



The mantra of energy saving

More than two-thirds of India's electricity comes from technologically obsolescent coal-fired power stations. The environmental hazards pollute the air, and there is no telling when this will stop. On the contrary, industrialisation is eating up more and more energy. Saving energy and environmental protection are an indivisible issue.

Rainer Hörig, text | Oliver Soulas, photos





Each winter, a ten million square kilometre bubble of dust, soot and poisonous gases develops above the North of the Indian Ocean. In the spring of 2001, an international team of scientists came to the conclusion that, "given the size of the population, the situation in Asia is becoming more and more threatening". Is there still time to stop the collapse of the world's climate?

The World Health Organization (WHO) claims that India's largest metropolises, Mumbai, New Delhi and Calcutta, with more than ten million inhabitants each, already rank among the cities with the highest levels of air pollution worldwide. The biggest environmental hazards are car traffic and the energy industry. Almost two-thirds of India's power supply is provided by technologically obsolescent coal-fired power stations. Millions of cars, lorries and scooters billowing forth fumes and several thousands of factories craving energy are polluting the air. Even the villages suffer from smog in an inversion climate during the winter. The rural households cook their meals on countless open fires that are fuelled with wood, dried cow-dung or harvest waste.

Singrauli is India's energy capital. Rows and rows of chimney-stacks reach into the sky on the edge of the Ganges Plain, south of the city of Varanasi.

Huge black pits have been eaten into the ground, and dust and soot darken the tropical sun. Most of the inhabitants are crowded into shabby colonies around vast mountain ranges of detritus. Just two generations ago, smallholders were tending their parcels of land here, and the original inhabitants were gathering honey and herbs in the forest. In the late fifties, a large-scale dam banked up the water of the River Rihand. Later, rich coal deposits were discovered close to the artificial lake that could be used to generate electricity.

Today, five large-scale power stations, an aluminium smelting plant, two cement factories and a chemical factory stand on the shores of the lake. The power stations, which have a total output of 7,000 megawatts, are supplied with fuel from nine coal mines via conveyor belts, and they are cooled with water out of the lake. They burn 27 million tons of hard coal a year, and more than 20,000 tons of ash containing heavy metals accumulate every day. It is mixed with water and then pumped into giant sedimentation basins on the shores of the artificial Rihand Lake. Since the pipes sometimes leak and bursting dams or flooding occasionally wash away large quantities of the poisonous sludge, the groundwater in Singrauli is now contaminated over wide areas.

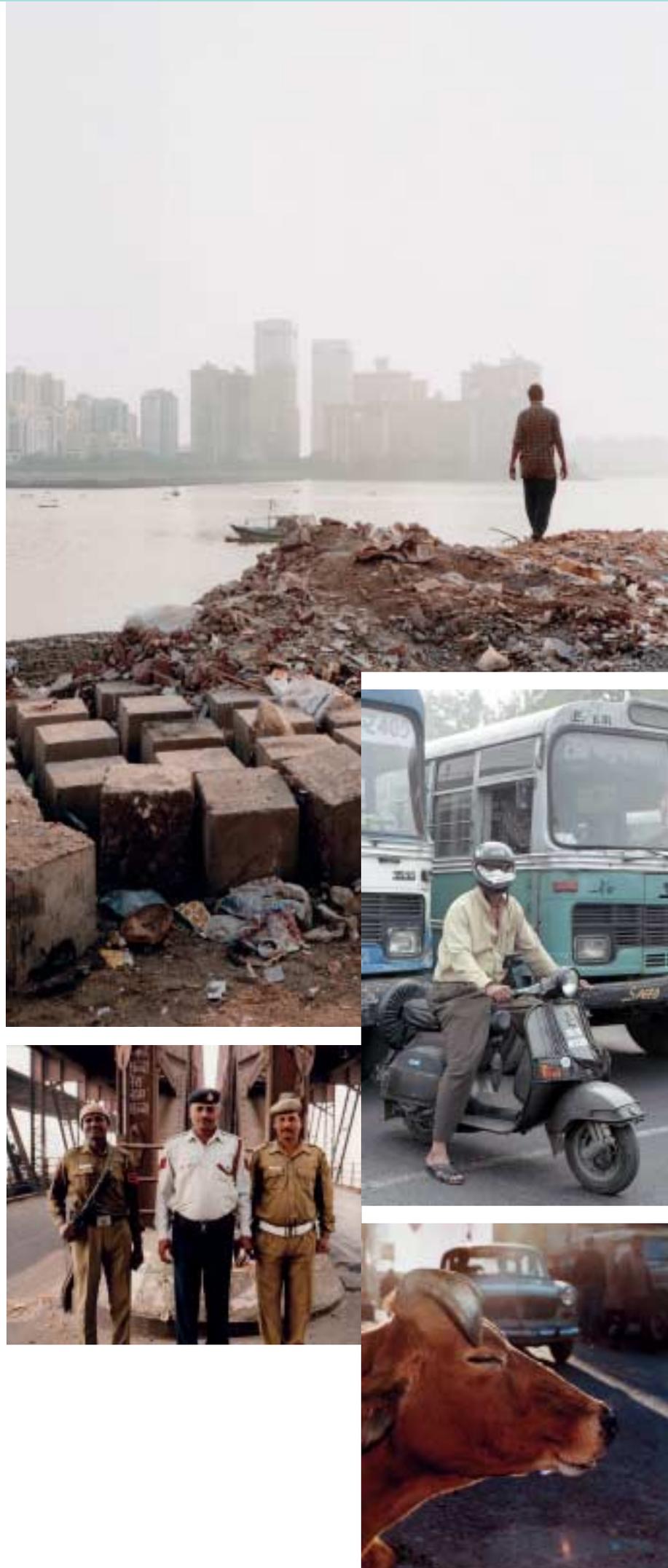
▷ In the artificial lake, a drinking-water reservoir for a million people, experts have detected traces of poisonous substances including cadmium, arsenic and nickel.

Germany is involved in developing the Indian energy sector, a task that figures high in bilateral development cooperation. In 1961, the German Development Ministry started to support Indian manufacturers of turbines, coal mines and the construction of power stations, spending more than a billion euro in all. Well over 87 million euro in German taxpayers' money flowed into the Singrauli project. This policy secured many a contract for German plant and equipment makers. "Half of the output currently installed in Indian fuelled power stations is based on Siemens technology," says Harminder Singh, who is responsible for the power station sector at Siemens India.

Focusing more on energy efficiency

Unlike in most industrialised countries, India's economic growth of five to seven percent a year is still closely linked to an increase in energy consumption. And because the population is still growing rapidly at around two percent a year and the country's industry wants to catch up with the lead the industrialised nations enjoy and hold its own in international competition, the government has planned a massive expansion of energy capacities. "We intend to increase the generating capacity of our power stations from a current 100,000 MW to double that amount over the next ten years," India's Energy Minister Suresh Prabhu announced, and on the occasion of Federal Chancellor Gerhard Schröder's visit in October 2001, he invited German industry to participate in the mammoth programme. This was a tempting offer, although it did have its pitfalls. Again and again, German energy corporations have been the target of criticism from environmentalists and human rights campaigners for getting involved in controversial power station schemes in India, such as the dams on the Narmada River and in Tehri.

Forced expulsion because of large-scale projects, mismanagement in inflated administrative bodies, brazen theft of electricity by slum inhabitants and industrial corporations or everyday power cuts suffice to demonstrate that India's energy sector is in a severe crisis. The country urgently requires better power supply. For years, experts have demanded that the public electricity industry be privatised, but following the energy crisis California experienced early in 2001 and the first and largest private power station project, in Dhabol/Maharashtra, going bankrupt, this mantra has lost its appeal. Although it seems certain that India will be building several more coal-fired power stations over the next few years, a new idea is gaining more and more ground that could render some of the environmentally



harmful large-scale projects superfluous: saving energy.

"Energy is used very inefficiently in India," says Girish Sant, a young engineer who deals with the energy industry from the consumer perspective in the citizen's action group Prayas-Pune. "Industry is working with obsolescent machinery, pumps and motors. The irrigation pumps used in agriculture have a ridiculously low level of efficiency," he maintains. "Private households are wasting electricity with conventional light-bulbs and technically obsolescent household appliances." With his colleagues from Prayas-Pune, Girish Sant initiated a survey of the energy sector in the Federal State of Maharashtra, and he worked out the costs of expanding and improving power supply using 16 different scenarios. He concludes: "The cheapest way is to save energy, and it is also the most environmentally friendly way. Determined saving could reduce additional energy demand by 30 to 40 percent."

During the nineties, the World Bank established a potential of just under a third for India's industry to save energy. The Energy Ministry in

New Delhi set up a new department, the Energy Conservation Cell. "It is much cheaper to save a megawatt of electricity than to produce it," says its Director, Shashi Shekhar, and adds: "We have launched a programme to modernise existing power stations and grids. The recently approved Law on Energy Saving obliges certain corporations to conduct an energy audit and defines standards for the energy consumption of mass consumer goods that will later on be reflected in labels for the consumer. The newly established Office for Energy Efficiency is responsible for developing these standards."

It is two hours by car to the small town of Hapur, east of New Delhi. Century Laminates Limited are the largest local employers, with a staff of 800 employees. "We manufacture laminates for the furniture industry," says plant superintendent Nagendra Singh, and adds that the factory is the largest of its kind in India.

Century Laminates are the market leaders in India, and run a modern plant. The factory yard is spick-and-span, while the workplaces with the gluing and hot-pressing machines are well illumi- ▶





nated and ventilated. Daily power consumption is at 10,000 kilowatt hours. In order to become independent of the irregular and strongly fluctuating public power supply, the company operates its own diesel generator, which provides power for 150 electric motors as well as other installations. A steam boiler fired with wood chips provides the process heat required for pressing and gluing, which is a novelty. "This fuel is both environmentally friendly and cheap," says Nagen-dra Singh.

"The company spends an annual 25 million rupies on energy," states Rajesh Jain. This is the equivalent of well over half a million euro. This young energy consultant, who has been examining the laminate factory for three months, comes up with a huge potential to save energy. "Our analysis shows that in the longer term, the company could save six million rupies a year, mainly in heat consumption, but also in electricity consumption. We recommend that the machines be modernised so that they work more efficiently. Organisational processes could be streamlined in order to minimise energy wasting." Much of this could be achieved without costly investments, the expert says. What would be ideal is a plant for the co-production of electricity and process steam. But this would be up to management to decide. Plant superintendent Singh welcomes the proposals: "If they pay their way, we will of course introduce these improvements. That goes without saying."

A project with a saving philosophy

GTZ in New Delhi is supporting the efforts the laminate factory at Hapur is making. For six years, the GTZ (German Technical Cooperation) has been commissioned by the German Federal Ministry for Economic Cooperation and Development to support the Indian Energy Ministry's measures to save energy. "In the first project phase, which covered four-and-a-half years, we worked together with the Tata Energy Research Institute in Bangalore," says Albrecht Kaupp, the GTZ project co-ordinator. The project supports 30 to 50 large companies a year. "We examined



their energy effort and worked out proposals to economise," Kaupp explains. "An efficiency audit revealed that the respective plants implemented an average 70 percent of our proposals, although this did take several years in some cases."

Albrecht Kaupp usually advises large-scale enterprises on how to save energy, where he can normally reckon with appropriate technical expertise as well as the adequate financial scope for implementation. "Experience has shown that half of the saving effect can be achieved merely with improved housekeeping and management, so that larger investments are not required," the GTZ expert says. But it is precisely this aspect that is often more difficult than the procurement of new machinery. Restructuring work routines often meets with resistance among the workforce. The prime incentive for an efficient use of energy is the financial savings it entails. Albrecht Kaupp and his team are co-operating with small consulting agencies and are establishing a qualified staff of energy consultants.

S. Ramaswamy, Kaupp's colleague at the Energy Ministry, has been working for the newly established Bureau for Energy Efficiency, an expert group of the Energy Ministry, since December 2001. The Bureau is to work out implementing regulations for the new Law on Energy Saving.

Efficiency is the keyword. Energy consulting is emerging as a new branch of industry in India.



Here, the emphasis is mainly on standards and norms for energy consumption in certain branches of industry. "We intend to achieve this in close coordination with the companies concerned. And we want to develop a sort of eco-label that would inform the consumer about the energy consumption of mass consumer products such as televisions and refrigerators," says Ramaswamy.

Energy consulting as a business sector

Is efficiency now going to become the new mantra of Indian energy policy? Support cannot be reckoned with from all sides, for you can hardly grow if all you do is save. Insiders put the illegal earnings of large-scale power stations and similar projects at around 20 percent of the investment costs. These are millions that fill the pockets of corrupt politicians and bureaucrats without any tax being paid. Industrialists have raised objections to a further system of controls that could impede their business. But there is another trend as well. India's largest industrial federation, CII, organised a seminar on energy saving in the Southern Indian city of Puna in December 2001. Local firms such as Cummins India and Marshall Forbes, who are among the country's leading mechanical engineering companies, presented

technical innovations for saving energy costs. So a new industrial branch is emerging: energy consulting.

The international debate on the protection of the climate is certainly going to boost this kind of business. In the Kyoto Protocol, the parties agreed on what is known as the Clean Development Mechanism (CDM). This mechanism provides for industrialised countries to credit reductions in levels of pollution they have achieved to their own account. Albrecht Kaupp hopes that German Technical Cooperation will succeed in qualifying for this in terms of energy efficiency and environmental protection in the near future and win points for Germany. For greater energy efficiency means less emission of harmful substances. "So we are contributing to climate protection here. I am sure that CDM is going to encourage further efforts and will make India more competitive," says Kaupp. ■

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