ADB

Project Performance Audit Report

PPA: IND 26470
(Final)

Industrial Energy Efficiency Project in India

February 2005

Operations Evaluation Department

Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit – Indian Rupee/s (Re/Rs)

		At Appraisal	At Completion	At Operations Evaluation
		July 1994	June 2000	October 2004
Re1.00	=	$0.0318	$0.0217	$0.0218
$1.00	=	Rs31.37	Rs46.07	Rs45.90

ABBREVIATIONS

ADB	–	Asian Development Bank
CFD	–	Corporate Finance Department
CO_2	–	carbon dioxide
DID	–	Department of Industrial Development
DIPP	–	Department of Industrial Policy and Promotion
EIRR	–	economic internal rate of return
FIRR	–	financial internal rate of return
FSD	–	Foreign Exchange Service Department
IDBI	–	Industrial Development Bank of India
INRM	–	India Resident Mission
LA	–	Loan Agreement
NPK	–	nitrogen/phosphorus/potassium
OEM	–	Operations Evaluation Mission
PCR	–	project completion report
PPAR	–	project performance audit report
PSE	–	public sector enterprise
RRP	–	report and recommendation of the President
SOE	–	statement of expenditure
TA	–	technical assistance
TOR	–	terms of reference

WEIGHTS AND MEASURES

GWh	–	gigawatt-hour (1 million kWh)
g	–	gram
kg	–	kilogram (1 thousand grams)
MW	–	megawatt (1 million watts)
kWh	–	kilowatt-hour
toe	–	ton of oil equivalent

NOTES

(i) The fiscal year (FY) of Industrial Development Bank of India ends on March 31.
(ii) In this report, "$" refers to US dollars.

Director General, Operations Evaluation Department	:	Bruce Murray
Director, Operations Evaluation Division 2	:	David Edwards
Evaluation Team Leader	:	Hong Wang

Operations Evaluation Department, PE-660

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Hong Wang, evaluation specialist (team leader), was responsible for the preparation of this report, and reviewed documents, interviewed key informants, and guided the fieldwork undertaken by V. Buhat-Ramos, evaluation officer, and the consultants. A. Silverio, operations evaluation assistant, provided secretarial assistance from Manila.

The guidelines formally adopted by the Operations Evaluation Department (OED) on avoiding conflict of interest in its independent evaluations were observed in the preparation of this report. To the knowledge of the management of OED, there were no conflicts of interest of the persons preparing, reviewing, or approving this report.

Attachment: Management Response on the Program Performance Audit Report on the Industrial Energy Efficiency Project in India.

BASIC DATA

Industrial Energy Efficiency Project (Loan 1343-IND)

Project Preparation and Institution Building

TA No.	TA Project Name	Type	Person-Months	Amount[a] ($)	Approval Date
1890	Industrial Energy Conservation and Environment Improvement	PPTA	20.0	275,000	19 May 1993
2403	Energy and Environmental Management of the Industrial Development Bank of India	ADTA	41.6	585,000	26 Sep 1995

Key Project Data ($ million)	As per ADB Loan Documents	Actual
Total Project Cost	150.0	150.0
Foreign Currency Cost	150.0	150.0
Bank Loan Amount and/or Utilization	150.0	150.0

Key Dates	Expected	Actual
Fact-finding		26 Jan–11 Feb 1994
Appraisal		26 Jun–11 Jul 1994
Loan Negotiations		5 Oct–15 Nov 1994
Board Approval		13 Dec 1994
Loan Agreement		30 Mar 1995
Loan Effectiveness	28 Jun 1995	28 Jul 1995
First Disbursement		29 Mar 1996
Project Completion	30 Jun 1999	30 Jun 2000
Loan Closing	28 Jul 2000	27 Sep 2000
Months (effectiveness to completion)	48	59

Economic and Financial Internal Rates of Return (%)	Appraisal	PCR	PPAR
Financial Internal Rate of Return	>WACC	—	—
Economic Internal Rate of Return	12.0	—	—

Borrower Industrial Development Bank of India

Executing Agency Industrial Development Bank of India

Mission Data

Type of Mission	Number of Missions	Number of Person-Days
Fact-Finding	1	68
Appraisal	1	102
Consultation	3	38
Project Administration		
- Inception	1	24
- Review	8	102
- Project Completion	1	2
Operations Evaluation	1	86

— = not calculated, ADB = Asian Development Bank, ADTA = advisory technical assistance, PCR = project completion report, PPAR = project performance audit report, PPTA = project preparatory technical assistance, TA = technical assistance, WACC = weighted average cost of capital.

[a] Represents approved amount of technical assistance.

EXECUTIVE SUMMARY

The Industrial Energy Efficiency Project (the Project) was consistent with efforts by the Asian Development Bank (ADB) to promote efficient and environmentally sustainable industrialization in India. The Project was to support specific Government initiatives in (i) turning energy sector reforms into demand-side management of energy-intensive industries, (ii) reducing energy shortages by increasing energy efficiency, (iii) improving the overall efficiency and international competitiveness of the industries, and (iv) integrating environmental considerations into project design and implementation.

The main objective of the Project was to promote energy efficiency in the energy-intensive industries in India. Since the industry did not invest as much as expected in energy efficiency, the Project sought to address this market failure through the Industrial Development Bank of India (IDBI), the apex project financing institution in India. The loan proceeds were to finance priority projects of public and private sector enterprises for energy efficiency and environmental improvement for 1995–1997 in the iron and steel, cement, chemical, fertilizer, pulp and paper, sugar, and textile sectors.

As defined at appraisal, the scope of the subprojects under the Project involved (i) modifying production processes through the installation of equipment required for energy efficiency and optimization of plant operations, (ii) technological restructuring of production facilities, and (iii) licensing or acquiring energy efficiency-related or other technologies. The project scope, as implemented, varied considerably from what was envisaged at appraisal. For example, 43% of the ADB loan was used for financing 10 captive power plants, including three that were power and heat cogeneration. Most of these captive power plants operate at relatively low plant load factors, meaning their macro-energy economics are not optimal. Small captive power plants that use fossil fuel also can pollute the environment badly. No subproject involved licensing or acquiring energy efficiency-related or other technologies as envisaged. Second-hand equipment made in the 1970s was imported for one captive power subproject, introducing outdated technology to the Project.

A number of design weaknesses in project formulation were identified. Formulated originally as an energy efficiency sector loan, the Project was reclassified as a financial intermediation loan for the purpose of administration system registration. Some of the important policy and institutional issues the project preparatory technical assistance (TA) identified were not incorporated fully in the final design of the Project. In the absence of policy and institutional changes, the Project effectively became an ordinary line of credit to IDBI. The energy efficiency programs to be introduced in each subproject were to reduce energy consumption by at least 18% after implementation. However, this performance indicator had certain weaknesses. First, it was difficult to quantify. Second, the quantum gains in energy efficiency achieved, as defined, did not incorporate the quantum of investment or associated change in operating and maintenance costs.

The $150 million loan was disbursed fully to finance 26 subprojects spread across 9 states and 7 industrial sectors. IDBI confirmed that 24 of the subprojects were implemented successfully. The other two subprojects were suspended due to financial difficulties of the subborrowers after the ADB-financed equipment arrived at the site.

During the first 18 months of project implementation, subproject approvals and loan disbursements were much slower than planned. In response, IDBI took steps to market the loan and relax some selection criteria, while ADB simplified disbursement procedures. Although disbursement accelerated, the quality of project selection and monitoring were undermined

somewhat. Various subprojects financed under the loan were part of ongoing expansion and/or modification schemes. In cases where IDBI already had financing agreements with the enterprises concerned, subloan agreements between IDBI and the respective subborrowers for the ADB funds were lacking. As a result, the subborrowers were unaware of any of their obligations to ADB. ADB loans were used to reimburse expenditures incurred before ADB approved the subproject. Furthermore, IDBI did not comply fully with the covenants in the Loan Agreement (LA), such as (i) the prohibition against selecting greenfield subprojects, (ii) the submission of benefit monitoring and evaluation reports for each subproject, and (iii) the establishment of a revolving fund to provide additional financing for energy efficiency projects.

Based on plant visits and interviews with representatives of subborrowers, the Operations Evaluation Mission (OEM) concluded that, to a large extent, subprojects financed under the loan had performed well in terms of operation and servicing of the subloans. Since IDBI did not set up a benefit monitoring and evaluation system for the Project, the OEM could not assess the energy efficiency achievements for all the subprojects. Based on the available information, analyses showed that only four of 11 achieved the energy efficiency improvement target of 18% for the respective plant. This relatively low improvement in energy efficiency reflected the fact that most ADB-financed subprojects were a small part of a much larger investment in the production process. The results also highlighted the inappropriateness of the performance indicator. In industrial enterprises in India, energy efficiency is rarely a separate focal area of business. Investment in stand-alone energy efficiency projects carries little incentive unless the quantum gains in energy efficiency in monetary terms exceed the quantum of investment or associated change in operating and maintenance costs. As a result, information on energy efficiency improvements for subprojects was not readily available. Most subprojects might have achieved the subborrowers' objectives of expanding capacity and improving quality. However, they were less successful in achieving the primary project objective of promoting energy efficiency in the industrial sector.

The sustainability of the successfully implemented subprojects depends on the proper maintenance of the facilities installed, and the sound financial performance of the subproject entities. Most project facilities that the OEM visited were maintained well. The weak financial health of subproject entities is the main concern for long-term sustainability. Of the nine subproject entities analyzed based on available information, eight encountered financial problems and experienced losses from time to time over the past 6 years. IDBI reported that repayments of four subloans were rescheduled due to financial difficulties of the subborrowers.

Environmental improvement was not the primary objective of any of the subprojects under the loan. However, improvement in energy efficiency undoubtedly leads to reductions in the emission of green house gases. This is also true for some of the captive power subprojects using industrial waste rather than fossil fuels.

Although an appropriate policy and institutional framework was considered important for achieving the project objectives, the Project did not include a policy or an institutional component. Hence, the direct policy impact of the Project was minimal. With regard to institutional impacts, the Project did not appear to offer any specialized energy efficiency services that were not available through IDBI's normal term lending instruments.

The performance of ADB and IDBI in project formulation, appraisal, and implementation was assessed as less than satisfactory. For ADB, this assessment reflected (i) design weaknesses at project formulation, particularly in excluding policy and institutional components; (ii) inadequate project supervision during implementation, as shown by the minimal documentation of subproject implementation; and (iii) inadequate provision for project

monitoring and evaluation after the completion of all subprojects. For IDBI, this assessment reflected the frequent change of project implementation responsibility within IDBI, and noncompliance with major loan covenants. Overall, the Project was rated partly successful.

The Project yielded five main lessons. First, the statement of the project objective in the report and recommendation of the President (RRP) did not specify how the objective was to be achieved. The RRP, LA, and minutes of loan negotiations on project scope and definitions of eligible subprojects lacked clarity and consistency. While greenfield investments should not be considered in energy efficiency projects, capacity expansion within some upper limits should be allowed. The yardsticks for measuring the energy efficiency achievements seemed arbitrary, and not relevant to cogeneration schemes. These issues should be resolved at the design stage by applying rigorously the project logical framework processes.

Second, the attainment of project objectives and goals were undermined to some extent by the relaxation of subproject selection criteria and simplification of disbursement procedures. These measures might have been appropriate from IDBI's point of view to accelerate loan disbursements. However, they gave insufficient consideration to their impacts on project outcomes and the achievement of project objectives. As a consequence, project selection and assessment became a repackaging exercise; and the project scope, as implemented, deviated considerably from what was envisaged at appraisal. The catalytic role of ADB financing in promoting energy efficiency at the subproject level was reduced significantly. This unsatisfactory outcome highlights the need for more thorough and rigorous demand analysis during project preparation.

Third, the simplification of disbursement procedures also made verification of project costs and expenditures difficult afterwards. While ADB should work to simplify disbursement procedures and reduce related transaction costs, measures must be in place to ensure that ADB funds are used for the intended purposes. The executing agencies of financial intermediation loans should be required to provide ADB with the subloan agreement before the first disbursement for the respective subproject. As with project loans, the executing agencies should be required to maintain original receipts for all expenses financed under the ADB loan for at least 5 years after loan closing. Such measures are needed to ensure the presence of a strong trail for auditing.

Fourth, ADB's project monitoring and supervision were inadequate. Delegation of loan administration responsibilities to the India Resident Mission (INRM) did not improve ADB's project supervision noticeably. The OEM could confirm that ADB staff visited only eight of the 26 subprojects. More effective arrangements for project monitoring and supervision should be put in place before project implementation. Since the subprojects are scattered in nine states across the country, domestic consultants could have been engaged to visit each subproject at least once during implementation if INRM did not have the staff to do so. The OEM believes that visiting all subproject sites during project implementation is an essential part of project administration.

Fifth, given the nature of energy efficiency activities and the considerable engineering industry capability in India, the capital cost of most investments would have a limited direct or indirect foreign exchange component. If domestic currency lending were available for commercially oriented public sector entities, the demand for ADB funds might have increased. Although project formulation had some weaknesses, the difficulty in disbursing the loan is a strong indicator that the loan proceeds were not competitive in the Indian financial sector. Compared to commercial banks, ADB has not been innovative enough to develop a broader range of financial instruments to meet the needs of clients such as IDBI better.

A number of issues for improving energy efficiency in India were identified:

(i) India is not making full use of market-based pricing signals to encourage industries to make the type of investments that are necessary to conserve energy and improve the energy efficiency of the economy. Pricing policies have a direct bearing on the viability of energy efficiency investments for the enterprises. Subsidized energy prices result in inadequate investment in energy efficiency.

(ii) Top management teams of most enterprises focus on product outputs, commercial competitiveness, quality, and profitability. They rarely focus on energy efficiency. Responsibility for energy efficiency often is given to the maintenance and/or electrical managers. As a result, most companies give investments in energy efficiency, and the adoption of new energy-efficient technologies, a secondary priority.

(iii) For many industries, second-hand plant and/or equipment have been imported. While this might be a rational way to lower the capital cost of the investment, the unintended result is the use of outdated technologies in terms of energy efficiency. Energy inefficiencies often are transferred from one plant to another as inefficient equipment is removed from one factory and usually resold for installation in another. Energy conservation norms for the industries need to be developed that make commercial sense.

By and large, ADB did not promote energy efficiency through this Project. Unless specific measures have been put in place to address the issues above, ADB financing for a similar project in the future is not justified.

After the OEM, INRM discussed with IDBI the establishment of a revolving fund. IDBI agreed to try to track the information required for the creation of the revolving fund. If it is unable to do so by the end of 2005, IDBI might consider prepayment of the loan to ADB.

Bruce Murray
Director General
Operations Evaluation Department

I. BACKGROUND

A. Rationale

1. In the early 1990s, the development strategy of the Government of India accorded a high priority to energy efficiency and related environmental improvements. The energy sector was considered critical to economic growth since it accounted for more than 30% of public investments, utilized 25% of export earnings for energy imports, and generated about 15% of Government revenues. In 1992, the Government launched the National Energy Efficiency Program, emphasizing the promotion of indigenous capabilities for design and manufacture of energy-efficient equipment. At the time, the operational strategy of the Asian Development Bank (ADB) for India supported economic growth with a focus on efficient industrialization of the economy. ADB's strategy recognized the dual needs to improve the efficiency of India's energy-intensive industries, and to strike a balance between industrial development and the environment. In this context, ADB supported projects aimed at energy efficiency and environmental improvements.

2. With its emphasis on improvements in energy efficiency, the Industrial Energy Efficiency Project[1] (the Project) was consistent with ADB's efforts to promote efficient and environmentally sustainable industrialization. The Project was to support the Government's specific initiatives in (i) turning energy sector reforms into demand-side management of energy-intensive industries, (ii) reducing energy shortages by increasing energy efficiency, (iii) improving the overall efficiency and international competitiveness of the industries, and (iv) integrating environmental considerations in project design and implementation.

B. Formulation

3. In response to a request from the Government, ADB approved a project preparatory technical assistance (TA)[2] in May 1993 to study energy efficiency investments in the industrial sector. The project preparatory TA, which was completed in May 1994, also was to prepare a project suitable for ADB financing. ADB fielded a loan fact-finding mission in February 1994, followed by an appraisal mission, and two consultation missions between June and September 1994.

4. The project preparatory TA proposed to ADB a sector loan project consisting of an investment component, an institutional strengthening component, and a set of recommended policy changes. The study yielded a list of 73 subproject candidates[3] in aluminum, cement, copper, fertilizer, pulp and paper, and steel. These subprojects potentially could represent a time slice of an industrial sector investment program, focusing on energy conservation and environmental improvement. While the primary project objective was fostering investments in industrial energy efficiency and environmental improvement, the study recommended complementary support to facilitate the participation and assistance of other financial institutions for integrated and comprehensive plant-specific technical studies. The project preparatory TA

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[1] ADB. 1994. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to India for the Industrial Energy Efficiency Project*. Manila (Loan 1343-IND, for $150 million, approved on 13 December 1994).

[2] ADB. 1993. *Technical Assistance to India for the Industrial Energy Efficiency Conservation and Environment Improvement*. Manila (TA 1890-IND, for $275,000, approved on 19 May 1993).

[3] Pre-investment works for 25 of the 73 candidate subprojects were deemed to have been completed at the time of the TA.

also recommended the consideration of policy adjustments,[4] such as (i) changing and extending the depreciation provisions, (ii) allowing the transfer of depreciation to energy or environmental service companies, and (iii) improving industrial solid waste and hazardous waste management.

5. The main conclusions of the appraisal mission included: (i) more than adequate demand existed for the loan at the market-based terms; (ii) the Industrial Development Bank of India (IDBI) had a developed energy appraisal capacity, and was a sound financial institution; and (iii) the policy framework was appropriate at the time. The mission did not highlight the need for institutional strengthening and policy changes. However, during the appraisal, IDBI requested a TA from ADB to strengthen its management and institutional capabilities. The TA would focus on improving IDBI's capabilities in energy and environmental technical assessment, and economic and financial evaluation, in energy efficiency and environmental pollution control projects. The appraisal mission informed IDBI that the request would be examined in due course, taking into account similar assistance that ADB provided earlier. ADB approved an advisory TA[5] in September 1995, 9 months after loan approval.

6. In accordance with ADB management's instructions, the consultation missions' discussions with the Government focused on an action plan to strengthen the supportive policy reforms in energy efficiency during project implementation. However, the Government resisted including this action plan as part of the loan covenants under the Project. The consultation missions related that ADB management believed the inclusion of the action plan would facilitate greatly the favorable consideration of the Project by the Board. With this understanding, the Government agreed to include the action plan in the appropriate sections of the report and recommendation of the President (RRP), indicating the objectives and directions of policy reforms.[6]

C. Purpose and Outputs

7. The objective of the Project was to promote energy efficiency in the energy-intensive industries in India, where market-oriented reforms had been—or soon would be—implemented. The project objective was to be realized through support for industrial investments that focused on energy efficiency and environmental improvements, and also showed satisfactory financial and economic rates of return. When the Project was formulated, however, industry had not invested as much as expected in energy efficiency improvements. The Project sought to address some of the sources of this market failure[7] by providing energy efficiency financing through a financial intermediary that had developed capabilities to undertake such activities.

8. Proceeds from the project loan were to finance priority projects of public sector enterprises[8] (PSEs) for energy efficiency and environmental improvements in the aluminum, cement, chemical, copper, pulp and paper, sugar, and textile subsectors in 1995–1997. Other energy-intensive subsectors, including fertilizer and iron and steel, also might be considered if

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[4] The project preparatory TA report noted that other policy changes might be recommended by a more thorough and extensive examination of the issues than was possible within the constraints of its study.

[5] ADB. 1995. *Technical Assistance to India for the Strengthening the Capacity of IDBI in Energy and Environmental Project Management*. Manila (TA 2403-IND. for $585,000, approved on 26 September 1995).

[6] This arrangement was reported to management in the back-to-office report of the mission dated 14 September 1994. Management did not comment on this remark, but the sector loan modality was no longer applied to the Project.

[7] The sources of the market failure were the lack of (i) capital, especially for smaller enterprises; (ii) adequate information on appropriate equipment and technology; and (iii) emphasis on energy efficiency investment financing by domestic financial institutions.

[8] Private sector entities also would be considered in the subsectors where market reforms were well advanced.

market-based reforms were implemented. The scope of the subprojects, as defined at appraisal, involved (i) modification of production processes through the installation of equipment required for energy efficiency and optimization of overall plant operations, (ii) technological restructuring of production facilities, and (iii) licensing or acquisition of energy efficiency-related or other technologies. The energy efficiency programs to be introduced in each of the subprojects were expected to reduce energy consumption by at least 18% after implementation.

9. The main criteria for selecting subprojects for ADB financing included:

(i) Energy efficiency should increase by at least 18%, as measured by the before-project and after-project energy consumption across the specific equipment or manufacturing process to be replaced or modified;
(ii) IDBI should not select and appraise any greenfield investment, or any expansion project;[9]
(iii) The economic internal rate of return (EIRR) should be at least 12% in real terms, while the financial internal rate of return (FIRR) should exceed the respective weighted average cost of capital after tax in real terms;
(iv) Subborrowers should contribute, out of their own resources, at least 25% of the cost of the subproject;
(v) Subborrowers should maintain a debt service ratio of at least 1.5 and debt-equity ratio not higher than 60:40; and
(vi) Subprojects should be designed to ensure that the modified plant would meet all local and national environmental standards, as well as internationally accepted safety standards.

D. Cost, Financing, and Executing Arrangements

10. ADB provided a loan of $150 million from its ordinary capital resources to finance 100% of direct and 50% of indirect foreign exchange costs of the qualified subprojects. The subborrowers were to arrange all local currency financing from their own resources, domestic borrowing, and other sources. IDBI was the Borrower and Executing Agency for the Project. A leading financial institution in India for term lending to the industrial sector, IDBI has considerable experience administering lines of credit funded by the World Bank and ADB. IDBI was to relend the loan proceeds to subborrowers in accordance with market-related lending policies. The subloans, provided in dollars or local currency, were to carry relending rates not lower than the prevailing minimum domestic lending rates. For dollar subloans, an interest rate of about 8.9%, including IDBI's spread of about 2%, was considered competitive. For subloans in local currency, the prevailing market rate of about 16% at appraisal was applicable.

11. IDBI was responsible for the selection, appraisal, and administration of all subprojects to be financed by the ADB loan in accordance with the selection criteria. IDBI was required to forward to ADB evaluation summaries of the subprojects for review.[10] To monitor the improvements in energy efficiency under ADB-financed subprojects, IDBI was to (i) require the

[9] The definition of an expansion project was not given in the RRP or the Loan Agreement. The definition probably was kept vague to allow flexibility in future interpretations. For this project performance audit report, an investment scheme is considered an expansion subproject if its objective, as stated in the subproject proposal, was for expansion of an existing production facility.

[10] According to the RRP, detailed appraisal reports for subprojects involving ADB financing of more than $5 million were to be submitted for ADB approval. However, this requirement was not stipulated in the Loan Agreement or the minutes of the loan negotiations.

subproject entities to undertake energy audits upon completion of the subprojects, and (ii) submit quarterly reports to ADB on energy savings for the completed subprojects.

12. The Department of Industrial Development (DID), which later was replaced by the Department of Industrial Policy and Promotion (DIPP), was responsible for implementing the policy measures required for expeditious utilization of the loan. DID also was to coordinate supportive policy reforms by the Government involving the industrial, energy, and environment sectors. In coordination with IDBI, DID was to provide ADB with reports on project benefit monitoring and evaluation during the first 5 years of full operation of each subproject. Further, DID was to submit reports to ADB on progress regarding price liberalization policies for energy inputs and industrial products, enterprise reforms in the public sector, and other measures introduced to encourage energy efficiency. An interministerial steering committee, headed by the DID secretary and comprising representatives from IDBI as well as the ministries involved in energy-intensive industries, was to be constituted. The committee was to review the policy framework periodically, and make appropriate recommendations for necessary adjustments.

E. Completion and Self-Evaluation

13. ADB's India Resident Mission (INRM) prepared the project completion report (PCR),[11] which was circulated in April 2002. INRM did not visit any of the subprojects during PCR preparation. The PCR concluded that the Project was substantially successful in achievement of its objectives. However, the PCR did not provide sufficient credible evidence that the project objectives had been achieved. The accounts of the design, scope, implementation, and performance of the subprojects were limited. The PCR provided little information on the financial and operational performance of the subproject entities. Due to the lack of benefit monitoring and evaluation data, the PCR did not calculate the EIRR and FIRR for any of the subprojects. Further, the PCR did not provide detailed information on policy developments regarding price liberalization of energy inputs and products of industrial enterprises, or on measures introduced to encourage energy efficiency. The PCR also failed to identify any substantive lessons learned. Nevertheless, the PCR recommended that ADB consider a follow-up loan.

F. Operations Evaluation

14. This project performance audit report (PPAR) reviewed the findings of the PCR, and assessed the Project in terms of relevance, efficacy, efficiency, sustainability, and institutional and other developmental impacts. The assessment was based on a review of ADB documents, discussions with ADB staff, and findings of the Operations Evaluation Mission (OEM). A questionnaire seeking required information was sent to IDBI before the OEM. The OEM visited India 30 August–23 September 2004, and held discussions with representatives from the Bureau of Energy Efficiency, IDBI, and 15 subproject entities.[12] The OEM also visited 7 of the 26 subprojects financed under the loan.[13] The files available at INRM and IDBI contained information only on subproject approval and disbursements. No documentation could be found

[11] Administration of project implementation was transferred to INRM on 1 June 1998. By then, ADB had committed subloans amounting to $90 million for 14 subprojects.

[12] During the OEM, INRM's repeated requests for a meeting with DIPP were declined.

[13] Considering sector coverage and logistical constraints, the subprojects that the OEM selected for plant visits were Star Paper Mills Ltd., Sintex Industries Ltd., Indorama Cement Ltd., Sunflag Iron & Steel Co. Ltd., Sree Rayalaseema Alkalies and Allied Chemicals Ltd., Madras Fertilizers Ltd., and EID Parry (India) Ltd. IDBI staff accompanied the OEM on most of the plant visits. The Mission also met representatives of the following subproject entities: Upper Ganges Sugar and Industries Ltd., Oudh Sugar Mills Ltd, Arunoday Mills Ltd., Gujarat Alkalies and Chemicals Ltd., Associated Cement Companies Ltd.; DCW Ltd., Godavari Sugar Mills Ltd., and Sun Paper Mill Ltd.

on the implementation and completion of individual subprojects,[14] creating difficulties in understanding fully the problems that arose during the Project and evaluating the achievement of project objectives. Nonetheless, information collected during the OEM was considered sufficient to provide an overall picture of project performance and impacts. The views of relevant ADB departments and offices, as well as those of the Government and IDBI, were considered when finalizing the PPAR.

II. PLANNING AND IMPLEMENTATION PERFORMANCE

A. Formulation and Design

15. At appraisal, one of the main justifications for the Project was the lack of adequate capital for energy efficiency investments in the targeted subsectors. However, the project preparatory TA study lacked a detailed analysis to explain why enterprises did not undertake profitable energy efficiency activities. On the other hand, ADB was concerned that a substantial portion of previous ADB loans for energy conservation and environment improvement projects had been canceled.[15] In response to the concern raised at the staff review committee meeting on 2 September 1994, the project team said that IDBI had pending requests for a large number of energy efficiency projects requiring financing for $350 million, and there was, therefore, more than adequate demand for the loan. However, the demand for ADB funds was not strong from industry in general and PSEs in particular, which became clear soon after the loan became effective. This was partly due to (i) the deterioration of the exchange rate, (ii) weak demand for industrial products at the time, (iii) limited need for foreign exchange in most of the energy efficiency investments, and (iv) ADB's elaborate documentation requirements. More importantly, energy efficiency is rarely a separate focal area of business in industrial enterprises in India. The objective of any investment scheme is usually the overall improvement of competitiveness and profitability. Investments in stand-alone energy efficiency projects carry little incentive, unless they contribute substantially to the bottom line. The OEM was told that IDBI had to market the loan through awareness seminars among IDBI staff, distribution of brochures to concerned industries, and relaxation of some selection criteria to include ongoing expansion schemes. The legitimate concern that demand for such an energy efficiency loan would be insufficient appears to have been overlooked during project formulation.

16. The Project, which was formulated originally as an energy efficiency sector loan, was reclassified later as a financial intermediation loan for the purpose of administration system registration. While a sector loan can accommodate financing multiple subprojects, and provides needed procurement flexibility, it is expected to improve sector policies—energy efficiency in this case—and strengthen institutional capacity. The energy efficiency action plan agreed during appraisal was included in the RRP, though it was not covered by the covenants in the Loan Agreement (LA). Despite IDBI's request for a TA during project design, the final project scope did not include an institutional strengthening component. In the absence of required policy and institutional changes, the Project was formulated largely as a special line of credit to IDBI.

[14] Based on the back-to-office reports of loan review missions, ADB staff visited 8 of 26 subprojects during the review missions. The issues discussed focused mainly on the selection of new subprojects for approval.

[15] ADB. 1992. *Report and Recommendation of the President on a Proposed Loan to India for the Energy Conservation and Environment Improvement Project*. Manila (Loan 1212-IND, for $147 million, approved on 17 December 1992). On 10 February 1994, ADB received a request from the Government, before loan effectiveness, for cancellation of $107.7 million, which was approved on 28 September 1994.

17. The Project, as implemented, deviated considerably from what was designed and envisaged at project preparation. Some of these variations were:

(i) The project preparatory TA identified 25 subproject candidates, with pre-investment work completed in the aluminum, cement, copper, fertilizer, steel, and pulp and paper subsectors—all of which were from PSEs. A de facto preference was given to PSEs, which had been the primary focus of the project preparatory TA study. However, when subprojects were approved for financing under the loan, 25 of the 26 selected were from private enterprises—and none, except Madras Fertilizers Ltd., was identified as a candidate during the project preparatory TA. IDBI offered two main reasons for the changes. First, many PSEs did not have the full authority to raise funds without Government approval. Second, many PSEs could still receive financial support or development funds from the Government. The project preparatory TA and ADB missions should have considered these factors during project design, so the Project could have been formulated better to meet the needs of private enterprises.

(ii) The scope of the Project, according to the RRP, included (a) modifying production processes through the installation of equipment required for energy efficiency and optimization of overall plant operations; (b) technological restructuring of production facilities; and (c) licensing or acquiring energy efficiency-related or other technologies. Captive (in-house) power plants, or power and heat cogeneration facilities, were not considered in the original project design.[16] During implementation, 43% of the ADB loan was used for financing 10 captive power plants, including three cogeneration facilities. Captive power plants were not considered at appraisal, because most operate at relatively low plant load factors and lack optimal macro-energy economics.[17] No subproject involved licensing or acquiring energy efficiency-related or other technologies as envisaged. In one captive power subproject,[18] second-hand equipment made in the 1970s was imported and installed, allowing outdated technology to be introduced. These changes in project activities suggest design weaknesses in project formulation.

(iii) By definition, any greenfield investments or expansion projects, other than for balanced use of conserved energy arising from technology restructuring, were not eligible for financing under the Project.[19] However, seven expansion subprojects[20] and at least one greenfield[21] subproject were financed under the loan. Due to the lack of clarity in definitions, determining if these expansion subprojects were within the project scope was difficult.

[16] According to the minutes of loan negotiations, the ADB team clarified that cogeneration subprojects involving conservation of energy would also be covered under the Project. Cogeneration is usually defined as generation of both electricity and steam.

[17] Between 1992 and 2002, the installed capacity of captive power generation in India increased from about 9,300 megawatts (MW) to 19,000 MW. By 2002, captive power plants accounted for approximately 20% of the installed generating capacity. This phenomenon of industrial users abandoning the unreliable and costly grid power is damaging to the power utilities and independent power producers, as industrial users represent a major segment of consumption, as well as reliable payers of higher tariffs.

[18] This was the subproject of Svadeshi Mills Co. Ltd.

[19] According to the minutes of loan negotiations, the ADB team clarified that expansion subprojects connected with the balanced use of conserved energy arising from technological restructuring would be eligible for financing under the Project. The expression “balanced use of conserved energy” was not clearly defined, however.

[20] These were the subprojects under Oudh Sugar Mills Ltd., Upper Ganges Sugar and Industries Ltd., Associated Cement Company Ltd. (Sindri), Associated Cement Company Ltd. (Lakheri), Associated Cement Companies Ltd. (Kymore), Tulsipur Sugar Company Ltd., and Balrampur Chini Mills Ltd.

[21] This was the subproject of Indo Rama Cement Ltd.

18. Under one of the most important subproject selection criteria, energy efficiency should have improved by at least 18% in all subprojects, as measured by the before-project and after-project energy consumption across the specific equipment or manufacturing process that was replaced or modified. However, the basis for the adoption of this important yardstick was not clear. The project preparatory TA quoted an excerpt from the Government's Eighth Five-Year Plan, which predicated an energy conservation potential of 25–30% for the industrial sector as a whole. However, it did not propose any specific indicator for measuring the energy efficiency gains under the subprojects. This seemingly arbitrary indicator was, in fact, difficult to quantify during subproject selection and monitor after implementation. With this indicator, the quantum gains in energy efficiency do not incorporate the quantum of investment or associated change in operating and maintenance cost.[22] For captive power generation schemes, the yardstick of energy efficiency achievement at 18% is not appropriately defined.

B. Achievement of Outputs

19. Under the Project, 26 subprojects requiring a combined investment of Rs36.07 billion were approved and financed. An overview of the subprojects is in Appendix 1. Of the 26 subprojects, 8 were for modification of production processes, 7 for capacity expansion of production facilities, 10 for power generation plants, and 1 for a greenfield cement production facility. The subprojects were spread across nine states and seven industrial subsectors (Table 1).

Table 1: Distribution of Subprojects by Sector

Subsector	Number of Subprojects	Amount of Subloans ($ million)	% to Total
Cement	4	38.12	26
Chemicals	3	26.26	18
Fertilizers	2	30.49	20
Paper	3	6.31	4
Steel	2	10.49	7
Sugar	9	30.23	20
Textiles	3	8.08	5
Total	**26**	**149.98**	**100**

Source: Operations Evaluation Mission.

20. The PCR reported that 24 of the 26 subprojects were implemented successfully, which IDBI confirmed. The other two subprojects, Swadeshi Mills Ltd. and Bellary Steels & Alloys Ltd., were suspended due to financial difficulties of the subborrowers after the ADB-financed equipment arrived at the site. Both companies have been registered for bankruptcy under the Board for Industrial & Financial Reconstruction, a statutory body dealing with financially weak companies in India. IDBI also is searching actively for investors to refinance and/or acquire these two subborrowers. Due to a lack of information on project implementation and completion at INRM and IDBI, the OEM was unable to evaluate independently the achievements of outputs for all subprojects.

[22] A more widely accepted indicator is the cost of conserved energy. It is calculated by annualizing the incremental investment in energy efficiency over its lifetime, adding to (or subtracting from) it the value of any increase (or decrease) in annual operations and maintenance costs, and dividing the result by the expected annual savings in energy.

21. Based on plant visits and interactions with representatives of the subprojects, the OEM concluded that most subprojects had been implemented as approved. Table 2 presents the physical outputs envisaged at approval and achieved for the seven subprojects that the OEM visited.

Table 2: Outputs of Subprojects Visited by the Operations Evaluation Mission

Subprojects	Output Envisaged	Output Achieved
Star Paper Mills Ltd.	• Set up three paper machines • Install a chemical recovery boiler • Install an electrostatic precipitator	Replaced by conveyor belt Implemented Implemented
Sintex Industries Ltd.	• Modernize the production facility from batch process to continuous process to improve the quality of finished fabrics • Replace six old narrow-width (150 cm) looms with wider-width (190 cm) new rapier looms	Implemented Implemented
Indo Rama Cement Ltd.	• Set up a slag-cement production factory with a capacity of 1 million tons per year by using blast furnace slag from a nearby iron and steel plant	Implemented
Sunflag Iron and Steel Co. Ltd.	• Install a waste heat recovery boiler and fluidized bed boiler to utilize waste heat and coal fines	Implemented
Sree Rayalaseema Alkalies and Allied Chemicals Ltd.	• Modernize the caustic soda plant • Installing a salt unloading system • Set up a caustic flakes fusion plant	Implemented Implemented Implemented
Madras Fertilizers Ltd.	• Implement an integrated scheme for modernization of NPK, urea, and ammonia production	Implemented
EID Parry (India) Ltd	• Install a bagasse-based power and heat cogeneration plant of 24.5 MW	Implemented

cm = centimeter, MW = megawatt, NPK = nitrogen/phosphorus/potassium (short name for a compound fertilizer).
Source: Operations Evaluation Mission.

C. Cost and Scheduling

22. The OEM was unable to confirm the costs for each subproject due to the difficulty in obtaining survey data from the subborrowers.[23] The PCR reported that the total cost of the Project was Rs36.07 billion. ADB loan disbursements of $149.98 million[24] accounted for 14.1% of the project cost, while the subborrowers contributed 34.4% in the form of equity investment or internal accruals. The percentage of ADB financing suggests that the subprojects had low foreign exchange requirements. Loans from domestic banks financed the remaining 51.5% of the project cost. Table 3 provides a summary of subproject financing.

[23] Only eight of 26 subborrowers responded to the questionnaire, which omitted much key information regarding project costs and benefits.
[24] This excludes $20,000 charged against the loan for the recovery of a portion of the project preparatory TA.

Table 3: Summary of Subproject Financing

S. NO.	Subloan No.	Subloan Borrowers	Equity/Internal Accruals /Promoters Contribution		ADB's contribution			Other Loans		Total
					Committed	Disbursed	Contribution			
			(Rs mn)	(%)	(Rs mn)		(%)	(Rs mn)	(%)	(Rs mn)
1	014	Associated Cement Company - Sindri	180.00	50.30	81.25	81.25	22.70	96.75	27.00	358.00
2	017	Associated Cement Companies Ltd.	850.00	41.00	937.00	937.00	46.00	263.00	13.00	2,050.00
3	015	Associated Cement Company - Lakheri	180.00	44.40	143.40	143.40	35.40	81.60	20.20	405.00
4	030	Aunoday Mills Ltd.	100.00	30.30	61.00	61.00	18.48	169.00	51.21	330.00
5	016	Bajaj Hindustan Ltd.	92.50	50.00	92.50	92.50	50.00	-	-	185.00
6	008	Balrampur Chini Mills Ltd.	150.00	34.40	217.60	217.60	50.00	67.70	15.60	435.30
7	003	Bellary Steel and Alloys Ltd.	110.00	26.83	203.95	203.95	49.74	96.05	23.43	410.00
8	013	DCW Ltd.	115.00	25.00	197.15	197.15	43.00	147.85	32.00	460.00
9	002	EID Parry (India) Ltd.	232.00	31.00	371.65	371.65	49.50	146.35	19.50	750.00
10	031	Godavari Sugar Mills Ltd.	291.00	26.94	57.00	57.00	5.28	732.00	67.78	1,080.00
11	019	Gujarat Alkalies and Chemicals Ltd.	1,750.00	55.00	641.30	641.30	20.00	788.70	25.00	3,180.00
12	027	Indo Rama Cement Ltd.	500.00	33.33	250.00	250.00	16.67	750.00	50.00	1,500.00
13	006	Kanoria Sugar and General Manufacturing	22.00	12.90	85.00	85.00	50.00	63.00	37.10	170.00
14	005	Kothari Sugars and Chemicals Ltd.	90.00	25.50	63.00	63.00	17.80	200.00	56.70	353.00
15	004	Madras Fertilizers Ltd.	1,210.00	26.00	250.00	250.00	6.00	3,040.00	68.00	4,500.00
16	021	Oswal Chemicals and Fertilizers Ltd.	5,260.00	33.00	250.00	250.00	2.00	10,290.00	65.00	15,800.00
17	026	Oudh Sugar Mills Ltd.	55.00	11.46	63.03	63.03	13.13	361.97	75.41	480.00
18	029	Sintex Industries Ltd.	116.50	25.00	249.70	249.70	53.50	100.30	21.50	466.50
19	009	Sree Rayalaseema Alkalies & Allied Chemicals	99.25	25.40	216.75	216.75	55.60	74.00	19.00	390.00
20	024	Star Paper Mills Ltd.	315.00	35.60	129.80	129.80	14.70	440.20	49.70	885.00
21	023	Sun Paper Mills Ltd.	95.00	40.00	106.65	106.65	45.40	33.35	14.60	235.00
22	022	Sunflag Iron and Steel Company Ltd.	111.15	24.00	188.85	188.85	41.00	161.30	35.00	461.30
23	001	Swadeshi Mills Co. Ltd.	12.50	25.00	36.50	36.50	73.00	1.00	2.00	50.00
24	025	Tulsipur Sugar Company Ltd.	315.00	52.10	134.20	134.20	22.20	155.80	25.70	605.00
25	010	Upper Ganges Sugar and Industries Ltd.	160.50	31.40	47.20	47.20	9.20	302.80	59.30	510.50
26	011	Yash Papers Ltd.	4.80	26.20	9.15	9.15	50.00	4.35	23.80	18.30
		Total	12,417.20	34.43	5,083.63	5,083.63	14.09	18,567.07	51.48	36,067.90

td. = Limited, mn = million, No. = number, and Rs = Indian Rupees.
Source: Asian Development Bank's Project Completion Report.

23. During interactions with the representative from Gujarat Alkalies and Chemicals Ltd., the OEM found that ADB's records showed a disbursed loan amount of Rs641.3 million (or $17.09 million) for the subproject with a total project cost of Rs3,180 million. However, the subborrower's record showed a loan of only $2.5 million from ADB.[25] After checking its records, IDBI confirmed that $17.09 million was disbursed under the ADB loan against this subproject. Since IDBI already had financing agreements with Gujarat Alkalies and Chemicals Ltd. for the subproject before applying for loan proceeds under the Project, a separate subloan agreement between IDBI and Gujarat Alkalies and Chemicals Ltd for ADB funds did not exist. ADB funds were used to reimburse expenditures incurred before ADB's approval. The $2.5 million loan shown in the subborrower's record represented a portion of the entire loan from IDBI, for which IDBI gave a 0.5% reduction in the interest rate. As far as the subborrower was concerned, ADB provided local currency financing of $2.5 million equivalent for the subproject to replace part of

[25] To this effect, the subborrower provided the OEM a copy of an IDBI letter dated 26 June 2000.

the IDBI loan with the benefit of a 0.5% concession on the original interest rate charged by IDBI. Similar cases might be found in other subprojects.[26]

24. ADB approved the loan on 13 December 1994. It became effective on 28 July 1995, a month later than the proposed date of loan effectiveness. The termination date for ADB commitments of loan proceeds was extended three times from 28 July 1997 to 31 December 1999. The loan was closed on 27 September 2000, 2 months later than the original closing date. During the initial 18 months of project implementation, subproject approvals and loan disbursements were much slower than envisaged. By the end of 1996, only nine subprojects were approved for ADB financing totaling $38.6 million, and only $19.42 million was disbursed. The main reasons for the slow pace of commitment and disbursement included (i) lower-than-expected demand for ADB funds, (ii) frequent changes of the project management team at IDBI, and (iii) IDBI's difficulties in following ADB disbursement procedures. In response to these issues, IDBI took steps to market the loan and relax some selection criteria (para. 15). ADB, meanwhile, simplified disbursement procedures so that (i) the statement of expenditure (SOE) limit was increased from $500,000 (per the subloan agreement) to $5 million; (ii) copies of the contract, invoice, and receipt were not required to be attached when preparing a withdrawal application for replenishment of the imprest fund, reimbursements for contract, or payment below the limit; (iii) retroactive financing would be allowed for IDBI's disbursement within 90 days of the submission of the subloan application to ADB; and (iv) IDBI had to ensure that subborrowers maintained records of all expenses financed under the Project for at least one year after loan closing. Although these measures resolved the implementation delays, the quality of subproject selection and ADB supervision were undermined somewhat (para. 28).

D. Procurement and Construction

25. Under the LA, procurement of ADB-financed equipment for the Project would be done in accordance with the ADB's *Guidelines for Procurement* applicable to credit lines to development finance institutions. Each subborrower would be responsible for its own procurement. IDBI would ensure that the procurement procedures adopted by the subborrowers were appropriate in the respective circumstances, and that the goods and services to be financed by subloans were produced by and procured in ADB member countries. The PCR did not report any issues regarding procurement and construction. Further, representatives of IDBI and the subborrowers who met with the OEM did not highlight any procurement- or construction-related problems.

26. During the plant visit to EID Parry (India) Ltd., the OEM found that a steam turbine generator was imported from what was then Czechoslovakia, while all other equipment was manufactured locally. Since equipment from nonmember countries of ADB is not eligible for ADB financing, the OEM was told that the generator was financed by alternative sources. However, the OEM was not able to obtain from the subborrower a cost breakdown of all equipment imported and locally procured under the subproject. A similar case was found during the plant visit to Sunflag Iron and Steel Company Ltd.

[26] During the plant visit to Sintex Industries Ltd., the OEM was informed that a reduction of 0.5% in the interest rate was applied to the first disbursement made under the original IDBI loan. For the subborrower, only this portion of the IDBI financing was converted to the ADB loan to avail of the reduced interest rate.

E. Organization and Management

27. IDBI was established in July 1964 as a wholly owned subsidiary of the Reserve Bank of India. Over the past 40 years, IDBI has been constantly reforming—from a development financial institution to, most recently, a commercial bank. A board of directors manages IDBI in accordance with the provisions of the IDBI Act of 1964. The current board comprises 10 directors, of whom nine are independent nonexecutive directors. In addition to appointing the chairman and managing director, the Government nominates as IDBI directors two officials and three persons with special knowledge and professional experience. The other four directors are elected by the shareholders, excluding the Government. The chairman and managing director are responsible for the day-to-day management of operations. A top management team, comprising executive directors and a legal adviser, provides support and expertise. With its head office in Mumbai, IDBI operates through a network of zonal offices (in Chennai, Guwahati, Kolkata, Mumbai, and New Delhi) and branch offices spread across the country.

28. IDBI's Technology Department initially handled project implementation management until those responsibilities were transferred to the new Venture Capital Department in 1996. A year later, IDBI handed project management over to the Foreign Exchange Service Department (FSD). However, FSD was not positioned well within IDBI to appraise projects, constraining its ability to select suitable candidates for the Project. FSD acted as the overall coordinator of the Project, providing a contact point between IDBI and ADB. Subprojects were processed and administered separately by the corporate financing departments (CFDs) in the relevant sectors. Since this additional task was outside the main priorities of the CFDs, this arrangement likely hindered the realization of the Project's full potential.[27] For example, many of the subprojects financed under the loan were part of ongoing expansion and/or modification schemes undertaken by the subproject entities. In cases where IDBI already had financing agreements with the enterprises concerned,[28] subloan agreements between IDBI and the respective subborrowers for ADB funds were lacking. As a result, the subborrowers were unaware of their obligations to ADB. ADB funds were used to reimburse expenditures incurred before ADB reviewed the subproject. Although this resulted in relatively faster disbursement of ADB funds, project selection and assessment became a repackaging exercise, and project monitoring became superficial.[29] In an extreme case, the subproject for Upper Ganges Sugar and Industries Ltd. was submitted for ADB review about 2 years after completion.

29. The steering committee that had been envisaged for the Project at appraisal was not formed, and DIPP was not actively involved in project implementation, according to IDBI.[30] However, ADB review missions fielded in November 1996 and December 1997 reported that an interministerial steering committee was established in June 1995. The available project files do not show any evidence of DIPP involvement in the Project, or the existence of the steering committee. In coordination with IDBI, DIPP was to provide ADB with reports on project benefit monitoring and evaluation during the first 5 years of full operation of each subproject. The project file does not contain any record that DIPP submitted those reports as required (para.12).

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[27] Under TA 2403-IND (footnote 5), the consultant report noted that the officers in CFDs were more comfortable dealing with normal finance schemes. Generally, they resisted taking up new schemes for which the primary responsibility lies with other departments. Moreover, if the loan amount is small compared to the normal project finance schemes, implementation of such a scheme carries another disincentive.

[28] INRM informed the OEM that IDBI should amend the loan agreements to include specific clauses with ADB requirements. However, IDBI and/or the subborrowers did not mention such amendments to the OEM, and they were not documented in project files.

[29] All subprojects visited by the OEM were approved by ADB after the start of implementation.

[30] The PCR noted that DIPP convened few meetings. During the OEM, DIPP declined INRM's request for a meeting.

30. IDBI did not comply fully with the covenants in the LA. Status of compliance with major loan covenants is provided in Appendix 12 of the PCR. The OEM found a few cases of noncompliance that were not reported in the PCR or are worth highlighting:

(i) Paragraph 3, Schedule 4 of LA: "IDBI shall not select and appraise any greenfield investment or any expansion project, but shall use the proceeds of the Loan [*sic*] for promoting energy efficiency in ongoing industrial enterprises." However, the OEM found that at least one greenfield subproject was financed under the loan (para. 17).[31]

(ii) Paragraph 8, Schedule 4 of LA: "In respect of each qualified project, IDBI shall summit to ADB for review on an ex post facto basis a short report, checklist, initial environmental examination, environmental impact assessment, or their summaries." Such information was not found in project files for any of the subprojects.[32]

(iii) Paragraph 11, Schedule 4 of LA: "IDBI will provide to the Department of Industrial Development (DID), benefit monitoring and evaluation reports relating to each qualified project during the first five [*sic*] years of its full operation, to enable an evaluation to be made of the benefits of each qualified project, including an assessment of the energy efficiency achieved and compliance with applicable environmental standards." IDBI representatives informed the OEM that IDBI had few communications with DID/DIPP during project implementation.

(iv) Paragraph 12, Schedule 4 of LA: "To monitor the actual realization of the targeted energy efficiency for each qualified project, each year, IDBI should submit information on actual energy savings for completed qualified projects in the quarterly reports to be submitted to ADB under Section 5.05 of the LA." While no such information was found in ADB project files, IDBI provided the OEM with energy efficiency auditing reports for four subprojects.

(v) Paragraph 17, Schedule 4 of LA: "IDBI will, pending repayment to ADB, cause all funds received from the repayment of principal of the subloans, to be used as a revolving fund to provide further financing for energy-efficient projects to qualified enterprises." This requirement was not met as of September 2004, although most subborrowers had repaid the subloans in accordance with the repayment schedules. Some even prepaid the full amount to take advantage of the lower domestic lending rates in the past few years.[33]

31. In light of these compliance issues, the implementation arrangements for the Project and the covenants stipulated in the LA were considered ineffective in delivering the intended project results. This resulted partly from (i) inadequate analysis at the project design stage of the issues to be addressed, and the readiness of candidate subprojects, (ii) lack of clarity and consistency in the RRP and LA on project scope; (iii) inappropriate assessments of institutional constraints in the Government and IDBI; and (iv) limitations of ADB lending products in accommodating this type of investment project (para. 15).

[31] Determining whether the seven expansion subprojects financed under the loan met the criteria, as referred to in the minutes of loan negotiation, is made difficult by the lack of clarity in definitions.

[32] INRM informed the OEM that, as part of project monitoring and progress reporting exercise, IDBI should prepare and submit to ADB summary statements on the subprojects' compliance with environmental safeguard requirements. Such information was not found in project files for any of the subprojects.

[33] The average long-term prime rate that IDBI charged its borrowers dropped from 16.8% in 1996 to 9.9% in 2003.

III. ACHIEVEMENT OF PROJECT PURPOSE

A. Operational Performance

32. Based on plant visits and interviews with representatives of subborrowers, the OEM concluded that subprojects financed under the loan, to a large extent, were performing well operationally at the time of the Mission. Only 2 of the 26 subprojects implemented had been suspended (para. 20). The operational performance of the subprojects visited by OEM—in terms of outputs, energy efficiency improvement, and environmental benefits—are presented in Appendix 2. The results are summarized in paras. 33–48.

1. EID Parry (India) Ltd.

33. The subproject was to replace the inefficient boilers and turbines of the captive power plant using bagasse as fuel. The power generation was expected to rise from 8.5 megawatts (MW) to 24.5 MW after implementation of the subproject. In addition to meeting the power requirement for its own sugar production, the plant would sell any excess power generated to the grid. The subproject was implemented successfully. The power plant has operated satisfactorily since its commencement in May 1997.

34. The OEM was informed that energy efficiency of the power plant, as measured by the increase in power generation for the same levels of bagasse input, had improved. By adding electrostatic precipitators in the boilers, the particulate emissions were reduced. However, data on the energy efficiency achievement and environmental improvement was not available.

2. Madras Fertilizers Ltd.

35. The subproject was a minor part of an integrated expansion and modernization scheme to enhance the production capacity of ammonia, urea, and nitrogen/phosphorus/potassium (NPK) fertilizers. Energy efficiency was not the main objective. During the site visit, the plant had been shut down for annual maintenance. Plant officials had trouble demarcating specific items covered by ADB funding. The whole scheme, which was implemented over 6 years, became fully operational only in 2002 due to technical problems.

36. The annual reports of Madras Fertilizers Ltd. stated that energy intensity for ammonia production, in terms of tons of oil equivalent (toe) per ton of ammonia output, was reduced by 19.4% from 1997 to 2002. During the same period, however, energy intensities for urea and NPK production increased by 4.4% and 71.7%, respectively. Due to its poor financial performance, the subborrower has been unable to make any loan repayments to IDBI. Currently, the subborrower is negotiating a debt restructuring with IDBI and other lenders.

3. Indo Rama Cement Ltd.

37. The subproject was to set up a new slag-cement factory with a capacity of 1 million tons per year by utilizing blast furnace slag produced from a nearby iron and steel plant. Implementation of the subproject started in 1997, 2 years before ADB's approval. The subproject was completed, as envisaged, in June 1999. However, the plant did not start commercial operation until July 2000, when the slag became available from the iron and steel plant. Since then, the plant has been operating satisfactorily at full capacity. The OEM found the production facilities well maintained.

38. The main feature of the subproject was the utilization of waste slag, instead of clinker, as raw material for cement production. For every ton of cement produced, 0.5 ton of clinker would be saved. This would reduce electricity consumption in cement production from 90 kilowatt-hours (kWh) per ton to 35 kWh/ton. With annual cement production of 1 million tons, the subproject would have consumed 55 gigawatt-hours (GWh) more electricity per year if clinker were used as raw material.

39. The environmental benefits of the subproject were derived mainly from (i) the productive use of 500,000 tons of waste slag per year, which otherwise would require a large land area for disposal and would cause serious environmental pollution; and (ii) a 15% reduction of carbon dioxide (CO_2) emissions from cement production in India compared to the national average. Indo Rama Cement Ltd. is exploring certified emission reduction trading with Norway.

4. Sree Rayalseema Alkalies and Allied Chemicals Limited

40. The subproject had two main purposes. First, it was to modernize a caustic soda plant by replacing 14 electrolyzers, which would arrest the loss of production of 3,300 tons of soda per year and result in power savings of 19%. Second, the subproject was to set up a caustic flakes fusion plant, which would reduce the transportation cost of caustic lye by 50%. The subproject was implemented successfully, and completed in December 1996. The equipment and auxiliaries installed are well maintained.

41. The OEM was informed that lower energy intensity for manufacturing caustic soda would reduce pollution. The conversion of caustic soda into flakes would lower fuel usage for transportation per unit of output, which also would have a positive impact on the environment. However, no data was readily available on the energy savings and environmental benefits achieved.

5. Sintex Industries Ltd.

42. The subproject was to modernize the textile production facilities from batch process to continuous process, and to replace narrow-width looms with wider rapier looms. The subproject was implemented as planned, and successfully completed in June 2000. The equipment installed is in good operating condition.

43. Sintex's Energy Audit Report of March 2001 stated that the subproject saved 34% in power and 33.5% in water, and reduced effluent generation by 32.8%. The subborrower prepaid the loan amount in full.

6. Star Paper Mills Ltd.

44. The subproject, as envisaged, was to modernize and expand the paper production capacity from 46,200 to 59,000 tons per year by rebuilding paper machines, installing a chemical recovery boiler for enhancing recovery of chemicals, and implementing additional steam generation and pollution-abatement measures. At the OEM, the subborrower informed the Mission that three schemes had been implemented under the Project: (i) the replacement of pneumatic chips blowing system with belt conveying system, (ii) the rehabilitation of the evaporator, and (iii) installation of a new recovery boiler.[34] The implementation of the subproject was started in 1995, 3 years before ADB approval, and was completed in September 1997.

[34] These schemes were not indicated in the original proposal for ADB approval.

45. The subborrower's main project objective was the modernization and expansion of production capacity. Baseline data on energy efficiency was unavailable for the three schemes before installation of equipment. However, the subborrower informed the OEM that all the ADB-funded schemes achieved considerable energy savings after implementation.

7. Sunflag Iron and Steel Company Ltd.

46. The subproject was to set up a 15 MW power plant by installing a waste heat recovery boiler and fluidized bed boiler, using sensible heat of flue gases, coal fines, and electrostatic precipitation dust from its production of sponge-iron. The implementation of the subproject started in 1995 and reached full operation by July 1998, 4 months before ADB approval of the subproject. The power plant and auxiliaries are maintained well and have been working satisfactorily.

47. The subproject's progress report submitted to IDBI in March 2001 stated that the power consumption per ton of steel produced increased from 1,000 kWh in 1998 to 1,100 kWh in 2000. However, the power purchased from the grid was reduced by 49.25%, which meant significant financial savings for the company from the cost difference between purchased and captive power, plus the sale of surplus power to the grid. Furthermore, about 128,000 cubic meters per hour of flue gases, which had been wasted, have been put to effective use. The waste products from the power plant are collected for the manufacture of bricks for the construction of buildings and roads.

8. Overall

48. Because IDBI did not set up a benefit monitoring and evaluation system for the Project (item (iii) in para. 30), the PPAR could not assess the energy efficiency achievements for the individual subprojects.[35] From the responses to the questionnaire and the annual reports, the OEM collected some relevant information for assessing energy efficiency improvements of subproject entities as a whole. Since most subprojects' proposals envisaged energy efficiency improvement of 18% or more for the whole plant, the use of findings for the whole plant as an indicator of subproject achievement in promoting energy efficiency was justified. Analyses of 11 such subproject entities, before and after the subproject, showed that reductions in energy consumption per unit of outputs varied between –18.4%[36] and 46.72% (Table 4). Four of the 11 subprojects analyzed achieved the energy efficiency improvement target of 18% or more. This relatively low improvement in energy efficiency reflected the fact that most ADB-financed subprojects were only a small part of much larger investments in the production process. The results also reflected the mismatch of primary project objectives among the subborrowers, IBDI, and ADB. While most subprojects might have achieved the subborrowers' objectives of capacity expansion and quality improvement, they were less successful regarding the primary project objective of promoting energy efficiency in the industrial sector.

[35] The PCR reported that 15 of the 17 schemes for which energy audit reports were available achieved the required energy efficiency improvements. The OEM was unable to find these energy audit reports in the project files at ADB, and obtained energy audit reports for only four subprojects from IDBI.

[36] In the case of Madras Fertilizers Ltd., the main reason for the deterioration in energy efficiency was the abnormal operational conditions resulting from technical problems, frequent interruptions of power supply, and severe drought in the region in the past 3 years.

Table 4: Energy Efficiency Improvements

Subborrowers	Energy Efficiency Achieved (%)
Madras Fertilizers Ltd.	(18.40)
Upper Ganges Sugar and Industries Ltd.	0.64
Sree Rayalaseema Alkakies and Allied Chemical Ltd.	2.06
EDI Parry (India) Ltd.	6.97
Associated Cement Companies Ltd.	9.32
Yash Papers Ltd.	11.40
Sintex Industries Ltd.	13.62
Oudh Sugar Mills Ltd.	18.99
Indo Rama Cement Ltd.	22.98
Sunflag Iron and Steel Co. Ltd.	26.21
Star Paper Mills Ltd.	46.72

Source: Annual reports and/or energy audit reports of the subborrowers.

B. Performance of the Operating Entity

49. The financial performances of nine subproject entities for which annual reports were available for the period under review were analyzed. Financial highlights of the nine subproject entities are presented in Appendix 3. Some key financial indicators for these entities are given in Table 5.

Table 5: Financial Performance of Selected Subproject Entities

Item	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03
Associated Cement Companies Ltd.						
Return on Equity (%)	1.35	7.44	(5.19)	7.68	16.32	11.22
Debt Service Ratio	0.03	0.17	(0.10)	0.16	0.32	0.19
Debt-Equity Ratio	1.46	1.37	1.27	1.44	1.48	1.30
Gujarat Alkalies and Chemicals Ltd.						
Return on Equity (%)	0.29	(3.79)	(17.49)	(9.0)	(12.45)	8.8
Debt Service Ratio	0.01	(0.10)	(0.42)	(0.29)	(0.37)	0.39
Debt-Equity Ratio	2.13	2.43	2.31	2.70	3.14	2.78
Kothari Sugars and Chemicals Ltd.						
Return on Equity (%)	—	(99.16)	(77.84)	(45.30)	(44.89)	—
Debt Service Ratio	—	(2.61)	(1.24)	(0.60)	(0.61)	—
Debt-Equity Ratio	—	3.69	4.19	4.4	4.79	—
Madras Fertilizers Ltd.						
Return on Equity (%)	(31.43)	(4.04)	3.62	(16.95)	(37.38)	4.36
Debt Service Ratio	(0.15)	(0.02)	0.01	(0.06)	(0.43)	0.03
Debt-Equity Ratio	4.08	4.6	4.6	4.78	4.13	4.06
Sun Paper Mills Ltd.						
Return on Equity (%)	9.62	6.35	(20.11)	6.52	(18.47)	14.48
Debt Service Ratio	—	0.21	(0.47)	0.13	0.32	0.36
Debt-Equity Ratio	1.21	1.21	1.52	1.47	1.59	1.23

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Continued

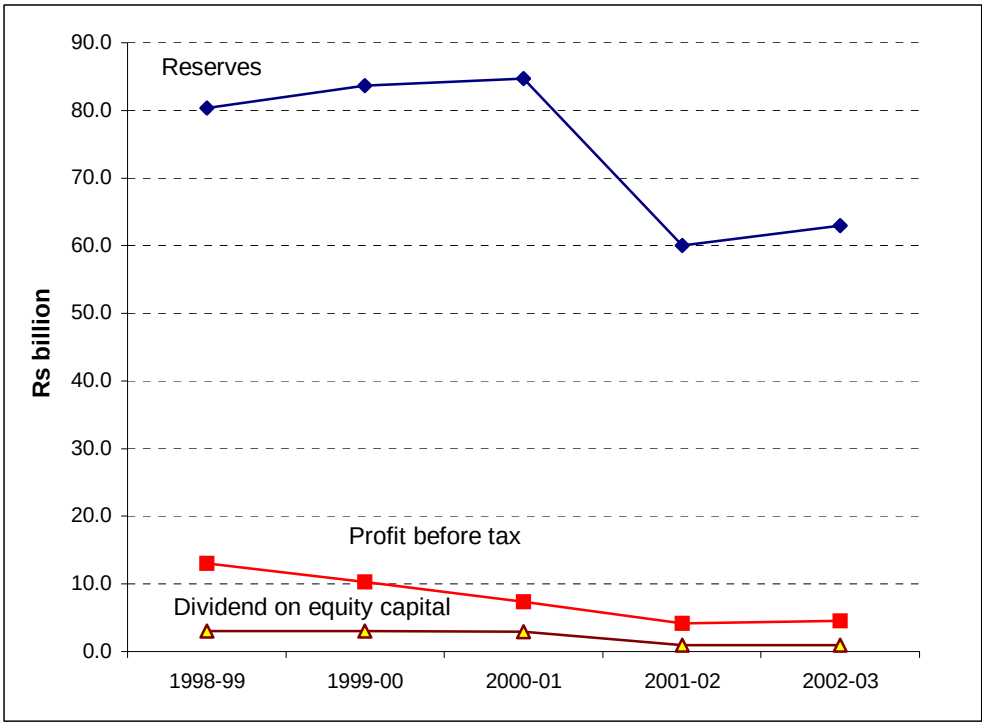
Item	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03
Star Paper Mills Ltd.						
Return on Equity (%)	1.35	(9.65)	(2.89)	9.31	2.49	4.17
Debt Service Ratio	0.08	(0.47)	(0.16)	0.54	0.25	0.37
Debt-Equity Ratio	0.38	0.65	0.88	0.75	0.63	0.59
Sunflag Iron and Steel Co. Ltd						
Return on Equity (%)	—	(24.19)	4.83	5.78	4.72	3.44
Debt Service Ratio	—	0.77	1.24	1.15	0.77	0.68
Debt-Equity Ratio	—	1.67	1.45	1.20	0.99	0.87
Upper Ganges Sugar and Industries Ltd.						
Return on Equity (%)	11.43	13.17	3.91	3.14	(8.04)	(13.03)
Debt Service Ratio	0.29	0.25	0.20	0.11	(0.15)	(0.20)
Debt-Equity Ratio	1.82	1.58	1.64	2.28	3.69	3.38
Yash Papers Ltd.						
Return on Equity (%)	0.84	2.54	6.49	9.12	10.62	21.92
Debt Service Ratio	0.07	0.18	0.49	0.64	1.14	1.12
Debt-Equity Ratio	0.76	0.69	0.70	0.72	0.48	0.50

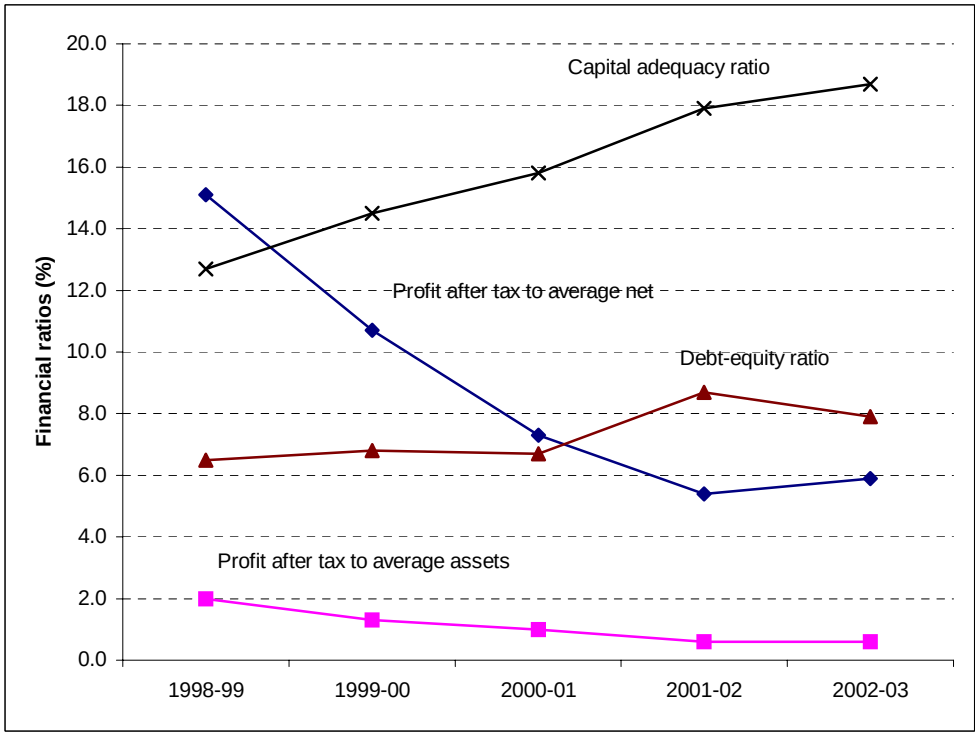
— = not available, 1997/98 = fiscal year of IDBI starting from 1 April 1997 and ending on 31 March 1998.
Source: Annual reports of the subborrowers concerned.

50. The results show that only Yash Papers Ltd. performed well financially over the period under review. Its return on equity increased steadily from 0.84% in 1997/98 to 21.92% in 2002/03. However, Yash Papers was unable to maintain a debt service ratio of at least 1.5, as required in the LA covenants. The other subproject entities encountered financial problems, and showed losses from time to time. Gujarat Alkalies and Chemicals Ltd., Kothari Sugars and Chemicals Ltd., and Madras Fertilizers Ltd. ran at a loss for most years between 1997/98 and 2002/03. The covenanted debt service and debt-equity ratios were not complied with in most of these cases. The reasons given in the annual reports for the poor financial performances of these entities included the sluggish market, lower-than-expected selling prices of products, higher-than-expected costs of raw materials, and severe drought in major sugarcane producing areas.

51. IDBI's financial position has been weakening over the past 5 years. Its profit before tax decreased from Rs13 billion in 1998/99 to Rs4.6 billion in 2002/03. The ratio of after-tax profit to average net worth dropped from 15.1% to 5.9% in the same period, while the debt-equity ratio increased from 6.5 to 7.9 (Figure 1).

Figure1: Key Financial Indicators of Industrial Development Bank of India





Source: Annual reports of Industrial Development Bank of India.

C. Financial and Economic Reevaluation

52. Since most of the ADB-financed subprojects were only small parts of much bigger investment schemes, the benefits attributable to ADB financing are difficult to define and measure. During the plant visits, the OEM unsuccessfully tried to verify the actual costs of the subprojects. In many cases, the subproject entities could not identify which equipment, or which part of the scheme, was financed with ADB funds. Without reliable data on costs and benefits, financial and economic reevaluation of the subprojects, and the Project, were neither feasible nor meaningful.

D. Sustainability

53. The sustainability of the 24 successfully implemented subprojects depends largely on proper maintenance of the facilities installed, and the sound financial performance of the subproject entities. Most subproject facilities visited by the OEM were maintained well. The main concern for long-term sustainability comes from the relatively weak financial health of subproject entities, as shown in Table 5. IDBI reported that (i) 4 subborrowers (Madras Fertilizer Ltd., Kothari Sugars and Chemcials Ltd., Bellary Steels and Alloys Ltd., and Swadeshi Mills Co. Ltd.) rescheduled their loan repayments; (ii) 5 subborrowers (Associated Cement Companies Ltd., DCW Ltd., EID Parry [India] Ltd., Sintex Industries Ltd., and Gujarat Alkalies and Chemicals Ltd.) repaid their subloans in full; and (iii) the 17 other subborrowers were on schedule with their loan repayments. Despite the generally satisfactory repayment status, the poor financial performance of subproject entities (para. 50) put the sustainability of the related subprojects at risk. However, the failure of a few subprojects and the weak financial performances of some subproject entities do not endanger the sustainability of the Project as a whole necessarily.

E. Related Technical Assistance

54. At the request of the Government during appraisal and loan negotiation, ADB approved TA2403-IND (footnote 5) in September 1995 to improve IDBI's capabilities in identifying, appraising, and implementing energy efficiency and environment projects. TA implementation did not start until January 1997, about 18 months after loan approval.[37] Due to the late start, the TA did not develop and implement an appropriate energy efficiency and environmental impact analysis for subproject selection and appraisal under the Project, as envisaged in the TA scope. The TA produced a report on the IDBI institutional structure and lending processes, plus 10 sector reports on the technological status of the industry, energy use and conservation potential, costs and benefits of energy efficiency, and environmental concerns. IDBI considered the procedures recommended by the TA for identifying and assessing energy efficiency projects unpractical. As such, they have not been incorporated into IDBI's business processes. The impact of the TA would have been more pronounced had the TA started before project implementation. Overall, the TA was assessed as unsuccessful.

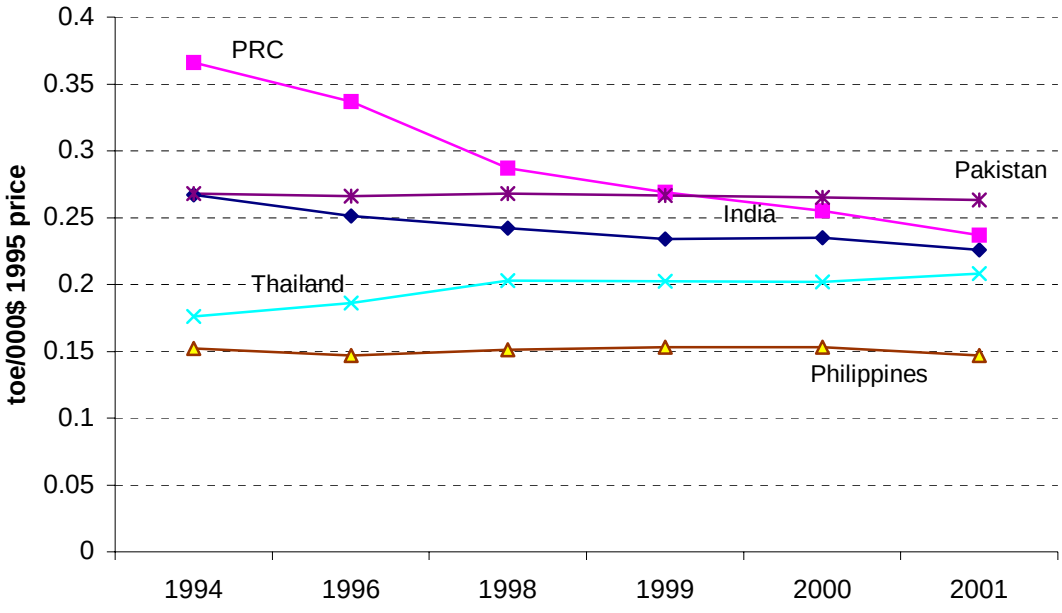
[37] The reason for ADB's late approval of the TA, and the delayed TA implementation, was not documented in the available files.

IV. ACHIEVEMENT OF OTHER DEVELOPMENT IMPACTS

A. Socioeconomic Impact

55. Since a majority of the subprojects were implemented within the premises of existing facilities, and involved mainly upgrading technology and equipment, the socioeconomic impact of the Project per se was limited. A review of energy intensities for India and several other countries in the region, in terms of toe/$1,000 of gross domestic product, showed that energy intensities in India and the People's Republic of China dropped by 15.4% and 35.3%, respectively, between 1994 and 2001. For Pakistan and the Philippines, energy intensities remained almost unchanged at around 0.27 toe/$1000 and 0.15 toe/$1000, respectively, during the same period. For Thailand, energy intensity increased from 0.17 toe/$1000 in 1994 to 0.21 toe/$1000 in 2001 (Figure 2). However, the link between the Project and the energy efficiency improvements in the country is unclear.

Figure 2: Energy Intensities in Selected Asian Countries



PRC = People's Republic of China, and toe = ton of oil equivalent.
Source: *World Development Indicators 2002*, World Bank.

B. Environmental Impact

56. Environmental improvement was not the primary objective of any subproject under the loan. However, improvement in energy efficiency undoubtedly leads to reductions in the emission of greenhouse gases. This is also true for some of the captive power subprojects financed under the loan. An INRM memo, dated 30 July 1999, reported that most of these

power subprojects had installed a combination of abatement equipment, such as bag filters, fly ash catchers, and electrostatic precipitators.

57. Ten of the 26 approved subprojects were intended for power generation. Six of them reported using surplus heat or bagasse as fuels, 3 used fossil energy for steam and power cogeneration, and 1 was a pure captive power plant using fossil fuel. The six subprojects using bagasse and surplus heat as fuels have a combined installed capacity of about 200 MW (Appendix 1), according to information collected during the OEM. Assuming a plant factor of 50%, and the use of no fossil fuels for these generation capacities, these 6 power plants will generate about 1,000 GWh of electricity per year. That will save about 450,000 tons of coal equivalent energy for the country.[38] An analysis by Ohio Supercomputer Center in 2003[39] concluded that a coal-fired power plant in India would emit on average about 0.8 kilogram (kg) per kWh of CO_2, 7.4 grams (g)/kWh of SO_2, and 6.2 g/kWh of NOx. Thus, 1,000 GWh of electricity generated from bagasse and surplus heat would translate into emission mitigation of 800,000 tons of CO_2, 7,400 tons of SO_2, and 6,200 tons of NOx.

58. In the case of Indo Rama Cement Ltd., the subproject was to build a new cement plant using slag from an adjacent iron and steel plant. If the cement plant were not developed, the slag—a by-product from the iron and steel plant—would pile up at a rate of 500,000 tons per year, causing considerable damage to the environment. In addition, Indo Rama Cement Ltd. reported that its cement production using slag is more energy efficient than the average cement production in India. As a result, CO_2 emissions per ton of cement output are about 15% less than the national average. The subproject entity is entitled to apply for CO_2 emission reduction credit under the United Nations Framework Convention on Climate Change. Indo Rama Cement Ltd. is considering trading the CO_2 emission reduction credits with Norway. However, a greenfield project of this kind, by design, was not eligible for ADB financing under the Project.

C. Impact on Institutions and Policy

59. Although an appropriate policy and institutional framework was considered important at appraisal for achieving the project objectives, the original project scope did not include a policy or institutional component. Under the LA, the Government only was required to inform ADB about progress on price liberalization policies for energy inputs and products of industrial enterprises, enterprise reforms in the public sector, and other measures introduced to encourage energy efficiency and improve energy management. Therefore, the Project's direct impact on policy was minimal. With regard to institutional impacts, the Project did not appear to offer any specialized energy efficiency services that were not available through IDBI's normal term lending instruments. The advisory TA (para. 54) also did not achieve its objective of improving IDBI's capabilities in identifying, appraising, and implementing energy efficiency and environment projects. However, in the past 10 years, several policy changes have been implemented independent of the Project (paras. 60–61).

60. Before 1995, significant policy measures concerning energy efficiency pertained to the disclosure of energy consumption and efficiency activity by every manufacturing company in the *Company Directors' Annual Report*, and the accelerated depreciation allowance for certain specified energy efficiency and pollution control equipment. These policies continue to be in

[38] It is reasonable to assume that primary energy consumption in a thermal power plant in India is about 450 grams of coal equivalent per kWh.

[39] Ohio Supercomputer Center. 2003. *Anthropogenic Emissions from Energy Activities in India: Generation and Source Characterization*.

effect. After the start of the Project in 1995, the enactment of the Energy Conservation Act (the Act), coupled with the establishment of the Bureau of Energy Efficiency in 2001, were major policy developments. Since then, a number of regulations to advance the objectives of the Act were put in place, including (i) the establishment of energy conservation norms, (ii) mandatory energy audits by accredited energy auditors by 2007, (iii) product standard and labeling with respect to energy efficiency, (iv) mandatory appointment of energy managers in industrial entities, and (v) penalty for noncompliance with the Act.

61. Linking domestic diesel prices to international prices and reducing the subsidy in 2003 was an important achievement in energy pricing reform. The Government continues to regulate and subsidize the prices for liquefied petroleum gas and kerosene. The price of natural gas was deregulated in September 1997. The prices of coking coal and high-grade non-coking coal were deregulated since 1996. However, the Government still controls the prices of lower-grade coal used almost exclusively for power generation. Among the industrial subsectors covered by the Project, prices of fertilizer and sugar are still regulated by the Government.

V. OVERALL ASSESSMENT

A. Relevance

62. At approval, the Project's goals and purposes were consistent with the high priority accorded to industrial energy efficiency in the Government's development strategy. The Project also was consistent with ADB's operational strategy for India at the time. The Project's objectives have remained highly relevant to the Government's development strategy, though they are less relevant to ADB's current operational strategy in India and its overarching strategic objective of poverty reduction. The design weaknesses identified in the report (paras. 15–18) suggest that the project design was not very relevant to the achievement of project outputs and objectives. Overall, the Project was assessed as partly relevant.

B. Efficacy

63. Most physical outputs of the Project were substantially achieved (paras. 19–21). However, project outcomes in terms of energy efficiency improvements (para. 48), and policy changes and institutional development, were not achieved fully. Despite the positive environmental benefits resulting from some of the subprojects, the Project failed to address sources of the market failure identified at appraisal. The subborrowers demand for the ADB loan was not as high as expected, and the revolving fund to provide additional financing for energy efficiency projects was not established. Overall, the Project was assessed as less efficacious.

C. Efficiency

64. Many of the subloans involved refinancing IDBI loans. ADB financing was only marginally incremental for most subprojects, and was not instrumental towards the achievement of project objectives. Overall, the Project was assessed as less efficient.

D. Sustainability

65. The operation and maintenance of most project facilities generally was satisfactory. The failure of a few subprojects, and the weak financial performances of some of the subproject entities studied (paras. 49–50), do not endanger the sustainability of the Project as a whole necessarily. Thus, the sustainability of the Project was considered likely.

E. Institutional Development and Other Impacts

66. The Project made little impact on the institutional development of IDBI and the subproject entities (para. 59). While the energy intensity of the country decreased between 1994 and 2000 (para. 55), the link between the project impacts and the reduction in energy intensity of the country was unclear. The institutional development and other impacts of the Project were assessed as negligible.

F. Overall Project Rating

67. On the basis of its relevance, efficacy, efficiency, sustainability, and institutional and other impacts, the Project was rated partly successful.

G. Assessment of Asian Development Bank and Borrower Performance

68. The performance of ADB and IDBI in project formulation, appraisal, and implementation was assessed as less than satisfactory. For ADB, this assessment reflected (i) design weaknesses at project formulation, particularly in excluding policy and institutional components; (ii) inadequate project supervision during implementation; and (iii) lack of benefit monitoring and evaluation after completion. Based on the back-to-office reports of review missions, ADB staff visited only eight of 26 subprojects during the review missions,[40] and the issues discussed focused mainly on the selection of new subprojects for approval. Available ADB files contain information only up to subproject approval. No documentation could be found on the implementation and completion of individual subprojects. For IDBI, this assessment reflected the frequent change of project implementation responsibility within IDBI (para. 28), FSD's difficulty in selecting and appraising suitable candidates for the Project, and noncompliance with major loan covenants (para. 30).

VI. ISSUES, LESSONS, AND FOLLOW-UP ACTIONS

A. Key Issues for the Future

69. India has made significant progress in reducing energy intensity. However, many more barriers and hurdles must be surmounted to progress further in energy efficiency. During the 1990s, energy costs as a percentage of production costs increased from 29% to 45% in the cement subsector; from 7% to 13% in the textile subsector; and from 14% to 25% in the pulp and paper subsector.[41] The potential energy savings in the Indian industrial sector are valued at

[40] The subprojects visited by the review missions were Gujarat Alkalies and Chemicals Ltd., Swadeshi Mills Ltd., Madras Fertilizers Ltd., EID Parry (India) Ltd., Shree Rayalaseema Alkalis and Allied Chemicals Ltd., Oswal Chemicals and Fertilizers Ltd., Bellary Steels and Alloys Ltd., and Indo Rama Cement Ltd.

[41] U. V. Krishna Mohan Rao. 2001. *Energy Audit and Management for Indian Industry*. New Delhi: The Institute of Chartered Accountants of India.

more than $200 million per year. Some key issues that need to be addressed to realize the gains associated with capturing this huge energy saving potential include the following:

(i) The Government still directly or indirectly subsidizes many energy inputs (para. 61). Energy prices do not reflect the full cost of energy supply. India is not making full use of market-based pricing signals to encourage industries to make the type of investments that are necessary to conserve energy and improve the energy efficiency of the economy. Pricing policies have a direct bearing on the viability of energy efficiency investments for the enterprises. Subsidized energy prices lead to inadequate investments in energy efficiency.

(ii) Top management teams of most enterprises focus on product outputs, commercial competitiveness, quality, and profitability. They rarely focus on energy efficiency. Responsibility for energy efficiency often is given to the maintenance and/or electrical managers. As a result, energy efficiency investments, and the adoption of new energy-efficient technologies, are given secondary priority in most companies. A clear analysis of the positive impact of energy efficiency investments on company profitability is required to change this priority.

(iii) For many industries, second-hand plant and/or equipment have been imported. While this may be a rational way to lower the capital cost of the investment, the unintended result is the use of outdated technologies in terms of energy efficiency. Energy inefficiencies often are transferred from one plant to another as inefficient equipment is removed from one factory and usually resold for installation in another. Energy conservation norms for the industries need to be developed that make commercial sense.

70. In light of the importance the Government attaches to further improvements in energy efficiency, the PCR and the Country Assistance Plan for India (2001–2003) proposed a follow-up industrial energy efficiency project. However, the OEM does not believe that ADB should continue to be involved in this area due to (i) the less-than-satisfactory performance of the Project, (ii) the fact that the loan proceeds did not have a major impact on energy conservation, (iii) the initial difficulties disbursing the loan, and (iv) IDBI's lack of commitment to the establishment of the energy efficiency revolving fund. ADB did not play a catalytic role or have measurable development impact through this Project. Unless specific measures have been put in place to address the issues highlighted in this PPAR, ADB financing for a similar project in the future is not justified.

B. Lessons Identified

71. The statement of the project objective in the RRP did not specify how the objective was to be achieved. The RRP and LA lacked clarity and consistency on project scope and definitions of eligible subprojects. The RRP, LA, and minutes of the loan negotiations should be clear and consistent. For example, while greenfield investments should not be considered, capacity expansion within some upper limits should be allowed in energy efficiency projects. In the case of cogeneration schemes, the yardsticks for measuring the energy efficiency achievements seemed arbitrary and irrelevant. The logical framework under the project performance management system can be a useful tool in sorting out some of the weaknesses and inconsistencies in project formulation. It also provides the basis for the Government and ADB to monitor and evaluate the Project.

72. The relaxation of subproject selection criteria and simplification of disbursement procedures (para. 24) undermined the attainment of project objectives and goals to some extent. These measures might have been appropriate from IDBI's point of view to accelerate loan disbursements. However, they gave insufficient consideration to their impacts on project outcomes and the achievement of project objectives. As a consequence, project selection and assessment became a repackaging exercise; and the project scope, as implemented, deviated considerably from that envisaged at appraisal (para. 17). During the plant visits, most subborrowers told the OEM that the only benefit to them of switching to ADB funds was to avail of a 0.5% reduction in interest rate on loans that IDBI provided previously. The catalytic role of ADB financing in promoting energy efficiency at subproject level was reduced significantly. This unsatisfactory outcome highlights the need for more thorough and rigorous analysis of the demand for ADB financing during project preparation.

73. The simplification of disbursement procedures made the verification of project costs and expenditures difficult afterwards. Under the simplified procedures, copies of the contract, invoice, and receipt were not required to be attached to the withdrawal application for replenishment of the imprest fund, or for reimbursements for contracts, or payments below the $5 million limit. Subborrowers were required to maintain records of all expenses financed under the Project for only 1 year after the loan closing date. In the case of Gujarat Alkalies and Chemicals Ltd. (para. 23), the OEM was unable to check the itemized record of expenses financed under the Project to reconcile the disbursement gap between the records of ADB and IDBI and the subborrower. While ADB should simplify disbursement procedures and reduce related transaction costs, measures must be in place to ensure that ADB funds are used for the intended purposes. The executing agencies of financial intermediation loans should be required to provide ADB with the subloan agreement before the first disbursement for the respective subproject. As with project loans, the executing agencies should be required to maintain original receipts for all expenses financed under the ADB loan for at least 5 years after loan closing. Such measures are needed to ensure the presence of a strong trail for auditing, and that the funds are used for the purpose intended.

74. ADB's project monitoring and supervision were inadequate. The need for TA2403–IND later on suggests that IDBI lacked the full capabilities to undertake energy efficiency activities. In some cases, project supervision and monitoring became superficial (para. 28). The delegation of loan administration responsibilities to INRM did not improve ADB's project supervision noticeably. More effective arrangements for project monitoring and supervision should be in place before project implementation. Since the subprojects are scattered in nine states across the country, domestic consultants could have been engaged to visit each subproject at least once during implementation if INRM did not have the staff to do so. The OEM believes that visiting all subproject sites during project implementation is an essential part of the project administration.

75. Given the nature of energy efficiency activities and the considerable engineering industry capability in India, the capital cost of most investments would have a limited direct or indirect foreign exchange component. This explains, to some extent, why the ADB loan accounted for only about 14.1% of the project cost (para. 22). If domestic currency lending were available for commercially oriented public sector entities, the demand for ADB funds might have increased significantly. Although the project formulation had some weaknesses, the difficulty in disbursing the loan is a strong indicator that the loan proceeds were not competitive in the Indian financial sector. The transaction costs and financial terms were not attractive to subborrowers. Domestic currency lending was introduced for private sector projects in India after ADB's Indian rupee bond issue in February 2004. However, it is still not available to commercially oriented public

sector entities. Compared to commercial banks, ADB has not been innovative enough to develop a broader range of financial instruments to meet the needs of clients such as IDBI better.

C. Follow-Up Actions

76. After the OEM, INRM discussed with IDBI the establishment of a revolving fund. IDBI agreed to try to track the information required for the creation of the revolving fund. If it is unable to do so by the end of 2005, IDBI might consider prepayment of the loan to ADB.

OVERVIEW OF SUBPROJECTS

	Subproject Entities	Type of Industry	ADB Loan Amount ($ '000)	Scope of Subprojects		
				Modernization	Captive Power	Capacity Expansion
1	Swadeshi Mills Ltd.	Textile	535.1		Cogeneration using fossil fuel (2.6 MW and steam)	
2	EID Parry (India) Ltd.	Sugar & Fertilizers	7,681.2		Bagasse-based power generation (24.5 MW)	
3	Bellary Steel and Alloys Ltd.	Steel	5,122.5		Power generation using waste gases (12 MW)	
4	Madras Fertilizers Ltd.	Fertilizers	8,100.5	Modernization (NKP, urea & ammonia plants)		
5	Kothari Sugars and Chemicals Ltd.	Sugar	1,415.0		Bagasse-based power generation (12 MW)	
6	Kanoria Sugar and General Manufacturing Co. Ltd.	Sugar	1,098.0	Modernization and effluent treatment plant		
7	Balrampur Chini Mills	Sugar	6,112.9			Modernization cum expansion
8	Sree Rayalaseema Alkalies and Allied Chemicals Ltd.	Chemicals	6,283.0	Modernization of caustic soda plant		
9	Upper Ganges Sugar and Industries Ltd.	Sugar	3,599.1			Modernization & expansion
10	Yash Papers Ltd.	Paper	270.0	Modernization and upgrading of boiler		
11	DCW Ltd.	Chemicals	2,884.5	Modernization		
12	Associated Cement Companies Ltd. (Sindri)	Cement	2,722.8			Modernization cum expansion (convert wet process plant to dry process)
13	Associated Cement Companies Ltd. (Lakheri)	Cement	4,409.3			Modernization cum expansion (convert wet process plant to dry process)
14	Bajaj Hindustan Ltd.	Sugar	1,647.1	Installation of high-pressure boilers		
15	Associated Cement Companies Ltd. (Kymore)	Cement	26,005.3			Modernization cum expansion (convert wet process plant to dry process)

Continued on next page

Continued

	Subproject Entities	Type of Industry	ADB Loan Amount ($ '000)	Scope of Subprojects		
				Modernization	Captive Power	Capacity Expansion
16	Gujarat Alkalies and Chemicals Ltd.	Chemicals	17,089.4		Cogeneration with fossil fuel (95 MW and 60 tons per hour of steam)	
17	Oswal Chemicals & Fertilizers Ltd.	Chemicals & Fertilizers	22,386.0		Power generation using waste heat (110 MW)	
18	Sunflag Iron and Steel Co. Ltd.	Iron & Steel	5,371.0		Power generation using waste heat (15MW)	
19	Sun Paper Mills Ltd.	Paper	2,534.3		Cogeneration with fossil fuel (5.8 MW of power and 15.6 tons per hour of steam)	
20	Star Paper Mill Ltd.	Paper	3,502.2	Installation of chemical recovery boiler, and renovation of evaporator plant		
21	Tulsipur Sugar Company Ltd.	Sugar	3,433.8			Expansion of sugar production
22	Oudh Sugar Mills Ltd.	Sugar	3,946.9			Modernization cum expansion
23	Indo Rama Cement Ltd.	Cement	4,986.0			New cement production facility of 1 million ton per year
24	Sintex Industries Ltd.	Textiles & Plastics	6,160.5	Modernization from batch to continuous processes		
25	Arunoday Mills Ltd.	Textiles	1,385.6		Installation of a captive power plant (3.8 MW)	
26	Godavari Sugar Mills Ltd.	Sugar	1,296.8		Bagasse-based power generation (24 MW)	
	Subtotal		**149,978.9**	**8**	**10**	**8**

Ltd. = Limited, and MW = megawatt.
Source: Operations Evaluation Mission

REPORTS ON PLANT VISITS

A. Indo Rama Cement Ltd.

1. Project Scope

1. The subproject was to set up a new slag-cement factory with a capacity of 1 million tons per year by utilizing blast furnace slag produced from a nearby iron and steel plant. The project cost was estimated at Rs1.5 billion ($33.3 million). Before the Asian Development Bank's (ADB) approval of $4.99 million for the subproject in March 1999, financing for the proposed subproject was secured by a loan from the Industrial Development Bank of India (IDBI).

2. Project Implementation

2. Implementation of the subproject started in 1997, 2 years before ADB's approval. Completed in June 1999, the subproject did not start commercial operation until July 2000 when the slag became available from the iron and steel plant. Since then, the cement plant has operated at full capacity satisfactorily. The Operations Evaluation Mission (OEM) inspected the project site and found the production facilities well maintained.

3. Energy Efficiency Improvement and Environmental Benefit

3. The main feature of the subproject was the utilization of waste slag, instead of clinker, as raw material for cement production. For every ton of cement produced, 0.5 ton of clinker would be saved. This would reduce electricity consumption in cement production from 90 kilowatt-hours (kWh) per ton to 35 kWh/ton. With annual cement production of 1 million tons, the subproject would have consumed 55 gigawatt-hours (GWh) more electricity per year if clinker were used as raw material.

4. The environmental benefits of the subproject were derived mainly from (i) the productive use of 500,000 tons of waste slag per year, which otherwise would require a large land area for disposal and would cause serious environmental pollution; and (ii) a 15% reduction in carbon dioxide (CO_2) emissions from cement production in India compared to the national average. Indo Rama Cement Ltd. is exploring the possibility of certified emission reduction trading with Norway.

4. Issues of Concern

5. The subproject was a greenfield investment, rather than an energy efficiency undertaking in an existing facility. The acquisition of 62 acres of land and installation of new equipment were required for the subproject. Furthermore, the subproject was close to completion at the time of ADB approval, and ADB funds were used to replace IDBI's committed funding for the subproject. For Indo Rama, the only benefit of switching to ADB funds was a 0.5% reduction in interest compared to the loans previously provided by IDBI. Thus, the catalytic role of ADB financing in promoting energy efficiency at the project level was questionable.

B. Madras Fertilizers Ltd.

1. Project Scope

6. The subproject was a minor part of a massive integrated expansion-cum-modernization scheme, covering almost the entire fertilizer-manufacturing complex. The subschemes financed under the Project, which were primarily for enhancing operating capacities rather than energy savings, included:

(i). For ammonia production, the subproject envisaged replacing the primary reformer, carbon oxide shift converter, CO_2 removal system, methanator, syngas, and process air compressors, and adding a pre-converter and an S-50 converter in the synthesis loop. While saving energy, the production capacity was expected to rise from 750 to 1050 tons per day (tpd). The energy savings were expected to be about 5 million kilocalories (Mkcal) per ton of ammonia production—from 14–15 to 9–10 Mkcal/ton.

(ii) For urea production, reactors, concentrators, air exhaust systems and instrumentation system were to be replaced, increasing urea capacity from 885 to 1475 tpd.

(iii) For the compound fertilizer plant, the replacement of preneutraliser, slurry pumps, and ammonia feed system, as well as the addition of a pipe reactor in one of the trains, were to enhance the capacity from 1800 to 2200 tpd.

7. The total cost of the subschemes was estimated at Rs4,500 million, for which Madras Fertilizers Ltd. sought Rs250 million under the ADB loan. After the completion of the subproject, energy cost per unit of production for the manufacturing complex was expected to improve by 37.67%.

2. Project Implementation

8. Implementation of the modernization, expansion, and revamp scheme started in 1992, 4 years before ADB's approval in January 1996, with IDBI as the lead financial institution. Although the subproject was completed in March 1998, at a cost of Rs6,014.3 million, it did not become fully operational until 2002 due to technical problems. ADB's loan of Rs250 million ($8.10 million) for the subproject constituted 4.16% of the project costs.

9. During the site visit, the plant was shut down for annual maintenance. Plant officials had trouble demarcating specific items covered by ADB funding.

3. Energy Efficiency Improvement and Environmental Benefit

10. Energy efficiency improvements were limited in 1997–2003, according to the subborrower's annual reports. Energy intensity for ammonia production declined by 19.4% from 1.321 tons of oil equivalent (toe) per ton of output in 1996/97 (1996/97 starting from 1 April 1996 and ending on 31 March 1997) to 0.802 toe/ton in 2002/03. However, during the same period, energy intensities for urea and NPK production increased by 4.4% and 71.7%, respectively.

4. Issues of Concern

11. Madras Fertilizers Ltd. started implementing this subproject 4 years before ADB's review, meaning this was merely a repackaging exercise for appropriating a loan of Rs250

million equivalent from ADB. Energy efficiency improvements related to the subproject implemented with ADB funds were not quantified separately, or tracked and reported periodically. Policy changes, particularly in product pricing, constantly negated the subborrower's operations. A water shortage in the subborrower's city forced the plant to be shut down for 1 year, leading to financial losses. The price increase of the feed stock, naphtha, also severely damaged the financial health of Madras Fertilizers Ltd. During the visit, the OEM was informed that the subborrower had not been able to repay loans from financial institutions, including IDBI, for several years. Madras Fertilizers Ltd. is negotiating a corporate debt restructuring with IDBI and other financial institutions to get the company through its financial crisis.

C. Sintex Industries Ltd.

1. Project Scope and Implementation

12. The subproject was to modernize Sintex Industries Ltd.'s textile processing facilities from batch process to continuous process, and to replace narrow-width looms with wider rapier looms. The project cost was estimated at Rs466.5 million ($11.5 million). Completed in June 2000, the subproject included the following installations:

(i) New factory building housing the new processing equipment,
(ii) Continuous process machinery, and
(iii) Imported rapier looms.

2. Energy Efficiency Improvement and Environmental Benefit

13. In the subborrower's Energy Audit Report of 19 March 2001, Sintex Industries Ltd. reported that the subproject saved 34% in power and 33.5% in water, and reduced effluent generation by 32.8%.

3. Issues of Concern

14. Financing for the proposed subproject was secured by a loan of Rs350 million under the Technological Upgradation Fund Scheme (TUFS) of the Ministry of Textiles, routed through IDBI, before ADB's approval of $6.16 million (Rs250 million) for the subproject in August 1999. Internal accruals were to cover the balance Rs116.5 million. Under TUFS, the effective rate was the primary long-term lending rate less 5%. IDBI merely appropriated a loan of Rs250 million equivalent from ADB under the Project. The ADB funds did not provide any additional benefit to the subproject, according to Sintex Industries Ltd. The subborrower prepaid the IDBI loan in full 1 year ahead of the final installment as another bank offered a lower rate.

D. Sree Rayalseema Alkalies and Allied Chemicals Ltd.

1. Project Scope and Implementation

15. The subproject had three components:

(i) Replacing 14 electrolyzers with 8 new ones of improved technology. This component was expected to avert earlier production losses of 4,800 ton per annum (tpa), and also provide additional production of 1,584 tpa and 19% power savings.

(ii) Installing salt handling system, saturators and reactors, anthracite and chelating tower, instrumentation, and certain electrical equipment for uninterrupted production. The purported energy savings by this component were not quantified.
(iii) Setting up a caustic flakes fusion plant to reduce the transportation energy requirement by 50%.

16. Financing for the subproject was secured in 1995 by loans from IDBI and other financial institutions. The total cost of the three components at completion was about Rs390 million, of which ADB funding accounted for Rs216.75 million.

17. Implementation of the subproject started in 1995, 1 year before the ADB's approval in May 1996. The subproject was completed in December 1996. During the site visit, the OEM observed the subproject equipment and auxiliaries working satisfactorily.

2. Energy Efficiency Improvement and Environmental Benefit

18. The lower energy intensity for manufacturing soda would reduce pollution. Strengthening the caustic soda plant would increase efficiency in the production process, lowering pollutant content. The conversion of caustic soda into flakes would reduce fuel usage for transportation per unit of output, another positive impact on the environment. However, the energy efficiency and environmental improvements achieved were not quantified.

3. Issues of Concern

19. The subborrower started implementing this project 1 year before ADB's approval, meaning the appropriation of Rs216.75 million ($6.283 million) as if financed by ADB was merely an exercise. Subsequently, a subloan agreement between IDBI and the subborrower for the ADB financing was not drawn up. As a result, the subborrower was not aware of any obligations to ADB. Benefits from implementing the 3 components of this subproject were not quantified separately, or tracked and reported periodically. A review of the subborrowers' annual reports before and after implementing the subproject does not show the expected reduction in power consumption of 500 kWh per ton of production.

E. Star Paper Mills Ltd.

1. Project Scope and Implementation

20. The subproject, as approved, was to modernize and expand Star Paper Mills Ltd.'s paper production capacity from 46,200 to 59,000 tons per year by (i) rebuilding paper machines, (ii) installing a chemical recovery boiler for enhancing recovery of chemicals, and (iii) adopting additional steam generation and pollution-abatement measures. The project cost was estimated at Rs885 million ($19.67 million). Financing was secured by a loan from domestic financial institutions and internal accruals before ADB's approval of $3.07 million for the subproject in December 1998.

21. Implementation of the subproject started in 1995 and was completed in September 1997, 1 year before ADB's approval. As implemented under the Project, Star Paper Mills Ltd. appropriated the following three components:

(i) Replacement of pneumatic chips blowing system with belt conveying system;
(ii) Installation of four film concentrator to improve steam economy and capacity; and

(iii) Installation of a new recovery boiler, replacing two old and inefficient recovery boilers.

22. The OEM found that these facilities were installed and working satisfactorily.

2. Energy Efficiency Improvement and Environmental Benefit

23. Star Paper Mills Ltd. reported that the implementation of the belt conveying system reduced power consumption by 52%. Installation of the film concentrators achieved 23% savings in coal, according to the subborrower. Installation of the new recovery boiler yielded savings of 9% in power, 35% in coal, and 52% in fuel oil, Star Paper Mills Ltd. reported. No data was available on the environmental impact of the schemes.

3. Issues of Concern

24. The energy savings schemes envisaged were changed after subproject approval without ADB's prior concurrence, and the subborrower's progress reports to IDBI covered only the changed schemes. The subborrower's main project pertained to modernization and expansion of production capacity. No baseline data was available for the three components before implementation. The subborrower considered the 0.5% reduction in interest on loans previously provided by IDBI the only benefit of availing of ADB funds.

F. Sunflag Iron and Steel Company Ltd.

1. Project Scope and Implementation

25. The subproject was to set up a 15 megawatt (MW) power plant by installing a waste heat recovery boiler (WHRB) and fluidized bed boiler (FBB), utilizing sensible heat of flue gases, coal fines, and electrostatic precipitation dust from its production of sponge-iron. The cost at completion was Rs461.3 million. Financing of the subproject was secured from IDBI 1 year before ADB's approval of $5.37 million in November 1998.

26. The implementation of the subproject started in 1995, 3 years before ADB's approval. The WHRB and FBB were installed between December 1997 and May 1998. They became fully operational in July 1998, 4 months before ADB's approval of the subproject. The OEM found the power plant and auxiliaries constructed were well maintained and working satisfactorily.

2. Energy Efficiency Improvement and Environmental Benefit

27. In the progress report of March 2001, Sunflag Iron and Steel Company Ltd. reported that power consumption per ton of steel produced increased from 1,000 kWh to 1,100 kWh after implementation of the subproject. However, the amount of power purchased from the grid dropped by 49.25%. Thus, the financial savings for the subborrower has been significant due to the cost difference between purchased and captive power, plus the sale of surplus power to the grid. Moreover, about 128,000 cubic meters per hour of flue gases, which had been wasted, are utilized in the WHRB, reducing environmental pollution. The waste products from the captive power plant are collected to manufacture bricks, which are used in the plant for the construction of buildings and roads. The subproject is considered a successful model, which other sponge-iron plants can replicate.

3. Issues of Concern

28. The subborrower considered the subproject entirely financed by IDBI, and refinanced by ADB's subloan retroactively to avail of a 0.5% reduction in interest rate on the IDBI loans.

29. Under the subproject, the turbo generator was imported from Skoda, in the former Czechoslovakia. The WHRB and FBB were procured from Indian manufacturers. Since equipment from nonmember countries of ADB are not eligible for ADB financing, the OEM was told that the turbo generator was financed by alternative sources. However, the OEM was unable to obtain from the subborrower a detailed cost breakdown of all equipment imported and locally procured under the subproject.

G. EID Parry (India) Ltd.

1. Project Scope and Implementation

30. The subproject proposed by the sugar producing subborrower was to replace inefficient boilers and turbines of the captive power plant with two new boilers and a steam turbo generator of higher efficiency and capacity. In-house power generation was expected to rise from 8.5 MW to 24.5 MW after implementation of the subproject. In addition to meeting the power requirement for sugar production, the surplus power could be sold to the grid.

31. The cost of the subproject at completion was at Rs750 million. Financing was secured from IDBI and other sources before ADB’s approval in November 1995. The 5-year term loan from IDBI was at 16.5% interest per year. The subproject was completed in May 1997.

2. Energy Efficiency Improvement and Environmental Benefit

32. At approval, the subproject was projected to achieve an energy efficiency of 175% based on the increase in power generation for the same bagasse input. By adding electrostatic precipitators in the boilers, particulate emissions would be reduced as well. However, no data was available to verify the energy efficiency improvements and environmental benefits.

3. Issues of Concern

33. The subborrower started implementing this subproject 1 year before ADB’s approval. The subborrower considered the subproject entirely financed by IDBI, and refinanced by ADB's subloan retroactively to avail of a 0.5% reduction in interest charged by IDBI.

34. Under the subproject, a steam turbine generator was imported from the former Czechoslovakia, while all other equipment manufactured locally. Since equipment from nonmember countries of ADB is not eligible for ADB financing, the OEM was informed that the generator was financed by alternative sources. However, the OEM was unable to obtain from the subborrower a detailed cost breakdown of all equipment imported and locally procured under the subproject.

FINANCIAL HIGHLIGHTS OF SELECTED SUBPROJECT ENTITIES

Table A3.1: Gujarat Alkalies and Chemicals Limited (Rs million)

Item	1997–1998	1998–1999	1999–2000	2000–2001	2001–2002	2002–2003
Operating Results						
Gross Income	3,662	5,764	7,904	9,920	9,325	10,322
Gross Profit	667	1,307	1,282	1,826	1,632	2,270
Interest	307	852	1,261	1,424	1,242	932
Depreciation	347	611	742	734	787	791
Profit/Loss Before Investment, Allowance, Reserve and Taxation	13	(156)	(722)	(331)	(396)	548
Prior Period Adjustment (net)	-	-	-	-	(11)	(15)
Profit/(Loss) Before Tax	13	(156)	(722)	(331)	(408)	533
Provision for taxation:						
- current income tax - mat	-		-	-	-	45
- deferred income tax	-		-	-	-	208
Profit/(Loss) After tax	13	(156)	(722)	(331)	(408)	280
Dividend	-					-
Tax on Dividend	-					-
Retained Earnings (Loss)	13	(156)	(722)	(331)	(408)	280
Sources and Application of Funds						
Source of Funds						
Share Capital	375	375	459	459	459	459
Preferential Allotment Application Money	-	-	-	-	-	-
Reserves and Surplus	3,914	3,739	3,669	3,219	2,815	2,729
Loans (net)	9,127	9,994	9,537	9,949	10,279	8,878
Deferred tax (net)				-	-	627
Total Funds Employed	13,416	14,108	13,665	13,627	13,554	12,693
Application of Funds						
Fixed Assets (Gross)	13,664	14,995	14,897	14,891	15,925	16,122
Depreciation	2,007	2,618	3,347	4,062	4,970	5,803
Fixed Assets (net)	11,656	12,277	11,550	10,829	10,954	10,319
Contribution Supply of Power, Water, and Services	214	214	214	214	-	-
Investments	614	608	605	602	599	585
Current Assets (net)	565	707	961	1,733	1,819	1,541
Miscellaneous Expenses to be Written Off	367	302	335	250	181	248
Total Funds Applied	13,416	14,108	13,665	13,627	13,554	12,693
Current Assets	1,115.33	1,589.05	2,112.52	2,241.17	2,361.92	2,330.85
Current Liabilities	967.40	1,581.10	1,726.62	1,152.15	1,089.23	1,379.61
Net Cash Flow from Operating Activities	240.83	13.91	(279.77)	(295.64)	192.77	1,718.61
Ratios:						
Return on Equity (%)	0.29	(3.79)	(17.49)	(9.00)	(12.45)	8.80
Return on Net Fixed Assets (%)	0.09	(1.04)	(4.85)	(2.22)	(2.56)	1.74
Debt/Equity	2.13	2.43	2.31	2.70	3.14	2.78
Self-Financing Ratio	0.01	0.00	(0.02)	(0.03)	0.02	0.04
Debt Service Coverage Ratio	0.01	(0.10)	(0.42)	(0.29)	(0.37)	0.39
Current Ratio	1.15	1.01	1.22	1.95	2.17	1.69

Source: Annual Report of Gujarat Alkalies and Chemicals Limited.

Table A3.2: Upper Ganges Sugar & Industries Limited (Rs million)

Item	1997–1998	1998–1999	1999–2000 (15 mos)	2000–2001	2001–2002	2002–2003
Operating Results						
Gross Income	2,378	2,406	2,519	2,254	2,491	2,374
Gross Profit	361	386	346	282	201	169
Interest	192	188	224	186	212	199
Depreciation	63	61	80	66	74	78
Profit/Loss Before Investment, Allowance, Reserve and Taxation	106	137	43	31	(85)	(107)
Prior Period Adjustment (net)						
Profit/(Loss) Before Tax	106	137	43	31	(85)	(107)
Provision for taxation:						
- current income tax - mat				6	3	5
- deferred income tax	16	21	7	-	(38)	(41)
Profit/(Loss) After tax	90	115	36	25	(50)	(72)
Dividend	24	25	-	12	7	-
Tax on dividend	2	3	-	1	-	
Retained Earnings (Loss)	64	88	36	12	(57)	(72)
Sources and Application of Funds						
Source of Funds						
Share Capital	100	100	100	100	70	70
Application Money	-	-	-	-	-	-
Reserves and Surplus	692	777	814	699	552	481
Loans (net)	1,442	1,382	1,499	1,823	2,291	1,862
Deferred Tax (net)				-	53	12
Total Funds Employed	2,234	2,258	2,413	2,622	2,965	2,425
Application of Funds						
Fixed Assets (Gross)	1,282	1,329	1,356	1,542	1,693	1,733
Depreciation	351	409	486	539	605	681
Fixed Assets (net)	931	919	870	1,003	1,088	1,052
Contribution Supply of Power, Water, and Services	-	-	-	-	-	-
Investments	156	151	226	228	228	228
Current Assets (net)	1,146	1,188	1,310	1,385	1,640	1,139
Miscellaneous Expenses to be Written Off				5	8	7
Total Funds Applied	2,234	2,258	2,406	2,622	2,965	2,425
Current Assets	1,404.48	1,539.83	1,437.03	1,570.97	2,118.28	1,565.44
Current Liabilities	371.81	545.59	213.32	284.48	587.22	544.91
Net Cash Flow from Operating Activities	21.56	396.02	127.00	52.65	(66.00)	669.62
Ratios:						
Return on Equity (%)	11.43	13.17	3.91	3.14	(8.04)	(13.03)
Return on Net Fixed Assets (%)	7.06	8.69	2.64	1.63	(2.95)	(4.14)
Debt/Equity	1.82	1.58	1.64	2.28	3.69	3.38
Self-Financing Ratio	0.02	0.44	0.14	0.05	(0.06)	0.16
Debt Service Coverage Ratio	0.29	0.25	0.20	0.11	(0.15)	(0.20)
Current Ratio	3.78	2.82	6.74	5.52	3.61	2.87

Source: Annual Report of Upper Ganges Sugar & Industries Limited.

Table A3.3: Associated Cement Companies Limited (Rs million)

Item	1997–1998	1998–1999	1999–2000	2000–2001	2001–2002	2002–2003
Operating Results						
Gross Income	24,847	27,474	28,187	30,318	33,224	29,708
Gross Profit	2,201	3,506	2,274	4,056	4,982	4,036
Interest	1,191	1,625	1,618	1,702	1,467	1,039
Depreciation	855	1,038	1,245	1,413	1,511	1,646
Profit/Loss Before Investment, Allowance, Reserve and Taxation	154	844	(589)	941	2,003	1,351
Prior Period Adjustment (net)						
Profit/(Loss) Before Tax	154	844	(589)	941	2,003	1,351
Provision for Taxation:						
- current income tax - mat				36	134	96
- deferred income tax	20	80	-	-	205	47
Profit/(Loss) After tax	134	764	(589)	905	1,664	1,209
Dividend	206	205	157	341	512	427
Tax on Dividend	21	23	35	35	-	55
Retained Earnings (Loss)	(92)	536	(780)	529	1,152	726
Sources and Application of Funds						
Source of Funds						
Share Capital	1,368	1,368	1,709	1,709	1,711	1,711
Stockists' Deposits	304	356	432	618	799	915
Reserves and Surplus	8,561	8,892	9,620	9,809	8,488	9,056
Loans (net)	14,524	14,020	14,441	16,572	15,103	14,048
Deferred Tax (net)				-	2,330	2,377
Total Funds Employed	24,757	24,636	26,202	28,707	28,430	28,106
Application of Funds						
Fixed Assets (Gross)	24,656	25,975	28,564	32,458	34,237	37,239
Depreciation	6,386	7,026	8,203	9,475	11,070	12,684
Fixed Assets (net)	18,269	18,949	20,361	22,982	23,167	24,555
Contribution Supply of Power, Water, and Services	-					
Investments	1,895	1,467	1,722	1,815	1,753	1,278
Current Assets (net)	4,234	3,784	3,247	3,209	2,773	1,752
Miscellaneous Expenses to be Written Off	359	430	872	701	736	522
Total Funds Applied	24,757	24,630	26,202	28,707	28,430	28,106
Current Assets	6,080.90	5,681.10	5,897.90	6,011.90	5,501.30	5,654.40
Current Liabilities	4,620.70	4,884.10	5,811.00	5,845.40	6,242.10	7,156.30
Net Cash Flow from Operating Activities	874.5					
Ratios:						
Return on Equity (%)	1.35	7.44	(5.19)	7.86	16.32	11.22
Return on Net Fixed Assets (%)	0.55	2.94	(2.06)	2.79	4.86	3.25
Debt/Equity	1.46	1.37	1.27	1.44	1.48	1.30
Self-Financing Ratio	0.05	0.00	0.00	0.00	0.00	0.00
Debt Service Coverage Ratio	0.03	0.17	(0.10)	0.16	0.32	0.19
Current Ratio	1.32	1.16	1.01	1.03	0.88	0.79

Source: Annual Report of Associated Cement Companies Limited.

Table A3.4: Yash Papers Limited (Rs million)

Item	1997–1998	1998–1999	1999–2000	2000–2001	2001–2002	2002–2003
Operating Results						
Gross Income	174	173	191	225	176	244
Gross Profit	11	14	19	26	34	46
Interest	-	-	-	-	-	-
Depreciation	10	10	11	12	10	14
Profit/Loss Before Investment, Allowance, Reserve and Taxation	1	3	8	14	24	32
Prior Period Adjustment (net)						
Profit/(Loss) Before Tax	1	3	8	14	24	32
Provision for Taxation:						
- current income tax - mat	0	0	1	1	2	4
- deferred income tax	0	0	0	0	9	(1)
Profit/(Loss) After tax	1	3	8	13	14	29
Dividend	0	0	0	0	4	4
Tax on Dividend	0	0	0	0		
Retained Earnings (Loss)	1	3	8	13	10	25
Sources and Application of Funds						
Source of Funds						
Share Capital	39	39	39	39	39	39
Application Money	3	-	-	-		
Reserves and Surplus	77	84	91	104	89	93
Loans (net)	88	85	91	103	61	66
Deferred Tax (net)			-	-	45	44
Total Funds Employed	207	207	221	246	233	241
Application of Funds						
Fixed Assets (Gross)	213	220	235	269	293	299
Depreciation	52	60	68	79	99	109
Fixed Assets (net)	161	160	167	191	194	190
Contribution Supply of Power, Water, and Services	-	-	-	-	-	-
Investments	1	1	1	1	0	0
Current Assets (net)	43	45	52	54	38	51
Miscellaneous Expenses to be Written Off	2	2	1	1	0	-
Total Funds Applied	207	207	221	246	233	241
Current Assets	51	58	64	69	51	71
Current Liabilities	17	19	17	22	21	29
Net Cash Flow from Operating Activities	6	12	13	25	46	9
Ratios:						
Return on Equity (%)	0.84	2.54	6.49	9.12	10.62	21.92
Return on Net Fixed Assets (%)	0.46	1.41	3.58	4.85	4.61	9.62
Debt/Equity	0.76	0.69	0.70	0.72	0.48	0.50
Self-Financing Ratio	0.05	0.07	0.07	0.13	0.24	0.07
Debt Service Coverage Ratio	0.07	0.18	0.49	0.64	1.14	1.12
Current Ratio	3.06	3.05	3.67	3.06	2.44	2.48

Source: Annual Report of Yash Papers Limited.

Table A3.5: Star Paper Mills Limited (Rs million)

Item	1997–1998	1998–1999	1999–2000	2000–2001	2001–2002	2002–2003
Operating Results						
Gross Income	2,204	1,414	1,674	1,797	1,724	1,602
Gross Profit	132	(17)	148	358	225	303
Interest	61	85	136	172	99	123
Depreciation	46	40	48	52	53	75
Profit/Loss Before Investment, Allowance, Reserve and Taxation	25	(141)	(36)	134	73	106
Prior Period Adjustment (net)	-					
Profit/(Loss) Before Tax	25	(141)	(36)	134	73	106
Provision for Taxation:						
- current income tax - mat	4			11	4	3
- deferred income tax	3			-	36	47
Profit/(Loss) After tax	22	(141)	(36)	123	33	56
Dividend	-	-	-	-	-	16
Tax on Dividend	-	-	-	-	-	2
Retained Earnings (Loss)	22	(141)	(36)	123	33	38
Sources and Application of Funds						
Source of Funds						
Share Capital	156	156	156	156	156	156
Application Money						
Reserves and Surplus	1,471	1,306	1,102	1,166	1,185	1,181
Loans (net)	618	956	1,104	990	847	790
Deferred Tax (net)	-	-	-			132
Total Funds Employed	2,246	2,418	2,362	2,311	2,188	2,259
Application of Funds						
Fixed Assets (Gross)	1,916	2,155	2,303	2,319	2,321	2,341
Depreciation	425	489	560	624	649	709
Fixed Assets (net)	1,491	1,666	1,743	1,695	1,672	1,632
Contribution Supply of Power, Water, and Services	-	-	-			
Investments	294	294	194	194	194	194
Current Assets (net)	461	459	394	423	408	434
Miscellaneous Expenses to be Written Off	-	-	31		(85)	-
Total Funds Applied	2,246	2,418	2,362	2,311	2,188	2,259
Current Assets	438.05	412.34	381.04	414.76	412.69	414.95
Current Liabilities	311.03	301.49	223.80	245.45	292.95	284.04
Net Cash Flow from Operating Activities	(60.51)	54.60	122.91	343.31	177.00	277.87
Ratios:						
Return on Equity (%)	1.35	(9.65)	(2.89)	9.31	2.49	4.17
Return on Net Fixed Assets (%)	1.14	(6.55)	(1.58)	5.30	1.44	2.38
Debt/Equity	0.38	0.65	0.88	0.75	0.63	0.59
Self-Financing Ratio	(0.04)	0.03	0.07	0.20	0.11	0.04
Debt Service Coverage Ratio	0.08	(0.47)	(0.16)	0.54	0.25	0.37
Current Ratio	1.41	1.37	1.70	1.69	1.41	1.46

Source: Annual Report of Star Paper Mills Limited.

Table A3.6: Madras Fertilizers Limited (Rs million)

Item	1997–1998	1998–1999	1999–2000	2000–2001	2001–2002	2002–2003
Operating Results						
Gross Income	5,468	17,542	6,370	14,048	10,976	11,391
Gross Profit	129	2,400	830	1,421	920	1,597
Interest	590	1,867	563	1,304	1,120	1,128
Depreciation	92	605	204	415	456	392
Profit/Loss Before Investment, Allowance, Reserve and Taxation	(552)	(71)	64	(298)	(656)	77
Prior Period Adjustment (net)	-					
Profit/(Loss) Before Tax	(552)	(71)	64	(298)	(656)	77
Provision for Taxation:						
- current income tax - mat	-	-	-	-	-	-
- deferred income tax	-	-	-	-	-	-
Profit/(Loss) After tax	(552)	(71)	64	(298)	(656)	77
Dividend	-	-	-	-	-	-
Tax on Dividend	-	-	-	-	-	-
Retained Earnings (Loss)	(552)	(71)	64	(298)	(656)	77
Sources and Application of Funds						
Source of Funds						
Share Capital	1,618	1,619	1,621	1,621	1,621	1,621
Stockists' Deposits	-					
Reserves & Surplus	140	143	133	134	134	134
Loans (net)	7,165	8,095	8,064	8,382	7,256	7,119
Deferred Tax (net)	-					
Total Funds Employed	8,923	9,857	9,818	10,137	9,011	8,874
Application of Funds						
Fixed Assets (Gross)	7,019	6,614	6,442	6,218	5,968	5,654
Depreciation		-	-			
Fixed Assets (net)	7,019	6,614	6,442	6,218	5,968	5,654
Contribution Supply of Power, Water, and Services	-	-	-	-	-	-
Investments	17	17	17	17	17	17
Current Assets (net)	346	1,763	2,020	2,367	940	1,345
Miscellaneous Expenses to be Written Off	1,543	1,463	1,339	1,535	2,087	1,859
Total Funds Applied	8,925	9,857	9,818	10,137	9,011	8,874
Current Assets	3,210.50	2,881.20	4,135.50	5,138.90	4,911.30	4,156.20
Current Liabilities	4,278.60	3,891.60	4,821.30	5,317.90	1,537.20	2,339.80
Net Cash Flow from Operating Activities						
Ratios:						
Return on Equity (%)	(31.42)	(4.04)	3.62	(16.95)	(37.38)	4.36
Return on Net Fixed Assets (%)	(7.87)	(1.07)	0.99	(4.78)	(10.99)	1.35
Debt/Equity	4.08	4.60	4.60	4.78	4.13	4.06
Self-Financing Ratio	0.00	0.00	0.00	0.00	0.00	0.00
Debt Service Coverage Ratio	(0.13)	(0.02)	0.01	(0.06)	(0.43)	0.03
Current Ratio	0.75	0.74	0.86	0.97	3.19	1.78

Source: Annual Report of Madras Fertilizers Limited.

Table A3.7: Kothari Sugars and Chemicals Limited (Rs million)

Item	1998-1999	1999-2000	2000-2001	2001-2002
Operating Results				
Gross Income	952	941	1,100	1,222
Gross Profit	(93)	(26)	115	94
Interest	289	291	255	261
Depreciation	122	122	122	114
Profit/Loss Before Investment, Allowance, Reserve and Taxation	(504)	(439)	(263)	(282)
Prior Period Adjustment (net)	118	49	19	
Profit/(Loss) Before Tax	(622)	(488)	(281)	(282)
Provision for Taxation:				
- current income tax - mat				
- deferred income tax	0		3	
Profit/(Loss) After tax	(622)	(488)	(284)	(282)
Dividend	-	-	-	-
Tax on Dividend	-	-	-	-
Retained Earnings (Loss)	(622)	(488)	(284)	(282)
Sources and Application of Funds				
Source of Funds				
Share Capital	289	289	289	289
Stockists' Deposits	-	-	-	-
Reserves and Surplus	338	338	338	338
Loans (net)	2,314	2,631	2,763	3,007
Deferred Tax (net)	-	-		
Total Funds Employed	2,941	3,259	3,391	3,635
Application of Funds				
Fixed Assets (Gross)	2,396	2,395	2,404	2,404
Depreciation	494	614	737	851
Fixed Assets (net)	1,902	1,781	1,667	1,554
Contribution Supply of Power, Water, and Services	-	-	-	-
Investments	62	35	16	16
Current Assets (net)	177	155	136	211
Miscellaneous Expenses to be Written Off	799	1,288	1,572	1,854
Total Funds Applied	2,941	3,259	3,391	3,635
Current Assets	352.00	510.15	568.27	632.98
Current Liabilities	238.24	393.14	465.94	461.41
Net Cash Flow from Operating Activities				
Ratios:				
Return on Equity (%)	(99.16)	(77.84)	(45.30)	(44.89)
Return on Net Fixed Assets (%)	(25.96)	(20.39)	(11.83)	(11.71)
Debt/Equity	3.69	4.19	4.40	4.79
Self-Financing Ratio	0.00	0.00	0.00	
Debt Service Coverage Ratio	(2.61)	(1.24)	(0.60)	(0.61)
Current Ratio	1.48	1.30	1.22	1.37

Source: Annual Report of Kothari Sugars and Chemicals Limited.

Table A3.8: Sun Paper Mill Ltd. (Rs million)

Item	1997–1998	1998–1999	1999–2000	2000–2001	2001–2002	2002–2003
Operating Results						
Gross Income	452	458	464	563	597	576
Gross Profit	29	38	33	74	87	84
Interest	11	13	42	40	37	32
Depreciation	7	8	22	22	22	22
Profit/Loss Before Investment, Allowance, Reserve and Taxation	11	17	(31)	12	28	30
Prior Period Adjustment (net)	1	(1)		-	4	-
Profit/(Loss) Before Tax	10	17	(31)	12	24	30
Provision for Taxation:						
- current income tax - mat	3	5		2	2	4
- deferred income tax					47	4
Profit/(Loss) After tax	10	12	(31)	10	(25)	22
Dividend	1	11	0	6	-	6
Tax on Dividend		-	-	-	-	
Retained Earnings (Loss)	9	1	(32)	4	(25)	16
Sources and Application of Funds						
Source of Funds:						
Share Capital	8	91	89	89	89	89
Stockists' Deposits						
Reserves and Surplus	98	100	68	72	47	63
Loans (net)	129	231	238	236	216	186
Deferred Tax (net)	-	-	-	-	47	51
Total Funds Employed	236	421	394	397	399	389
Application of Funds						
Fixed Assets (Gross)	288	481	489	500	517	529
Depreciation	80	88	110	132	154	176
Fixed Assets (net)	208	393	379	368	363	353
Contribution Supply of Power, Water, and Services	-			-	-	-
Investments	0	0	0	0	0	0
Current Assets (net)	28	26	14	27	35	35
Miscellaneous Expenses to be Written Off	-	2	1	1	2	1
Total Funds Applied	236	421	394	397	399	389
Current Assets	160.94	82.16	53.60	80	80	98
Current Liabilities	162.34	84.29	67.61	89	75	83
Net Cash Flow from Operating Activities						
Ratios:						
Return on Equity (%)	9.62	6.35	(20.11)	6.52	(18.47)	14.48
Return on Net Fixed Assets (%)	3.56	2.51	(6.43)	2.10	(4.85)	4.15
Debt/Equity	1.21	1.21	1.52	1.47	1.59	1.23
Self-Financing Ratio	0.00	0.00	0.00	0.00	0.00	0.00
Debt Service Coverage Ratio	0.06	0.21	(0.47)	0.13	0.32	0.36
Current Ratio	0.99	0.97	0.79	0.89	1.07	1.19

Source: Annual Report of Sun Paper Mill Limited.

Table A3.9: Sunflag Iron and Steel Co. Ltd. (Rs million)

Item	1998–1999	1999–2000	2000–2001	2001–2002	2002–2003
Operating Results					
Gross Income	3,518	4,211	4,214	4,098	4,256
Gross Profit	546	751	747	639	593
Interest	380	423	384	295	268
Depreciation	209	241	249	250	255
Profit/Loss Before Investment, Allowance, Reserve and Taxation	(43)	88	114	94	69
Prior Period Adjustment (net)	338	(3)	2,612	-	(1)
Profit/(Loss) Before Tax	(380)	91	(2,498)	94	71
Provision for Taxation:					
- current income tax - mat	1	9	8,413	6	4
- deferred income tax	16	0			-
Profit/(Loss) After tax	(397)	81	(10,911)	88	67
Dividend			-	-	-
Tax on Dividend			-	-	-
Retained Earnings (Loss)	(397)	81	(10,911)	88	67
Sources and Application of Funds					
Source of Funds					
Share Capital	1,622	1,622	1,622	1,622	1,622
Advance Application Money	84	84	84	84	-
Reserves and Surplus	18	55	158	246	312
Loans (net)	2,735	2,429	2,131	1,846	1,693
Deferred Tax (net)	-				
Total Funds Employed	4,459	4,190	3,995	3,799	3,627
Application of Funds					
Fixed Assets (Gross)	5,006	4,967	5,032	5,145	5,250
Depreciation	1,633	1,850	2,097	2,346	2,600
Fixed Assets (net)	3,372	3,117	2,935	2,799	2,650
Contribution Supply of Power, Water, and Services	-	-	-	-	-
Investments	-	-	-		-
Current Assets (net)	1,021	1,057	1,052	999	977
Miscellaneous Expenses to be Written Off	21	16	7	-	
Total Funds Applied	4,415	4,190	3,995	3,799	3,627
Current Assets	1,384.21	1,518.35	1,456	1,576	1,495
Current Liabilities	709.59	604.62	647	831	871
Net Cash Flow from Operating Activities					
Ratios:					
Return on Equity (%)	(24.19)	4.83	(613.11)	4.72	3.44
Return on Net Fixed Assets (%)	(7.92)	1.63	(216.82)	1.71	1.27
Debt/Equity	1.67	1.45	1.20	0.99	0.87
Self-Financing Ratio	0.00	0.00	0.00	0.00	0.00
Debt Service Coverage Ratio	(0.54)	0.15	(3.86)	0.11	0.08
Current Ratio	1.95	2.51	2.25	1.90	1.72

Source: Annual Report of Sunflag Iron and Steel Company Limited.

MANAGEMENT RESPONSE TO THE PROJECT PERFORMANCE AUDIT REPORT ON THE INDUSTRIAL ENERGY EFFICIENCY PROJECT IN INDIA (Loan 1343-IND)

On 25 April 2005, the Director General, Operations Evaluation Department, received the following response from the Managing Director General on behalf of Management:

1. Management finds the PPAR well prepared and makes a candid assessment of the project's performance. While agreeing with the overall rating and the lessons learned, Management would like to make the following comments on several aspects of the lessons proposed by the PPAR.

2. The PPAR argues that the lower-than-expected demand for ADB funds led to the relaxation of subproject selection criteria and the simplification of disbursement procedures, undermining the attainment of the project objectives and goals. Management agrees with the need for rigorous demand analysis during project preparation as suggested in the PPAR. On the other hand, Management would like to point out that applying flexible approaches is also necessary in implementing a project under frequently changing environment. It is understood that the abovementioned relaxation in the selection criteria and the disbursement procedures was made to adapt to the changing environment.

3. The PPAR also suggests that ADB future financing for a similar project is not justified unless specific measures have been put in place to address the issues highlighted in the PPAR. It is noted that such a broad statement may have overstated the issues when we consider that the policy environment for energy efficiency in India has changed. For instance, the Government of India passed the Energy Conservation Act in 2001 (the Act) that gives the central and state governments the requisite statutory powers for promoting and enforcing a progressive regime of energy conservation. The Act also requires these entities and their designated agencies to (i) promote mass awareness for energy conservation, consumer education and consumer guidance; (ii) encourage preferential treatment for energy efficient equipment and appliances; and (iii) establish an Energy Conservation Fund at both the central and state government levels to provide grants or loans for promoting energy conservation. This now provides a more conducive environment for ADB to assist the Government in promoting energy efficiency in India. In addition, given the current high prices for energy in ADB's DMCs, which are expected to continue, there is a role for ADB to assist its DMCs in enhancing energy efficiency.

4. The PPAR suggests that ADB needs to provide innovative financial instruments in response to changing financial markets, wherein the demand for rupee resources are quite large. It should be noted that ADB has already begun to introduce such innovative instruments. ADB has recently issued Indian Rupee bonds and is exploring other innovative modalities to provide rupee-based financial instruments to the Indian private sector, including financing energy efficiency through leveraging local sources of funding in the energy sector.