Im on possibilities of assistance to the portfolio of projects. Status:
 - LBG/GEP independently and in association with EIC is establishing linkages with the funding sources. Since international climate change negotiations have been proceeding slowly, these funds have not been highly active. LBG/GEP is currently developing several clean energy projects for putting forth to funds like the EAAF, REEF etc.
 - Possible tie up between Indian FIs e.g. ICICI and the US Ex-Im for the credit to the Indian climate change projects
 - US Ex-Im has signed agreements with IDBI and SBI for extending finance to clean energy projects.
 - Possible involvement with LBL for the study of carbon costs and baselines in various industrial sectors and the power generation sector in India.

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<p>Dr. Stan Sussmam Vice President, Environment Division Dr. Richard Richels Director, Climate Change Research 3412 Hillview Avenue Palo Alto, CA 94304 http://www.epri.gov</p>	<p>Mr. Greg Wikler Principal Global Energy Partners 3569 Mt. Diablo Avenue Lafayette, CA 94549 Tel: (925) 284-3780 http://www.gepllc.com</p>

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges



**United States Agency for International Development
Greenhouse Gas Pollution Prevention Project
Climate Change Supplement
(GEP-CCS)**

**Policy Level Exchange Visits between
U.S. & Indian Counter-Parts**

**Task 6A
Policy Exchange Visit Report
Mr. V. Raguraman, Senior Energy Advisor, CII**

**Dates:
September 10-19, 2000**

BY:

**The Louis Berger Group, Inc.
C-6/7, Safdarjung Development Area
New Delhi 110 016**

May 15, 2001

EXECUTIVE SUMMARY

LBG/GEP conducted the first policy level exchange in the month of September 2000. It was conducted to coincide with momentum created by the visit of Prime Minister Atal Bihari Vajpayee to the U.S. and to further GEP-CCS goals as outlined above. Overall, the purpose of the exchange visit was to introduce a key Indian expert in the clean energy field to a variety of experts and institutions in the U.S. The outcome has been the creation of a number of U.S./Indian partnerships that have and will continue to facilitate cooperation between the countries for the promotion of clean energy development and reduction in GHG emissions.

LBG/GEP selected Mr. V. Raghuraman, senior Energy Adviser of the Confederation of Indian Industry (CII) to participate in this study exchange. Mr. V. Raghuraman is a renowned expert in the energy field having over 25 years of experience in energy conservation, renewable energy, and policy considerations. He heads the Climate Change Center (CCC) at CII and as such, is in prime position to develop relationships in the U.S. that would catalyze CII's efforts to help industry in developing and formulating GHG reduction projects. His exposure to initiatives in the U.S. would allow him to build perspective and build capacity at CII's CCC for creating the enabling environment referred to above.

Mr. Raghuraman visited the U. S. during September 10 – 19, 2000 and met with organizations in Washington D. C. and New York. The thrust of his meetings was on discussing various technology options available for Indian industry, identify funding sources in the U.S. for these projects and to discuss the status of funding and the impediments faced in formulating these projects. Mr. Raghuraman also met with U. S. Energy Association, the Green Institute, Aspen Institute, and Business Council for Sustainable Development in order to sign and promote certain agreements that would enable them to work more closely with CII in future.

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

OBJECTIVES

The objectives of the policy exchange were several fold:

- To create U.S./Indo partnerships that promote creation of an enabling environment in India for the use of clean energy technology to reduce GHG emissions;
- Build the capacity of the CII Climate Change Center by giving its main energy and technology expert additional information and tools for use in climate change and clean technology policy development in India;
- Build linkages with U.S. interests that promote potential technology transfer opportunities.
- Provide better understanding of international financial institution processes for funding clean energy technology projects that reduce GHG emissions.

This first policy exchange visit under GEP-CCS was organized during September 10 – 19, 2000 wherein *Mr. V. Raguraman, Senior Adviser – Energy* at the Confederation of Indian Industry (CII) visited several highly regarded institutions in the U. S. This visit was in conjunction with the visit of Prime Minister Mr. Atal Bihari Vajpayee to the U.S. Mr. V. Raguraman is an acclaimed expert with significant experience of over 25 years in the Indian energy sector covering areas of energy conservation and renewable energy projects, policy promotion on various energy issues. Mr. Raguraman has been heading the Climate Change Center at CII that was created under a previous USAID assisted initiative. LBG/GEP is closely working with CII and also with Development Alternatives through building their capacity in clean energy project development. This note briefly describes the salient points that emerged in the meetings held as part of this policy exchange and the achievements thereof.

LINKAGES WITH THE LBG/GEP-CCS PROGRAM

The GEP-CCS project utilizes policy and study tour exchanges strategically to maximize their cumulative value-added throughout the various project activities. As noted above, this policy exchange was carried to create positive impact in two primary project specific activities. First, the exchange has built capacity of the CII Climate Change Center. Mr. Raguraman has returned to India with a wealth of new information and partnerships for collaboration in the energy technology arena. These will help the CCC to expand its understanding and access to resources. Second, since CII is a key player due to its access to industry where high potential exists for the use of clean technology and for GHG reductions, Mr. Raguraman and his colleagues will become more effective promoters and developers of GHG emissions projects in collaboration with CII industry constituents.

POLICY EXCHANGE SCHEDULE

Mr. Raguraman's itinerary, the lists of organizations and individuals with whom he met with are summarized in Appendix A of this report. In all, Mr. Raguraman participated in 17 substantive meetings over eight days and met approximately 26 experts from various institutions during that time.

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

2

OVERVIEW OF MEETINGS

United States Energy Association (USEA)

- Mr. Barry Worthington, Mr. John Hammond and Mr. Sridhar Samudrala

USEA represents 150 private and public energy-related organizations, corporations and government agencies in the US. USEA (with funding support from the United States Agency for International Development - USAID) has established over 50 energy partnerships between US utilities and regulatory commissions in over 20 countries, including 10 in India. In addition, USEA sponsors trade exchange visits to other countries dealing with global energy and environment issues.

The "Joint statement on Cooperation in Energy and Environment between India and United States" signed between Madeleine Albright and Jaswant Singh during President Clinton visit to India called for the creation of a Joint Private Sector Working Group. Accordingly, CII and USEA signed a MoU on "*Joint Indo-US Private Sector Trade and Investment Working Group on Clean Energy and Environment*". The first meeting of the Working Group was held on September 15, 2000 at Washington. The group was co-chaired by Delbert L Williamson, president, Global Sales, GE Power Systems, Inc. and Mr. Arun Bharat Ram, President, CII and Vice-chairman & Sr. Managing Director, SRF Ltd.

The meeting with USEA was to strategize the working of the Group to promote the role of the private sector in:

- Energy efficient and environmentally sound technology transfer;
- Commercial development and demonstration of renewable and non-polluting sources;
- Increasing the use of market-based approaches for energy conservation and improved environmental management;
- Fostering private sector investments and technical partnerships in Indo-US bilateral programs;
- Participation in planned two-way Indo-US trade missions; and
- Pursuing other mutually beneficial commercial opportunities as they arise.

Outcomes:

- Formulation of the Working Group comprising key participating members from both the countries.
- First meeting of the Working Group on Clean Energy on 15th September 2000.
- Signing of the Charter between CII and USEA specifying the working procedure of the Group.
- Facilitating initiation of the Business Dialogue between Indian & US Industry.

Next Steps:

- To formulate a Work Plan of the Working Group.
- The second meeting of the Working Group was planned for 20th February 2001.
- Further business interaction between Indian & US Business planned:
 - Indo-US Business Dialogue on Clean Energy: 20th February 2001 in New Delhi, India.
 - Clean Energy, 2001: 19-20th February, 2001, New Delhi India.
 - Continued Collaboration and future exchanges.

Progress:

- CII organized the workshop on Policies to Accelerate Renewable Energy Market Development on 19 – 20 February 2001 as scheduled. However, the Indo –US business Dialogue has been rescheduled.

Green Institute

- Michael Krause

The Green Institute is a nonprofit economic development organization focused on sustainable enterprise. The Green Institute works with the local community in Minneapolis, Minnesota. It also works with private, public and NGOs involved in energy and environmental technology, as well as corporations, government agencies, and communities throughout the US. In October 1999, the Institute completed construction of the Phillips Eco-Enterprise Center (PEEC), an office and light industrial facility for high-growth, innovative energy and environmental businesses. PEEC tenants are part of a base of more than 500 companies in Minnesota delivering products and services that reduce the use of fossil fuels, helping restore the environment, promoting clean and efficient energy choices and positively affecting economic growth. The Phillips Eco-Enterprise Center is a national model for environmentally sound design, construction and operation. The project has an overall objective of revitalizing an inner city neighborhood through sustainable commercial development; creating local jobs with living wages and benefits; and promoting Minnesota's high-potential energy and environment business sector. PEEC is also linked to programs providing targeted technical assistance and seed capital.

The meeting resulted in several outcomes and items of collaboration. These are as follows:

- Build the Green Business Center at Hyderabad on the experience of The Green Institute and the PEEC to incorporate energy efficient and environmentally sound practices and technologies in the design, construction and development of the site for the GBC in Hyderabad.
- Promote market-based clean energy and environment business opportunities and support development of private sector investment and commercial relationships in Andhra Pradesh and in the State of Minnesota.

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

- Share strategies for the development of human resources and for catalyzing changes in public and business policies to better reflect the principles of sustainability.
- Promote and organize participation in two-way Indo-US trade interactions such as reverse trade missions, conferences and exhibitions.
- Assist each other in promoting local employment generation through the creation of domestic and trade-oriented business opportunities.

Outcomes:

A MoU in this regard was signed between Mr. Arun Bharat Ram, President CII & Michael Krause, Executive Director, The Green Institute.

This would assist not only the Green Business Center at Hyderabad but would also assist in the activities of the CII Climate Change Facilitation Center. The NGO outlook of the Green institute and their experience with recycling would be an additional input for both the centers.

Next Steps:

To further the association on the Green Business Center and share the experience of the Green Institute, CII proposed to hold a meeting during the CII Partnership Summit in January 2001.

Progress:

- The Green Business Center project of CII has been progressing as scheduled. The Business Plan for the GBC has been finalized. CII is working closely with US organizations like Green Institute and BCSE on the same. The Construction design has commenced. GBC facilities of the GBC would be built by the end of next year. GBC website has been launched.

Business Council for Sustainable Energy

- Randall Swisher, Executive Director, American Wind Energy Association & Allison A Schumacher, International Associate, Business Council for Sustainable Energy

The Business Council for Sustainable Energy (BCSE) advocates policies that promote economic, environmental and energy independence objectives, both within the U.S. and internationally. It stands for implementation of cost effective programs and policies that recognize the environmental attributes of various energy sources, technological responses to environmental issues and reduced reliance on imported fossil fuels.

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

The following agreements were reached during the meetings:

- Promote commercially viable clean energy and environment opportunities and enhance the cooperation of the private sector in Andhra Pradesh and the United States through:
 - Building up contracts of goods and service procedures for business deals;
 - Commercial development and demonstration of leaner energy sources such as renewable energy, natural gas and energy efficiency;
 - Increasing the use of market-based approaches for energy conservation and improved environmental management; and
 - Spreading knowledge of the benefits and widespread adoption of voluntary environmental management systems.
- Share strategy of human resource development & catalyzing policy changes.
- Enhance Indo-U.S. trade opportunities through trade missions, reverse trade missions, conferences, exhibitions and more.

Outcomes:

A MoU in this regard was signed between Mr. Arun Bharat Ram, President CII & Randall Swisher, Executive Director, American Wind Energy Association representing BCSE.

This would assist not only the Green Business Center at Hyderabad but would also assist in the activities of the CII Climate Change Facilitation Center. Since BCSE represents the non-utility sector, it would assist CII in facilitating Industrial cooperation with the non-utility industry also.

Next Steps:

To further the association on the working of the Green Business Center and share the experience of the Green Institute CII proposes to hold a meeting during CII Partnership Summit: 2001, 9-11 January, 2001.

The Atlantic Council

- Meeting with Donald L Guertin, Director, Program on Energy & Environment

The Atlantic Council is a non-partisan network of leaders who are convinced of the pivotal importance of effective U.S. foreign policy and the cohesion of U.S. international relationships. The Council promotes constructive U.S. leadership and engagement in

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

international affairs based on the central role of the Atlantic community in the contemporary world situation. It does this by:

- Stimulating dialogue and discussion about critical international policy issues, with the intention of enriching public debate and promoting consensus in the administration, the Congress, the corporate and nonprofit sectors and the media in the United States and among leaders in Europe, Asia and the Americas;
- Promoting educational and other programs for successor generations of U.S. leaders who will value U.S. international engagement and have the formation necessary to develop effective policies, building on U.S. leadership in the Atlantic community.

The Atlantic Council has initiated a China-India-Japan-US Cooperation project on Promoting Clean Air for China and India. The objective of this project is to develop on consensus recommendations for economic and energy policies to promote clean air and reduce air pollution associated with energy use in China & India. This in turn would help in creating an enabling environment between the countries for promoting clean energy.

The project will form a senior level advisory group composed of two experts from each country. The group would share their countries experience and specially address issues on pricing; deregulation and restructuring; investment; trade; and technology transfer. The outcome of the meeting was the recommendation that Mr. Tarun Das, Director General; CII would be co-chairing the group from the Indian side.

Next Steps:

- CII plans to produce a status paper on the energy scenario in India that will be used as a foundation for defining further areas of collaboration.
- Facilitate interactions for creating an enabling environment for partnership project between the countries.
- Exchange collaboration/program ideas in September 2001 during environment summit.

Progress:

- Delegations from U.S., Japan, and China visited India for discussions on Policies for Clean Air and CII prepared the status report on the topic.

Various U.S. Government Officials

- Mr. T J Glauthier, Deputy Secretary, US Department of Energy, Mr. David Pumphry, Deputy Assistant Secretary, US Department of Energy and assisting Mr. A K Basu, Secretary, Ministry of Power; Mr. Anil Razdan, Joint Secretary, Ministry of Power; Dr A K Palit, Director Technical, NTPC.

This meeting brought several interests together. It was intended as an introduction to the activities of each organization in order to find common areas of potential collaboration.

It also assisted Government of India officials on energy related Indo-US Cooperation matters especially in:

Outcomes:

- 1) Drafting statement of intent signed between Mr. T J Glauthier, Deputy Secretary, US Department of Energy and Mr. A K Basu, Secretary, Ministry of Power.
- 2) Department of Energy and & National Thermal Power Corporation of India Memorandum of Understanding on IGCC technology development was signed.

International Clean Energy Technology and GHG Project Funding Agencies

- Vikram Widge and Vivek Talvadkar, International Finance Corporation
- Charles Feinstein, World Bank
- Nandita Mongia, Global Environment Facility

The purpose of these meetings was to bring CII together with key clean energy/carbon reduction oriented funding agencies to discuss financing and project development potential within India and within the constituency of CII. Each leading institution outlined its guidelines for lending for clean energy technology/GHG emission reduction projects and discussed the current status of its related activities. CII shared ideas on how funding opportunities might be capitalized upon by project developers and on the current understanding of international sources of funding for related projects.

Outcomes and Key Points:

- FIs are willing to consider funding clean energy projects but the financial terms in some cases may not be very attractive to or cumbersome for Indian project developers.
- Some of the FIs do seem to offer cheaper financing for carbon reduction, but the government approval process is seen as a constraint/barrier.
- The FIs do not have a good understanding of GHG mitigation project finance issues in India.
- Funds like GEF could be good funds for capacity building, barrier removals, and demonstration projects.
- Some of the funds have cumbersome procedures and are time consuming.
- Some funds need to understand the need for looking at India with a long term perspective and not short term gains.

Next Steps:

- There is a need to have better interaction and creating understanding of the India markets amongst the international Funding agencies. CII and the FIs discussed possible avenues for expanding interaction and understanding.
- Improve interaction between the GOI and FIs to identify possibilities of financing projects under the Prototype Carbon Fund of the World Bank.

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

8

- Work to develop a GHG mitigation demo project to increase understanding amongst international funding agencies about project development in India. CII and the FIs discussed potential collaboration over time through activities of GEP-CCS.

Global Environment Facility

- Nandita Mongia

At its first meeting, the conference of Parties of UNFCCC guided the GEF as the interim operating entity of the financial mechanism of the convention to support activities of the parties not included in Annex I to the convention that:

- Are country driven and are supportive of national development priorities.
- Consistent with and supportive of internationally agreed programme of action for sustainable development.
- Transfer technologies that are environmentally sound and adapted to suit local conditions.
- Sustainable lead to wider application.
- Cost effective.
- Mitigate climate change.

The GEF would finance activities including project preparation on an incremental cost basis. The type of activities that could be financed include: research, capacity building, technical assistance and investment reductions.

The meeting was designed to help CII understand the GEF funding process and accessibility of funds for projects in India. It is noteworthy that China has attracted more than \$5 billion worth of project assistance under this facility, while India is still to make much headway. The concern was shared with GEF. It was decided to discuss this further with the Indian GEF setup and the MoEF in order to develop GEF compatible projects.

Outcomes and Key Points:

- India can leverage funds from GEF.
- Delays in GEF processing need to be minimized and GEF processing activities need to be better informed about the Indian context for project development and financing.
- Methods by which the private sector can leverage GEF funds need to be made more private sector friendly – discussion on how CII and GEF might collaborate for this purpose.

World Resources Institute

- Rhuchi Bhandari and Navroz Dubash

World Resources Institute (WRI) was formed with the objective of providing information, ideas, and solutions to global environmental problems. WRI works with a goal to:

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

- Reverse the rapid degradation of ecosystems, assuring their capacity to provide the goods and services on which human well being depends.
- Halt the changes to the Earth's climate caused by human activity.
- Catalyze the adoption of policies and practices that expand prosperity while reducing the use of materials and generation of wastes.
- Guarantee people's access to information and decisions regarding natural resources and environment.

The meeting with WRI was to discuss a range of issues, but especially those related to the flexible market based mechanisms such as under the UNFCCC. Both parties agreed that these mechanisms could certainly assist in clean energy projects in developing countries like India if implemented properly.

Outcomes and Key Points:

- Project selection criteria need to be refined.
- Projects should look at creation and correction projects in the developing countries, as significant difference exists in operating efficiencies in the older and newer projects
- Energy efficiency, power, and transport are the areas where the market based mechanisms could be appropriate.
- Project development process will be more successful with minimum transaction cost.
- Bureaucratic delays should be minimized to have better private sector participation.
- Independent agencies should be involved for monitoring, verification etc under the guidelines of the COP and implemented by the Executive Board.
- The sustainable development criteria of the individual countries should be respected. The World Bank criteria and other existing criteria could be used as the guidance principals.

Black & Veatch

- Mohan Tahiliani

Black & Veatch is one of the largest energy consulting, engineering, and construction firms in the world. Black & Veatch works towards integrating advanced technology in their business practices and in the power plants they design. Some key areas of work are:

- Power generation
- Power delivery
- Gas / LNG
- Advanced Generation technologies
- Renewables
- Environment

Outcomes and Key Points:

- Agreement that there is a need for expanded clean energy project experience in India and that the potential for such projects is very high, especially for advanced generation technologies and renewables.
- Pace of power sector reforms is a key issue that will affect the entire sector.
- Advanced generation technologies such as IGCC, ultra-supercritical steam cycle, and distributed generation may be potential technology ideas to investigate for creating demo projects.
- Wind, cogeneration and solar energy development in India and internationally was discussed.

The Aspen Institute

- Elmer Johnson

CII and Aspen Institute initiated a dialogue on reforms and restructuring in the power sector in India. In April 1998 CII and Aspen Institute had outlined the blueprint for Reforms in India's Power Sector viz:

- Restructuring, Regulation
- Unbundling
- Realising rational user charges
- Environmental responsibility

The measures initiated by India since the beginning of the dialogue were discussed and the need to employ clean technologies to reduce GHG emissions with better combustion and coal washing was evaluated.

UN Department of Economic and Social Affairs (UN-DESA)

- Donald Guertin

The discussions at UNDESA were focused on the strategies for intensifying renewable energy penetration in the Indian context. The recent initiative of Ministry of Non Conventional Energy Sources (MNES) on the Draft Renewable Energy Policy to achieve 10% additional generation through renewable sources of energy by 2012 was discussed. The following main aspects were deliberated:

- Need for market based mechanisms for promotion of renewables
- Incentives to end user to promote renewables
- Investment in RE Market and need for dedicated renewable energy fund
- Renewable vs. conventional energy sources and need to make RE competitive by removing unnecessary subsidies on conventional energy sources

APPENDIX A.

SCHEDULE OF MEETINGS

Date	Organization	Person Met
11 th September, 2000	USAID	Mr. Robert C Randolph Mr. Christine M Wegman
11 th September, 2000	International Finance Cooperation	Mr. Vikram Widge Mr. Vivek Talvaikar
12 th September, 2000	American Wind Energy Association The Business Council for Sustainable Energy	Mr. Randall Swisher Ms Alison Schumacher
12 th September, 2000	United States Energy Association	Mr. Barry Worthington Mr. John Hammond Mr. Sridhar B Samudrala
12 th September, 2000	GEF	Ms Nandita Mongia
13 th September, 2000	The Atlantic Council of the United States	Mr. Donald L Guertin
13 th September, 2000	Department of Economic & Social Affairs	Mr. J Gururaja
14 th September, 2000	ASPEN Institute	Mr. Elmer W Johnson
14 th September, 2000	United States Energy Association	Mr. Barry Worthington Mr. John Hammond Mr. Sridhar B Samudrala
14 th September, 2000	Office of The White House	Mr. Niel Laner
14 th September, 2000	The Green Institute	Mr. Michael Krause
15 th September, 2000	Conference Indo-US Business Dialogue on Clean Energy	
15 th September, 2000	World Resource Institute	Ms Ruchi Bhandari Navroz K Dubash
16 th September, 2000	Black & Veatch	Mr. Mohan Tahiliani
18 th September, 2000	The Louis Berger Group	Ms Julie M Haines
18 th September, 2000	United States Energy Association	Mr. Barry Worthington Mr. John Hammond Mr. Sridhar B Samudrala Ms Tricia Williams
18 th September, 2000	The World Bank	Mr. Charles Feinstein

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

12

APPENDIX B.

CONTACT DETAILS

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<p>Mr. Barry Worthington United States Energy Association 1620 Eye Street, NW Suite 1000 Washington, DC 20006 Tel# 202 331 0415 Fax # 202 659 0418</p>	<p>Mr. John Hammond United States Energy Association 1620 Eye Street, NW Suite 1000 Washington, DC 20006 Tel# 202 331 0415 Fax # 202 659 0418</p>
<p>Ms. Tracia Williams United States Energy Association 1620 Eye Street, NW Suite 1000 Washington, DC 20006 Tel# 202 331 0415 Fax # 202 659 0418</p>	<p>Mr. Sridhar B. Samudrala Senior Program coordinator, Engr. United States Energy Association 1620 Eye Street, NW Suite 1000 Washington, DC 20006 Tel# 202 331 0415 Fax # 202 659 0418 Email: 102722.3051@compuserve.com</p>
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<p>Mr. Vivek Talvadkar Director – Power Dept. International Finance Corporation 2121 Pennsylvania Avenue, NW Washington, DC 20433 USA Tel# 202 473 0607 Fax# 202 974 4309 Email: vtalvadkar@ifc.org</p>	<p>Ms. Julie M. Haines Vice President The Louis Berger Group Inc Panavangs Bldg, Suite 708 104 Suriwongse Road Bangkok 10500, Thailand Tel# 662 235 3551 Fax # 662 236 1353</p>

CLIN 6: Policy Level Exchange Visits between U.S. & Indian Counter-Parts

Task 6A: Completion of study tour and exchanges for Milestone A - for all CLINS + 2 policy exchanges

13

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46