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PROJECT PERFORMANCE ASSESSMENT REPORT

INDIA

INDUSTRIAL POLLUTION CONTROL PROJECT
(LOAN 3334-IN AND CREDIT 2252-IN)

AND

INDUSTRIAL POLLUTION PREVENTION PROJECT
(LOAN 3779 & 3780-IN AND CREDIT 2645-IN)

January 25, 2007

Sector, Thematic and Global Evaluation Division
Independent Evaluation Group (World Bank)

Currency Equivalents

Currency Unit = Indian Rupees (INR)

2003 (Feb)	US$1.00	Rs. 45.5
2004 (Feb)	US$1.00	Rs. 45.0
2005 (Feb)	US$1.00	Rs. 43.4
2006 (Feb)	US$1.00	Rs. 44.0

Abbreviations and Acronyms

ADB	Asian Development Bank
CAS	Country Assistance Strategy
CETPs	Common Effluent Treatment Plants
CII	Confederation of Indian Industry
CNG	Compressed natural gas
CPCB	Central Pollution Control Board
CSE	Centre for Science and Environment
DOEs	State Departments of Environment
EAP	Environment Action Program
ERRs	Economic rates of return
GIS	Geographic information system
GOI	Government of India
ICICI	Industrial Credit and Investment Corporation of India, Limited (later ICICI Bank Limited)
ICR	Implementation Completion Report
IDBI	Industrial Development Bank of India, Limited
IEG	Independent Evaluation Group
IEGWB	Independent Evaluation Group (World Bank)
IPCP	Industrial Pollution Control Project
IPPP	Industrial Pollution Prevention Project
IRRs	Internal rates of return
IWRPs	Industrial Water Recycling Plants
MIS	Management information systems
MOEF	Ministry of Environment and Forests
MTR	Mid-Term Review
PPAR	Project Performance Assessment Report
PSAP	Policy Statement for Abatement of Pollution
SPCBs	State Pollution Control Boards
UNCED	UN Conference on Environment and Development
WMCs	Waste Minimization Circles

Fiscal Year

Government: April 1 – March 31

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IEGWB Mission: Enhancing development effectiveness through excellence and independence in evaluation.

About this Report

The Independent Evaluation Group assesses the programs and activities of the World Bank for two purposes: first, to ensure the integrity of the Bank's self-evaluation process and to verify that the Bank's work is producing the expected results, and second, to help develop improved directions, policies, and procedures through the dissemination of lessons drawn from experience. As part of this work, IEGWB annually assesses about 25 percent of the Bank's lending operations. In selecting operations for assessment, preference is given to those that are innovative, large, or complex; those that are relevant to upcoming studies or country evaluations; those for which Executive Directors or Bank management have requested assessments; and those that are likely to generate important lessons. The projects, topics, and analytical approaches selected for assessment support larger evaluation studies.

A Project Performance Assessment Report (PPAR) is based on a review of the Implementation Completion Report (a self-evaluation by the responsible Bank department) and fieldwork conducted by IEGWB. To prepare PPARs, IEGWB staff examine project files and other documents, interview operational staff, and in most cases visit the borrowing country for onsite discussions with project staff and beneficiaries. The PPAR thereby seeks to validate and augment the information provided in the ICR, as well as examine issues of special interest to broader IEGWB studies.

Each PPAR is subject to a peer review process and IEGWB management approval. Once cleared internally, the PPAR is reviewed by the responsible Bank department and amended as necessary. The completed PPAR is then sent to the borrower for review; the borrowers' comments are attached to the document that is sent to the Bank's Board of Executive Directors. After an assessment report has been sent to the Board, it is disclosed to the public.

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Relevance of Objectives: The extent to which the project's objectives are consistent with the country's current development priorities and with current Bank country and sectoral assistance strategies and corporate goals (expressed in Poverty Reduction Strategy Papers, Country Assistance Strategies, Sector Strategy Papers, Operational Policies). *Possible ratings:* High, Substantial, Modest, Negligible.

Efficacy: The extent to which the project's objectives were achieved, or expected to be achieved, taking into account their relative importance. *Possible ratings:* High, Substantial, Modest, Negligible.

Efficiency: The extent to which the project achieved, or is expected to achieve, a return higher than the opportunity cost of capital and benefits at least cost compared to alternatives. *Possible ratings:* High, Substantial, Modest, Negligible. This rating is not generally applied to adjustment operations.

Sustainability: The resilience to risk of net benefits flows over time. *Possible ratings:* Highly Likely, Likely, Unlikely, Highly Unlikely, Not Evaluable.

Institutional Development Impact: The extent to which a project improves the ability of a country or region to make more efficient, equitable and sustainable use of its human, financial, and natural resources through: (a) better definition, stability, transparency, enforceability, and predictability of institutional arrangements and/or (b) better alignment of the mission and capacity of an organization with its mandate, which derives from these institutional arrangements. Institutional Development Impact includes both intended and unintended effects of a project. *Possible ratings:* High, Substantial, Modest, Negligible.

Outcome: The extent to which the project's major relevant objectives were achieved, or are expected to be achieved, efficiently. *Possible ratings:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

Bank Performance: The extent to which services provided by the Bank ensured quality at entry and supported implementation through appropriate supervision (including ensuring adequate transition arrangements for regular operation of the project). *Possible ratings:* Highly Satisfactory, Satisfactory, Unsatisfactory, Highly Unsatisfactory.

Borrower Performance: The extent to which the borrower assumed ownership and responsibility to ensure quality of preparation and implementation, and complied with covenants and agreements, towards the achievement of development objectives and sustainability. Possible ratings: Highly Satisfactory, Satisfactory, Unsatisfactory, Highly Unsatisfactory.

Contents

This report was prepared by John Redwood, who assessed the projects in April-May 2006. The report was edited by William Hurlbut, and Soon-Won Pak provided administrative support.

Principal Ratings

	*ICR**	*ICR Review**	*PPAR*
India Industrial Pollution Control Project (Loan 3334-IN and Credit 2252-IN)			
Outcome	Unsatisfactory	Marginally Unsatisfactory	Moderately Unsatisfactory
Institutional Dev.	Partial	Modest	Modest
Sustainability	Unlikely	Uncertain	Likely
Bank Performance	Deficient	Unsatisfactory	Unsatisfactory
Borrower Performance	Deficient	Unsatisfactory	Unsatisfactory
India Industrial Pollution Prevention Project (Loan 3779 & 3780-IN and Credit 2645-IN)			
Outcome	Unsatisfactory	Moderately Satisfactory	Moderately Unsatisfactory
Institutional Dev	Substantial	Substantial	Substantial
Sustainability	Likely	Likely	Likely
Bank Performance	Unsatisfactory	Unsatisfactory	Unsatisfactory
Borrower Performance	Unsatisfactory	Unsatisfactory	Unsatisfactory

* The Implementation Completion Report (ICR) is a self-evaluation by the responsible operational division of the Bank. The ICR Review is an intermediate IEGWB product that seeks to independently verify the findings of the ICR.

Key Staff Responsible

Project	*Task Manager/Leader*	*Division Chief/ Sector Director*	*Country Director*
India Industrial Pollution Control Project (Loan 3334-IN and Credit 2252-IN)			
Appraisal	W. Vergara	M. Gould	H. Vergin
Completion	N. Hadjitarkhani	R. Ackermann	E. Lim
India Industrial Pollution Prevention Project (Loan 3779 & 3780-IN and Credit 2645-IN)			
Appraisal	W. Vergara	J. Khalilzadeh-Shirazi	H. Vergin
Completion	B. Onursal	J. S. Racki	M. Carter

Preface

This is the Project Performance Assessment Report (PPAR) for the Industrial Pollution Control and Industrial Pollution Prevention Projects (IPCP and IPPP, respectively) in India. These two closely linked operations constituted a major line of Bank assistance to the Government of India (GOI) in response to one of its declared priority areas for improved environmental management during the 1990s.

IPCP was approved on May 30, 1991 with an IBRD loan (Ln. 3334-IN) of US$ 124 million and an IDA credit (Cr. 2252-IN) in the amount of US$ 31.6 million. Both the loan and the credit were closed on March 31, 1999, after a nine month extension of the original closing date. US$ 7.5 million was canceled from the loan and US$ 6.6 million from the credit.

IPPP was approved on July 26, 1994 with two IBRD loans totaling US$ 143 million – Ln. 3779-IN for US$ 93 million to the Industrial Development Bank of India, Limited (IDBI) and Ln. 3880-IN for US$ 50 million to the ICICI Bank Limited (formerly Industrial Credit and Investment Corporation of India; hereafter ICICI) – and an IDA credit (Cr. 2645-IN) of US$ 25 million to GOI. The loan to IDBI was closed in March 31, 2001 with cancellation of US$ 66.7 million and that to ICICI was closed on November 30, 2002 after two extensions for a total of 20 months and cancellation of US$ 10.5 million. The credit was also closed on November 30, 2002 after an extension of 8 months with cancellation of SDR 6.7 million. The cancellations were partly due to significant devaluation of the Rupee in relation to the dollar during the 1990s.

This report is based on a review of project documents, including Implementation Completion Reports, Staff Appraisal Reports, Memoranda to the President, legal documents and project files, and on discussions with Bank staff involved in the projects both in Washington and New Delhi. An IEG mission visited India in April-May 2006, including four of the states that directly benefited under the two operations (Karnataka, Maharasthra, Rajasthan and Tamil Nadu), and met with government officials and others familiar with project implementation and related pollution management issues in the Ministry of Environment and Forests (MOEF), the Central Pollution Control Board (CPCB), the respective State Departments of Environment (DOEs) and State Pollution Control Boards (SPCBs), ICICI and IDBI, as well as with the Confederation of Indian Industry (CII), the Asian Development Bank (ADB) and the Centre for Science and Environment (CSE), a renowned national environmental NGO. We gratefully acknowledge the courtesies and attention received from all these interlocutors together with the excellent logistical support provided by the visiting missions unit and other staff in the Bank's country office in New Delhi.

Following standard IEG procedures, copies of the draft PPAR was sent to the Borrowers (GOI, ICICI and IDBI) for comments, but none were received.

Summary

The India Industrial Pollution Control and Industrial Pollution Prevention Projects (IPCP and IPPP) were approved on May 30, 1991 and July 26, 1994 respectively, and supported with three Bank loans (3334-IN, 3799-IN and 3780-IN) and two IDA credits (2252-IN and 2645-IN) involving total commitments of US$ 323.6 million. The projects, whose designs were nearly identical, sought to support GOI's efforts to prevent and alleviate environmental degradation from industrial activities and help it meet its short and medium-term environmental policy targets (IPCP), and promote cost-effective pollution abatement from industrial sources (IPPP), respectively.

Each project had three components: (i) institutional development of selected State Pollution Control Boards (SPCBs) to strengthen government enforcement capacity in those states possessing the highest concentrations of polluting industries; (ii) investment in pollution control/prevention equipment and technologies by individual industries in targeted subsectors financed in part through dedicated credit lines managed by two important domestic financial intermediaries; and (iii) technical assistance to the Ministry of Environment and Forests and participating financial intermediaries.

The main difference between the two projects was IPPP's more explicit focus on pollution prevention, waste minimization, and resource recovery, as compared with more traditional "end-of-pipe" industrial pollution control approaches under IPCP. The credit lines under both operations were targeted on larger industrial establishments, and both projects sought to implement Common Effluent Treatment Plants (CETPs) for smaller industries, and demonstration projects to pilot new techniques. In addition, IPPP sought to finance Industrial Water Recycling Plants (IWRPs), establish a Clean Technology Institutional Network, and create Waste Minimization Circles (WMCs).

The outcome of both projects is rated ***moderately unsatisfactory*** in that their objectives were only partially achieved and with significant shortcomings. The projects were, nevertheless, ***substantially relevant*** both in terms of GOI environmental priorities and Bank Country Assistance Strategies. Both projects did contribute to pollution abatement and prevention in some key industrial establishments, as well as to building institutional capacity at the state level. IPCP's performance was superior to that of IPPP on the investment component, while that of IPPP was relatively stronger in terms of capacity building. However, in both cases there were major shortfalls both in terms of credit line performance and institutional development. The overall ratings in terms of institutional development impact were ***modest*** for IPCP and ***substantial*** for IPPP. On the whole, sustainability of the economic, environmental, and institutional benefits associated with both operations is ***likely*** as the individual industries have a financial incentive to maintain resource saving and waste minimization technologies and SPCBs have recently been bolstered by increasing civil society, judicial, and media proactivity regarding pollution abatement.

On the less positive side, there were implementation delays with the institutional strengthening and technical assistance components, one of the credit lines under IPPP was underutilized, the quality and sustainability of many CETPs and demonstration

projects are questionable, better use could have been made of technical assistance resources, and inter-institutional coordination could have been stronger. More generally, Bank experience in India, Brazil and elsewhere has revealed that special industrial credit lines are not the most effective way of achieving improvements in air and water quality.

On balance, Bank and the Borrower performance are rated ***unsatisfactory***, even though there was considerable improvement on the part of both following the mid-term review of IPPP. Many of the shortcomings mentioned above could have been avoided had the Bank supervised IPCP more carefully from the beginning and sought to correct its initial design flaws early on.

Several lessons can be derived from this experience both with regard to pollution management and to project quality and development effectiveness more generally:

- These efforts should have been part of more comprehensive local pollution abatement strategies, involving the full range of contributing sectors and sources and suitable actions to address the entire set of air, water and land degradation problems in a spatially more focused way.

- Bank environmental projects should have explicit environmental quality objectives that can be readily monitored and evaluated.

- Bank projects seeking to improve the environment, whether in a single sector such as industry or more generally, should use all available means, including public disclosure, to achieve this objective.

- The Bank should not go forward with new projects that attempt to extend and/or replicate previously untested design approaches if there has been insufficient opportunity to monitor, evaluate, and learn from the first operation. Adequate monitoring and evaluation are particularly important in such situations.

- In project extension decisions, development effectiveness should take precedence over internal Bank portfolio housekeeping concerns.

Despite the significant shortcomings of the two projects under review, the PPAR mission found that Bank support for pollution management through the projects assessed was appreciated by the Indian Government, private industry, and civil society, at both the national and state levels, and further assistance in this area is welcomed**.** Given its continuing relevance in a context of rapid urbanization, industrialization, and economic growth, improved pollution management should remain a key focus of Bank environmental support to India in the years ahead.

Vinod Thomas
Director-General
Evaluation

1. Background

1.1 Addressing industrial pollution is one of the seven priority areas identified by the Government of India (GOI) in its Environment Action Program (EAP), issued by the Ministry of Environment and Forests (MOEF) in December 1993. The EAP highlighted the need to control industrial pollution "with emphasis on the reduction and management of wastes, particularly hazardous wastes." A second priority was increased access to clean technologies, with the associated objective of pollution prevention. A third referred to improved management of urban environmental problems more generally, especially air and water pollution from non-industrial sources and municipal solid waste collection and disposal.[1]

1.2 These priorities were picked up in the Bank's subsequent assessment of the EAP, issued in January 1996. This report observed that, between 1963 and 1991, industrial output in India had quadrupled, growing at an annual average rate of about 5.5 percent. The greatest expansion occurred in the garment, petroleum, chemical, beverage and ferrous and non-ferrous metals subsectors. Toxic releases from industrial sources, including heavy metals, cyanides and pesticides, however, increased sixfold over this period. These were highly concentrated in certain subsectors, with chemical and iron and steel producers contributing close to 70 percent (as compared with 20 percent of total industrial output). MOEF estimated that roughly one-third of all water pollution in the country came from industrial sources.[2]

1.3 Based on an examination of the interaction between industry and the environment, the report highlights three major issues – industrial pollution, chemical accidents and occupational health – and mentions Bank efforts to help India address the first of these through the two projects which are the object of the present assessment. It observed that "though environmental management in India has improved significantly in the past several years, institutions are still weak, and the policy and implementation framework needs strengthening." As a result, further Bank assistance was required, starting with efforts to "refine and expand current efforts at pollution abatement" and "develop assistance in other areas of industrial environmental management." It also recommends that the Bank "help the government in…developing an area-based approach to pollution abatement [which] focuses the efforts and resources of enforcement agencies on targeted reductions of pollution and covers all sources of pollution."[3] Unfortunately, however, the

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1. The other key priorities identified in the EAP were: conservation and sustainable utilization of biodiversity in selected ecosystems; afforestation, wasteland development, conservation of soil and moisture, prevention of ground and surface water pollution (in rural areas); development of an alternative energy plan; and, scientific understanding of environmental issues, training, creation of environmental awareness, and resource assessment.

2. World Bank, *India's Environment – Taking Stock of Plans, Programs and Priorities: An Assessment of the Environment Action Program*, India, Nepal and Bhutan Country Department, January 1996, pp. 138-139.

3. Ibid., pp. 146-147. With respect to the improved enforcement in some of the more industrialized states, the report notes that "this improvement is limited to non-toxic air and water pollution from large and medium-sized private industrial units. Regulations for public units are poorly enforced due to political

Bank did not follow up on this recommendation, suggesting a possible "disconnect" between staff carrying our analytical work and those preparing lending operations for pollution abatement.

1.4 Well before the 1990s, GOI demonstrated its concern with pollution problems through pioneering legislation. This included the Water (Prevention and Control of Pollution) Act of 1974, passed following the first United Nations Conference on the Environment in Stockholm in 1972, the Water Cess Act of 1977, and the Air (Prevention and Control of Pollution) Act of 1981. A broader Environment (Protection) Act was promulgated in 1986, in response to the industrial tragedy in Bhopal, providing an umbrella structure for Indian environmental legislation and empowering the central government to take the measures necessary to improve environmental quality and control pollution from all sources. This act also gave government the capacity to prohibit or restrict the location or operation of industrial activities on environmental grounds and established comprehensive minimum national discharge standards for particular types of industrial operations[4] which the states were also required to apply (and could further tighten at their discretion). Additional rules were established under the Environment Act in 1989 to address hazardous waste collection and disposal, which, as central and state environmental authorities repeatedly informed the PPAR mission, continue to be a major concern in much of the country.[5]

1.5 The basic institutional arrangements for environmental management at the national and subnational levels were also established under this legislation, including the Ministry of Environment and Forests (MOEF) and the Central Pollution Control Board (CPCB), together with Environment Departments[6] and Pollution Control Boards (SPCBs) in each of the states. The Pollution Control Boards, which were set up under the 1974 Water Act, were given authority to inspect and place conditions on the operation of industrial facilities, set water quality and effluent standards, and permit or prohibit the discharge of liquid and solid wastes into water bodies. The Boards were also empowered to monitor and enforce compliance with legal requirements. The Air Act added

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interference in the functions of the state boards. In addition, the boards cannot deal with the large number of small-scale units [and] lack the capacity to monitor and enforce regulations related to hazardous waste."

4. Industrial subsectors of particular concern were chemicals and petrochemicals, textiles, tanneries, pharmaceuticals, fertilizers, pulp and paper, sugar, and pesticides.

5. The lone exception among the states visited was Maharashtra, where an industrial hazardous waste disposal facility is already in place. According to a recent Bank document, the current estimate of hazardous waste generated in India is about 4.4 million tons a year, of which 1.4 million tons is recyclable, 100,000 tons can be incinerated and 2.9 million tons must be disposed of by other means. This total is expected to increase with continued rapid industrial expansion, while both its location and future growth will be concentrated in a small number of rapidly industrializing states. See Project Concept Note (PCN) for the proposed India Capacity Building for Industrial Pollution Management Project, Environment and Social Development Unit, South Asia Region (SASES), February 10, 2006, pg. 2.

6. In some states, such as Maharashtra and Tamil Nadu, these Departments focus primarily on pollution management (i.e., "brown" environmental issues), while in others, such as Karnataka, they also cover forests and ecological concerns (or "green" environmental issues). Where the focus is mainly on pollution issues, the states normally have separate Departments of Forests, and most states, including Karnataka, have separate Departments for Water Resource Management. In theory, actions related to environmental management at the state level are coordinated across these different government agencies.

responsibility for protection of air quality and gave the Boards authority to establish emission standards for airborne pollutants together with ambient air quality standards and associated monitoring and enforcement procedures.

1.6 At the time of the UN Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992 and with Bank technical support, GOI issued a Policy Statement for Abatement of Pollution (PSAP) with the stated intention of better integrating environmental and economic aspects in development planning. By stressing preventive aspects of pollution abatement, this policy represented a significant change in India's approach to environmental regulation. It also provided the policy backdrop for IPPP whose Staff Appraisal Report (SAR) included it as an annex. Specific measures associated with PSAP were: preventing pollution at its source; encouraging, developing and applying the best available technological solutions as part of the production process; ensuring that polluters paid for pollution prevention and control arrangements; focusing protection on heavily polluted air- (mainly in the largest cities such as Delhi and Mumbai) and watersheds; involving the public in decision making; and increasing the safety of industrial operations. The main thrust of PSAP, however, was to shift the focus of government action from installation of "end-of-pipe" (or end-of-stack) controls to encouraging industrial pollution prevention through adoption of waste minimization, resource recovery and cleaner production technologies that would generate economic as well as environmental benefits. PSAP also called for a mix of instruments including legislation and regulation, fiscal incentives, voluntary agreements, educational programs and information campaigns, and affirmed that "while large and medium industrial units will remain totally responsible for control of their pollution, assistance will be provided to small-scale industrial units…to aid the implementation of pollution control measures" through the development and adoption of cleaner technologies.[7]

1.7 Despite evolving national legal and institutional measures, according to the EAP, "the establishment of a diversified industrial structure, based on a unique combination of heavy and small-scale industries and the growing urban and rural population in India, has produced pressures on water and land resources [which] are reflected in the growing incidence of air and water pollution."[8] Poor compliance by heavily polluting industries, particularly in the chemical sectors, and institutional weaknesses, especially with respect to monitoring and enforcement by the SPCBs, were among the principal concerns identified. In this context, the Bank was requested to provide financial and capacity building support for industrial pollution control and prevention, based in part on its experience with similar operations elsewhere, particularly Brazil,[9] from which the design of the India projects (e.g., dedicated credit lines and technical assistance to selected state environmental protection agencies) appears to have been largely drawn.

1.8 Controlling and preventing industrial pollution remains a significant environmental challenge in India. Over the past decade, industrial development,

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7. Government of India, *Policy Statement for Abatement of Pollution*, February 1992.

8. Government of India, *Environment Action Program*, December 1993, pg. 20

9. More specifically, the São Paulo Industrial Pollution Control Project, approved in March 1980, the Second Industrial Pollution Control Project, approved in June 1987 (also for SãoPaulo state), and the National Industrial Pollution Control Project, approved in June 1992.

stimulated by economic liberalization, has been a major contributing factor in the country's impressive output growth and presently accounts for roughly one quarter of GDP. Over the past few years, industrial production has expanded at about 8 percent annually and is expected to continue to be a significant element in future economic growth. While compliance by larger industrial establishments with national environmental regulations has greatly improved since the early 1990s, in part as the result of Bank support, pollution by small and medium-scale enterprises (SMEs), which are currently estimated to account for as much as 60 percent of the total industrial pollution load, continues to be a significant concern. As a result, according to one recent Bank project document, "indiscriminate dumping of waste, both on site and alongside roads, rivers and canal pits outside industrial estates, is occurring and posing significant hazards to the labor force and local population, and turning sizeable areas into ecologically degraded zones."[10] Addressing air, water, soil and noise pollution from multiple sources, including industry, accordingly, is identified as an important element in GOI's recently approved National Environment Policy 2006.[11]

2. Project Design, Implementation and Results

Project Design

2.1 Not surprisingly since they were designed to be both substantively and geographically complementary, the objectives and components of the Industrial Pollution Control and Industrial Pollution Prevention Projects (IPCP and IPPP) were quite similar. As stated in the respective Staff Appraisal Reports (SARs), project objectives were as follows:

- IPCP: to support the Government of India's efforts to prevent and alleviate environmental degradation caused by industrial operations and assist in the successful attainment of the proposed short and medium-term targets of its environmental policy. Specific goals were: (i) to promote effective and timely enforcement of existing legislation on environmental protection regarding industrial sources; (ii) to support efforts by industry to comply with existing environmental regulations, including a special effort designed to reach small scale industry through the setting up of common treatment facilities; and (iii) to support resource recovery and pollution abatement in industry. In short, by promoting improved enforcement, while supporting compliance and providing technical assistance [to CPCB and four selected SPCBs] for the identification and implementation of solutions to environmental problems, the project

10. PCN for the proposed India Capacity Building for Industrial Pollution Management Project, op. cit., pg. 2. This note also observes that "pollution prevention and waste minimization is (sic) relatively more expensive and technologically challenging for SMEs" and that "many of them can not afford the requisite investments in effective pollution mitigation."

11. Government of India, *National Environment Policy 2006*, Ministry of Environment and Forests, New Delhi, May 18, 2006.

sought to be a catalyst for environmental performance improvements in the Indian industrial sector.[12]

- IPPP: to promote cost-effective pollution abatement from industrial sources, more specifically by: (i) strengthening four additional SPCBs in respect to their facilities, equipment, and skills, to enable them to more effectively perform their mandate, while continuing the program of support to the Boards already assisted; (ii) facilitating priority investments dedicated to prevent pollution from industrial sources by encouraging use of clean technologies, waste minimization and resource recovery by industry, or pollution control where cost effective and where these investments have a significant demonstration and replication potential; and (iii) provide technical assistance for adoption of modern tools of information, management and control of residues; organize a clean technology network; and set up an extension service on environmentally sound practices for small scale industry.[13]

2.2 Both projects contained components for institutional development, investment and technical assistance. They were characterized by complex financing and institutional arrangements involving three Bank loans, two IDA credits, two domestic financial intermediaries, the Ministry of Environment and Forests (MOEF), the Central Pollution Control Board (CPCB) and nine State Pollution Control Boards (SPCBs). The Bank loans were channeled through the Industrial Credit and Investment Corporation of India[14] (ICICI) and the Industrial Development Bank of India (IDBI) for on-lending to industrial sub-borrowers in priority subsectors, but through different arrangements and conditions under the two projects (described in Annex B) that would have a direct impact on their performance. The financial intermediaries and industrial sub-borrowers were expected to use some of their own resources to finance pollution control and prevention investments supported under the credit lines (see Annex B), while GOI was to provide counterpart funds for the IDA credits (US$ 17.4 million for IPCP and US$ 16 million for IPPP). The IDA credits (US$ 31.6 million, for IPCP and US$ 25 million, for IPPP) were to be passed on as budgetary allocations (see Annex B for details).

2.3 The institutional development components were intended to strengthen government enforcement capacity by financing improvements at CPCB and selected SPCBs – in Gujarat, Maharashtra, Tamil Nadu and Uttar Pradesh under IPCP and Andhra Pradesh, Karnataka, Madhya Pradesh, and Rajasthan under IPPP[15] -- to enable them to better carry out their legal responsibilities. These states were selected because of the relatively high concentrations of polluting industries within their borders. More specifically, these components would finance training programs in technical and managerial skills, acquisition of laboratory and monitoring equipment required to upgrade the analytical and technical capabilities of the Boards (both at their central

12. SAR, India Industrial Pollution Control Project (IPCP), Report No. 9347-IN, May 7, 1991, pg. 17.

13. SAR., India Industrial Pollution Prevention Project (IPPP), Report No. 12822-IN, June 9, 1994, pg. 13.

14. Now formally named ICICI Bank Limited.

15. The SPCB in the newly established state of Chattisgarth, which was split off from Madhya Pradesh during the project implementation period, was later also added to this group.

headquarters and district office locations), and provision or improvement of other facilities, including mobile monitoring stations. Additional support for training and equipment was provided to the four SPCBs benefited under IPCP through IPPP, with special attention to Gujarat, including, among other measures, a Geographic Information System (GIS).[16]

2.4 The investment components would finance individual subprojects for waste minimization, resource recovery and pollution abatement in "target" (i.e., heavily polluting) industrial subsectors, through the ICICI and IDBI credit lines. "Adoption of cleaner production methods" was added to the description of the industrial investments to be funded under IPPP. CETPs at industrial estates for the treatment and disposal of liquid and solid waste and selected demonstration projects "based on their prototype nature or novelty of application in India, the potential environmental benefits and other eligibility criteria," would also be financed. Under IPPP, financing was likewise to be provided for Industrial Water Recycling Plants (IWRPs)[17] and additional CETPs. As in IPCP, these plants were designed to serve clusters of small and medium-scale industries that could not afford individual treatment facilities.

2.5 The technical assistance component under IPCP was described very vaguely in the SAR to "assist MOEF to evaluate environmental problems and solutions" and ICICI and IDBI to help potential industrial sub-borrowers undertake feasibility studies for pollution control investments (other than those already prepared prior to appraisal for immediate implementation). Under IPPP, this component would: (i) support establishment of a "clean technology institutional network designed to promote the development, diffusion and transfer of technologies with environmental benefits for industries;" (ii) provide extension services for identification of waste minimization and abatement methods for small scale industries, together with the organization of "Waste Minimization Circles" (WMCs); (iii) finance pre-investment studies for CETPs, IWRPs and other waste minimization facilities proposed for funding under the project; and (iv) provide other training and consulting services to MOEF, including on "requirements for the preparation of environmental statements by industries."[18]

2.6 Several smaller subcomponents were added to IPPP following the Mid-Term Review (MTR) in January 2000. These were for strengthening environmental management information systems (MIS/GIS) in the SPCBs and state environmental awareness programs; an updated needs assessment for the project SPCBs; an independent evaluation of WMCs; development of a laboratory guidance manual to standardize procedures and strengthen quality control; and a resource optimization study to help SPCBs improve their approach to sampling and analysis. The training program was also reorganized and supervision intensified following the MTR.

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16. Gujarat was also a significant beneficiary under the contemporaneous Bank-supported Environmental Management Capacity Building (EMCB) Project, which is the subject of a parallel PPAR, reported separately but whose field mission was undertaken by IEG at the same time as that for IPCP and IPPP.

17. IWRPs were tertiary treatment units, mainly at municipal sewage treatment plants, intended to provide a competitive source of recycled water for nearby industrial establishments.

18. More detailed descriptions of the TA and other components are contained in the respective SARs.

2.7 Even though the SAR for IPPP explicitly refers to "implementation progress" with IPCP and contains an annex describing several of the individual subprojects financed under it, one highly questionable aspect of the design and processing of the second operation was the rapidity with which it followed the first, which, due mainly to procurement delays for the non-investment components, would remain under execution for nearly five more years. As the ICR for IPPP correctly points out, this did not permit sufficient time for the results and lessons of IPCP, which was the Bank's first such experience in India, to be properly taken into account in preparing the follow-on operation, and was one of the main reasons why quality-at-entry of the second project was unsatisfactory.[19] As confirmed by senior officials at ICICI and IDBI during the PPAR mission, moreover, insufficient analysis regarding the implications of evolving macroeconomic policy and domestic financial market conditions (e.g., progressive liberalization and its short, medium and longer-term impacts on the national industrial sector), the availability of competing – and less expensive -- credit lines (including those funded by other multilateral and bilateral donors), and the differing terms of the Bank's on-lending arrangements for IPCP and IPPP with respect to the subsequent uptake of the Bank-supported credit line resources by potential industrial sub-borrowers also constitute significant design shortcomings of the latter operation.

2.8 On the more positive side, however, these two projects were innovative[20] in several respects. IPCP introduced CETPs and IPPP WMCs, which would subsequently become models for use with medium and small-scale industries in other parts of the world. As observed in the ICR for IPPP and verified in a recent UNIDO/UNEP assessment, for example,

> Asian countries such as Bangladesh, Philippines, Sri Lanka and Vietnam have picked up on the concept of CETP…WMC and its success have also been discussed in several international conferences….Several countries, notably Indonesia, Egypt, Nepal, Sri Lanka, South Africa and Thailand, have taken a cue from the WMC program. Today the concept has been dovetailed into the design and operation of the UNIDO/UNEP National Cleaner Production Centres.[21]

19. For details, see Implementation Completion Report (ICR), India Industrial Pollution Prevention Project, Report No. 26255, June 30, 2003, pp. 7-9. IPPP was also subject to two different QAG reviews, in 1997 and 1999, respectively, which reached similar negative conclusions in this regard.

20. CEPTs and WMCs were not included in the earlier industrial pollution abatement projects in Brazil, for example.

21. ICR for IPPP, op. cit., pp. 4-5. For a recent summary assessment of the UNIDO/UNEP National Cleaner Production Centres, see Ralph Luken & Paul Hesp, *Review of Selected Industrial Environmental Initiatives of the United Nations System and Regional Banks – Issues Paper for the United Nations Environmental Management Group*, unpublished draft, January 17, 2006. This paper also contains a positive evaluation of IPCP and IPPP that seems to be drawn almost exclusively from the Bank's ICR of the latter project, which was more critical of project performance.

Project Implementation and Results

2.9 The ICRs provide detailed accounts of the implementation and results of both IPCP and IPPP.[22] Hence, only the highlights will be summarized here. In the case of IPCP, commitment of the ICICI and IDBI credit lines for individual industrial pollution control investments occurred quite rapidly, representing one of the motives for Bank processing of IPPP to move ahead – in retrospect, too -- quickly. The principal reason for the rapid commitment of IPCP credit line resources was the growing differential between their on-lending rates and regular commercial interest rates as the former were not adjusted upward to parallel increases in the latter. As a result, project credit lines became increasingly attractive to industrial sub-borrowers, although this led to certain distortions, including substitution of Bank-supported credit for that from other, more expensive, commercial sources in some cases. This experience contrasts sharply with that under IPPP, where demand for the credit lines proved to be much lower, leading to a corresponding decrease in the number of subprojects financed and eventual cancellation of a substantial part of the Bank loans, particularly to IDBI. The availability of a robust pipeline of potential industrial pollution control subprojects for funding under the credit lines for IPCP, which was not the case for IPPP -- again due largely to the premature processing of the latter, and thus, another significant quality-at-entry deficiency -- was also a factor in the differing experiences of the two operations.

2.10 Both IPCP and IPPP experienced significant implementation delays with their institutional strengthening and technical assistance components, particularly because of equipment procurement problems. The CETPs financed under IPCP also suffered delays and associated cost overruns, largely because of organizational difficulties and communication problems between MOEF and IDBI. The approval of demonstration projects under IPCP was similarly delayed because of cumbersome approval procedures and the inability of IDBI to identify appropriate subborrowers given that its client base consisted mainly of medium and large scale enterprises (which were not eligible for assistance under this subcomponent). Despite this, twelve projects were eventually approved, although three were subsequently withdrawn and five were already under implementation, suggesting that project funds may simply have been used to substitute for more expensive non-project resources already available under more conventional credit lines. Finally, delays were experienced in carrying out a number of studies due to poor coordination between MOEF and CPCB, together with the low priority given by ICICI and IDBI for use of project funds to strengthen their internal environment-related capabilities.

2.11 Many of the same implementation problems, especially equipment procurement delays, affected IPPP, in part because the new SPCBs (i.e., not assisted under IPCP) were unfamiliar with Bank requirements and procedures. Project results in terms of the establishment of additional CETPs and IWRPs were likewise disappointing. Again, both poor executing agency performance and inter-institutional coordination problems, especially between the central and state government levels, were contributing factors. The ICR for IPPP observes, additionally, that CPCB's lack of involvement hindered efforts to disseminate good practices and lessons among participating (and non-project) SPCBs, thereby limiting possibilities of greater institutional learning from project-related experience. The PPAR mission confirmed that "horizontal" interaction among SPCBs, although better than in the past, continues to be limited, and that most communication takes place

22. The ICR for IPCP, which was carried out by two experienced consultants and benefited from significant Regional management oversight, was particularly good in this respect, as in its assessment of project outcomes and lessons, more generally. Furthermore, this ICR later played an important role in reorienting the institutional strengthening and technical assistance components of IPPP following its Mid-term Review. See Implementation Completion Report (ICR), India Industrial Pollution Control Project, Report No. 19678, November 30, 1999.

"vertically" between individual state Boards and the central environmental agencies in Delhi. Another issue affecting project implementation was the frequent turnover of senior managers in the SPCBs, which is still the case, although, on the more positive side, there does appear to be significant continuity of senior technical staff (e.g., scientists and environmental engineers) within these agencies.[23]

2.12 Implementation of the institutional strengthening and technical assistance components of IPPP improved substantially over time, particularly after the Bank intensified its supervision following a change in the task team in 1998. As a result, greater attention was given both to technical and managerial training and the introduction of IT and other system improvements, as well as to the continued upgrading of laboratories, monitoring equipment and other facilities, for the SPCBs. The relevance and usefulness of this assistance was emphasized to the PPAR mission by managers and staff in all of the SPBCs visited, and nearly all regretted that a proposed further extension of IPPP had not been granted by Bank management – apparently more for internal portfolio "quality" than development effectiveness reasons[24] - at a time when project implementation was clearly improving.

2.13 Visits to SPCB laboratories and discussions with technical staff during the PPAR mission revealed that project-provided equipment and facilities were being well used, but that a clear need exists for further assistance. This encompasses both additional equipment, including information technology and monitoring and analytical devices,[25] and further training, especially on the technical side. Those interviewed at the state level also expressed strong appreciation for Bank material and technical support[26] under the projects, especially IPPP. The SPCBs and some state Department of Environment heads indicated, however, that proper staffing, both in quantitative and qualitative terms, was the main limitation they were presently facing due to continued government hiring freezes.

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23. Most of the state Environment Department heads and Chairmen of the SPCBs met during the PPAR mission were relatively new in their positions and, as a result, personally unfamiliar with the Bank-supported projects, especially the older IPCP.

24. IEG was informed that the decision not to further extend the project primarily reflected a desire on the part of Regional management at the time to reduce the number of "unsatisfactory" operations in its portfolio despite what both the executing agencies and the Bank task team felt were sound technical reasons for granting the requested extension.

25. The SPCB for Rajasthan, for example, presented the PPAR mission with a request for additional IT support to allow it to improve its networking capacity between its headquarters in Jaipur and district offices, while the SPCBs in Tamil Nadu, Karnataka and Maharashtra referred mainly to the need to enhance their air and water quality monitoring and analysis capabilities. The SPCB in Karnataka was particularly proud of its mobile environmental education facilities, including specialized vehicles for use with industries and schools and specifically focused on urban environmental issues, that had been funded under IPPP, while environmental authorities in Tamil Nadu highlighted their periodic newsletters, including recent and forthcoming issues on biodiversity and coastal zone management, which also benefited from Bank support under the environmental information system (ENVIS) component of the EMBC project mentioned in footnote 13 above.

26. In addition to the training opportunities provided through the project, including some outside of India, professional staff at several of the Boards visited during the PPAR mission, particularly in Karnataka and Tamil Nadu, as well as at ICICI headquarters in Mumbai, expressed their strong appreciation for the nature and quality of the technical discussions held with the Bank's last task manager for IPPP, who made a point of at least briefly visiting all the participating agencies during project supervision missions.

3. Evaluation Findings

Relevance

3.1 Project relevance is rated as ***substantial*** for both operations. Industrial pollution, both among large scale and small and medium-sized enterprises was, indeed, a significant and growing problem associated with rapid urbanization and economic growth in India in the 1990s. Its priority among the principal environmental management challenges facing the country was clearly identified in the National Environment Program issued in 1993, and pollution abatement in industrial and other sources, first with respect to water and later air, were the main concerns of Indian environmental legislation dating back to the early 1970s. This was reinforced in GOI's nearly simultaneous Policy Statement for Abatement of Pollution (PSAP). Environment, including pollution abatement, was also an "area of special emphasis" in the Bank's May 1995 Country Assistance Strategy (CAS) for India that specifically mentions Bank support for industrial pollution abatement through IPCP and IPPP[27]

3.2 Combating industrial and other forms of pollution continues to be a highly relevant concern. Air and water pollution remain serious environmental problems in India, although the larger industrial sources are reportedly under much better control than they were in the early 1990s. This is due in part to financial and institutional support provided through IPCP and IPPP, but also to legal restrictions on the location of new industrial activities[28] and other factors (see para. 3.4 below). According to ICICI technical staff met during the PPAR mission, several of the industrial pollution control investments financed under the two Bank-supported operations had important demonstration effects for other (i.e., non-project-assisted) enterprises, particularly in the cement and sugar subsectors, indicating that their influence extended beyond the specific investments directly supported by these projects.

3.3 The importance of adequately addressing pollution in India is undeniable. Urban air quality problems, related mainly to the transport and energy sectors (i.e., the rapid expansion of vehicle fleets[29] and increasing energy demand supplied in good measure by coal-fired power plants), persist and continue to represent a major challenge for Indian

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27. World Bank, Country Assistance Strategy for India, Report No. 14509-IN, May 19, 1995, pg. 23. It states "besides strengthening State Pollution Control Boards, also finance industrial waste prevention, common treatment and water recycling plants."

28. The importance of these restrictions, together with other, more direct pollution control measures, were highlighted, for example, during the PPAR mission's meeting with the Principal Secretary for the Environment for Maharasthra in Mumbai.

29. Even though strong measures taken by GOI in recent years to remove lead from gasoline and convert taxis, including three-wheelers, and buses to clean natural gas (CNG) and other cleaner fuels in Delhi, Mumbai and other very large cities, among others, have had a positive impact, the rapid expansion in the number of two, three and four wheeled motor vehicles over the past decade, has resulted in added emissions. Nevertheless, the net effect has been a positive one.

environmental authorities, as well as a major concern for civil society.[30] Urban water pollution from non-industrial sources, including that associated with inadequate sewage and solid waste collection and disposal, is likewise a significant continuing problem, as was repeatedly affirmed to the PPAR mission by officials at both the central and state government levels. On the industrial side, in turn, hazardous waste management continues to be a serious problem in most states, while in those, such as Karnataka and Tamil Nadu, where rapidly expanding information technology industries are concentrated, electronic, or "e-waste" – particularly the safe disposal of obsolete computers and other IT equipment -- is a growing concern.[31] The need to adequately manage hazardous wastes from industrial and biomedical sources, for example, was at the top of the list of major environmental issues in India presented to the PPAR mission by the Member Secretary of the CPCB in Delhi.[32]

3.4 According to many of those interviewed during the PPAR mission, including representatives of both the Confederation of Indian Industry (CII) and the Centre for Science and Environment (CSE), improved regulatory enforcement by the SPCBs, especially those supported through IPCP and IPPP in the states where the most highly polluting industries are concentrated, has played a role in improved industrial compliance with national effluent and emissions standards. However, a much more important factor has been the Indian judicial system, especially the Supreme Court, which has required greater industrial compliance with pollution legislation in recent years. Growing public awareness regarding the severity of environmental -- especially air and water quality -- problems associated with increasingly rapid urbanization and economic growth, has also played a major role, as have expanding media coverage and the action of key national environmental NGOs, including CSE.[33] In combination, the increasingly proactive courts, media, and selected NGOs, together with more enlightened public opinion, appear to have been significant motivating and/or supporting factors in the reported growing effectiveness of the SPCBs in carrying out their legal mandates. The improved material, technical, information processing, and managerial capabilities of these agencies, for which IPCP and IPPP did provide direct support, have also made an relevant contribution.

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30. See, for example, Centre for Science and Environment (CSE), *The Leapfrog Factor: Clearing the Air in Asian Cities*, New Delhi, 2006, which focuses especially on the transport sector.

31. The PPAR mission visit to Bangalore coincided with a full-day technical workshop on this subject, which is now a significant concern to state environmental authorities, as is the degradation and threatened disappearance of a system of local lakes in Bangalore, which is one of the key environmental features of India's self-proclaimed "garden city," due to rapid and poorly planned urban growth and sprawl. For more on these and other local environmental priorities, see the excellent *State of the Environment Report and Action Plan – 2003* published, with Bank assistance, by the Department of Forest, Ecology and Environment, Government of Karnataka, Bangalore, 2004.

32. This list in contained in a detailed Power Point presentation provided by the Member Secretary entitled *Overview of Activities and Achievements of Central Pollution Control Board*, CPCB, February 28, 2005.

33. These factors were identified in a specific case study presentation on air quality improvements in Delhi in a recent Bank workshop on social accountability and environmental governance. See Harry Blair, *Strengthening Social Accountability through Civil Society Action; Reducing Air Pollution in Delhi*, unpublished paper, Department of Political Science, Yale University, May 15, 2006.

Efficacy (Achievement of Objectives)

3.5 The objectives of both IPCP and IPPP were ***only partially achieved and with significant shortcomings***. IPCP was more successful than IPPP in terms of achieving its investment objectives and less so in terms of its institutional strengthening and technical assistance objectives. While 76 pollution control subprojects were implemented under the investment component of IPCP, only 24 (12 financed by IDBI and 12 by ICICI) were supported under IPPP.[34] Most of the funding for both operations was, nevertheless, used for its intended purposes, and most of the individual investment subprojects financed under IPCP and IPPP appear to have generated their expected benefits. The objective of reaching large and medium-scale industries in the chemical and other priority sectors in the most industrialized states in India was generally met. Subprojects financed under IPPP, for example, came predominantly from the steel/aluminum, cement, petroleum coke, and sugar subsectors, which together accounted for close to 70% of the total investments.

3.6 The objective of assisting smaller-scale industries through the provision of Common Effluent Treatment Plants (CETPs), however, was only partly attained and with delays. Performance in this regard under IPCP -- as in utilization of the ICICI and (especially) IDBI credit lines to finance individual industrial pollution abatement investments -- was better than that under the subsequent IPPP, although the quality of these facilities and their operation was an issue in the former.[35] In this connection, a recent evaluation of CETPs throughout India provided to the PPAR mission by CPCB found that, despite design improvements in the treatment plants implemented under IPPP,[36] on the whole, performance of these facilities was "very unsatisfactory" due to poor operation and maintenance. [37]

3.7 Due in part to procurement delays and inter-institutional coordination difficulties, the objectives of the projects' institutional development and technical assistance

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34. The respective ICRs provide details on each of these investments.

35. The ICR for IPPP states that only 2 new CEPTs were financed under IPPP compared with 53 under IPCP. According to the Principal Secretary for Environment in Maharasthra, however, CETPs financed by the Bank were technically and organizationally superior with support from other sources. And in a recently published evaluation of CETPs, 59 of the 88 such facilities were located in the four states covered by IPCP, as compared to 14 in the additional states supported by IPPP (see, Central Pollution Control Board, *Performance Status of Common Effluent Treatment Plants in India*, Delhi, January 2006 for details).

36. According to the ICR for IPPP, the CEPTs funded under this project "were more comprehensive in scope than [those] funded under IPCP and included aspects such as sludge management, waste minimization and effluent recycling/reuse – important aspects missed in schemes financed under IPCP." (pg. 13) The IPPP team also prepared for MOEF a CETP Policy Note which captured many of the features of the new CEPT schemes financed.

37. CPCB, op. cit., pg. 27. This report also indicated that the SPCBs needed to conduct regular monitoring "to ensure proper operation and maintenance, failing which they should initiate action against negligent agencies and willful defaulters." The report contains a number of other specific technical recommendations which should be considered for any future Bank operations that seek to support CEPTs. Its conclusions are also consistent with those of the ICR for IPCP which observed that "except in a few cases, most CETPs are only in partial compliance with the SPCBs' standards and are not operating according to design specifications, and may have a shorter life span than planned." (op. cit., pg. iii and pp. 16-19 for details).

objectives were also only partially achieved. The assistance provided, both in terms of facilities and equipment and management and staff training, appears to have been well used and was clearly appreciated by the beneficiary SPCBs, at least in the states visited by the PPAR mission.[38] However, the corresponding project components had a less positive impact on MOEF and CPCB, and communication problems between these two key national environment agencies appear to persist.[39]

3.8 The two new subcomponents under IPPP, moreover, largely failed to achieve their intended objectives. Only one Industrial Water Recycling Plant (IWRP) was built, and the proposed Clean Technology Network never got off the ground.[40] However, IPPP did succeed in setting up 115 Waste Minimization Circles (WMCs), involving 17 states and 41 industrial subsectors and directly benefiting over 500 small and medium scale industries, which, according to the ICR, have "interacted to generate ideas on waste minimization and pollution prevention."[41] In addition, it trained a large number of professionals and organized awareness programs for 4,500 participants. Both of these activities were relevant for the SPCBs since one of their major responsibilities, as was stressed during the PPAR mission visits to Tamil Nadu and Karnataka, is to raise public awareness regarding environmental problems and solutions.

3.9 A final project accomplishment, as cited in the ICR, was "clear evidence" that several participating SPCBs have become "more responsive to clients, more focused on achieving and reporting results, and less tolerant of poor performance and corruption."[42] While the PPAR mission was not able to independently determine the extent to which SPCB performance had improved in relation to possible corruption problems,[43] the Boards visited by the mission do appear to be quite client-responsive and results-focused, in part because of the equipment, systems (particularly IT improvements) and training provided under the Bank-supported projects, especially IPPP. However, the PPAR mission also observed that considerable institutional and technical capacity differences still exist among the Boards, as reflected in the extent and quality of their facilities and in the size and technical qualifications of their professional staff, among other indicators.[44]

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38. The ICR for IPPP notes that the SPCBs achieved their institutional objectives with a particularly strong impact on environmental awareness in Andhra Pradesh (not visited by the PPAR mission) and Karnataka (confirmed by the mission) and that this had a positive demonstration effect on non-project SPCBs.

39. A senior official in the CPCB informed the PPAR mission, for example, that, despite CPCB's technical knowledge and experience, MOEF was not sufficiently involving the Board in the preparation of a possible new Bank operation to support capacity building for industrial pollution management.

40. According to the ICR for IPPP (op. cit., pg. 16), this was "offset to some extent" by the establishment of a website for WMCs which has met some of the original objectives of the proposed Clean Technology Network.

41. Ibid, pg. 16. The PPAR mission confirmed with several interlocutors, both at the central and state government levels, that the WMCs were, indeed, a beneficial innovation introduced under the project.

42. Ibid, pg. 17.

43. A strong view among some civil society groups, as reported in meetings with representatives of CSE during the PPAR mission, is that, even though the situation appears to have improved in recent years, corruption remains an issue, although not necessarily involving the SPCBs supported under IPCP and IPPP.

44. Among the SPCBs visited, that in Karnataka appeared to be the most capable (and proactive), followed by those in Tamil Nadu, Maharasthra and Rajasthan, and this also was the general sense of local Bank

Furthermore, several of the meetings with heads of state Environment Departments, particularly in Jaipur and Mumbai, but also Bangalore, suggested that there are several areas where SPCB performance still needs to improve, and that they would benefit from further technical and managerial assistance from the Bank or other external sources.[45]

Efficiency

3.10 Despite the fact that they could have been calculated based on investment subprojects in the project pipelines and actually implemented, overall economic rates of return (ERRs) were not provided in the SARs or ICRs for either project, while expected project benefits were described only in general terms.[46] This is a serious shortcoming. The SAR for IPPP did indicate, however, that, as had previously been the case with IPCP, each subproject sponsor would be subject to "a careful financial and economic analysis and only those operations that on the whole are financially and economically viable" would be supported. Even though the individual investments are briefly described in annexes to the respective ICRs, and such calculations should have been made, no rates of return are provided for subprojects funded under IPCP and they are presented for only some of those financed under IPPP. The ICR for the latter project observed that, while IRRs had not been calculated for all subprojects, those that were ranged from 16% to 35% for IDBI-supported investments and 20% to 92% those funded through ICICI. In addition, many subprojects had "significant demonstration potential, multiplier impacts, and environmental benefits."[47] In the aggregate, these benefits reportedly included: savings of 10-35% in water consumption, 15-20% in electricity consumption, 10-20% in fuel consumption, 10-20% in raw material use, 10-30% in wastewater generation, 5-10% in air emissions, and 5-20% in solid waste generation.

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environmental staff interviewed in Delhi. Gujarat and Andhra Pradesh were likewise viewed as states having comparatively stronger Boards. On the whole, the relatively more modern and prosperous southern states were judged to have better governance, both from an environmental and a more general standpoint, than the poorer ones in the north.

45. During the PPAR mission meeting, the (recently arrived) Principal Secretary of the Environment Department for Maharashtra, for example, criticized (in the presence of one of its most senior technical staff members) the poor quality of a number of analyses and reports produced by the SPCB under the tenure of her predecessor , as well as its website, and indicated that she was in the process of inducing it to improve its performance, which was expected to take about another six months.

46. The SAR for IPPP stated, for example, "an overall economic analysis of this project is not feasible, as all the environmental and social benefits decurrent (sic) from the sponsored activities (health, safety, conservation of natural resources) are difficult to quantify. However, the proposed project will assist industries to meet the environmental regulations for their industrial activities. These standards have been established by GOI as a measure of what are considered unacceptable environmental costs." (pg. 32) Although not stated in the SAR, this most likely actually reflected the lack of a pipeline of subprojects that had been assessed in terms of their suitability for implementation under the additional credit lines and is simply another reflection of poor quality-at-entry.

47. ICR for IPPP, pg. 17. A similar impression was transmitted to the PPAR mission by senior officials and technical staff of IDBI and ICICI. The ICR also observes that while "the institutional benefits under the project (e.g., to SPCBs) are difficult to quantify in economic terms, under the WMC program, over 220 of 500 identified options were implemented, about US$ 2 million in investments by WMC member units led to annual savings of about US$ 1.8 million, indicating a payback period of less than 14 months."

This suggests that, on average, IPPP did help reduce waste and improve efficiency of natural resource use in the individual industrial subprojects supported.

3.11 This also appears to have been the case with the more numerous individual investments financed under IPCP, even though there was less of an up-front focus on pollution prevention than in IPPP. While this could not be independently verified by the PPAR mission which, due to time limitations and their spatial dispersion, did not have an opportunity to visit any of the individual industrial investment subprojects, the ICR for IPCP concludes that "most individual subprojects appear to have generated their intended benefits, whether legal compliance, resource and/or energy savings, waste minimization through recycling of wastes, or cleaner technology."[48] However, this is not adequately documented in the ICR and, more importantly, there is no information for either project on possible improvements in ambient air and water quality in the areas where these investments took place, which is another serious deficiency of these operations and reflects inadequate monitoring and evaluation.

3.12 The efficiency of project resource use and benefits associated with the institutional strengthening and technical assistance components are more difficult to determine and, in any event, are not readily quantifiable. Nonetheless, the initial benefits, as described in meetings with SPCBs during the PPAR mission, seem to have been substantial. Among the participating financial intermediaries, ICICI benefited to a greater extent from training opportunities and other technical support, including direct interaction with the task team, than did IDBI, particularly during the latter stages of IPPP. The impacts on MOEF and CPCB were less significant, even though a number of studies, including on the staffing and organization of the SPCBs, involving a total of close to US$ 1 million, were carried out under IPCP.[49]

Institutional Development Impact

3.13 The institutional development impact of both projects was mixed, but appears to have been stronger under IPPP than IPCP. The participating SPCBs benefited from the facilities and monitoring and laboratory equipment, as well as the training provided, under both operations, but especially under IPPP. ICICI, particularly its Technology Group, which includes a number of environmental specialists, also seems to have benefited substantially from this component. Following its involvement in IPPP, ICICI

48. ICR for IPCP, pg. 20. Further details on these benefits in individual subprojects are provided in the ICR. It also notes, however, that "these achievements need to be tempered in several respects" including that "most subloans for individual projects were made to [ICICI's and IDBI's] existing customers, and were not necessarily directed to the ones most in need of this financial assistance; while investments include many liquid effluent treatment subprojects and, to a lesser extent, dust and emissions control subprojects, except for an incineration unit and the waste recycling plants, the project did not finance investments to address problems of adequate disposal of hazardous wastes, a pervasive problem in India; and there are strong doubts about the incrementality of project environmental benefits, at least with respect to 25 projects (one third of the number of total projects and 30% of total funding)."

49. These studies and their respective costs, ranging from roughly US$ 16,500 to US$ 163,000, are listed in an annex of the IPCP ICR (pg. 101). The ICR notes, however, that the technical assistance component of this project "appears to have suffered from a general lack of attention and frequency of changes in senior officials in MOEF and from a lack of close coordination with CPCB." (pg. 25)

has successfully managed an ADB credit line for an Energy Efficiency Project and has been the financial intermediary for a series of well-performing World Bank Montreal Protocol Projects to reduce the production and consumption of ozone depleting substances in India. There appears to have been less of an impact on IDBI,[50] MOEF and CPCB. Considering that the main concern of the projects was on institutional capacity building at the state level, however, the PPAR agrees with the institutional development ratings for IPCP (***modest***)[51] and IPPP (***substantial)*** contained in the respective ICRs.

Sustainability

3.14 Sustainability of the benefits generated under both IPCP and IPPP is rated ***likely***.[52] The sustainability of some of the CETPs financed under IPCP remains questionable and these facilities suffer from operation and maintenance deficiencies according to the recent evaluation by CPCB. However, if the recommendations of the CPCB evaluation are followed by the pertinent SPCBs, these facilities could improve both in terms of the quality of the waste disposal services they provide and their organization and financial sustainability in the years ahead.

3.15 More importantly, many of the individual industrial pollution prevention and control investments financed by the ICICI and IDBI credit lines under both projects are likely to be sustainable. These improvements have reportedly provided tangible financial savings and other benefits (through resource savings, waste recycling, etc.) to the industrial enterprises involved, in addition to environmental (and economic) benefits to society as a whole in the form of lower air and water pollution (and a likely associated reduction in public health costs). Because of the private benefits, moreover, there is a built-in incentive for these firms to ensure the continued efficient operation and proper maintenance of these investments.

3.16 For the most part, the institutional strengthening support provided to the SPCBs also appears to be reasonably sustainable over the medium term. This is especially the case with the assistance provided under IPPP, which, especially after the mid-term review, was more attuned to the specific needs of each SPCB. The facilities, equipment (both for monitoring and laboratory analysis and information technology), vehicles and information systems (e.g., management and geographic information systems, among others) financed under the projects are still in use, and managerial and technical training provided to participating SPCB staff was and, according to those professionals met during the PPAR mission , continues to be helpful. The financial position of at least some of the SPCBs also appears to be healthy, because of the Water Cess Act (mentioned in para, 1.4 above) under which fees are channeled directly to the Boards rather than

50. Although given the much greater resources available to them as a result of their general operations, assistance on the material and information technology fronts was clearly not needed by ICICI and IDBI, so support under the projects primarily took the form of training, which was well utilized, especially by ICICI.

51. The ICR for IPCP, under an older rating format, considered achievements on this score “partial,” but the IEG ICR review rated them “modest,” with which the PPAR agrees.

52. In this regard, the PPAR agrees with the ICR and IEG ICR review for IPPP, but disagrees with the ICR and IEG ICR review for IPCP, where sustainability was rated as “unlikely” and “uncertain,” respectively.

passing them through the general treasury.[53] This is particularly important, as financial sustainability – in this case, by having an earmarked, reliable and predictable revenue source -- is generally a necessary condition for institutional sustainability as well.[54]

3.17 Being aware of this, the ICR for IPPP cautioned that "the extent to which the favorable present financial retention arrangement may be vulnerable to future changes could not be assessed by the ICR mission [which took place in February 2003], but this clearly bears on the future sustainability of these bodies." However, the April-May 2006 PPAR mission was able to ascertain that this arrangement is still in place, and that, while there are clearly differences among the Boards, the main constraints faced by the SPCBs at present appear to be more on the technical and staffing, than on the financial sustainability side More generally, rising public awareness about the increasing severity of environmental pollution and the serious health and other impacts associated with it, together with the aforementioned proactive stance of the courts and media, has effectively strengthened environmental governance throughout India in recent years. This includes both industrial compliance and SPCB enforcement. It also contributes to the continued effective use of the material and technical assistance provided under IPCP and IPPP and, thus, to the likely sustainability of the benefits associated with them, at least over the medium-term.

3.18 Finally, some of the concerns regarding potential project sustainability expressed in the ICR for IPCP (issued in November 1999), finally, while valid at the time, would appear not to have been borne out in practice or to have subsequently been resolved. Two, in particular, merit additional comment. First, according to the ICR, "sustainability of the investment components would largely depend on the ability of SPCBs to maintain pressure for compliance through regular monitoring activities, agreed self-compliance programs and enforcement actions." However, as the ICR points out "large and medium-scale industries have significantly improved compliance since 1991 under pressure from the courts, and legal requirements for periodic environmental audits should reinforce this trend further."[55] Central and state government officials met during the PPAR mission, as well as representatives of CII and CSE, confirmed that both SPCB enforcement and compliance by medium and large-scale industries have continued to improve over time, especially in the most industrialized states, although compliance by many small-scale industries, particularly those not served by CETPs, remains a challenge, as does the adequate disposal of industrial hazardous wastes.

3.19 Secondly, the ICR for IPCP indicated that "the SPCBs made substantial progress towards financial self-sufficiency, but it will be imperative that these funds be used

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53. The ICR for IPPP specifically mentions the SPCB in Andhra Pradesh, which was not visited by the PPAR mission, as a good practice example here. However, the Karnataka SPCB, which was visited, seems to represent a similar case in terms of the characteristics described in the ICR and, to a lesser extent, so does that in Tamil Nadu, which was benefited primarily under IPCP with further assistance under the Bank-supported EMCB Project.

54. Ibid., pg. 19 Despite this preoccupation, the ICR identifies other changes in the "business culture" of the SPCBs, including more open discussion of measures to fight corruption, as well as a more "service-oriented" approach toward clients and concern about improving their public image, that are worthy of note.

55. ICR for IPCP, pg. 26.

wisely. Specifically, effectiveness of the Boards needs to be enhanced in the area of strategic planning and management."[56] The field observations of the PPAR mission suggest that, at least among those Boards visited, this is, indeed, occurring, and that the institutional strengthening component of IPPP played a role in these improvements, which were particularly evident in Karnataka and Tamil Nadu. However, as the PPAR mission was only able to visit half of the participating SPCBs, the overall sustainability of benefits generated by the capacity building and technical assistance components could not be fully determined.

Outcome

3.20 Based on the evaluation results summarized above, the outcome of both projects can be considered ***moderately unsatisfactory*****.** In both cases, the objectives were relevant but only partly achieved, with significant quality-at-entry problems and other shortcomings**.** Performance of IPCP was better than that of IPPP on the investment side, including the number (if not the quality) of CETPs installed, while IPPP was relatively stronger with respect to capacity building. Both projects had some positive institutional development impacts at the state level, although the impact of IPPP was more substantial in this regard, especially during its final years, than that of IPCP. On the whole, sustainability of the economic, environmental, and institutional benefits associated with both operations remains uncertain, although additional support is clearly needed (and desired) to assure continued capacity development of the participating SPCBs.

3.21 Shortcomings included implementation delays with the institutional strengthening and technical assistance components of both projects, underutilization of the IDBI credit line under IPPP, questionable quality and sustainability of some of the CETPs and demonstration projects, ineffective use of some of the technical assistance resources, and less than fully satisfactory inter-institutional coordination , both "vertically" between the central and state government environmental authorities and "horizontally" between MOEF and CPCB and across states among the various project (and non-project) SPCBs. Some of the latter shortcomings persist and represent an area that future Bank or other donor capacity building efforts should address to enhance institutional learning among, and the associated effectiveness of, both central and state environmental agencies in India.

Bank Performance

3.22 Bank performance was mixed, but, on balance, must be rated ***unsatisfactory*** for both operations. While quality-at-entry for IPPP was clearly poor for the reasons indicated in para. 2.7, that for the earlier IPCP was also deficient according to the respective ICR -- with which the PPAR agrees -- that observed "during preparation the Bank failed to anticipate implementation difficulties which could have been foreseen" such as the problems later experienced with procurement of equipment for the institutional strengthening component. Supervision of IPCP was likewise inadequate, in part because it was carried out almost exclusively from Headquarters, but more importantly because much of the focus of the missions that did take place was on preparation of follow-on operations, including IPPP and a proposed project to address hazardous waste management, which the Bank later decided to drop.[57] Specific

56. Ibid, pg. 26.

57. It is not entirely clear why the Bank decided not to proceed with this project, which appears to have been a priority at the time for GOI and is still a major concern of both the CPCB and many of the state

shortcomings included the infrequency of Bank missions,[58] especially for a project approach with which neither the Region nor the executing agencies were familiar, a insufficient Bank proactivity in responding to implementation problems once identified, and inadequate attention to and reporting on financial aspects associated with management of the credit lines, which likewise contributed to the quality-at-entry shortcomings of the follow-on operation.

3.23 Supervision during the early years of IPPP, which overlapped with the latter years of IPCP and involved the same Bank team, suffered from many of the same problems for the same reasons. Bank management, both at the country and the sector levels, also seems to have given insufficient attention to these projects during much of the time they were under implementation. Supervision of IPPP improved considerably after 1998 following a change in the task team, which managed to turn around many of the initial concerns. As a result, needs for equipment, environmental information systems, public awareness, data quality, resource optimization, personnel, and financial management were identified and incorporated into the project. Supervision of project procurements and financial aspects was also strengthened. The positive results of more intensive Bank supervision during the latter years of project implementation were verified by the PPAR mission. However, the PPAR agrees with the ICR that these improvements were not sufficient to override the unsatisfactory nature of Bank performance during preparation, appraisal, and early supervision.

Borrower Performance

3.24 Overall, borrower performance was also ***unsatisfactory,*** although it is important to distinguish between that of the participating agencies at the national (i.e., MOEF, CPCB, ICICI and IDBI) and subnational (SPCB) levels. Performance of the latter was generally better than that of the former, except in terms of procurement delays. At least in terms of credit line commitments and the number of individual investments supported, it is also necessary to differentiate the performance of the participating financial intermediaries under the two projects, with that in IPCP being superior to that in IPPP. ICICI's performance was also considerably stronger than that of IDBI in IPPP.

3.25 However, these shortcomings are largely a reflection of basic project design deficiencies, for which much of the responsibility must fall squarely on the Bank. The ICRs provide the reasons for these assessments in some detail, which include low involvement of Borrower agencies in project preparation, especially for IPPP, together

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Boards. Presumably, increasing awareness within the Bank of the design and implementation deficiencies of IPCP and IPPP were contributing factors to this decision. In addition, it appears that country management at the time was primarily concerned with low disbursements, "while sector management appears to have lost confidence in the approach of extending credit to industrial firms by the time of the IPCP ICR in 1999." Other relevant considerations were the availability of competing sources of capital from other banks, especially to larger industries, but even to smaller ones though credit lines supported by other donors. Abandonment by the Bank of this approach to industrial pollution abatement also occurred around the same time in Brazil, so this tendency was not restricted to India alone.

58. The ICR for IPCP, op. cit., observes, "in general, the frequency of missions, only annually, except in 1996 and 1997, may not have been sufficient at times, given the novelty of the project in India and the problems that emerged." (pg. 27)

with many of the same project management, procurement and inter-institutional coordination problems that characterized IPCP.

4. Lessons

4.1 The ICRs for both operations contain a number of relevant findings and lessons, focusing on specific project design and implementation issues. The PPAR agrees with these observations, which will not be repeated here. Unfortunately, moreover, the ICR for IPCP and MTR for IPPP were not carried out sooner, so that their lessons and recommendations could have been taken into account earlier in the life of the follow-on operation. As a result, it experienced many of the same design-related problems encountered by IPCP. This timing "disconnect," while perhaps unavoidable given the Bank's (in retrospect, clearly premature) decision to press ahead quickly with the processing of IPPP, nevertheless suggests an important generic lesson: ***the Bank should not go forward with new (even complementary follow-on) projects that attempt to extend and/or replicate previously untested design approaches when there has been insufficient opportunity to monitor, evaluate and learn from the implementation experience and results of the first operation. Adequate monitoring and evaluation mechanisms are also particularly important under these circumstances.***

4.2 A second lesson concerns the way the objectives of these projects were framed: to support GOI efforts to prevent and alleviate industrial pollution (IPCP) and to promote cost-effective pollution abatement from industrial sources (IPPP). These are general objectives that focus on processes rather than concrete results in terms of environmental quality.[59] However, by expressing project objectives in terms of support to processes rather than attainment of outcomes, there is no incentive to build in monitoring and evaluation mechanisms that focus on environmental results, without which it is impossible to determine what the actual environmental impact of the actions taken has been. This was clearly the case with both IPCP and IPPP. To the extent possible, therefore, ***the objectives of Bank-supported environment projects should identify up-front the specific outcomes they seek to achieve in terms of improvements in environmental quality.***

4.3 Other general lessons which can be drawn from this experience refer to the approach to pollution management followed in IPCP and IPPP, which was clearly ***a partial one***. While industrial pollution was an important contributing factor to overall air and water quality problems in India in the 1980s and '90s, and the projects' focus on the most highly polluting industrial subsectors and establishments by targeting them and the states where they were primarily located was not inappropriate***, these efforts should have been placed in the context of more comprehensive national and local pollution abatement strategies, involving the full range of contributing sectors (in all likelihood including urban sanitation, transport, energy and even agriculture, as well as industry) and suitable actions to address air, water, and land degradation problems in a more spatially focused way.***

59. Many early Bank environment projects had similar objectives, so IPCP and IPPP are not unique in this regard.

4.4 By not doing so, even though project environmental outcomes ***appear*** to have been positive, in that they did reduce emissions and effluent discharges by specific polluting industries, ***they may not have had a significant impact in terms of improving overall ambient air and water quality*** in the places where these industrial plants are situated.[60] This could have been the case either because the establishments involved are spatially dispersed, because non-industrial sources of air and water pollution were not addressed at the same time at the same locations, or both. In any event, ***no information was collected*** that would allow an assessment of these potential impacts on ambient environmental quality.

4.5 In short, these operations, with their exclusive focus on (in all likelihood, dispersed) industrial sources, may have been ***necessary, but not sufficient, to resolve broader air and water pollution problems*** in India, even in the specific localities where project-related investments were made. Nor is information provided in any of the project documents (either *ex-ante* or *ex-post*) about the relative importance of industrial versus other sources of air and water pollution in the specific localities where project interventions occurred. Hence, ***it is impossible to determine the relative priority of addressing industrial, as compared with other, sources of pollution at any particular locality, or more generally. This should, in fact, have been the starting point for Bank involvement in this regard.***

4.6 By not taking an ***"area-based" approach*** to addressing pollution problems, the Bank missed an opportunity to implement one of its own specific recommendations following its assessment of GOI's Environment Action Program in 1995. Why this "disconnect" occurred is unclear, but it would appear that the staff assessing the EAP and managing preparation of IPPP were either not sufficiently in communication (or agreement) regarding how the Bank should approach pollution abatement in India or that there was simply too much "inertia" in the design of IPCP that was carried over without much question into IPPP.

4.7 The approach to industrial pollution management through IPCP and IPPP was also a partial one in that it ***did not incorporate the full range of instruments*** which could have potentially been used to achieve pollution prevention and control objectives. The approach followed did involve a combination of "carrot" (i.e., effectively subsidized credit for industrial pollution abatement investments, grant financed Common Effluent Treatment Plants, demonstration projects, etc.) and "stick" (i.e., effluent charges, strengthening of SPCBs to enhance their capacity to enforce pollution control legislation and monitor industrial compliance). And the two acting together, particularly stronger enforcement on the part of environmental authorities, do generally appear to have had a positive result in terms of reducing pollution in the "target" industrial subsectors, at least among the larger establishments. However, ***public disclosure of polluting industries,*** especially in those cases where compliance problems persisted, could also have been used as a way of inducing offenders to adopt less polluting and/or resource saving technologies and better waste management practices. This approach has proven ***highly***

60. Or as the IEG ICR review for IPCP put it "lines of credit geared to environmentally related investment by private entities are likely to provide little assistance in achieving broader sectoral objectives."

cost-effective in other countries such as Indonesia[61] and could also be particularly so in India given growing public awareness of the health and other costs associated with pollution, together with the increasingly proactive role of environmental NGOs, the media ,and the court system. The associated lesson is that ***Bank projects seeking to improve the environment, whether in a single sector such as industry or more generally, should use all available means to achieve this objective.***

4.8 Institutional strengthening of the State Pollution Control Boards was an important objective of both Bank operations. This is a ***persisting need*** clearly recognized by the Boards themselves. More generally, institutional capacity building for environmental management (as for many other purposes) tends to be ***a long-term process that requires continuous support.*** In this regard, the Bank missed an opportunity to be more helpful to the SPCBs ***by not granting a further extension*** at a time when IPPP's implementation was clearly improving**.**[62] This reportedly occurred because Bank management was more concerned with removing an "unsatisfactory" project from its portfolio than continuing to support key client agencies when they were making increasingly good use of Bank assistance. The corresponding lesson is that ***in project extension decisions, development effectiveness considerations should take precedence over internal Bank portfolio "quality" concerns.***

4.9 Finally, in addition to the need to approach pollution management challenges in a ***more holistic and spatially strategic way***, a number of ***priorities for potential future Bank and/or other donor support*** were confirmed in discussions with environmental authorities and other national stakeholders during the PPAR mission.[63] These include:

- Within the industrial sector, preventing and ***controlling pollution from small and medium-scale establishments*** through better functioning CETPs and other means appears to be the principal on-going challenge, together with ***collection and disposal of hazardous waste***. Both at the central and state government levels, GOI recognizes the need to improve the design, implementation and operation of CEPTs, to focus more on smaller polluting industries, and to properly address hazardous waste issues from both bio-medical and industrial sources.

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61. For a discussion of this and other approaches to industrial pollution management, see World Bank, *Greening Industry: New Roles for Communities, Markets and Governments*, Oxford University Press, New York, 2000, especially Chapter III ("Communities, Markets and Public Information").

62. It is encouraging to note, however, that a follow-on project for Capacity Building for Industrial Pollution Management in India (Project Concept Note dated February 26, 2006) is under preparation and proposes to assist the SPCBs and local authorities with some of the pollution problems not covered or adequately resolved by IPCP and IPPP including hazardous waste and municipal solid waste management.

63. These priorities seem to generally coincide with those identified during the recent elaboration of a Country Environmental Analysis (CEA) for India, which highlights industry, together with the energy and highways sector. According to the concept note for this exercise, dated November 13, 2004 and which is now nearing completion, the industrial section of the analysis will focus particularly on experiences with the development and management of industrial estates and environmental compliance and performance by industry.

- ***Urban air quality***, especially associated with the transport and energy sectors, is a key priority, and should be a focus of greater Bank attention in the future.[64]

- ***Indoor air pollution*** resulting from household use of traditional biomass fuels (including fuelwood, dung and crop residues) continues to be a significant problem in many rural areas[65] and needs to be addressed as part of a more comprehensive approach to pollution management in India.

- An increasing industry-related pollution problem, especially in Karnataka and Tamil Nadu, is ***electronic or "e-waste,"*** or the safe disposal of used computers and other electronic equipment.

- Perhaps the most serious pollution problems at present, especially in terms of their adverse health impacts on the poor are associated with ***inadequate collection, treatment and disposal of municipal sewage[66] and solid waste,*** particularly in the largest urban areas.[67]

- In this connection also, considerable interest was likewise expressed in receiving both technical and financial assistance, including through carbon finance mechanisms, for projects to ***capture methane for energy production linked to the installation of sanitary landfills*** and, thus, to more adequate solid waste disposal.[68]

64. For experience to date see *For A Breath of Fresh Air: Ten Years of Progress and Challenges in Urban Air Quality Management in India, 1993-2002*, Environment and Social Development Unit, South Asia Region, World Bank, New Delhi , June 2005.

65. See, for example, Energy Sector Management Assistance Program (ESMAP), *India: Household Energy, Indoor Air Pollution and Health*, Report No. 261/02, World Bank, November 2002.

66. This was also one of the main conclusions of the environmental background paper for IEG's Country Assistance Evaluation (CAE) for India (see Klaus Ringskog & Nola Chow, *India: Environmental Sustainability in the 1990s – A Country Assistance Evaluation*, OED Working Paper Series, 2002.

67. The Bank has also recently stepped up its assistance in this area through specific analytical work on solid waste management (see David Hanrahan, Sanjay Srivastava & A. Sita Ramakrishna, *Improving Management of Municipal Solid Waste in India: Overview and Challenges*, Environment and Social Development Unit, South Asia Region, New Delhi, April 2006). According to this report, as many as 45 million tons of solid waste are currently generated on an annual basis in India, with Mumbai and Delhi alone jointly accounting for some 5 million tons a year. At expected future rates of urbanization and economic growth, the total is projected to rise to 100 million tons a year sometime between 2015 and 2020.

68. The Principal Secretary for Environment for Maharasthra specifically requested Bank technical assistance in this area and her request was communicated to the operational staff responsible for environmental matters in India.

Annex A. Basic Data Sheet

India Industrial Pollution Control Project (Loan 3334-IN and Credit 2252-IN)

KEY PROJECT DATA (AMOUNTS IN US$ MILLION)

	Appraisal estimate	*Actual or current estimate*	*Actual as % of appraisal estimate*
Total project costs	260.0	685.0 *	263 *
Loan amount	124.0	116.5	94
Credit amount	31.6	23.3	74
Cofinancing	25.0	57.3	230
Cancellation	--	14.1	--

* Includes total subproject costs reported by ICICI and IDBI and not pollution control-related costs alone (which were not reported), and, thus, is not directly comparable with appraisal estimate.

CUMULATIVE ESTIMATED AND ACTUAL DISBURSEMENTS

	FY92	*FY93*	*FY94*	*FY95*	*FY96*	*FY97*	*FY98*	*FY99*
Appraisal estimate (US$M)	7.0	15.0	34.0	72.0	106.5	129.0	144.0	155.6
Actual (US$M)	8.03	19.09	65.74	73.92	83.96	116.8	135.8	139.8
Actual as % of appraisal	114.7	127.3	193.4	102.7	78.8	90.5	94.3	89.8
Date of final disbursement:	October 6, 1999							

PROJECT DATES

	Original	*Actual*
Identification/Preparation	--	October 1989
Appraisal	October 1990	Nov/Dec 1990
Negotiations	February 1991	Apr 15-19, 1991
Board approval	March 1991	May 30, 1991
Signing	--	July 8, 1991
Effectiveness	October 1991	November 6, 1991
Closing date	June 30, 1998	March 31, 1999

STAFF INPUTS (STAFF WEEKS)

	No of staff weeks	*US$ ('000)*
Preappraisal	95.9	218.5
Appraisal	33.8	37.1
Negotiations	10.8	26.5
Supervision	208.4	281.5
Completion	n.a.	n.a.
Total	n.a.	n.a

MISSION DATA

	Date (month/ year)	*No. of persons*	*Staff days in field*	*Specializations represented*	*Perfor- mance rating*	*Rating trend*	*Types of problems*
Identification	October 1989	3	19	CHEMICAL ENGINEER (TM) ENV. SPECIALIST, ECONOMIST			
Preparation	January 1990	1	14	CHEMICAL ENGINEER (TM)			
Pre-appraisal	April 1990	1	29	CHEMICAL ENGINEER (TM)			
Follow-up	Aug/Sept 1990	3	18	CHEMICAL ENGINEER (TM), ENV. SPECIALIST, ECONOMIST			
Appraisal	Nov/Dec. 1990	7	20	CHEMICAL ENGINEER (TM), ENV. SPECIALIST, ENV. ENGINEER, INSTIT. SPECIALIST, ECONOMIST			
Supervision 1	November 1991	6	13	CHEMICAL ENGINEER (TM), ENV. ENGINEER, INSTIT. SPECIALIST, ECONOMIST, PROC. SPECIALIST, OPERATIONS ANALYST	1	1	Additional work required on State Boards Organization Study; no demonstration projects identified
Supervision 2	October 1992	4	8	CHEMICAL ENGINEER (TM), ENV. ENGINEER, INDUST. ENGINEER, OPERATIONS ANALYST	1	1	Lack of continuity in staff of implementation cell; need to simplify approval procedures for demonstration projects, need for detailed training schedules and full

	Date (month/ year)	*No. of persons*	*Staff days in field*	*Specializations represented*	*Perfor-mance rating*	*Rating trend*	*Types of problems*
							time training coordinator
Supervision 3	March 1993	3	7	CHEMICAL ENGINEER (TM), ENV. ENGINEER, OPERATIONS ANALYST	1	1	Delays in procurement of eqpt (instit. Strengthening component), CETPS approvals lagging behind, difficulties in identifying eligible demonstration projects.
Supervision 4	Aug/Sept. 1994	4	15	CHEMICAL ENGINEER (TM), ENV. ENGINEER, ECONOMIST, OPERATIONS ANALYST	S	HS	Need to strengthen implementation cell; delays in procurement of eqpt; need to change approval procedures for demonstration projects
Supervision 5	Jan/Feb 1995	3	13	CHEMICAL ENGINEER (TM), ENV. ENGINEER, OPERATIONS ANALYST	S	S	No progress in demonstration projects and in committing technical assistance funds; delays in procurement of equipment
Supervision 6 – mid-term review	February 1996	5	17	CHEMICAL ENGINEER (TM), ENV. ENGINEER, ECONOMIST, OPERATIONS OFFICER, RES. ASSISTANT	S	S	Need to strenghthen implementation cell; delsys in procurement of eqpt; slow pace of disbursements; delays in Performance Indicators Study; need to review experience on CETPs
Supervision 7	October 1996	1	5	CHEMICAL ENGINEER (TM),	No rating	No rating	No progress under Technical Assistance component; delays in release of grants to CETPs; unsatisfactory performance of implementation cell
Supervision 8	February 1997	3	17	CHEMICAL ENGINEER (TM), ENV. ENGINEER, ECONOMIST	S	S	Counterpart funds from Central Government; delays in release of grants to CEPTs; major delays in procurement of eqpt; mixed environmental performance of completed CETPs
Supervision 9	July 1997	2	13	CHEMICAL ENGINEER (TM),	No rating	No rating	Delays in release of grants to CETPs and

	Date (month/ year)	*No. of persons*	*Staff days in field*	*Specializations represented*	*Perfor-mance rating*	*Rating trend*	*Types of problems*
				PROJECTS ASSISTANT			resulting cost overruns; IDBI personal guarantee requirements for CETPs; need to develop a systematic strategy to optimize CETP design, operations and management, and outside monitoring; insufficient attention to sludge management and feasibility studies
Supervision 10	August 1997	2	15	CHEMICAL ENGINEER (TM), ENV. ENGINEER	S	S	Report not found
Supervision 11	September 1998	4	13	OPERATIONS OFFICER, ENV. SPECIALISTS (2), PROC. SPECIALIST	S	No rating	Delays in procurement of eqpt; commitment of IDA funds to 15 CETPs in Delhi without Bank agreement may not be eligible.
Final SPN and ICR Preparation	April 1999	7	18	OPERATIONS OFFICER (TM), ENV. ENGINEER, INDUST. ENGINEER, ECONOMIST, ENV. SPECIALIST, PROC. SPECIALIST, FINANCIAL SPECIALIST	U	S	Late delivery of eqpt.; Commitment of IDA funds to additional CETPs without IDBI review and Bank approval

OTHER PROJECT DATA

Borrower/Executing Agency:

FOLLOW-ON OPERATIONS

Operation	*Credit no.*	*Amount (US$ million)*	*Board date*
Industrial Pollution Prevention Project	L3779-IN	93.0	July 26, 1994
	L37806-IN	50.0	
	C2645-IN	17.7	
Environmental Management Capacity Building Technical Assistance Project	C2930-IN	50.0	December 23, 1996

India Industrial Pollution Prevention Project (Loan 3779 & 3780-IN and Credit 2645-IN)

KEY PROJECT DATA (AMOUNTS IN US$ MILLION)

	Appraisal estimate	*Actual or current estimate*	*Actual as % of appraisal estimate*
Total project costs	330.0	1046.6 *	317 *
Loan amount	143.0	78.8	55
Credit amount	25.0	23.3	93
Cofinancing	162.0	**	**
Cancellation	--	66.7	n.a.

* Includes total subproject costs reported by ICICI and IDBI and not pollution prevention-related costs alone (which were not reported) and, thus, are not directly comparable with appraisal estimate.
** Unavailable.

CUMULATIVE ESTIMATED AND ACTUAL DISBURSEMENTS

	FY95	*FY96*	*FY97*	*FY98*	*FY99*	*FY00*	*FY01*	*FY02*	*FY03*
Appraisal estimate (US$M)	5.6	22.4	42.0	74.4	112.3	151.1	165.1	168	168
Actual (US$M)	6.0	6.0	11.6	19.9	22.3	23.6	31.1	60.8	80.4
Actual as % of appraisal	107.1	26.8	27.6	26.7	19.9	15.6	18.8	36.2	47.9
Date of final disbursement:	April16, 2003								

PROJECT DATES

	Original	*Actual*
PCD	--	March 8, 1993
Negotiations	--	--
Board approval	--	July 26, 1994
Signing	--	November 21, 1994
Effectiveness	--	March 1, 1995
Closing date	March 30, 2002	November 30, 2002

STAFF INPUTS (STAFF WEEKS)

	No of staff weeks	*US$ ('000)*
Identification/preparation	93.6	240.7
Appraisal/negotiation	38.9	118.8
Supervision	280.4	1,710.4
Completion	25.6	103.0
Total	394.3	2,172.9

MISSION DATA

	Date	*No. of persons*	*Specializations represented*	*Performance rating* *Impl. Progress*	*Dev. Obj*
Identification/ Preparation	9/30/1993		ENVIRONMENTAL ENGINEER, ENVIRONMENTAL SPECIALIST OPERATIONS OFFICER, ECONOMIST, GIS SPECIALIST		
Appraisal	2/21/1994		ENVIRONMENTAL ENGINEER, ENVIRONMENTAL SPECIALIST OPERATIONS OFFICER, ECONOMIST, GIS SPECIALIST		
Supervision	02/29/1996	5	ENVIRONMENTAL ENGINEER (1); RESEARCH ASSISTANT (1); OPERATIONS OFFICER (1); ECONOMIST (1); CHEMICAL ENGINEER (1)	S	S
	02/26/1997	3	CHEM. ENGG. (1); ECONOMIST (1); ENV. ENGG. (1)	S	S
	09/01/1997	1	CHEM. ENGR. (1)	S	S
	09/25/1998	4	TEAM LEADER (1); TEAM MEMBER (1); PROCEUREMENT ENGINEER (1); ENVIRONMENT SPECIALIST (1)	S	S
	04/16/1999	4	SR. ENVIRONMENTAL SPEC (2); PROCUREMENT SPECIALIST (1); INFORMATION TECH SPEC (1)	S	S
	01/18/2001	5	TASK TEAM LEADER (1); ENV./IT SPECIALIST (1); PROCUREMENT SPECIALIST (1); DISBURSEMENT SPEC. (1); ENV. CONSULTANT (1)	S	U

	Date (month/year)	*No. of persons*	*Specializations represented*	*Performance rating* *Impl. Progress*	*Dev. Obj*
	11/26/2001	5	TASK TEAM LEADER (1); IT SPECIALIST (1); SR. PROCUREMENT SPECIALIST (1); ENVIRONMENT CONSULTANT (1); SR. FINANCIAL SPEC. (1)	U	U
	05/10/2002	6	TASK TEAM LEADER (1); ENVIRONMENTAL SPECIALIST (2); FINANCIAL SPECIALIST (2); PROCUREMENT SPECIALIST (1)	S	S
Completion	2/2003	4	TASK TEAM LEADER (1); ENVIRONMENTAL SPECIALIST (1); ICR CONSULTANTS (2); INANCIAL SPECIALIST (1) PROCUREMENT SPECIALIST (1)		

OTHER PROJECT DATA

Borrower/Executing Agency:

FOLLOW-ON OPERATIONS

Operation	*Credit no.*	*Amount (US$ million)*	*Board date*
Environmental Management Capacity Building Technical Assistance Project	C2930-IN	50.0	December 23, 1996

Annex B. Project Financing Arrangements

As observed in the main text of this report, IPCP and IPPP had different and complex financing arrangements, which had a direct impact on their performance. In the case of IPCP, the Bank loan of US$ 124 million was to GOI, which on-lent the proceeds to ICICI (US$ 50 million) and IDBI (US$ 74 million), while in that of IPPP, the Bank loans went to ICICI (also US$ 50 million) and IDBI (US$ 93 million) directly. In the loan for IPCP, moreover, the Government bore the foreign exchange risk and on-lent to ICICI and IDBI in Rupees at an interest rate 2% below the long-term commercial lending rate (15% at the time of appraisal) with a repayment period of 15 years and a 5 year grace period. ICICI and IDBI were to on-lend to their industrial sub-borrowers at 15% or other rate agreed with the Bank.

The direct loans to the two financial intermediaries for IPIP, in turn, were for a period of 20 years with a 5 year grace period at the Bank's standard variable rate, and ICICI and IDBI, rather than GOI, assumed the foreign exchange risk. According to the SAR, the borrowers would then on-lend to their sub-borrowers at rates determined by the former based on "market conditions" and their respective lending policies "at levels not lower than prevailing minimum rates, with a maximum ten year repayment period, including up to two years grace."

In addition to the Bank and IDA resources to be on-lent through the special credit lines, both ICICI and IDBI, on the one hand, and each of the industrial sub-borrowers, on the other, were expected to contribute some of their own resources to finance pollution control investments. More specifically, these contributions were expected to be US$ 25 million (intermediaries) and US$ 62 million (sub-borrowers) under IPCP and US$ 60 million (ICICI and IDBI) and US$ 86 million (sub-borrowers) under IPPP, respectively.

The IDA credits for IPCP and IPPP, finally, were expected to be allocated as follows:

- IPCP: US$ 14.1 million to MOEF for the institutional and technical assistance components; US$ 5.5 million to IDBI, which would act as a "Government agent" for demonstration projects and technical assistance schemes; and US$ 12 million to be used by GOI for direct support on a grant basis for investment in common treatment facilities, for which IDBI would act also act as a lending agent.

- IPPP: US$ 22.5 million to MOEF for the institutional and technical assistance components; US$ 0.5 million to IDBI, which would again act as a "Government agent" for the financing of pre-investment studies under the technical assistance component; and US$ 2 million as direct support on a grant basis for the common treatment facilities (now identified as Common Effluent Treatment Plants - CETPs), also through IDBI.