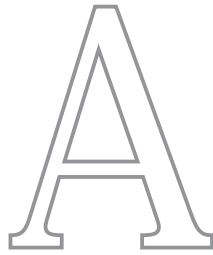
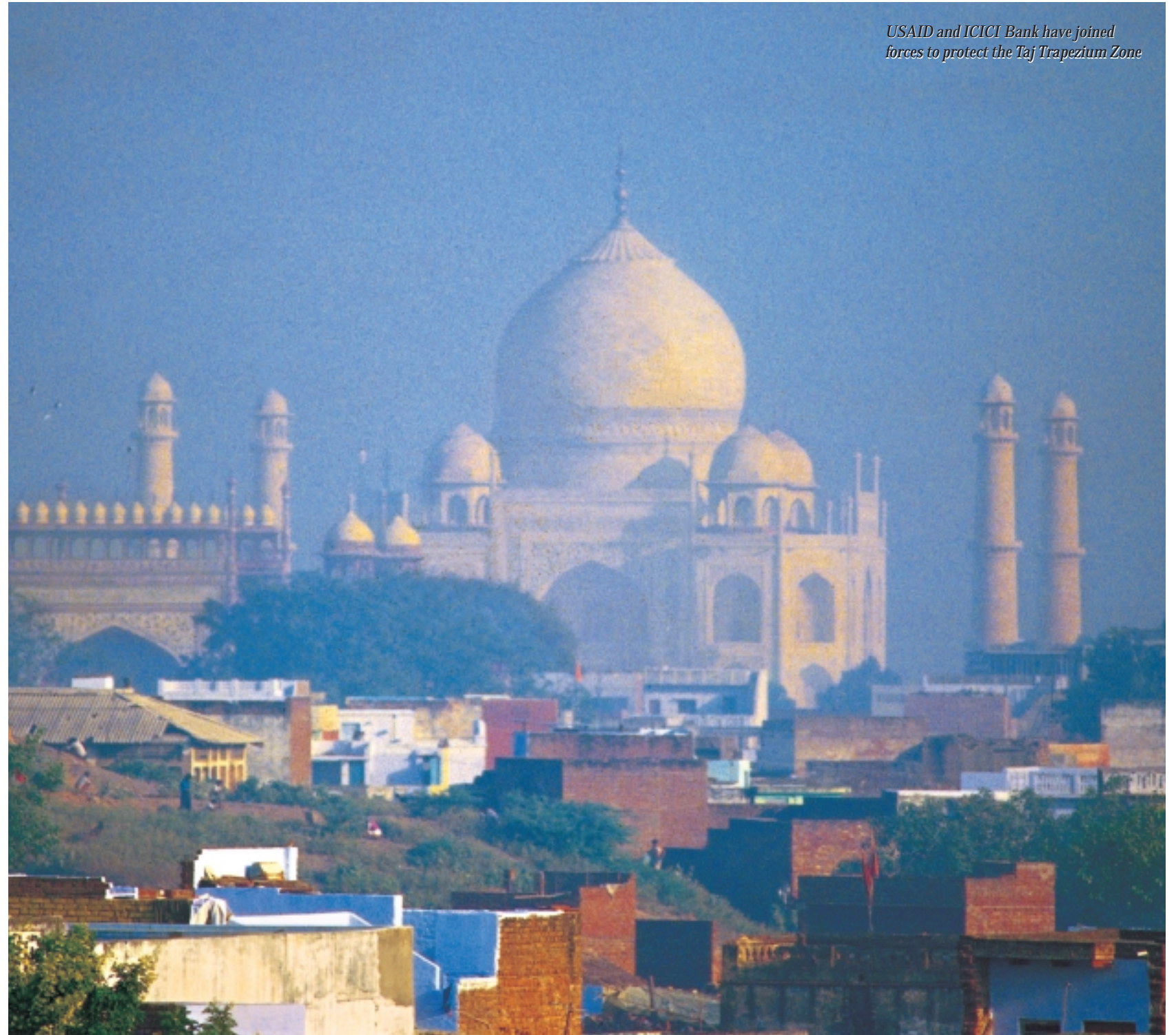
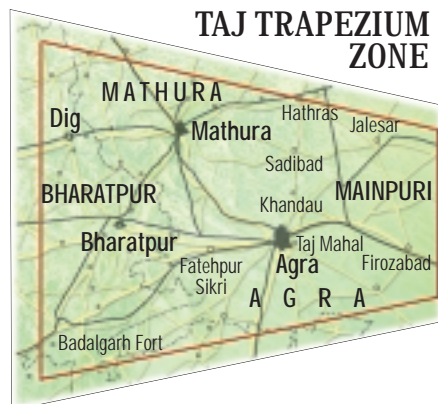


ENERGY & CLIMATE CHANGE
**ECO-SENSE IS
 SENSIBLE ECONOMICS**



As you reach the banks of the Yamuna river near Agra, the magnificent white-marble edifice of the Taj Mahal rises into the horizon stirring your senses to the 15th century beauty—a testimony of Mughal King Shahjehan’s love for his wife Mumtaz. But over the years, the pollution created by vehicular traffic and small-scale industries surrounding the Taj Mahal has damaged the monument, prompting the Government of India, courts, activist groups and donor agencies to raise awareness about the threat and develop programs to ensure the monument’s survival.

This is, perhaps, one of the most visible examples of the U.S.-India partnership on energy and climate. Among the many activities that have formed the partnership over the years is the Clean Technology Initiative (CTI), a joint effort of the U.S. Agency for International Development and the ICICI Bank to promote climate-friendly technologies and certifiable environment management systems (EMS). In its newest evolution, CTI is focused on the 10,400 sq km Taj Trapezium Zone (TTZ) to help achieve sustainable industrial growth while protecting the environment. The plans for the TTZ include the launch of a host of



USAID and ICICI Bank have joined forces to protect the Taj Trapezium Zone

USAID's GHG Pollution Prevention
Project benefits NTPC power plants



USAID and
Indian
agencies are
collaborating
to facilitate a
hydrogen
economy.

cleaner production processes in glass, bangle-making, foundry and diesel generator manufacturing. In addition, the project aims to create awareness of clean technologies and conduct factory walkthroughs to identify cost-effective and energy-efficient options. It will also arrange the necessary finances and render the supply chain "green."

During 2003, India and the United States launched a new initiative known as the U.S.-India Climate Change Partnership, which includes 18 activities focused on research, technology cooperation, carbon sequestration, market-based mechanisms and institutional approaches, and adaptation. The initiative is being led by the U.S. Department of State and the Government of India's Ministry of Environment and Forests. A broad coalition of government agencies from both countries participates in the climate change partnership. The partnership builds on the past success in climate change cooperation between India and the U.S. while looking toward future opportunities.

Central to this partnership is the work of the Greenhouse Gas Pollution Prevention (GEP) Project. This is USAID's largest climate

change initiative worldwide. The project's efficient power generation component seeks to reduce greenhouse gas (GHG) emissions per unit of electricity generated by thermal power stations. Power plants of both the National Thermal Power Corporation and State Electricity Boards have benefited from this program. GEP's Alternative Bagasse Cogeneration component encourages efficient use of biomass fuels in sugar mills. In the past, cogeneration units used low temperature and low pressure turbines which deliver lower efficiency. The focus is now on high-efficiency configuration systems at nine sugar mills where financial and technical assistance have been provided. Also, the project's climate change supplement seeks to develop human and institutional capacity to design and implement policies that reduce GHG emissions. It has created greater awareness of climate change issues among a broad group of stakeholders, worked closely with municipal corporations in Hyderabad, Bangalore, Agra and Delhi on specific initiatives, and helped to secure funding for a diversity of GHG mitigation projects.

A separate activity, Accelerating Renewable Energy Commercialization in India, is designed to overcome barriers that impede private investment in the field. It has funded and promoted solar, wind, hydro and biomass technologies in Karnataka, Andhra Pradesh, Tamil Nadu, Rajasthan, Himachal Pradesh,

ZERO POLLUTION MOBILITY

TWO FOR THE ROAD

REVA, THE SMOKELESS CAR, IS NOT ONLY AFFORDABLE BUT OFFERS PRIVACY FOR THOSE WHO DO NOT WANT A THIRD PERSON ON A RELATIVELY LONG AND FAST TRIP

It can carry two at 80 kmph, has no gears, no petrol or diesel is needed and, of course, there is no smoke. It can travel 80 km without a recharge, and it is called Reva. India's very own electric car, Reva was designed in a joint venture between the Maini Group, Bangalore, and Amerigon, Monrovia, CA. Compared with a petrol-driven car, which costs Rs 2.60 per km, Reva costs barely 40 paise per km, using the equivalent of nine units of power. The basic Reva model is priced at Rs 2.47 lakh (\$6,000), while the fully loaded version comes at Rs 3.22 lakh (\$7,000). A truly cutting edge collaboration supported by USAID, Reva has been tested in the U.S. and commercially marketed since mid-2001 in India and abroad.

In fact, the Maini group, in collaboration with a UK-based firm, Going Green Plc, will export 500 cars to Britain under the brand name G-Wiz. The

SAIBAL DAS/INDIA TODAY



This eco-friendly car got a good response in global markets

battery-run vehicle has recently been granted the European Economic Community's certificate for homologation, which qualifies the firm to enter the European market commercially and its potential is huge. As Chetan Maini, the Managing Director of the Rs 600 million Maini Industrial Group said, the certification validates Reva's technical expertise in the auto industry. The compact car makes sense for mobility in European cities and towns and will be competitive as it will be the lowest-cost electric car in the European and British markets. Maini maintains that, as the second largest electric car producer in the world (behind U.S.-based Ford), Reva has the first move advantage in the emerging trend for zero pollution cars.

THE ORCHID

PROFITABLY ECO-FRIENDLY

THIS MUMBAI-BASED HOTEL IS A SUCCESSFUL EXAMPLE OF A JOINT U.S.-INDIA GREEN INITIATIVE

With funding from USAID, the Orchid Group of Hotels, India's first eco-hotel chain, is setting new standards for energy conservation. The facade of the Mumbai hotel is a blend of depressions and protrusions that are designed to reduce radiation. The design and placement of the rooms reduce heat load and sound while adding light. And the rooftop pool acts as an insulator. The cement used throughout the building is Portland pozzalana, which contains 15% fly ash. The internal partitions are constructed from QED wall panels, which are made from fertilizer waste, instead of red bricks, which are made from the top soil of the earth.

The hotel also reduces, reuses, and recycles water through special aerators, which increase the water's force and reduce outflow, and the Geberit Concealed Cistern, which uses only six liters of water per flush versus the 15-20 liters used in conventional flushes. The waste-water is then treated using the

latest technology and reused for air-conditioning and gardening. The hotel's interiors are designed to cut sound, light and cost, as triple-glazed windows block the heat of the sun and help conserve air-conditioning energy. The windows also prevent fabric and furniture colors from fading, as the triple-glazed unit prevents infrared sunlight from entering the room and effectively cuts down on the noise pollution from India's busiest airport.

The Orchid also saves energy through recycling paper and treating garbage via vermiculture. Even cockroaches are killed herbally. Not surprisingly, the hotel is estimated to have had a savings of over Rs 1 crore per year. The hotel's success is marked by a high repeat clientele rate and by the fact that other hotel managers are visiting the site to learn about the benefits of being profitably green. The Orchid is a successful example of a joint U.S.-India green initiative that promotes business-friendly environmental management systems.

Business management gets a new meaning at the Orchid as the hotel profits through its eco-friendly systems

BHASKAR PAUL/INDIA TODAY



SHARAD SAXENA

Gujarat and Madhya Pradesh. The partnership also brings in other U.S. Government agencies. Integrated Environmental Strategies, a collaboration between the U.S. Environmental Protection Agency, the National Renewable Energy Lab, USAID and Indian institutions, quantifies the human health, economic, and environmental benefits from clean energy policies and technologies.

There are many other areas where collaboration between the two countries has paid off. With coal accounting for nearly 70% of power production in the country, the World Bank pressed India to come up with innovative measures to dispose of the huge quantities of fly ash. Current estimates put the figure at 95 million tons of fly ash produced each year. Rising to the critical occasion, the Ministry of Power and the NTPC began to work with USAID and the U.S. Department of Energy (DOE) to find a productive use for fly ash and reduce the risk of health hazards. Efforts have focused on using fly ash in wasteland reclamation, as construction material in concrete and brick-making and as a foundation for road beds. As an example, the Delhi-Noida-Delhi Flyway has been built over fly ash recovered from thermal power plants. One good possibility to utilize large quantities of fly ash lies in the Gorbi Mine ash haul back study, which explores the feasibility of

CTI is promoting clean technology in bangle manufacturing in the TTZ

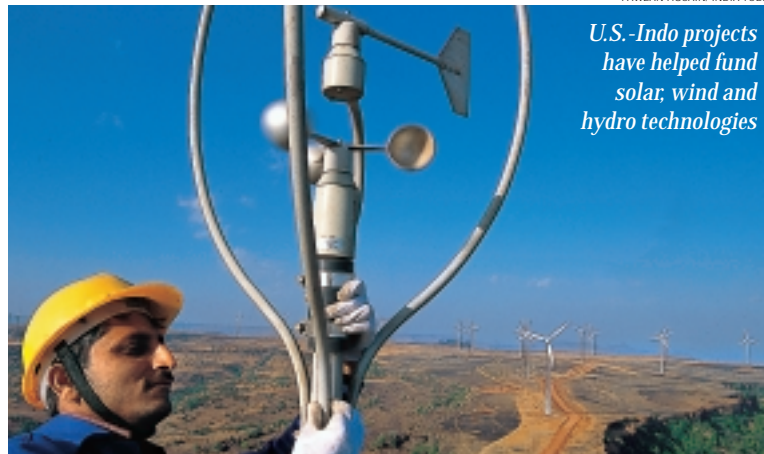
Shree Cements received funding of Rs 29.3 lakh in May 2000 to set up a heat recovery system at its cement mill using hot dust laden flue gases. The technology was provided by Caldyn Inc., New York.

Morarjee Gokuldas Spinning and Weaving Mills was provided funding of Rs 27.7 lakh in March 2000 to implement energy-efficient improvement measures in the textile mill.

—Both were funded under the Clean Technology Initiative run jointly by USAID and ICICI Bank.

backfilling the abandoned mine with fly ash and eventually returning it to a forested state.

The U.S. first raised the idea of cooperation in the energy sector back in the 1960s. The fact that the U.S. and India are at different levels of development hardly matters. What does matter, however, is the willingness to work together and learn from one another. The individual approaches of the two countries may differ but their end-goal is the same—cooperation in the field of energy and climate change is mutually beneficial. Says Harlan Watson, senior U.S.



U.S.-Indo projects have helped fund solar, wind and hydro technologies

climate negotiator: “The bilateral partnership allows us to share our experience and knowledge with India in climate change and science and technology.”

Not surprisingly then, India and the U.S. are collaborating on a range of activities that require educational inputs, consultancy services and funding in the energy sector. Practitioner-to-practitioner contacts have become the norm between utilities under the Energy Partnership Program. In states like Andhra Pradesh, Maharashtra, West Bengal and Karnataka, a series of links have been developed to ensure better electricity supply and distribution. And it is this second element, energy distribution, that is quickly becoming the key to the growing bilateral relationship on energy and climate change.

The U.S.-India partnership in energy has evolved from a focus on electricity generation to an emphasis on energy distribution. To this end, USAID/India is funding a variety of distribution-based projects with the aim of contributing to the power distribution reform process and introducing commercial best-practices with regards to energy and water resource management. The Water-Energy Nexus Activity

U.S.-India collaboration stresses the importance of harnessing renewable energy sources like wind



(WENEXA) strives to bridge the policy gap between the water and energy sectors and works with institutions on the national, state and local levels. The project's objectives include developing policies that promote and support viable power distribution companies, fostering state-level water sector reforms, reinforcing market-oriented energy policies and ensuring the effective communication of water and energy issues to village and town residents.

The Distribution Reform Upgrades and Management (DRUM) project is another example of the shifting focus in U.S.-India energy collaboration. Today, the reform of power distribution is widely viewed as the key to improving the commercial performance and financial viability of India's power sector. In recent years, a number of states have worked to improve the commercial performance of their state utilities, including the unbundling of state entities, the creation of more independent regulatory systems and the development of measures to control losses and theft.

Recognizing the urgent need to address the issue of reducing losses and improving the quality of power delivery, the Ministry of Power (MoP) has focused on implementing distribution reforms and has introduced several measures to further the process. The recent initiatives include the enactment of the Electricity Act 2003, which provides the framework for a more competitive, transparent and commercially-driven power sector. The Act recognizes the need for a strategy that distinguishes urban power distribution from rural electricity supply. It also facilitates establishment of participatory models for rural distribution, including electricity cooperatives, rural *gram panchayats*

NOIDA TOLL ROAD

GREEN FLYWAY

THE SLOGAN: REDUCE THE HAZARDS BUT MAKE USE OF FLY ASH. HERE IS A GRAND BID TO CREATE GARDENS AROUND FLY ASH PONDS.

It is estimated that currently 95 million tons of fly ash are being generated in India annually and over 65,000 acres of land are being occupied by ash ponds. Such a huge quantity of fly ash poses challenging problems in the form of land usage, health hazards and environmental dangers. In a collaborative effort with USAID and the U.S. Department of Energy, the Ministry of Power and the National Thermal Power Corporation are working out ways to not just reduce these hazards, but also to use fly ash productively and economically.

The World Bank has cautioned India that by 2015, disposal of coal ash would require 1,000 square kilometers of land. Since coal accounts for almost 70% of the country's power production, the World Bank has highlighted the need for new and innovative methods of reducing the environmental impact. To this end, the MoP and NTPC are creating gardens around the fly ash ponds using leguminous plants and moss that help the wasteland to regenerate organic matter. It is interesting to note that the material used for the Noida freeway foundation in Delhi is made from fly ash recovered from thermal power plants. Fly ash is even being used as an effective ingredient in eco-friendly cement plants and brick kilns. The question of whether fly ash could be used to fill abandoned coal mines is currently under study. The long-term success of these and other green initiatives will be critical for India's future.



Noida toll road makes use of fly ash as landfill

(local government), distribution franchisees, etc. Another program focused on improving electricity distribution is the Accelerated Power Development Reform Program (APDRP), which finances the modernization of sub-transmission and distribution networks, including a system of local management and energy accounting through widespread metering in every state utility's distribution circles.

The MoP and USAID/India recognize that the major inefficiencies in the electricity distribution sector inhibit more rapid and comprehensive reform of the energy sector throughout the country. As a result, USAID/India designed the DRUM project with the purpose to demonstrate best commercial and technological practices that improve the quality and reliability of "last mile" power distribution in selected urban and rural distribution circles in the country. The project is in synch with the GoI policy on power sector reforms, the Electricity Act 2003 and the APDRP scheme. DRUM is a five-year bilateral project with a planned funding of Rs 135 crore (\$30 million) over the life of the project.

Even day-to-day operations in various industries have recorded a change. CTI's efforts, along with CII and FICCI, to introduce eco-friendly measures and enhance productivity has managed to realize savings for automotive companies, five-star hotels, cement producers and textile mills.

The Orchid Hotel in Mumbai is a good example of U.S.-India cooperation. A stone's throw away from the domestic airport, the plush five-star is a unique *ecotel* that has benefited from the U.S.-India collaboration. Everything about this hotel is in keeping with its larger goal of conservation: a facade designed to cut radiation, reusable wall panels made from fertilizer waste, triple glazed windows that block the sun rays and provide a buffer against the roar of the constant plane traffic above, a rooftop pool that acts as an insulator, special aerators to manage water flow, crockery that

is recycled, even garbage that is treated through vermiculture—there's nothing in the hotel that is not eco-friendly. And after it turned into an *ecotel*, the Orchid is believed to be saving approximately Rs 1 crore (\$223,000) a year.

While much of the focus is on the present, possibilities for the future are also being emphasized. As U.S. Energy Secretary Spencer Abraham projects, "In the U.S., demand for oil may increase by nearly 50% by 2025. We can expect similar or higher increases all over the world, particularly among major developing countries like China and India." This, in turn, raises questions about pollution, health hazards, long-term environmental fallout and climate change. To attempt to address these issues, India and the U.S. have joined other nations under the International Partnership for the Hydrogen Economy. Of special concern are issues like fossil-fuel depletion and a roadmap for a hydrogen economy. In the U.S., the Government has pledged \$1.7 billion over the next five years to help launch hydrogen-powered cars and build infrastructure to support them. In India, the priority may be to use hydrogen as a fuel to generate electricity. USAID and the U.S. Department of Energy have expressed willingness to provide technical assistance to the Government of India to assist India in the development of a hydrogen roadmap. The roadmap would identify opportunities and barriers in production, transportation, storage and utilization of hydrogen fuel.

U.S.-India cooperation in the field of energy and climate change is a dynamic partnership that continues to thrive. Whether through electric cars, eco-friendly hotels or improvements in energy distribution, the U.S. and India are working together to lessen negative impact on the environment. The environment is a precious global resource, which both countries are working together to restore and preserve for future generations.