

Global Environment Facility

GEF

MOHAMED T. EL-ASHRY
CHIEF EXECUTIVE OFFICER
AND CHAIRMAN

April 6, 1998

Dear Council Member:

The World Bank, as the Implementing Agency for the project entitled, *India: Energy Efficiency Project*, has submitted the attached proposed project document for CEO endorsement prior to final approval of the project document in accordance with World Bank procedures.

Over the next four weeks, the Secretariat will be reviewing the project document to ascertain that it is consistent with the proposal included in the work program approved by the Council in January 1998, and with GEF policies and procedures. The Secretariat will also ascertain whether the proposed level of GEF financing is appropriate in light of the project's objectives.

If by May 3, 1998, I have not received requests from at least four Council Members to have the proposed project reviewed at a Council meeting because in the Member's view the project is not consistent with the Instrument or GEF policies and procedures, I will complete the Secretariat's assessment with a view to endorsing the proposed project document.

Sincerely,

for Mohamed T. El-Ashry
Chief Executive Officer and
Chairman

Attachments: *India Energy Efficiency Project*

cc: Alternates, Implementing Agencies, STAP

OFFICE MEMORANDUM

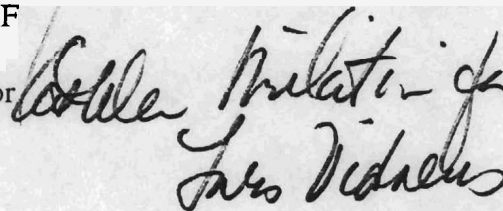
DATE: April 6, 1998

TO: Mr. Mohamed El-Ashry, CEO/Chairman, GEF

FROM: Mr. Lars Vidaeus, GEF Executive Coordinator

EXTENSION: 34188

SUBJECT: **INDIA: Energy Efficiency Project
Final Council Review/CEO Endorsement**



1. Please find attached 75 copies of the Project Appraisal Document (PAD) for the Second Renewable Energy Project which includes the proposed GEF-financed Energy Efficiency Project for circulation to Council and your final endorsement. The GEF project was originally presented for work program inclusion as an individual document. When the Project Concept Document (PCD) was presented to the GEF Council for inclusion in the Work Program, for the benefit of the Council, the project documentation focused specifically on the GEF project. As per GEF Council recommendations to mainstream GEF project processing with Bank project processing, the attached PAD fully integrates the GEF project, Energy Efficiency, with the associated Bank project, Second Renewable Energy, in one package of documentation.
2. The overall objectives and features of the Energy Efficiency project component as presented to the GEF Council in December 1997 remain unchanged. We have noted the comments received from the GEF Council Members and have addressed their concerns in the project design. These are summarized accordingly:
3. Regarding concerns on IREDA's capacity to acquire, within the relatively short timeframe, the necessary skills and expertise on appraisal of energy efficiency projects and the need for IREDA to associate itself with strong partners in carrying out the project: IREDA has, among its current roster, more than six staff with academic and professional experience in energy audit and energy management. In addition, engagement of energy efficiency consultants is underway to assist IREDA in developing appraisal criteria to be applied to the initial set of loan applications for energy efficiency investment. The technical assistance, likewise, provides training and consultant support for strengthening IREDA's appraisal team. Under the project, IREDA will forge partnerships with experts in energy efficiency through its network arrangements with domestic and international technical organizations. As in its other business windows supported by the Bank, IREDA will set up a technical advisory panel consisting of leading practitioners in the sector; this is in addition to the inter-ministerial Steering Committee established to ensure coordination with other energy efficiency programs. Coordination among bilateral donors would be promoted in implementing similar or complementary programs, e.g., USAID programs (Energy

Management Consultation and Training; Energy Conservation Applications) and the Indo-German Energy Efficiency Project for industry (G-EEP) being implemented by GTZ.

4. Selection criteria regarding ESCOs and beneficiaries of technical assistance will be developed with the assistance of consultants engaged by IREDA and be disseminated during business meetings with various stakeholders as well as through IREDA's regular public information modes. In particular, rather than duplicate efforts already underway through various donor-supported programs for building technical capacity to develop projects upstream, emphasis of the TA will be on transforming identified projects into bankable business transactions which would attract investor interest.
5. Monitoring and evaluation arrangements of project implementation will be pursued consistent with principles agreed between the Bank and IREDA and are spelt out in the PAD. In addition, a system for monitoring GHG abatement resulting from the project, as well as for assessing the sustainability and effectiveness of GEF's intervention in catalyzing the ESCO business in India, will be developed and implemented. Independent monitoring will be done through third party reviews of project performance.
6. Regarding the need for more information on the status of energy efficiency in the various sectors in which the project would be implemented, latest available information has been incorporated in the PAD. Data for industrial, agricultural and domestic/commercial sectors are based on an on-going sector work as well as from studies associated with the state power sector restructuring projects being financed by the Bank.
7. In view of the above, we request that the revised project document be endorsed by the GEF for final approval by Bank management. Please send me a copy of your outgoing letter for our records. Many thanks.

Attachments

cc: Messrs./Mmes. King, Ahuja, Rittner (GEF); Mikitin, Broadfield, Elliott, Feinstein (ENVGC); Lim, Chassard (SACIN); McKechnie, Manzo, Nyman, Ziff (SASEG); Ahmed (LEGSA); Perera (LOAAS)

**Document of
The World Bank**

Report No:

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED
IDA CREDIT OF SDR ___ MILLION (US \$50 MILLION EQUIVALENT)
TO INDIA
AND AN IBRD LOAN OF US \$120 MILLION
(WITH THE GUARANTEE OF INDIA)
AND A GLOBAL ENVIRONMENTAL FACILITY GRANT IN AN AMOUNT
EQUIVALENT TO US\$5 MILLION
TO THE INDIAN RENEWABLE ENERGY DEVELOPMENT AGENCY LIMITED
FOR A
SECOND RENEWABLE ENERGY PROJECT

MARCH 27, 1998

**Energy Sector Unit
South Asia Region**

CURRENCY EQUIVALENTS
(Exchange Rate Effective July 1997)
Currency Unit = Indian Rupees
US\$1.00 = Rupee 36.00

GOVERNMENT FISCAL YEAR
April 1 - March 31

METRIC EQUIVALENT
1 kilowatt-hour (kWh) = 1,000 watt-hours
1 Megawatt (MW) = 1,000 kilowatts (kW)
1 Megawatt-hour (MWh) = 1,000 kilowatt-hours
1 Gigawatt-hour (GWh) = 1,000,000 kilowatt-hours

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AFOS	Agriculture, Forestry, and Other Human Activities Subgroup
ASSOCHAM	The Associated Chamber of Commerce and Industry of India
CAS	Country Assistance Strategy
CII	Confederation of Indian Industry
DANIDA	Danish International Development Agency
DEA	Department of Economic Affairs
DPR	Detailed project reports
DSM	Demand-side Management
EIRR	Economic Internal Rate of Return
EIS	Energy and Industry Subgroup
EMC	Energy Management Centre
EMCAT	Energy Management Consulting and Training
ERR	Economic Rate of Return
ESCOs	Energy Service Companies
FICCI	Federation of Indian Chambers of Commerce & Industry
FIRR	Financial Internal Rate of Return
GEF	Global Environment Facility
GET	Global Environment Trust Fund
GHG	Greenhouse Gas
GTZ	Gesellschaft für Technische Zusammenarbeit
IBRD	International Bank for Reconstruction and Development
ICB	International Competitive Bidding
ICICI	Industrial Credit and Investment Corporation of India
IDA	International Development Association
IDBI	Industrial Development Bank of India
IGIDR	Indira Gandhi Institute of Development Research
IREDA	Indian Renewable Energy Development Agency Limited
KfW	Kreditanstalt für Wiederaufbau
MNES	Ministry of Non-Conventional Energy Sources
NEAP	National Environmental Action Plan
NGOs	Non-governmental organizations
OECF	The Overseas Economic Cooperation Fund
OPS	Operational Policy Statement
PDAT	Procurement, Disbursement and Audit
SEB	State Electricity Board
TA	Technical Assistance
TERI	Tata Energy and Resources Institute
USAID	U. S. Agency for International Development

India
Second Renewable Energy Project

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India

Second Renewable Energy Project

Project Appraisal Document

South Asia Energy Sector Unit

Date: March 27, 1998 Country Director: Edwin R. Lim Project ID: IN-PE-49770; IN-GE-55906 Lending Instrument: IBRD/IDA/GEF SIL	Task Leader: Magdalena V. Manzo Sector Manager: Alastair J. McKechnie Sector: Energy/Power Program Objective Category: PV, EN Program of Targeted Intervention: No
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Project Financing Data	<input checked="" type="checkbox"/> Loan	<input checked="" type="checkbox"/> Credit	<input type="checkbox"/> Guarantee	<input checked="" type="checkbox"/> Other: GEF
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For Loans/Credits/Others:

Loan Amount : US \$120 Million

Proposed terms:

Grace period (years): 5 years

Years to maturity: 20 years

Commitment fee: Standard

☒ Single Currency

☒ LIBOR-Based

US Dollars

Service Charge: nil

Borrower: Indian Renewable Energy Development Agency Limited (IREDA)

Guarantor: Government of India

Credit Amount: Equivalent to US \$50 Million

Proposed terms: Standard IDA terms to Government of India with a 35 year maturity

Borrower: Government of India Beneficiary: IREDA

GEF Grant: Equivalent to US\$5 Million

Grantee: IREDA

Responsible agency(ies): IREDA and private sector investors

Financing plan (US\$m):

<u>Source</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
Private Developers	110	-	110
Government/IREDA	15	-	15
IBRD	68	52	120
IDA	35	15	50
GEF	2	3	5
Total	230	70	300

Estimated disbursements (Bank FY/US\$m):	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04
IBRD						
Annual	7	14	28	35	28	8
Cumulative	7	21	49	84	112	120
IDA						
Annual	3	6	12	15	12	2
Cumulative	3	9	21	36	48	50
GEF						
Annual	1.0	1.5	1.0	1.0	0.5	
Cumulative	1.0	2.5	3.5	4.5	5.0	

Project implementation period: 5 ½ years

Expected effectiveness date: September 1, 1998

Expected closing date: March 31, 2004

A: Project Development Objective

1. Project development objectives and key performance indicators (see Annex 1):

- a) Augment power supply through environmentally sustainable small hydro investments;
- b) Mobilize private sector investments in small-scale renewable energy power projects; and
- c) Promote energy efficiency and demand-side management (DSM) investments .

The Global GEF objectives are to enhance and sustain improved end-use energy efficiencies with consequent reduction in carbon emissions. The key project concept is to catalyze an energy efficiency services industry in India by addressing market development barriers and helping develop entrepreneurial initiatives including the formation of Energy Service Companies (ESCOs).

B: Strategic Context

1 a. Sector-related Country Assistance Strategy (CAS) goal supported by the project (see Annex 1):

CAS document number: 17241-IN dated December 19, 1997; Date of latest CAS discussion: January 15, 1998

- The project directly supports the CAS objectives of reducing infrastructure bottlenecks and promoting private sector development in the energy sector. Specifically, the project supports establishment of policies and incentives for private investment in small scale power generation and helps mobilize private investments by providing term financing through a financial intermediary.
- The project also supports the CAS objective of ensuring environmental sustainability in the energy sector by exploring renewable energy and energy efficiency strategies. The initiative is in accordance with the India Compact which calls for the Bank to assist the Government to implement priorities identified in its National Environmental Action Plan (NEAP 1993), including development of the Alternative Energy Plan.

b. GEF Operational Strategy/Program Objective addressed by the project:

The proposed project is fully consistent with GEF Operational Program No. 5 on removing market barriers to large scale application and implementation of energy efficiency services, products and technologies. Preliminary estimates emerging from analysis of fourteen pilot energy efficiency investments (three ESCO-based, one utility DSM, and the balance 12 industrial energy efficiency projects) indicate a total carbon avoidance of 0.76 million tons at an incremental cost of US \$6.6 per ton of carbon avoided. Based on studies prepared for a number of states, the size of the ESCO market in India over the next 10 years is estimated at \$425 million. Although the project directly supports less than 5% of this potential, if it successfully catalyzes India's ESCO market involving a potential carbon savings of 6.3 million tons, the incremental cost of carbon avoidance resulting from this proposed GEF intervention becomes as low as \$0.79 per ton of carbon.

2. Main sector issues and Government strategy:

- India's power industry is characterized by inadequate and inefficient power supply with peak capacity and energy supply shortages exceeding 20% and 10%, respectively. The bulk of capacity additions in power supply is expected to come from coal-fired stations supplemented by hydroelectric power development and medium-sized diesel or naphtha-based plants. However, fossil-based power has environmental repercussions relating to emissions of suspended particulate matter (SPM), sulfur dioxide (SO₂), nitrous oxide (NO_x), carbon dioxide (CO₂), and other gases. Large hydro power plants could lead to loss of forests, wildlife habitat and biodiversity and most importantly, the displacement of people. Cognizant of the need for environmentally sustainable energy

investments, the Government is accelerating the development of the country's renewable energy resources so as to increase their contribution to power supply.

- Carbon dioxide from commercial energy consumption in India has grown at 5.9% per year since 1950, making India the 6th highest national contributor to greenhouse gas (GHG) emissions. Over this period, total emissions increased 10.4 times, and per capita emissions increased almost 4 times. GHG emissions in India continue to result largely from coal combustion with coal contributing 87% of the emissions in 1950 and 71% in 1991; at the same time the emissions from oil-based activities increased from 11% to 22%.¹ In an EIS/AFOS Reference scenario², carbon dioxide emissions are expected to increase roughly six-fold from 359 MMT in 1985 to 2,273 MMT in 2025. Per capita emissions, however, are relatively low with India trailing behind fourteen other countries having the highest total emissions. Per capita emissions in 1991 were ~4% of the U.S. value.
- On the demand-side, inefficient pricing and a variety of market and non-market barriers to energy efficiency have contributed to the inefficient end-use of electricity and thermal energy. This inefficiency exacerbates the energy shortage situation. Energy pricing reforms emerging from restructuring of the power sector at the state level is expected to heighten consumer awareness of the need for energy conservation. However, many consumers in the industrial and commercial sectors who already pay high prices (above the cost of supply) continue to under-invest in energy efficiency. Thus, while the technical and economic potential for improving energy efficiency and thereby reducing carbon emissions in India is sizable, a host of barriers exist to capturing this potential. The barriers include:

Financial constraints : (a) The discount rate gap in India distorts the market against investments in energy conservation measures. The market generally favors expansion of power supply and industrial production capacities, and subjects energy conservation investments to implicitly higher discount rates of 25% to 50% as compared to traditionally acceptable returns of 14% to 20%. This large discrepancy in discount rates used has led to an emphasis on first-cost minimization and/or short payback period. (b) Cost of energy-efficient equipment in India is high, and there is limited competitive pressure to reduce costs, although with liberalization, this constraint is slowly receding. (c) Power supply is unreliable, and electricity prices are set below generation costs, particularly in the agricultural sector.

Technical constraints include: (a) long in-service life of equipment and utilization of used (second-hand) equipment; (b) limited availability of efficient equipment and components; (c) the manufacture of inefficient products in the small-scale sector; and (d) end-users' aversion to taking risks associated with new technologies.

Institutional and Policy constraints : (a) DSM/energy efficiency planning and evaluation skills are not adequately developed in several key institutions, viz. industries, utilities, commercial businesses and financial institutions. (b) Utilities which would have to rule on the prudence of utility DSM investments have little in-house experience in implementing DSM programs. (c) Financial institutions are constrained by the relatively small size of investments involved and the lack of in-house expertise to assess reliability of energy bill savings that would enable loan repayment. (d) There is a general absence of energy efficiency service providers, specifically ESCOs, and this has stymied the effort to move beyond energy audit studies into actual

¹ Source: Global, regional and national CO₂ emissions. pp. 505-584; Marland G., R.J. Andres and T.A. Borden. 1994

² Scenarios developed by the Energy and Industry Subgroup (EIS) and the Agriculture, Forestry, and Other Human Activities Subgroup (AFOS) of the Response Strategies Working Group (RSWG) of the IPCC.

implementation, particularly among the small and medium-sized firms. Risk sharing mechanisms by third party investors are unknown.

Government Strategy

- To stem the shortfall in power supply and deterioration in electricity services, the Government issued policy incentives to encourage entry of private sector investments. Selected states are restructuring their power sectors, including establishing independent regulatory agencies, so as to create an attractive investment environment.
- The Government considers the accelerated development of the country's renewable energy resources and of energy efficiency programs as priority thrust areas under India's National Environmental Action Plan (NEAP). The Ministry of Non-Conventional Energy Sources (MNES) administers one of the largest renewable energy programs among developing countries. In 1987, the Government established the Indian Renewable Energy Development Agency Limited (IREDA) under the administrative purview of the MNES. IREDA was given the dual mandate of promoting renewable energy technologies and of providing financial support to investments in the sector. Recognizing the opportunities afforded by private sector participation, MNES is giving greater emphasis to power generation from renewable sources and in mainstreaming the technologies into the commercial markets through IREDA's operations. At the state level, following the initiatives taken in the southern region, other states have recently established policies and incentives, including wheeling and third party sales arrangements, specifically intended to attract private sector development of small hydros as well as of other small-scale renewable energy power facilities.
- The Government is pursuing a long-term strategy to disseminate information to end-users on opportunities and technologies for energy efficiency improvements. The strategy has focused on energy audits and information dissemination programs in the industrial sector operated by public sector institutions such as the National Productivity Council, the Petroleum Conservation Research Association, the Industrial Development Bank of India (IDBI) and the Energy Management Center (EMC).
- Tax incentives for energy efficiency investments are available, most notably a 100% depreciation allowance for certain categories of energy-saving equipment. Government has also supported limited financing for energy efficiency investments in the industrial sector through IDBI. In the Ninth Plan, Government plans to allocate Rs.1320 million (US \$37 million) towards a national energy efficiency program aimed at strengthening policy formulation, developing energy efficiency auditing services, and training at the central and state levels.

3. Sector issues to be addressed by the project:

a. The project supports government initiatives to reduce power supply shortages and reduce greenhouse gas emissions through environmentally sustainable investments. It will mobilize private investments and management resources in small scale power generation by tapping the country's vast hydro resources. It is estimated that India has a potential of 10,000 MW of small hydro capacity; however, its development is dependent on the ability of entrepreneurs to build the plants in a cost effective manner so as to yield sufficient financial returns. To date, about 500MW has been commissioned, with another 500MW underway, including the 125MW capacity being financed by IDA through the on-going project with IREDA. There are 600 small hydro schemes with an aggregate capacity of 1,580 MW which have been identified in nine states, with more sites being identified elsewhere. Two-thirds of these sites are being offered by the states for development by the private sector. The project will support the renewable energy development programs launched by the states through dissemination of best practices on incentive regulation, grid inter-face arrangements, pricing and delivery mechanisms and by making available requisite financing resources. It will assist private sector to better understand the business risks associated with small hydro development including marketing and sales to third parties. The project will also provide a basis for state governments to create a policy environment that would encourage the setting up of viable utility businesses that would extend energy services to the rural areas and remote communities.

b. The project will strengthen the national energy efficiency program by providing capital for energy efficiency services, equipment and devices and promote business arrangements that would lead to reduced transaction costs and risks. Specifically, the project will help overcome the barriers to investment in energy efficiency by: (i) improving domestic capacity to promote and implement private sector initiatives in energy efficiency; (ii) mitigating the costs and risks of developing and investing in smaller projects; (iii) disseminating information on best practices in implementing energy efficiency services, technologies and cost recovery mechanisms; and (iv) providing medium-term loan and lease facilities.

4. The Indian Renewable Energy Development Agency Limited (IREDA): Development Strategy

To attain the Government's objective of accelerating the large-scale utilization of renewable energy sources, financing of alternate energy technologies and systems has to be mobilized. Cognizant of the reluctance of Indian financial institutions and commercial banks to assume the technological, business and financial risks associated with renewable technologies, IREDA was established in 1987 to finance pioneering investments and promote further technological improvements in the sector. IREDA's mandate is to catalyze the creation of larger markets for renewable energy technologies, thus lowering investment risks and costs. IREDA mounts technology promotion campaigns and offers entrepreneurial development training to foster investor interest in the sector. At the same time, IREDA nurtures proven and near-commercial technologies by financing, initially under concessional terms, business-oriented technology applications. And as the demand for the technology grows, IREDA subsequently adjusts its financing terms to approach market interest rates. By so doing, IREDA helps bring these technologies into the commercial mainstream with the end in view of encouraging other financial institutions and investors to include renewable energy in their regular lending and investment portfolio, respectively. IREDA's operations represent a unique experiment in commercialization of renewable energy which other countries are now looking at replicating.

- IREDA recently completed its first decade of service dedicated to the promotion, development, and financing of renewable energy technologies in India. Altogether, it has financed some 837 projects in the areas of wind energy, solar photovoltaic, small hydro, bio-gas, co-generation, briquetting, agro and solid waste power, bio-methanation, improved stoves, and solar thermal. Starting from a small financial resource base (capital and borrowings) of Rs 43 million and annual lending program of Rs56 million, the Company has successfully parlayed its operations into a multi-million rupee business. By 1997, IREDA's resource base reached Rs 6,197 million with an annual lending program of Rs3,287 million. Annual pre-tax profit earnings rose from Rs 1.5 million to Rs 205 million over the decade. During the last five years, disbursement levels doubled annually, profit increased at an average annual rate of 73%, assets by 67% and equity and reserves by 59%.
- Since 1993, Bank and GEF support through the Renewable Resources Development Project (Cr. 2449-IN, GET28633-IN) helped propel IREDA to its leadership position in developing market opportunities for renewable energy in the private sector. Due to the success of IREDA in promoting investor interest in various renewable energy technologies, the Agency is now attracting financing from other multilateral and bilateral sources. As an example, the wind generation program launched by IREDA with IDA and GEF support catalyzed over 900 MW of new capacity in India, way above the project target of 85 MW. DANIDA, ADB and export creditors have since provided additional financing for wind generation. In addition, ADB is supporting bagasse co-generation and bio-methanation applications through IREDA, and KfW and OECF, among others, have expressed interest to work with IREDA in financing various renewable energy investments.
- IREDA's operations in the next five years is projected to expand four-fold. To retain its competitive edge, IREDA will have to work from a solid financial footing, keep up with latest technological developments and continue to pursue sound and flexible business principles. Its financial asset base is expected to grow by more than 20% annually, which will have to be matched by a parallel growth in funding. IREDA's equity base will need to be strengthened to avoid the Company having to rely heavily on borrowings. Bank/IDA assistance is estimated to account for 20% of IREDA's borrowings. Recognizing the Government's limited budgetary resources, and given the private sector thrust in creating a large scale market for renewables, involvement of

Indian Financial Institutions (IDBI and ICICI) and private strategic investors in IREDA's equity base is being explored. Under the project, a plan for the diversification and expansion of IREDA's shareholdings will be formulated and its implementation initiated. IREDA's Board has agreed, in principle, to such diversification. IREDA has explored the concept with the IFIs and has received initial favorable response. Moreover, the participation of the private banking arm of multilateral institutions, such as the IFC and ADB will also be explored. The comprehensive portfolio and financial performance audit based on international standards, which IREDA will be commissioning under the project, will measure the business risks faced by IREDA and prepare the groundwork for IREDA's equity diversification.

C: Project Description Summary

1. *Project components (see Annex 2 for a detailed description and Annex 3 for a detailed cost breakdown):*

The project is a follow-up Bank lending operation with IREDA to expand the small hydro program beyond the southern region and to include innovative types of small hydro schemes. In addition, the proposed project will support a new initiative within IREDA to promote and finance the delivery of energy efficiency services and equipment, implementation of DSM schemes, and development of energy service companies (ESCOs).

a. The **Small Hydro component** will finance 200 MWs of small hydro investments by the private sector, with focus on the following types: (i) canal-based and dam toe schemes; (ii) run-of-river schemes; (iii) rehabilitation and/or upgrading of old plants; (iv) use of tail ends of cooling water systems of thermal power plants; and (v) stand alone micro-hydro schemes. It is envisaged that about 80% of the schemes would fall into categories (i) and (ii) ranging in size from 1MW to as large as 20 to 25 MW. Irrigation canal-based and dam-toe schemes are already being demonstrated to be relatively low-risk and cost-effective under the on-going IDA operation with IREDA. Under the Second Renewable Energy project, the loan window will also be opened to other types of small hydro initiatives to test the business risks and opportunities surrounding these transactions. Accordingly, financing will be made available for the development of run-of-river schemes in hilly areas, rehabilitation of old plants, and installation of off-grid systems in remote rural areas. While some of these initiatives involve more risks and are less economically attractive, the experience gained will serve as important input in mapping out a strategy for decentralized energy options for rural communities. The project is thus envisaged to result in assisting the states and private entrepreneurs in designing rural energy initiatives that would feature partnerships between private investors and user communities as well as embody appropriate service standards and cost recovery mechanisms.

b. The **Energy Efficiency/DSM** component will finance investments associated with: (i) design, development and implementation of integrated energy management services operated by ESCOs and end-users on a performance guarantee basis; (ii) purchase and installation of energy efficiency and/or load management devices and systems; (iii) production of energy efficient equipment; and (iv) end-user participation in SEB-and other utility-sponsored DSM programs.

End-user specific energy efficiency equipment installations involve the purchase and installation of a variety of energy efficiency and/or load management devices and systems. These represent schemes from among a wide spectrum of end-users in the commercial, industrial and institutional sectors. The end-use technologies cover efficient motors and motor-driven equipment, refrigeration, industrial cogeneration, boilers and steam drives, efficient lighting and a variety of thermal devices and electrical control equipment designed to reduce plant energy use. The size of the capital cost of the project is likely to vary from \$25,000 to \$250,000.

The ESCO-defined energy efficiency services will involve contractual partnerships with end-users. The ESCOs will avail of IREDA financing and implement integrated energy efficiency solutions in end-users' facilities under performance-based contracts. This will involve complete turnkey package of energy efficiency services including energy auditing, feasibility study preparation, performance contracting, brokering financing,

specialized contract documents, and marketing. The ESCOs will be most effective in delivering energy efficiency services to large industrial and commercial end-users with large and stable energy loads such as continuous process paper, steel and chemical industries. Major electrical energy efficiency measures would include cogeneration, load management controls, efficient motors, pumps and compressors and vapor absorption refrigeration. On the thermal side, key investments would include efficient boilers and furnaces, advanced combustion control systems, efficient steam systems, waste heat recovery and energy substitution. Investments involved will typically range from \$250,000 to \$1.0 million. The indicative pipeline of such schemes covers steel, chemicals and distilleries industry.

The Technical Assistance component will finance the following: (i) pre-investment activities aimed at developing a sustainable pipeline of energy efficiency investments, preparation of standard bidding documents for procuring ESCO services, operational and business development modules and information dissemination; (ii) establishing in-house capacity within IREDA to appraise, supervise and promote energy efficiency services and schemes; (iii) assisting participating states in promoting end-use efficiency including development of appropriate policy incentives; and (iv) training of public and private sector energy and industry officials and staff on energy conservation and DSM.

The GEF-financed TA will support the incremental costs associated with preparatory and project development and design activities. The key preparatory activity will involve mapping a strategy for investment planning and business development that will identify, characterize and prioritize energy efficiency/DSM projects and programs in terms of sectors, investments, customer response and interest, national economic and environmental goals. Supporting activities include publicity and promotional campaigns that will disseminate information on project guidelines and financing, development of ESCO proposals, and formulation of appropriate evaluation criteria. A national survey is planned to collate and synthesize information related to energy efficiency business development and investment including the identification of potential partners to foster the implementation of the TA program.

Major project design and development activities will include: a) provision of technical assistance (consultant) services on project proposal development, appraisal, procurement, quality assurance and monitoring/evaluation of projects; b) development of standard bidding documents for procuring ESCO and end-user defined energy efficiency services, equipment and installed system financing; c) preparation of operational manuals detailing the procedural guidelines and terms and conditions of IREDA's line of credit for energy efficiency business investments; d) preparation of business development modules to enable promoters and developers evaluate and prepare business proposals (typically these will focus on risk assessment and analysis of energy efficiency/DSM projects, ESCO financing models, market assessment of energy efficient technologies, and monitoring and verification protocols for energy savings); and e) dissemination of information on energy efficiency solutions to enterprise managers, developers/investors, energy consumers and others. A key focus will be on entrepreneurial development of prospective private sector energy efficiency service providers.

Project Costs and Financing

The following table shows a summary breakdown of the project costs per component:

In US\$ Millions

Component	Category	Cost incl. Contingencies	% of Total	IBRD	IDA	GEF	% of IBRD IDA, GEF Financing
a. Small Hydro Investments:	Physical						
Run-of-River (100MW)		155					
Canal falls/Dam toes (65MW)		75					
Thermal cooling water tail-ends (20MW); Plant upgrading & rehab (10MW); Stand-alone microhydros (5MW)		33					
Sub-Total		263	87.7%	120	30		86%
b. Energy Efficiency (EE) Investments: by industrial, commercial, utilities, ESCOs, equipment vendors	Physical	30	10.0%		20		11%
c. Technical Assistance							
Pre-investment activities: EE investment pipeline; business development & procurement models	Implementation Support	2					
Strengthening of IREDA in-house capacity in project appraisal, monitoring and promotion of EE	Capacity & Institution Building	3					
Policy development for private sector investments in ESCOs and DSM	Policy Support	1					
Program outreach and training	Capacity Building	1					
Sub-Total		7	2.3%	-		5	3%
Total Project Cost		300	100%	120	50	5	100%

2. Key policy and institutional reforms supported by the project:

a. The project will finance and promote small hydro sector development by the private sector in more states. It will foster establishment of policy incentives for off-site captive power development as well as for sale by private power producers to third parties and to the grid. The project will allow the participating states to track the best practices for operational and delivery arrangements for grid-interconnected as well as isolated small hydro development, which can then serve as basis for designing distributed generation and rural energy options involving the private sector.

b. The project will address institutional and market barriers to implementation of cost-effective energy efficiency measures among industrial and commercial sectors:

Policy Issues:

- *Skills and training needs* will be addressed through fostering investments in training, information gathering and dissemination;
- *Lack of energy efficiency data base* will be addressed through creation of comprehensive database on carbon emission sources and quantum as related to end-use energy consumption;

- *The slow adoption of energy conservation technologies* will be addressed through expansion of efforts to promote the production of high efficiency technologies in India;
- *Poor institutional capacity and coordination* will be addressed through implementation of institutional changes to increase the priority accorded to national conservation efforts and to improve the coordination of these efforts.

Private sector participation :

- *Weak financing institutional capability to develop and appraise energy efficiency projects.* The GEF-financed TA component will strengthen financing institutions' capacity to develop, appraise and finance ESCO and end-user defined energy efficiency investments;
- *Lack of knowledge on energy efficiency business transactions and allocation of risks/benefits.* The TA component will support development of skills and advance knowledge on the risks and benefits of energy efficiency business transactions;
- *Absence of performance contracting as a means to market and deliver efficiency services.* The project will formulate and test the validity and application of different energy efficiency project financing and implementation models that deliver performance based services;
- *Poor availability of private sector energy efficiency services* in the country. The project will expand private sector role in financing and delivering energy efficiency services and catalyze utility-led DSM programs.

3. Benefits and target population:

- a. The project will augment power supply to meet the growing demand for electric power by user industries. It will mobilize private sector capital and management expertise into the power sector, help diversify energy sources and reduce, albeit in a moderate way, heavy reliance of the energy sector on fossil fuel.
- b. The project will result in conservation of energy by industries and other end-users which, in turn, will directly result in reduced GHG emissions.
- c. The project will stimulate the development of an energy services market in the private sector and enhance an understanding of risks and benefits of energy business transactions. It will pave the way for the emergence of a new breed of entrepreneurs engaged in delivery and sales of electricity from small-scale decentralized power facilities and of energy efficiency services.
- d. Project beneficiaries are the industries, commercial establishments, communities and other electricity consumers served by the small hydro power stations and availing of energy cost savings and productivity gains as a result of energy efficiency and DSM investments.

4. Institutional and implementation arrangements:

Implementation period: Five and one-half years (FY1998/99 - 2003/04)

Project management: IREDA will be responsible for the overall management of the project. The Agency is organized to appraise, supervise and monitor all the energy sub-projects earmarked for funding. The small hydro unit at IREDA has established a good performance track record. A separate team to be headed by a General Manager will oversee the energy efficiency portfolio which will be manned by existing IREDA staff experienced in energy efficiency and management. In addition, IREDA will retain consultants and technical experts to assist in technical and economic evaluation of the sub-projects as well as perform quality control and field supervision work. The project incorporates activities designed to strengthen IREDA's capacity to undertake its project management role. As administrator of the technical assistance (TA) program, IREDA will engage the necessary

consultant services and participate in relevant training programs to strengthen its in-house capacity to appraise, supervise and promote its energy efficiency lending portfolio. IREDA will also organize and/or finance from proceeds of the TA program funds, business meetings, policy dialogue and training events for end-users, energy service providers, consultant firms, government agencies, financial intermediaries and other prospective players in the energy efficiency industry.

Executing Entities and Implementation Arrangements: As a financial intermediary, IREDA will on-lend the proceeds from the Bank loan and IDA credit to private developers and, on an exception basis, to state-owned corporations meeting IREDA's loan eligibility criteria. IREDA will ensure that sub-projects and their promoters comply with the sub-loan eligibility criteria provided in its Operational Policy Statement (OPS) as agreed upon between IREDA and the Bank. IREDA's clients, i.e., private sector developers, ESCOs, energy end-users and equipment vendors, will be responsible for the preparation, in-house or by their consultants, of the feasibility studies and energy audits, detailed engineering, securing the necessary licensing and power transfer/pricing arrangements, provision of necessary equity capital, and for applying for a loan from IREDA. The developers will bear ultimate responsibility for incorporating least-cost solutions in the plant design and for ensuring the integrity and safety of the schemes. Bidding, construction, installation, management, operation and liability associated with each scheme would rest with the lead developer. IREDA will retain consultants to advise its staff as well as its clients on quality assurance issues and project implementation management. IREDA will work proactively with project developers and industry in advancing energy efficiency financing and ESCO development in India.

On-lending terms: The IDA Credit will be extended to the Government of India and on-lent to IREDA under a subsidiary agreement. The IBRD loan will be extended to IREDA, as Borrower, to be guaranteed by the Government. Proceeds from the IDA Credit and IBRD loan will be on-lent by IREDA to private sector developers in rupees at terms and conditions based on IREDA's OPS. IREDA will assume the foreign exchange risk. IREDA's onlending rates for its various loan windows vary and are subject to change from time to time based on, inter-alia, IREDA's prevailing cost of funds, financial market conditions, commercial maturity of the technology, project gestation, and pay-back period of the investments being financed. Accordingly, some of IREDA's loan windows offer concessional financing, while those involving more mature technologies are available at more commercial terms. The specific on-lending terms and conditions applicable to each loan window are spelt out in IREDA's Financing Guidelines, a summary of which is given in Annex 10. These include on-lending terms for loan windows supported by proceeds from the Bank loan and IDA Credit which IREDA sets according to its assessment of what the market can bear, pursuant to its agreement with the Bank that said rates would approach market interest levels as the technology reaches commercial maturity. Notwithstanding the differential pricing among IREDA's loan windows, IREDA is required, under its OPS, to earn a positive return, in real terms, on its paid-up capital and reserves.

Currently, IREDA's on-lending terms for small hydros involve an annual interest rate of 16.5 per cent with a repayment period of 10 years, including a grace period of 3 years. The loan window for energy efficiency will be launched with this project. The initial structure of onlending terms for this loan window is under design and will be firmed up by December 1998 based on the structure of required financing emerging from the pipeline of energy efficiency schemes. Currently, the loan interest rate of IREDA for energy efficiency equipment is 16 per cent, with a repayment period of 5 years and grace period of 1 year.

Policy guidance and support: Policy support for attracting private investments into small hydro development will be provided by the respective state governments largely through the SEBs and energy development agencies. These may include provision of fiscal and financial incentives, issuance of construction permits, and allowing power purchase and delivery arrangements under commercially enforceable contracts. The Ministry of Non-Conventional Energy Sources (MNES) will also provide policy and administrative support, including policy interface with the states, to help sustain the momentum of the small hydro program. For the energy efficiency

component, a Steering Committee under the chairmanship of the Secretary, MNES, has been set-up to coordinate, monitor and provide policy and program support. Members of the Committee include the Energy Management Centre (EMC), Power Finance Corporation (PFC), Industrial Credit and Investment Corporation of India Limited (ICICI), National Productivity Council (NPC), and Department of Economic Affairs (DEA). The composition of the committee will be varied depending on perceived needs; special efforts will be made to consult with industry associations. Coordination among bilateral donors would be promoted in implementing similar or complementary programs, e.g., USAID programs (Energy Management Consultation and Training; Energy Conservation Applications) and the Indo-German Energy Efficiency Project for industry (G-EEP) being implemented by GTZ.

Accounting, financial reporting and auditing arrangements: IREDA operates an accounting system in conformity with the Companies Act. IREDA's statutory auditor is a private firm appointed by the Government of India on the advice of the Comptroller and Auditor General, who may also elect to carry out his own audit. In 1995, the Agency was declared a Public Financial Institution and classified as a Loan Company, and thus subject to the Non Banking Financial Companies Circular. IREDA's credit policy is sound as evidenced by the quality of its loan portfolio. In support of the planned broad-basing of its capital base, and with the view of determining IREDA's emerging capital adequacy requirements, IREDA has agreed to engage the services of external auditors during the project's implementation to perform a comprehensive financial and portfolio audit based on international accounting standards and international auditing guidelines. The upgrading of IREDA's financial management and accounting system, including computerization of financial data base and procedures, has been on-going with technical assistance support under the IDA-financed Renewable Resources Development Project and GEF-financed India: Alternative Energy Project. Since 1993, the Financial Services group has been strengthened, experienced accounting and finance staff recruited and the range of financial management and planning activities widened. The unit's functions now range from accounting and budgeting matters to asset, liability and risk management. The Financial Services group ably managed IREDA's multi-fold increase in disbursement and business activities during the past years. IREDA has been in compliance with the key financial covenants under Credit 2449-IN. In addition, IREDA ensures that its clients have accounting and internal control systems which will support financial information required to assess sub-project implementation performance under the sub-loan agreements. IREDA will furnish the Bank copies of its annual financial reports and current and five-year business plan together with five-year financial statements and cash flow projections. In addition, IREDA will furnish the Bank with quarterly financial reports on the status of project implementation which will provide a comparison of project expenditures with budgeted amounts, and establish linkage with performance indicators. The draft quarterly reporting formats will be discussed and agreed at negotiations.

The Government will maintain records and accounts for project expenditures financed from proceeds of the Credit, including those made on the basis of statements of expenditure. These accounts will be annually audited in accordance with appropriate auditing principles by independent auditors acceptable to the Association. The Government will also furnish the Association, not later than six months after the end of each fiscal year, copies of the audited reports including a separate opinion by the auditors as to whether the statement of expenditure, together with the procedures and internal controls involved in their preparation, can be relied upon to support the related withdrawals. The project accounts will be prepared on a quarterly basis showing actual expenditures compared to the budgeted amounts including an analysis for the variances.

Monitoring and evaluation arrangements: IREDA would monitor and evaluate sub-project performance through regular field visits and progress reports from its clients. IREDA's respective project teams would handle sub-project monitoring and supervision. IREDA will furnish the Bank progress reports on the status of the physical works, consulting services, sub-project costs, contract processing and performance, disbursement, and administrative arrangements for the project within 45 days of the end of each quarter. In addition, the progress reports shall contain separate sections reporting on the following: (a) IREDA compliance with the OPS; (b) compliance by sub-borrowers with conditions of the sub-loans; (c) changes in policy incentives for programs; (d)

loan portfolio performance analysis; (e) status of multi-donor technical assistance program; and (f) latest record of its own institutional development program. Moreover, the GHG abatement benefits that result from the implementation of energy efficiency/DSM projects will be monitored and reported. An evaluation system for assessing the sustainability and effectiveness of GEF's intervention in catalyzing the ESCO business in India will be developed and implemented. The Bank will field regular supervision missions to IREDA to review the Agency's corporate and financial performance and evaluate the quality of its loan portfolio. The missions will involve field visits to sub-project sites to elicit sub-borrower feedback, verify status of sub-project progress, and identify and resolve issues affecting project performance. A third party supervision team will be commissioned by the Bank to undertake an independent review of the project, and its recommendations will feed into the mid-term project review. The Procurement, Disbursement and Audit (PDAT) Unit of the Bank's New Delhi Office will be actively involved in the supervision of the project in aspects relating to PDAT's functional services.

D: Project Rationale

1. Project alternatives considered:

- One option is not to extend a second line of credit to IREDA and to let the commercial banking institutions in India support the financing requirements of small hydro developers. However, since the program has so far been largely limited to a few southern states, there is a need to support similar programs in other states and assist them in creating an attractive investment environment. The project will also support innovative small hydro schemes in remote and hilly areas. The market risks to be faced by new entrants to the small hydro business will likely constrain the commercial banking sector from providing requisite financing. Further, the commercial banks are not poised to undertake the requisite policy and technology promotions aspects of the program, whereas IREDA has developed the in-house capacity to do so.
- Unlike the first operation wherein Bank group support consisted fully of IDA and GEF financing, in view of the progress made in commercializing the small hydro technology, IDA financing for the proposed project is being limited to less than 30%, with the IBRD loan accounting for the major part of Bank assistance. The Credit will assist IREDA in offering attractive terms for its energy efficiency loan window, as well as for new entrants to small hydro business in newly participating states, including developers of the riskier hydros schemes in hilly and isolated areas.
- Bank support for energy efficiency is currently being extended through the state power sector restructuring programs. Nevertheless, the Bank intends to pursue all feasible options in this area. Since power utilities are not set up to finance investments on the customer side of the meter, they will require services of financial intermediaries which can assess and assume the credit risks associated with end-user lending. A parallel support through IREDA will thus complement energy efficiency efforts in these states, as well as encourage private sector initiatives in other states to pursue both thermal and electrical efficiency opportunities.
- Providing the energy efficiency loan to IDBI, the Industrial Credit and Investment Corporation of India (ICICI) or state-owned financial entities was not considered because these banks restrict their activities to relatively large-scale diverse industrial modernization and development which may marginalize the energy efficiency window. State development institutions were not considered due to their generally poor performance track records. In contrast, IREDA is capable of serving a market niche among small and medium-scale projects in various sectors in which its business has made inroads and is thriving, and the Agency is able to provide the special promotional support needed for the project.
- IREDA's role in advancing carbon emission mitigation by mobilizing private capacity is a critical basis for its selection as implementing agency for GEF's technical assistance for energy efficiency component. Energy conservation or savings of conventional energy through substitution by renewable energy resources has been a key result of IREDA's programs. In addition, there is close synergism between IREDA's renewable energy activities and those required to advance the energy efficiency program. It is envisaged that the catalytic effect such as that resulting from the IDA/GEF-financed windfarm program managed by IREDA will be replicated in the energy efficiency program.

- Finally, while the project is private sector oriented, no private entity was found suitably prepared to offer both technology promotions services as well as financial services for small and medium sized entrepreneurs such as that currently rendered by IREDA.

2. Major related projects financed by the Bank and/or other development agencies (completed, ongoing and planned):

Sector issue	Project	Latest Supervision (Form 590) Ratings (Bank-financed projects only)	
		Implementation Progress (IP)	Development Objective (DO)
<u>Bank-financed : On-going</u> Development of renewable energy for electric power	Renewable Resources Development Project/Alternate Energy (Cr.2449-IN/GET 28633-IN)	S	S
Demand side management as part of state power sector reform	Orissa State Power Sector Restructuring Project (Ln4014-IN) Haryana APL I (Ln 4271-IN)	S	S
<u>Planned:</u> Demand side management as part of state power sector reform projects	Rajasthan and AP Power Sector Restructuring projects		
<u>Other development agencies</u> Asian Development Bank (ADB)	Renewable Energy Development Industrial Energy Efficiency Project		
U.S. Agency for International Development co-financing with Bank Ln3436-IN	Energy Management, Consulting and Training (EMCAT)		

IP/DO Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

3. Lessons learned and reflected in the project design:

- Under the first project, the cost of civil works for small hydros was underestimated during project appraisal and loan financing was focused on equipment supply. This resulted in slow project completion and delayed loan disbursement as the borrowers had to first mobilize co-financing for the civil works which preceded equipment orders and deliveries. The proposed project recognizes the significance of civil works expense for which Bank financing will be made available. This will facilitate timely project completion.
- A sufficient sub-project pipeline must be in place and early procurement action commenced to ensure timely loan disbursements. IREDA has received applications for small hydro schemes involving an aggregate capacity of over 60MW, representing about 30% of the target hydro capacity. Project developers have been advised on the tendering process acceptable to the Bank and advanced procurement actions have been taken by several developers. Likewise, loan applications from the private sector for energy efficiency schemes involving the entire proposed value of the energy efficiency component have been received by IREDA and are now under evaluation.
- Whenever applicable, agreement by SEBs to provide the necessary transmission and sub-transmission line facilities to connect the small hydro plants will have to be reconfirmed by IREDA with the State authorities given the deteriorating financial positions of many SEBs. As in the on-going operation, cost of interconnection facilities are eligible for funding.
- In the late eighties, the Bank developed an Industrial Energy Efficiency Project in India which was later abandoned. Among the lessons learned from this experience are those related to the linkage between energy efficiency market barriers and the need for basic structural reforms in the power sector; e.g., pricing as well as non-pricing barriers due to lack of appropriate tariff regulatory framework and inadequate institutional capacity

to design and implement utility led DSM programs. The current approach is to work in parallel, but separately, on incentive-setting sector reforms and on project-specific design and operational issues. To this end, the Bank is supporting one on-going and four planned DSM components as part of power sector restructuring projects in various states. The project will benefit from the experience gained in the design and development of these DSM projects.

- Lessons learned from the on-going Bank-financed DSM project in the State of Orissa are that : (a) alternatives to utility driven DSM programs need to be explored to fully address market development barriers, (b) the role of financial institutions is critical to appraise and administer EE/DSM loans; and (c) in the absence of such financial institution support, utilities would be reluctant to finance energy efficiency projects on their own. The current project plans to develop capacity in an Indian financial institution (IREDA) to appraise and finance efficiency investments.
- Lessons learned from two other ongoing DSM programs outside India, namely in Mexico and Jamaica, are that (a) pricing and regulatory reforms are necessary, but not sufficient, to maximize and capture energy efficiency potential; and (b) key market barriers must be addressed in a sustainable way to expand EE investments. The proposed project plans to develop sustainable businesses such as ESCOs.
- Two current energy efficiency projects (under development) in Brazil and China will catalyze a market-based energy efficiency industry, primarily ESCOs. The proposed project, however plans, to foster other market delivery mechanisms in addition to ESCOs. Progress of the China and Brazil projects will be monitored for their applicability to the Indian situation.
- Based on the deliberations of the IBRD/USAID/IREDA-sponsored workshop on Energy Efficiency held in February 1997 in which progress of various programs was reviewed, it was recognized that favorable prospects exist for investments by industries in energy efficient products, devices and systems. However, the workshop concluded that development of energy efficiency services aimed at providing integrated cost-effective solutions face greater challenges due to the nascent nature of the Indian ESCO industry and the lack of experience in performance contract arrangements. Consequently, a tepid market response may be generated during the initial stages of the component until the commercial returns of such ESCO-based transactions are amply demonstrated through pioneering schemes.

4. Indications of borrower commitment and ownership:

Small Hydro Component

- A shelf of 20 projects already exists of which 14 have been appraised and approved by IREDA.
- Promoters have been advised of procurement procedures acceptable to the Bank, and tender documents have already been prepared and floated for 11 schemes. Some contracts have already been awarded and construction has started in a few schemes.
- Consultants for appraisal and supervision of sub-projects, and for procurement review, are positioned to assist IREDA staff in further evaluation.
- Consultants for quality assurance and environmental assessment upgrading are being engaged.
- Terms of Reference and selection of consultants to complete pre-feasibility study for innovative types of small hydro have been made.

Energy efficiency/DSM component:

- IREDA organized and hosted, with support from World Bank and USAID, a workshop on Energy Efficiency Project Development and Financing in February 1997. The workshop served as a pre-project marketing activity with participation of over 75 representatives from government, energy audit firms, vendors, financial institutions, end-users and leasing companies.
- A pipeline of sub-projects has been prepared ranging from ESCO-defined energy efficiency services to discrete investments in industrial energy efficiency devices and installed systems. Loan applications have been received by IREDA involving \$30 million worth of investments which are currently under review.

- The position for general manager/deputy general manager to head the energy efficiency unit has been advertised. Shortlisting from among 75 applications received is now on-going.
- Consultants have been engaged to assist IREDA in appraising the loan proposals for energy efficiency investments and in developing an appraisal manual for staff use and guidance of borrowers.

5. Value added of Bank support in this project:

- Bank support will help extend the small hydro program beyond the Southern region to other states in India and thus sustain the momentum of on-going policy development and technology promotions efforts to bring small hydro investments into the commercial mainstream.
- Bank financing will help mitigate the risks associated with energy efficiency investments.
- The Bank's continuing dialogue with reforming States, in which private investments, competition in generation and transmission access are fostered, supports the project objectives. Moreover, the reform initiatives include preparation of DSM-related schemes which can serve as a take-off point for development of a robust lending pipeline for IREDA's energy efficiency loan window. Conversely, IREDA's energy efficiency programs are also likely to advance the DSM objectives of the states' power sector reform.
- Best practices emerging from the energy efficiency portfolio in other countries will be shared with project participants in order to improve project performance effectiveness.
- The GEF grant is critical if the project is to achieve measurable success in addressing several pervasive non-price and market barriers to energy efficiency in India. GEF support will enable India to mobilize, with international support, alternative approaches to developing and financing conservation projects.
- The GEF-financed energy efficiency TA would contribute to strengthening in-country capacity to develop and appraise market-driven projects; advance knowledge on the risks and benefits of business transactions, and expand private sector role in financing and delivery of performance-based services.
- Finally, as demonstrated in the wind and small hydro sectors, Bank support for these technologies, has raised the awareness of the domestic banking institutions on the opportunities afforded by renewables resulting in their providing stand-alone financing for wind projects, as well as co-financing for IREDA-approved small hydro schemes. It is envisaged that a similar response would be elicited from the banking sector for energy efficiency investments leading to mainstreaming of energy efficiency and small hydro investments in their loan portfolios.

E: Summary Project Analysis (Detailed assessments are in the project file, see Annex 12)

1. Economic (supported by Annexes 4 and 5):

[x] Cost-Benefit Analysis : Small Hydro: ERR= 20% to 51% (real); Energy Efficiency: ERR= 26% to over 100% (real).

Each investment scheme is subject to economic appraisal by IREDA. Project viability is evaluated based on market demand, project costs, value-engineering design, and least cost analysis. Only schemes which generate a minimum of 12% economic internal rate of return in real terms are considered.

a. Small hydro: Given the chronic shortfall in grid power supply and decentralized location of the schemes, economic benefits from small hydro are expressed in terms of the avoided cost of energy supply from self-generation through diesel plants. This is estimated to reach Rs 3.38 per kWh in 1997 prices. Economic costs of the schemes are derived by adjusting the capital and operational expenses for taxes and duties, and applying a standard conversion factor (SCF) of 0.9 to the local costs. Annual operation and maintenance costs are taken at 2% of capital costs. A 20-year period of evaluation is used. Economic rates of return for the small hydro sub-projects in the pipeline range from 20 percent to 51 percent.

b. Energy Efficiency: In estimating the economic costs of several indicative energy efficiency schemes (3 ESCO projects, 12 end-user specified installation of energy efficiency equipment and 1 utility-based DSM

scheme), costs and benefits were adjusted for taxes and a standard conversion factor of 0.9 was applied to local costs. Resulting economic rates of return range from 26% to 155%. It is expected that IREDA will be able to estimate with greater precision the value of energy savings involved in each scheme based on more detailed information that will be required of applicants on specific project equipment costs, fuel and energy supplies and their respective border prices.

2. Financial (see Annexes 4 & 6):

Rates of Return (nominal): Small Hydro: FRR= 21% to 40% ; Energy Efficiency: FRR= 27% to over 100%

a. *Project Level.* A sub-project qualifies for financing only if it yields a minimum financial IRR of 12 per cent, IREDA's hurdle rate. In addition, only those schemes which generate sufficient savings or revenues to service the debt obligations with IREDA and other sub-project creditors are accepted. The corporate financial performance and credit standing of the borrower is also evaluated and appropriate lending limits applied based on assessed credit risk and corresponding security packages established.

Small hydros: The FIRRs of approved small hydro schemes currently in the pipeline range from 21 per cent to 40 per cent. Energy efficiency schemes in the indicative pipeline yield FIRRs ranging from 27 percent to over 100 percent. The financial returns on the investor's equity taking into account debt and corporate tax structure are also estimated for small hydro schemes based on conditions stipulated in the operating agreements with the States and at lending rates currently offered by IREDA. It is assumed that developers will contribute at least 25 per cent in the form of equity. Financial returns on equity (post tax) range from 14 percent to 46 per cent.

Energy efficiency schemes in the indicative pipeline yield FIRRs ranging from 27 percent to over 100 percent. Financial returns to equity were also estimated yielding returns ranging from 34 per cent to over 300 per cent. Despite such attractive returns, financial institutions have been slow to respond. Two of the important reasons are: generally small size of the individual investments encountered in practice; and, lack of in-house expertise to assess reliability of energy bill savings that would enable loan repayment.

b. *Fiscal impact:* The project's fiscal impact is expected to be neutral in the medium term. Benefits derived from increased sales and reduced energy costs point to quick pay-backs to participating industries and utilities in terms of improved productivity and profitability. The foregone tax revenues resulting from incentives provided by participating states in terms of accelerated depreciation charges and tax relief to investors are compensated by improvement in operating margins which in turn will generate tax revenues. Positive fiscal impact will be generated when the demonstration effects of the project are taken into account.

c. IREDA's Corporate Financial Performance (Refer to Annex 6)

- Since its creation in 1987, IREDA's business dramatically expanded, and the past decade saw IREDA's financial operations consistently outperform earlier expectations. For example, results of IREDA's operations in FY1997, exceeded appraisal projections prepared by the Bank in 1992, by posting 100% more in net profits, 45% higher in disbursement levels, and about 10% more in asset base. IREDA's success needs to be seen within the context of the Agency's two main objectives. On the one hand, it extends financial assistance to entrepreneurs in renewable energy on which it should earn sufficient spreads on its funds. On the other hand, IREDA is mandated to promote new and innovative technologies. Accordingly, IREDA not only underwrites the costs of technology promotions and awareness campaigns, it also has to ensure that its lending rates are sufficiently attractive to offset perceived technology risks. While discharging these functions, IREDA is expected to maintain a solid financial position to ensure its long-term existence. This requires careful balancing between IREDA's promotional and financial service activities. To date, IREDA has performed creditably in the discharge of its dual mandate as reflected in the table below:

Highlights of IREDA's Financial Performance FY90 to FY97
(Rs. million)

	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97
Annual Disbursements	49	82	102	182	562	1309	2386	2375
Net Profit after Tax	5	1	16	50	31	53	75	140
Return on Paid-in Capital	6.5%	12.4%	16.5%	49.7%	12.9%	21.6%	17.2%	18.3%
Return on Invested Capital	4.3%	6.6%	11.2%	12.4%	9.5%	7.4%	9.2%	12.6%
Total Assets	189	474	619	723	1218	2542	4714	7352
Capital Base	186	187	295	425	516	1146	1477	1952

IREDA has been in compliance with the provisions of its Operational Policy Statement (OPS) earlier agreed with the Bank, except that at the end of FY1997, its debt service coverage ratio stood at 1.4, or short of the target 1.5. The original OPS calls for IREDA to earn a positive return, in real terms, on its paid-in capital and reserves, maintain a debt service coverage ratio (DSCR) not lower than 1.5, and a maximum debt to equity (including grants) ratio of 4:1. In view of the growing demand for its services, IREDA would have to expand its business operations for which IREDA plans to mobilize funds from other external funding sources (e.g., ADB, KfW, OECF) and promote co-financing with local financing institutions. To increase the leverage capacity of IREDA and permit requisite business expansion, the OPS is being modified to provide for a DSCR of 1.3 and D/E ratio of 5:1. Moreover, with IREDA now able to directly access foreign exchange loans, the OPS is being modified to allow the Company to assume and manage the forex and interest risks associated with these loans. For this purpose a forex management unit is being set up for which advisers are being engaged to design forex risk management programs and to train staff.

In spite of the relatively high technological and commercial risks associated with IREDA's business, IREDA has so far been able to maintain a sound loan portfolio characterized as follows: Normal accounts, 95.6%; sub-standard, 3.5%; doubtful, 0.5%; and loss, 0.4%. Overdue loans represent 4.4% of IREDA's overall loan portfolio considerably below the levels of non-performing assets reported by some leading domestic commercial banks which range from 10% to 39%. Nevertheless, the level of overdue in IREDA's portfolio is on the rise particularly as a result of the industrial slowdown in recent years. Accordingly, under the project, a comprehensive portfolio audit and related diagnostic studies will be undertaken with the view of determining loss provisioning and capital adequacy requirements appropriate to the risks associated with IREDA's business operations.

- In view of IREDA's growing operations and increasing involvement in higher-value loans, further improvements in credit management and portfolio review capacity will be called for. The technical assistance program (TAP) associated with the on-going IDA operation already supports several initiatives for upgrading IREDA's financial management systems. Consultants for credit, asset and liability, and for risk management are currently being recruited.

3. Technical:

- IREDA reviews the technical soundness of each investment scheme based on the detailed project reports (DPR) prepared and submitted by the private developers and their consultants. In the case of small hydro schemes, the DPR includes, inter alia, the hydrological data, results of geological surveys, and plant engineering designs. The promoters also are required to demonstrate use of appropriate designs based on value engineering considerations. Technical configurations for irrigation canal and dam-toe based schemes, as well as for run-of-river schemes, have been shown to be cost-effective and viable under the ongoing IDA-financed Renewable Resources Development Project. Quality assurance review during construction and commissioning will be conducted by consultants engaged by IREDA. Operational manuals on appraisal and monitoring of small hydro

schemes were developed under the on-going IDA operation. Guidelines to borrowers on preparation of small hydro investments including acceptable procurement procedures are available.

- Technical capability for delivering energy efficiency services is reasonably developed in India. There are a large number of energy audit companies located mainly in the Western and Southern regions. These firms conduct detailed energy audits, techno-economic analysis of energy efficiency options and provide engineering system designs for recommended solutions as well as offer procurement and implementation services. However, there is only a handful (about four) of ESCOs operating in India and most have yet to offer full range of integrated energy services under performance contract arrangements. ESCO formation is thus an area to be promoted under the project.
- Generally the technical risks associated with energy efficiency projects are minimal to moderate since in most cases the projects involve known and tested engineering/technological applications. However, in the case of innovative measures (ESCOs and integrated systems solutions) that have been largely untried in the Indian situation, the risk of failure is being addressed by carefully designed implementation plans, including monitoring, verification and dissemination activities proposed under the current project. Furthermore, in the case of ESCO projects, the technical risk of energy efficiency project performance will be assumed by the ESCO. These risks will be assessed at the time of project development and will be reflected in the performance contracts between the parties.
- IREDA reviews the technical soundness of each investment scheme based on the detailed project reports (DPR) prepared and submitted by the private developers and their consultants. For energy efficiency schemes, IREDA will assess the performance effectiveness of the energy management techniques applied and equipment to be installed. Appraisal and monitoring manuals, guidelines for borrowers, as well as model bid documents for procurement of ESCO services will be developed under the project's technical assistance package.

4. Institutional:

- a. A key result of the project is to enhance awareness and interest among the investor community and energy consumers on the business opportunities and socio-economic benefits afforded by development of energy efficiency services and of small hydro and other renewable energy resources. As described earlier, there are several market and institutional barriers to energy efficiency investments and ESCO formation which the project will be addressing through the GEF-financed technical assistance program. On the part of small-scale power plant investors, a key challenge lies in the forging of alliances among various stakeholders at the state and local level so as to result in timely plant commissioning and sustainable delivery of power. On the other hand, local engineering consultancy base for small hydro development is relatively mature and widespread in India, and local and joint venture turbine manufacturing facilities have expanded since the launching of IREDA's IDA-assisted loan window, with equipment supply generally meeting performance norms.
- b. An innovative aspect of the project involves exploration of alternative arrangements for bringing the benefits of distributed generation to the rural areas particularly in the grid expansion zone, and possibly to isolated areas. The experiences gained by the entrepreneurs in operating off-site small hydro facilities are expected to result in lowering of risks associated with future transactions which opens an opportunity to stimulate investor interest in setting up mini-grids to serve the rural areas in cases where the economics of distributed generation prove favorable.

5. Social:

The bulk of small hydro schemes will be built within the right of way of existing canals or dams and will therefore not involve land acquisition nor displacement or resettlement of people. In cases where land is acquired, this will be done on a private "buyer-seller" basis. Sub-borrowers will be required to conduct a Social Impact Assessment (SIA) and the results presented as part of the detailed project report to be submitted to IREDA for appraisal. IREDA's staff will review the identified social impacts and ensure that they are addressed in accordance with the SIA Framework agreed with the Bank. A set of SIA guidelines (refer to Annex 9) will be issued by IREDA to its clients together with the SIA Framework and the Bank's OD: 4.30. The project is expected to yield positive social impact. Many of the enterprises that will avail of the output of the small hydro projects and savings from energy efficiency employ significant numbers of low-income people. Energy efficiency will increase enterprise productivity including improvements in the reliability of power supplies. These positive outcomes will help ensure the enterprises' financial viability, encourage expansion of operations and increase employment opportunities.

6. Environmental assessment: Environmental Category: B

a. The project will have limited adverse impact on the environment, and will contribute to improved air quality by displacing fossil-based energy systems, particularly, diesel engines and kerosene lamps. Replacement of diesel for power generation will reduce emissions of SO_x, NO_x, CO₂ and particulate. The small hydro schemes will largely be on existing irrigation works and cause minimal changes to the existing environments. IREDA requires that all projects in its portfolio have central government and state environmental clearances. IREDA's technical staff will review environmental issues and advise borrowers on the preparation of environmental impact assessments. A set of environmental review guidelines (Annex 8), acceptable to the Bank, is being issued by IREDA to its clients.

b. Justification/Rationale for category rating: The project directly supports environmentally friendly technologies and initiatives. Small hydro development reduces reliance on polluting fossil-based fuels and avoids the environmental issues associated with large hydros. Most schemes will be situated in existing canals where basic infrastructure facilities are already in place. Only schemes meeting Government environmental standards and the Bank's OD 4.01 will be financed. Furthermore, improvements in electrical and thermal energy efficiencies in industrial and other operations will advance local, regional and global environmental objectives. At the plant level, the project will reduce air pollution associated with thermal energy conversions, e.g., combustion of fossil fuels. At the regional level, energy savings would reduce the possibility of acid rain and particulate emissions since the Indian power system would reduce the use of coal at the margin. Benefits at the sub-continental or global level relate to the positive impact of reduced carbon emissions on climate change.

7. Participatory approach:

a. Most of the canal and dam-based hydro projects will normally be built on land owned by government entities in which case consultation with landowners will rarely be necessary in regard to the siting of the projects. Utilization of water for power generation will require information sharing with other users of the water. Construction activities will likely involve workers coming from outside the development area requiring consultation with local communities during preparation stages. In the case of sub-projects featuring isolated small hydro schemes for power distribution to remote communities, project proponents would have to foster active involvement of beneficiary electricity consumers from the project design phase through the operational stage to ensure adequate end-user support.

b. Other key stakeholders: State electricity boards, irrigation departments, equipment suppliers and other electricity service providers would be involved in various stages of sub-project preparation and implementation as

these entities will be providing administrative, logistical and operational support to ensure that the sub-projects become operational. A series of business meetings on small hydros have been organized by IREDA in several states over the recent years, during which program and policy information have been shared with various stakeholders.

c. Local groups and NGOs consulted: Extensive discussions have been conducted at several Energy Efficiency workshops and seminars with potential project participants that include industry, energy efficiency companies, research institutions, government agencies and NGOs. These discussions have resulted in the constitution of a multi-agency Steering Committee, represented by the above local groups, to oversee and guide the project.

F: Sustainability and Risks

1. Sustainability:

The small hydro projects will be designed to last for more than twenty years, and as revenue earning assets, there will be a strong incentive for the owners to maintain them in good condition. Sustainability is supported by the low costs involved in running the plants and establishment of long-term arrangements for their operation by the private sector. IREDA would promote and foster the role of the private sector to deliver energy efficiency services through profitable, cost-shared business arrangements. The cost savings resulting in short pay-back periods would render energy efficiency investments replicable. Pilot projects that test a wide range of energy efficiency investment models would also enhance understanding of commercial, technical, institutional and other risks that surround energy efficiency project development, financing and implementation. Thus, the project will assist in arriving at empirical-based measures of the business and other risks associated with the transactions as well as validate achievable technical energy savings. These would help reduce the perception of risks associated with energy efficiency project financing in India. The project is expected to generate interest among commercial financial institutions in India to include small hydro and energy efficiency financing in their loan portfolios. IREDA's performance to date shows that it is able to help bring renewable energy technologies into the commercial mainstream through its business and training meetings with developers, co-financiers, and suppliers, and through networking with technical consultant firms, and encouraging state entities to foster private development of the large potential of small hydro sites and energy efficiency schemes identified in state and utility surveys.

2. Critical Risks (reflecting assumptions in the fourth column of Annex 1):

Risk	Risk Rating	Risk Minimization Measure
Shifts in government policy incentives for private development of small hydros will deter investors	Low	Experience in southern states demonstrate best practices in attracting private investments which can be improved upon by newly participating states; sub-projects are approved only after power sales and delivery contracts are finalized
SEBs contracted to purchase energy generated by some small hydro sub-projects are not able meet payment obligations	Substantial	For schemes involving purchase power agreements (PPA) with SEBs, a revenue escrow account will be established by the SEB. Moreover, the PPA provides for sale of the output to a third party in case of a default on the part of the SEB.
Energy efficient products, devices and installed systems, as well as services and delivery infrastructure, are not readily available to meet end-user demand	Low	Cost effective end-use efficiency technologies are stimulating market conditions. Prospects exist for well-defined vendor-managed activities aimed at selected market niches.

ESCO-defined energy efficiency services and integrated energy solutions are still at a nascent stage of development.	Substantial	The energy efficiency/DSM investment component is limited to \$30 million or 10 per cent of total project cost, and is supplemented by TA support for project development and promotion of the emerging energy efficiency service industry.
Demand for energy-efficiency investments does not materialize or is not translated into bankable schemes	Modest	Program will focus on creditworthy commercial and industrial consumers where the energy bill represents 15-50% of the total operating costs and for which the pay-back from energy efficiency investments and services would be high. Demand will be fostered by promoting integrated energy services through ESCOs. TA is being provided to assist investors in preparing bankable energy efficiency/DSM projects.
Overall Risk Rating	Modest	

3. Possible Controversial Aspects: NIL

G: Main Loan Conditions

1. **Effectiveness Conditions:** Normal legal opinions and security documentation for Bank loan and IDA Credit.

2. *Other [classify according to covenant types used in the Legal Agreements.]:*

Project Implementation and Financial Performance	<ul style="list-style-type: none"> ◇ Operational Policy Statement (OPS): IREDA shall implement the OPS and consult with the Bank/Association before any material modification is made to it. ◇ Within eight months of loan effectiveness, IREDA shall engage the services of external auditors to perform a comprehensive financial and portfolio audit based on international accounting standards and international auditing guidelines with the view of determining suitable loss provisioning and capital adequacy requirements. ◇ By not later than December 1, 1999, IREDA shall provide to the Bank/Association a timebound action plan for restructuring its capital base and inter alia expand its shareholder base, taking into account the recommendations of the aforementioned financial and portfolio audit. ◇ Except as the Bank/Association shall otherwise agree, IREDA shall not incur any debt, if after incurring such debt, the debt to revolving fund (i.e., paid-in capital + reserves + grants) shall be greater than 5:1. This ratio may be revised taking into account the recommendations on capital adequacy and leverage ratios emerging from the aforementioned financial and portfolio audit. ◇ Except as the Bank/Association shall otherwise agree, IREDA shall not incur any debt, if after incurring such debt, the debt service coverage ratio falls below 1.3. ◇ IREDA shall include in its sub-loan agreements a provision to ensure that its clients meet environmental and R&R standards acceptable to the Government and the Bank/Association. ◇ Each scheme estimated to cost the equivalent of US\$5 million or more shall be subject to prior approval by the Bank/Association, as well as the first two schemes on energy efficiency, and the first ESCO-based scheme, regardless of project cost.
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<i>Accounts/ Audit, Fund Flow and Counterpart Funding</i>	<ul style="list-style-type: none"> ◊ IREDA shall furnish to the Bank/Association audited financial statements within six months after FY end, along with auditor's report. ◊ IREDA shall furnish to the Bank/Association by December 31 of each year, the financial and cash flow statements showing the estimates of the current year and the projections for the following five years. ◊ With respect to the Loan and Grant, IREDA shall open a Special Deposit Account with the State Bank of India, or any other national bank acceptable to the Bank. ◊ IREDA shall furnish to the Bank/Association audit report of the Special Account not later than six months after the end of the FY. ◊ With respect to the Credit, Government shall open a Special Deposit Account with the State Bank of India and shall furnish to the Bank/Association audit report of the Special Account not later than six months after the end of the FY. ◊ Government shall enter into agreement with IREDA for the payment by IREDA of a guarantee fee equivalent to <i>1.2 per cent per annum</i> for the principal amount withdrawn and outstanding from the Loan from time to time. ◊ Government to inform the Bank/Association by March 31 each year the approved budgetary allocation for IREDA for the following fiscal year.
<i>Monitoring, Review and Reporting</i>	<ul style="list-style-type: none"> ◊ IREDA will submit quarterly progress reports within 45 days after the close of the quarter. ◊ IREDA to engage independent consultants to carry out a mid-term review of the project and furnish findings of the review to the Bank/Association no later than October 31, 2000. A "mid-term" review by the Bank will take place on or before December 31, 2000

H. Readiness for Implementation

- [X] The engineering design documents for the first year's activities are complete and ready for the start of project implementation. A few schemes are already under construction.
- [X] The procurement documents for the first year's activities have been floated, and some contracts awarded.
- [X] The Project Implementation Plan has been appraised and found to be realistic and of satisfactory quality.

I. Compliance with Bank Policies

- [X] This project complies with all applicable Bank policies.

Magdalena Manzo, Task Leader, SASEG

Alastair McKechnie, Sector Manager, SASEG

Edwin R. Lim, Country Director, India

Annex 1 Project Design Summary

India: Second Renewable Energy Project

Narrative Summary	Key Performance Indicators	Monitoring and Evaluation	Critical Assumptions
a. Sector-related CAS Goal: <ul style="list-style-type: none"> • Reduce infrastructure bottleneck by promoting private investment in energy sector • Ensure environmental sustainability in energy sector by exploring renewable energy and energy efficiency strategies b. GEF Operational Program: <ul style="list-style-type: none"> • Reduce GHG emissions 	<ul style="list-style-type: none"> • Increased private sector investments in small hydro plants in various states • Increased private sector financing of energy efficiency activities • Increased efficiency by target end-users. • Avoidance of carbon emissions 	<ul style="list-style-type: none"> • MNES annual report on status of small hydro development in India • IREDA and Energy Management Centre (EMC) reports on growth of energy efficiency service sector • Energy audits, quantification of GHG reductions based on estimated savings in fuel consumption 	(Goal to Bank/GEF Missions) <ul style="list-style-type: none"> • Assumes private investments will improve quality and efficiency of energy supply and services in India • Assumes that the demand for energy efficiency financing exists • Assumes other reform initiatives in the power sector are gaining ground
a. Project Development Objective: <ul style="list-style-type: none"> • Increase power supply through development of environmentally sustainable small hydro schemes • Promote energy efficiency and demand-side management (DSM) investments b. Global Objectives: <ul style="list-style-type: none"> • Remove market barriers to delivery of energy efficiency services and products. 	<ul style="list-style-type: none"> • Increase in small hydro installed capacity during the Ninth and Tenth Plan period • Increased availability and utilization of energy efficient products & equipment and of ESCO services • Energy efficiency service providers are able to gain market entry 	<ul style="list-style-type: none"> • MNES report on status of small hydro development in India • IREDA's quarterly progress reports and end-user feedback 	(Objective to Goal) <ul style="list-style-type: none"> • Assumes shortfall in grid supply will prompt industries to search for and invest in short-gestation, alternative sources of reliable power and in energy conservation schemes • Assumes bankable energy efficiency projects are generated
a. Project Outputs: <ul style="list-style-type: none"> • Increased power capacity and energy production • Mobilization of private capital and management resources into the power sector • Productivity gains from energy savings and increased availability of power supply due to conservation 	<ul style="list-style-type: none"> • Commissioning of small hydro schemes involving an aggregate capacity of 200 MW (<i>i.e., 50 MW by December 2001, and a total of 200 MW by December 2003.</i>) • Promoters' contribution to the sub-projects • Energy efficiency sub-projects financed are commissioned and result in measurable energy and capacity savings. (<i>Investments worth \$15 million by December 2001, and aggregate of \$30 million by December 2003.</i>) 	<ul style="list-style-type: none"> • IREDA's quarterly progress report on project implementation; performance review of small hydro plant operations and delivery arrangements • IREDA's quarterly progress reports and energy audits • Feedback from end-users, manufacturers/ vendor and ESCO 	(Outputs to Objective) <ul style="list-style-type: none"> • Assumes operational, delivery/sales agreements with States/SEB are viable and enforced • Assumes policy incentives are adequate and Government and IREDA clearances are streamlined to attract private investors • Assumes appropriate technology, equipment & service infrastructure are available • Assumes energy efficiency systems and products perform as designed and at expected costs • Assumes enforcement of performance contracts

Narrative Summary	Key Performance Indicators	Monitoring and Evaluation	Critical Assumptions
<ul style="list-style-type: none"> • Credit from commercial sector is catalyzed and made available for small hydro and energy efficiency investments and to ESCO firms. • Develop institutional capacity of IREDA to finance energy-efficient equipment and energy-efficiency projects <p>b. Global Outputs: Mitigation of business risks associated with energy efficiency through development of appropriate financing and service delivery mechanisms, contracting arrangements and policy incentives.</p>	<ul style="list-style-type: none"> • Financial intermediation by commercial banks for stand-alone energy efficiency projects begins • Types and range of financial instruments available to clients increase and expanded. • IREDA is able to build up a sound and sustainable energy efficiency loan portfolio. <p>Alternative workable business models in applying and delivering energy efficiency technologies and services, respectively, emerge which can be replicated in South Asia and elsewhere</p>	<ul style="list-style-type: none"> • Feedback from other financial institutions • Progress report on TA program <p>Quarterly progress report; evaluation report of Steering Committee</p>	<ul style="list-style-type: none"> • Assumes perception of business risks among commercial banks are reduced. • Assumes IREDA is able to attract and maintain qualified staff and consultants <p>Assumes various stakeholders, i.e., end-users, EE industry, financial sector, utilities and government experience tangible benefits from the investments</p>
<p>a. Project Components</p> <ul style="list-style-type: none"> • Investments in small hydro schemes • Investments in energy efficiency services and equipment • Technical Assistance for institutional strengthening of IREDA <p>b. Global Component:</p> <ul style="list-style-type: none"> • Support technical assistance activities addressing market barriers to energy efficiency 	<ul style="list-style-type: none"> • US\$263 million • US\$ 30 million • US\$ 2 million • US\$ 5 million 	<ul style="list-style-type: none"> • Quarterly progress report on status of project implementation; PDAT's report on status of contract awards. 	<p>(Components to Outputs)</p> <ul style="list-style-type: none"> • Assumes pipeline of financially viable and bankable projects are in place; procurement process is well-managed; and IREDA staff is able to monitor multiple works in progress. • Assumes IREDA maintains its capacity to manage multi-task and multi-year TA program

Annex 2

Second Renewable Energy Project Project Description

Introduction. The project will provide a line of credit to IREDA, proceeds of which will finance development of small hydro power stations and energy efficiency investments by the private sector. Financing of technical assistance activities to strengthen IREDA's capacity to promote these loan windows and develop local entrepreneurship in the small hydro and energy efficiency fields will also be provided.

Project Component A - US\$263 million: Small Hydro Investments. Financing of up to 200 MW of small hydro investments by the private sector, with focus on the following types: (i) canal-based and dam toe schemes; (ii) run-of-river schemes; (iii) rehabilitation and/or upgrading of old plants; (iv) use of tail ends of cooling water systems of thermal power plants; and (v) stand alone micro-hydel schemes. It is envisaged that the bulk, or 80%, of the schemes would fall into categories (i) and (ii). This will allow IREDA to expand its on-going small hydro program from the southern states to the northern and central states of India.

Market Potential. In 1991, a study under the UNDP/World Bank Energy Sector Management Assistance Program (ESMAP) investigated the prospects for small hydropower projects in five states--Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, and Punjab. The study concluded that there are numerous sites, many of them at canal drops, where it is technically and financially feasible to develop small scale hydro projects. Successful implementation of these schemes is being demonstrated under the on-going small hydro program through IREDA. A significant number of potential sites with an aggregate capacity of more than 1570 MW has since been identified for development by private sector entrepreneurs. Currently, 137 sites with an aggregate capacity of 570 MW have been allotted to private developers, and 241 sites involving 469 MW are in the process of being allotted. Following the initiatives taken by the three southern states of Karnataka, Kerala and Andhra Pradesh, other states have recently promulgated policies and guidelines encouraging private participation in small hydros. The large volume of applications elicited by recent advertisements of potential sites is indicative of the keen interest among private sector investors to develop small hydro sites to meet the captive power needs of their industries as well as to avail of the business opportunity to sell electricity to the state grids or third parties at attractive rates.

Table 2a. Small Hydro Schemes for Private Sector Investment

State	Total Identified		Allotted		Advertised/Under allotment	
	No. of Projects	Cap. MW	No. of Projects	Cap. MW	No. of Projects	Capacity in MW
Andhra Pradesh	17	91.15	17	91.15	-	-
Tamil Nadu	70	156.95	3	10.90	-	-
Karnataka	166	444.40	39	272.90	-	-
Orissa	14	195.70	-	-	-	-
Kerala	65	203.08	8	76.50	48	105.5
Uttar Pradesh	11	104.28	3	25.78	8	78.50
Madhya Pradesh	93	158.80	13	22.95	80	135.85
Punjab	22	19.4	-	-	22	19.40
Himachal Pradesh	137	200.00	54	69.89	83	130.11
TOTAL	595	1573.7	137	570.07	241	468.86

Irrigation Canal-based and Dam-toe schemes. Canal drop schemes involve low-head plants with large volumes of water flow. They are built on a by-pass channel alongside the canal. Water is diverted into the by-pass upstream of the canal drop and flows through the power house before it returns to the canal. The heads available for development generally range from six to twelve meters, and the power plant capacities are in the range of 1 MW to 6 MW. Horizontal shaft Kaplan turbines are adopted in most cases. The dam-toe plant schemes are usually sited on a canal below an existing dam, but some simply develop the head between the reservoir and the

tailwater below the dam. Turbine and generator technology are well established for low-head canal drop and dam-toe schemes and civil works are relatively simple. These projects present no significant technical risks.

Run-of-river schemes. These plants involve development of a head by cutting off a loop in a river. They consist of a diversion dam, a tunnel, a penstock and a powerhouse. They develop much higher heads than canal drops and use much smaller volumes of water. Thus the higher cost of the civil works is offset by the small physical size of the turbines (usually Francis type) and related equipment. While run-of-river schemes occasionally involve tunnels which pose some geological risk, the tunnels are usually short.

Upgrading old plants. India has a long history of small hydro development and a number of old plants are still in operation, albeit at de-rated capacity. These plants can be upgraded with new efficient equipment at reasonable cost. For example, IREDA can finance private sector investments under Rehabilitate Operate and Maintain (ROM) contracts.

Utilizing the cooling water discharge of thermal power plants. Cooling pond plants exploit the head at the outlet of cooling ponds at thermal plants. A capacity of over 68,000 MW of thermal power plants are in operation in India providing a sizable potential for developing such small hydros schemes. Several studies have been conducted in sufficient detail to confirm their technical and financial feasibility. A replicable model for energy retrieval and conservation is foreseeable.

Stand alone micro hydros. These are small plants (25kW to 100kW) that develop the head of small mountain streams. They usually involve small Pelton wheels that are installed with a minimum of civil works. A pilot project sponsored by MNES for supply and installation of micro hydro sets in remote villages has sparked an initial success story as a decentralized energy option as well as a community development program. Micro hydros are however less likely to be economical compared to small hydro although they meet social objectives. Economically viable schemes can be considered for financing where proper distribution and recovery mechanisms are ensured through the private sector and with the active participation of community groups or NGOs.

Project Component B - US\$30 million: Energy Efficiency and Demand-side Management (DSM)

Investments associated with: (i) purchase and installation of energy efficiency and/or load management devices and systems; (ii) production of energy efficient equipment; (iii) design, development and implementation of integrated energy management services operated by ESCOs and end-users on a performance guarantee basis; and (iv) end-user participation in SEB-and other utility-sponsored DSM programs. Based on the indicative project pipeline, the energy efficiency portfolio will broadly fall under two program components: a) End-user energy efficiency devices and installed systems; and b) ESCO defined energy efficiency services. Twelve prospective projects were identified during an energy efficiency workshop sponsored by IREDA. This indicative investment pipeline consists of eight proposals involving end-user specific energy efficiency products and installed systems, and four ESCO-based schemes.

End-user specific energy efficiency equipment installations involve the purchase and installation of a variety of energy efficiency and/or load management devices and systems. These sub-projects are likely to represent the major part of the project in terms of their numbers and application across a wide spectrum of end-users, e.g. medium and large industry, commercial offices and hotels, government buildings/facilities, public and private hospitals and schools, etc. The end-use technologies cover efficient motors and motor-driven equipment, refrigeration, industrial cogeneration, boilers and steam drives, efficient lighting and a variety of thermal devices and electrical control equipment designed to reduce plant energy use. The size of the capital cost of the project is likely to vary from \$ 25,000 to \$250,000.

The ESCO- defined energy efficiency services will involve contractual partnership with end-users. The ESCOs will avail of IREDA financing and implement integrated energy efficiency solutions in end-users' facilities under performance-based contracts. This will involve complete turnkey package of energy efficiency services including energy auditing, feasibility study preparation, performance contracting, brokering financing, specialized contract documents, and marketing. The ESCOs will be most effective in delivering energy efficiency services to large industrial and commercial end-users with large and stable energy loads such as continuous process paper, steel and

chemical industries. Major electrical energy efficiency measures would include cogeneration, load management controls, efficient motors, pumps and compressors and vapor absorption refrigeration. On the thermal side key investments would include efficient boilers and furnaces, advanced combustion control systems, efficient steam systems, waste heat recovery and energy substitution. Investments involved will typically range from \$250,000 to \$ 1.0 million. The indicative pipeline of such schemes cover steel, chemicals, distilleries industry as well as a program on leasing of capacitors.

Performance contracts will be employed in the financing of ESCO-driven energy efficiency projects. In performance contracting, an end-user (such as an industry), seeking to improve its energy efficiency, contracts with the ESCO for energy efficiency services and financing. Since energy efficiency projects generate incremental cost savings as opposed to incremental revenues from the sale of outputs, the energy cost savings can be turned into incremental cash flows to the lender or ESCO based on the commitment of the end-user to pay for the savings. The essence of performance contracting is that some part of the contract is based on the ESCO's performance in achieving energy savings. Thus performance contracting through an ESCO transfers the technology and management risks away from the end-user to the ESCO. For energy users reluctant to invest in energy efficiency, a performance contract can be a powerful incentive to implement a project. Performance contracting also minimizes or eliminates the up-front cash outlay required by the end-user. Payments are made over time as the energy savings are realized.

Vendor driven ESCOs will also be supported by the project. Such ESCOs will deliver turnkey energy efficiency projects including engineering, procurement, installation, operation and maintenance, measurement and verification of efficiency gains, performance guarantees and project financing. The client base of vendor driven ESCOs are likely to be Indian State Electricity Boards, private utilities and private industry. Technologies and systems offered would include low tension and high tension capacitors and switched capacitor panels for reactive power management and load monitoring systems; amorphous core distribution transformers; efficient lighting; efficient motor systems and metering equipment. The ESCO structure will be based on off-balance sheet financing using a sale-lease-back arrangement where the vendor sells the assets to a profitable leasing/financing company and leases back the assets for on-leasing to the SEBs. The profitable financial intermediary gets the full depreciation benefit thereby enabling it to lower its lease rents to the vendor ESCO. The vendor ESCO's lease payments are fully secured by back to back lease payments of the SEBs guaranteed by an acceptable bank letter of credit or an escrow account built up by previously earmarked SEB revenues. The financial intermediary (leasing company) retains the ownership of the assets created. The difference between the two lease streams is the revenue stream for the ESCO which provides the installation, operation and maintenance service to the SEB. Such a financial structure results in low cost financing for essential investments with a payment stream that is:

- a fraction of the cost savings realized by the SEBs;
- can be put to tender to meet the procurement regulations of the SEBs;
- and, the obligation of the SEB to pay can contractually be made subject to the installations remaining operational and generating specified efficiency gains.

Risk Assessment. There are five types of risks inherent in performance contracting:

- *Project Development Risk:* This is the risk that the project won't be implemented even though funds have been spent on project development. Equity investors in the ESCO mostly bear project development risk
- *Performance Risk:* The principal performance risks associated with performance-based projects relate to engineering and system design and equipment performance. Engineering and system design risks address the risk that the project is properly engineered to achieve energy savings and that the design is appropriate to the end-user's applications and existing facilities. Equipment performance risk means that the new equipment can perform according to its specifications. The ESCO's experience, warranties, the reputation of equipment manufacturers, the performance history of previous projects, and engineering due diligence are the main methods for evaluating these risks.
- *Hours of Operation and Use/Load Risk:* If the energy-consuming equipment is not used as projected, there can be no savings. In general, the end-users assume this risk.
- *Construction Risks:* Lenders must be confident that the project will be constructed in time, within budget, and according to specifications.
- *Credit Risks:* The customer's ability to continue to be a going concern and to meet its obligations for both energy services payments and loan or lease payments is a risk to both the ESCO and the lender.

Table 2b. Technical Features of IREDA-Appraised Small Hydro Schemes in the Project Pipeline

Project	State	Promoter	Classification	Capacity No. x kW	Annual Gen. (MU)	Capacity Factor	Head (Mtr)	Discharge (Cumec)	Type of Machine	Date of Sanction	Power Utilisation	Implementation (Months)	Schedule Commis- sioning
1	Karnatak	SKPCL	Dam Toe	2 x 10000	52.80	30.0%	21.24	120.0	Full Kaplan	29.04.97	Third Party Sale	36	Jun 1999
2	Uttar Pradesh	RGPC	R-O-R	2 x 3500	44.90	73.0%	51.97	16.50	Francis	20.11.96	Sale to SEB	30	Mar 1999
3	Uttar Pradesh	PPPL	R-O-R	2 x 1500	18.39	73.0%	190.0	1.90	Francis	20.11.96	Sale to SEB	30	Jun 1999
4	Karnatak	RSPL	Canal Drop	3 x 1000	19.28	69.0%	4.80	84.00	Semi Kaplan	27.03.97	Sale to SEB	24	Oct 1998
5	Andhra Pradesh	SJPC	Canal Drop	2 x 1000	8.47	73.0%	6.37	20.00	V. Kaplan	27.03.97	Captive	24	Sep 1999
6	Andhra Pradesh	SJPC	Canal Drop	2 x 1000	8.47	48.0%	6.37	20.00	V. Kaplan	27.03.97	Captive	24	Sep 1998
7	Uttar Pradesh	BGPPL	R-O-R	2 x 1250	16.89	77.0%	46.90	6.70	Francis	29.04.97	Sale to SEB	24	Nov 1998
8	Himachal Pradesh	SBA	R-O-R	1 x 1000	8.44	96.35	108.5	1.34	Francis	UA	Third Party Sale	15	Dec 1998
9	Karnatak	ETC	Canal Drop	2 x 1000	9.40	53.65	10.09	24.50	F. Kaplan	UA	Third Party Sale	20	May 1999
10	Uttar Pradesh	Magnum	R-O-R	2 x 1500	22.54	85.78	42.00	8.40	Francis	UA	Sale to SEB	36	Sep 2000
11	Uttar Pradesh	Magnum	R-O-R	2 x 1000	13.697	78.18	95.00	2.37	Francis	UA	Sale to SEB	36	Sep 2000
12	Karnatak	BPCL	Canal Drop	2 x 1000	8.93	50.97	19.00	6.50	H-Francis	UA	Third Party Sale	24	Sep 1999
13	Uttar Pradesh	Himalaya	R-O-R	2 x 4500	60.2	76.36	120.0	9.00	Francis	UA	Sale to SEB	36	Sep 2000
14	West Bengal	Hanuma	R-O-R	3 x 800	9.67	46.00	27.09	9.97	H Tubular	UA	Captive	30	Mar 1999

Table 2c. Indicative Pipeline of Energy Efficiency Sub-Projects

No.	Industry Type	Project Cost US\$ million	Equipment Investments
ESCO-based			
1.	Steel	\$1.50	Load management for arc furnaces
2.	Chemicals	\$3.87	Combined cycle gas turbine; - Heat recovery steam generation
3.	Distillery	\$1.34	Biogas cogeneration
End-user Specific Equipment			
4.	Automotive parts	\$0.52	Gas-fired arc furnace; Vapor absorption refrigeration; Thermic fluid heating; Thyristor control panels
5.	Paper	\$0.14	Vapor absorption refrigeration
6.	Structural materials	\$0.07	HT voltage stabilizer
7.	Paper	\$0.39	Electric drive; Control system; Upgraded paper machine
8.	Various	\$1.29	High efficiency pumps and fans; Centrifugal compressors; Lithium bromide/ammonia VAR systems; HT capacitors; High efficiency lighting
9.	Sugar	\$0.25	Boiler economisers; Variable speed drives; DC drives
10.	Rayon	\$3.17	High efficiency motors, pumps, fans, etc.; Upgraded boiler plant; Temperature controllers
11.	Paper	\$5.13	High efficiency thermal and electrical equipment; Cogeneration; Digester two-stage heating system
12.	Electric Utility	10.17	LT capacitors, lighting, water pumping system improvements,
13.	Textile	0.40	High efficiency motors, fans, lighting
14.	Chemicals	1.49	Cogeneration, vapor absorption refrigeration
15.	Engineering	0.07	Waste heat recovery, combustion control
16.	Sugar	0.27	Multiple effect evaporator
Total		30.07	

* Projects involving ESCOs include the following services: equipment procurement, installation and maintenance, energy management and monitoring and verification of energy savings.

Project Component C - US\$7 million: Technical Assistance (TA) will: (i) finance pre-investment studies with a view of developing a sustainable pipeline of energy efficiency investments and support project design activities including preparation of business development modules and model bidding documents for procuring ESCO services; (ii) strengthen IREDA's capacity to appraise, supervise and promote energy efficiency and small hydro investments; (iii) assist participating states in developing appropriate policy incentives to promote private sector development of end-use efficiency, and (iv) training of energy service providers, end-users and government and industry officials and staff on energy conservation and DSM. A detailed description of this component which will be financed by the GEF is presented in Annex 5.

Implementation Arrangements

Overall Project Management. IREDA will have overall responsibility for project management and for supervising and coordinating the implementation by its clients of the various project components. As a financial intermediary, IREDA will on-lend the proceeds from the Bank loan to private developers and, on exception basis, to public corporations. All sub-projects, including applications for PIF loans, will be appraised and evaluated by IREDA according to its loan eligibility criteria (see annex A). These criteria will be reviewed during project preparation, and revisions, if any, will be agreed upon between IREDA and the Bank during project appraisal. The first two schemes on energy efficiency will be subject to the Bank's prior review and no-objection clearance. All other sub-projects involving total project costs equivalent to US\$5 million or above would be subject to Bank prior review and clearance. Bid documents and procurement arrangements entered into by the sub-borrower would be reviewed by IREDA to ensure they follow Bank procurement guidelines. Procurement arrangements in place under Cr. 2449-IN would remain in place.

On-lending terms and conditions. IREDA will on-lend proceeds of the Bank loan to its clients based on terms and conditions spelt out in IREDA's Operational Policy Statement (OPS) as agreed with the Bank. These terms and conditions include inter alia: minimum promoters contribution of 25%; adjustability of lending rates based on IREDA's prevailing cost of funds; non-rescheduling of loans; security provisions and a loan amount limit equivalent to 20 per cent of IREDA's paid-in capital plus reserves plus grants. Current lending rates for Rupee loans for small hydro schemes range from 16.5 % to 17.0% with 10 years repayment including 2 years grace. Similar terms are envisaged for energy efficiency investments. IREDA may, however, choose to offer in the future, loans denominated in US dollars, in which case the on-lending rates would be pegged to the LIBOR plus appropriate points to cover IREDA's margin.

Implementation agreement between IREDA and implementing entities. The sub-borrowers will implement the respective sub-projects and will handle the bidding and contract awards, supervise construction and own and operate the facilities upon commissioning. IREDA would monitor and evaluate project performance through regular field visits and progress reports from the clients. The sub-loan agreements between IREDA and its client would provide that the sub-borrower agrees to undertake the following in the course of sub-project implementation: (i) maintain proper financial accounts and records based on Companies Act; (ii) allow inspection by IREDA/Bank of matters related to the sub-loan; (iii) prepare and submit to IREDA regular reports on the progress of sub-project implementation and utilization of the sub-loan; (iv) ensure that the sub-loan is used solely for the goods/services required to implement the sub-project; (v) procurement follows Bank guidelines and contracts; and (vi) appropriate insurance coverage is provided for goods financed from proceeds of the sub-loan.

Management of TA Components. The TA program will be managed by IREDA and will be integrated with the management of the on-going multi-donor TA program. IREDA will continue to issue a separate quarterly progress report on its TA activities for circulation to IREDA's various donors.

Coordination and responsibilities of implementing entities and other agencies. Project beneficiaries are the electricity end-users who avail of the increased power supply generated by the small hydro power stations and consumers who benefit from reduced outages and from productivity gains accruing from energy savings. In most cases, the beneficiaries are themselves the investors in the sub-projects, and hence will exercise due diligence in sub-project implementation to ensure the value of their respective investments are not only preserved but enhanced. Developers would need to comply with state and government regulations including environmental norms, water use and power supply standards, among others.

Policy support from the state governments would be required, especially for the small hydro component, to ensure that the developers are able to secure the appropriate clearances to proceed with the project construction. Moreover, arrangements for the wheeling and sales of power and grid interconnection have to be established with the SEBs, under commercially enforceable contracts. Policy and administrative support from the Ministry of Non-Conventional Energy Sources Power, including interface with the states, would help sustain the momentum of the small hydro program. An inter-ministerial Steering Committee has been set up for this purpose. The Committee is composed of the Secretary, MNES, as chairman and representatives of ICICI, DEA, PFC, EMC, and NPC as members.

Participation arrangements. Design and construction of small hydro plants would require extensive consultations by the developer with the SEB, irrigation and water authorities, and state energy development boards. In addition, information sharing with surrounding communities are encouraged to build goodwill and avoid misconception that use of water for power production would reduce available irrigation waters for the farmers. Implementation of the project is not expected to involve displacement of people since most schemes will be situated in areas where the right-of-way have been secured. In the exception that right-of-way acquisition is involved, this would be on a "private buyer- private seller" basis, and sub-borrowers would be required to keep the local population duly informed of the status of sub-projects. On the DSM program, to extend the demonstration effect of successful energy efficiency schemes, consultation with business federations and consumer groups would take place.

Foreign exchange risk management. With IREDA now bearing the foreign exchange risks associated with external funding support, a foreign exchange risk management unit is being established within the Agency. At the

same time, consultants are being engaged under the IDA/GEF technical assistance program to serve as advisor(s) to IREDA on this area. In the interim, IREDA has recently entered into an arrangement with the Bank of Baroda for forex risk management including swap arrangements for withdrawals of loan from one of its external creditors, i.e., Asian Development Bank. A similar arrangement is deemed suitable for the proposed Bank loan.

Role of Bank during project implementation. The Bank will monitor the progress of project implementation through the quarterly progress reports prepared by IREDA. The Bank will field regular supervision missions to IREDA to review the Agency's financial performance and evaluate the quality of its loan portfolio. The missions will occasionally involve field visits to sub-project sites to elicit sub-borrower feedback, verify status of sub-project progress, and identify and resolve issues affecting project performance. As in the on-going IDA operation with IREDA, third party supervision will be commissioned by the Bank to undertake an independent review of the project, and its recommendations will feed into the mid-term project review. The Procurement, Disbursement and Audit (PDAT) Unit of the Bank's New Delhi Office will be actively involved in the supervision of the project in aspects relating to PDAT's functional services.

Monitoring and Evaluation (*refer to annex 1 for a list of key performance indicators*) IREDA's respective project teams would handle sub-project monitoring and supervision. Regular progress reports are submitted to IREDA by the sub-borrowers. In addition, IREDA staff would conduct site visits as well as hold regular dialogues with the investor community and state energy agencies on progress of implementation of their respective small hydro projects and programs.

IREDA will furnish the Bank quarterly progress reports on the status of small hydro privatization program in the various participating states, the physical works, consulting services, sub-project costs, contract processing and performance, disbursement, and administrative arrangements for the project within 45 days of the end of each quarter. The progress reports shall contain separate sections reporting on the following: (a) IREDA's compliance with the OPS; (b) compliance by sub-borrowers with conditions of the sub-loans; (c) changes in policy incentives for small hydro and DSM programs; (d) loan portfolio performance analysis; (e) status of multi-donor technical assistance program; and (f) latest record of its own institutional development program. In addition, IREDA will furnish the Bank copies of its annual financial reports and current and five-year business plan together with 5-year financial projections including cash flows.

A mid-term review of the project will be conducted by the Bank in or before December 2000. Prior to said review, but no later than October 2000, IREDA will engage the services of consultants to conduct an independent assessment of the project and furnish the Bank results of said review. As in the case of the on-going Renewable Resources Development Project, the mid-term review would involve participation of other donors and creditors of IREDA.

Annex 3 Second Renewable Energy Project Estimated Project Costs

TOTAL PROJECT

Project Component	Local	Foreign	Total
	-----US \$ million-----		
A. Small Hydro Investments	203	60	263.0
B. Energy Efficiency and DSM Investments	23	7	30.0
C. Technical Assistance			
Implementation Support	1.0	1.0	2.0
Capacity and Institutional Building	2.0	1.0	3.0
Policy Support	0.5	0.5	1.0
Outreach program	0.5	0.5	1.0
Total Project Cost	230.0	70.0	300.0

Part A. Small Hydro Component

	Sub-Component	Local Cost	Foreign cost	Project Cost
		-----US \$ Million-----		
1	Land	2.0		2.0
2	Civil Works	103.0		103.0
3	E & M Equipment	68.0	58.0	126.0
4	Installation	4.3		4.3
5	Engg. & Consultancy	1.9	1.9	3.8
6	Project Management	1.9		1.9
7	Others	1.8		1.8
8	Taxes & Duties	8.1		8.1
9	Contingency	12.1		12.1
	TOTAL	203.0	60.0	263.0

Part B. Energy Efficiency/DSM Component

Sub-Project Types	Local	Foreign	Total
	-----US \$ million-----		
A. ESCO-defined energy efficiency services	2.5	4.2	6.7
B. Energy efficiency devices and installed systems	20.2	3.1	23.3
Total	22.7	7.3	30.0

Part C. Technical Assistance

Activities	Local	Foreign	Total
	-----US \$ million-----		
A. Implementation Support: Pre-investment studies, model procurement documents, business development modules	1.0	1.0	2.0
B. Institutional Strengthening : Strengthening of IREDA in project appraisal, supervision and promotion of DSM	2.0	1.0	3.0
C. Policy Support: Policy Development to private sector investments in promote energy efficiency	0.5	0.5	1.0
D. Outreach program and training for energy end-users and service providers	0.5	0.5	1.0
Total	4.0	3.0	7.0

Annex 4

Second Renewable Energy Project Cost Benefit Analysis Summary

(In Rupees, Base Year = 1997)

A. Small Hydro Component

Financial Analysis:

1. Financial benefits consist of revenues to be earned by the firm from the sale to third parties or to the grid of energy generated from the small hydro plants. Prices of energy are based on the specific purchase price agreements. In the case of captive power schemes, the benefits are expressed in terms of the tariff that the firm would have otherwise paid to utilities if they could draw from the grid. A 10% annual rise in grid tariffs are assumed, which is relatively conservative based on past trends.

2. The cost stream consists of the capital cost of the power plant and the following expenses:

- ◊ Operation and maintenance costs equivalent to 2% of capital cost, with 5% annual escalation;
- ◊ Insurance expense at 0.5% of capital costs
- ◊ Auxiliary energy consumption at 0.5% of generation;
- ◊ Wheeling charges, water royalty fees, and electricity tax based on agreement with the state involved.
- ◊ Duty on imports: zero
- ◊ A 20-year period of evaluation was used.

The resulting financial internal rates of return (nominal) for the schemes currently in the project pipeline range from 21% to 40%.

3. In addition, the financial returns to investor equity were calculated, taking into account the debt structure, corporate tax structure, and other financing charges. Among the assumptions used are:

- ◊ Minimum 25% of equity contribution;
- ◊ Depreciation rate of equipment: 20 years
- ◊ Income tax rate: 35 %

The post-tax returns to equity are estimated to range from 14 % to 46 %.

Economic Analysis:

4. The economic benefits of the small hydropower schemes consist of the electricity generated by the plants valued at the avoided cost of energy supply. The shortage in grid supply has prompted industrial and commercial electricity users to resort to diesel generators to meet their growing power needs. Development of small hydros would be an alternative to captive diesel generation. The cost of autogeneration from diesel engines is estimated at Rs3.38 per kWh, based on CIF price of fuel.

5. Economic costs of the schemes were derived by adjusting for taxes and applying a standard conversion factor (SCF) of 0.9 to local costs.

The resulting economic rates of return (real) for the sub-projects in the pipeline range from 20% to 51%.

Indicative Rates of Return and Benefits from Small Hydro Investments

(in Rupees)

(in 1000 tons)

Project	Capital Cost/kW	Gen Cost kWh	Sale Price	FIRR nominal %	Return on Equity %	Project DSCR	EIRR %	Pollution CO ₂	Abatement Fly Ash
Kabini	38020	2.10	3.00	27.90	28.80	1.68	20.50	52.8	14.5
Rishi Ganga	35100	2.20	2.25	32.70	30.10	2.43	51.30	44.9	12.3
Loherkhet	46530	1.46	2.25	26.50	20.40	1.69	35.60	18.4	5.0
Madhav Mantri	44178	1.60	2.25	30.50	27.40	1.72	46.10	19.3	5.3
Addanki 440	44910	1.60	2.75	23.90	18.30	1.46	28.90	8.5	2.3
Addanki 550	44720	1.60	2.75	24.90	19.70	1.52	30.10	8.5	2.3
Birahi Ganga	50951	2.20	2.25	20.70	16.40	1.43	35.30	16.9	4.6
Jiwa	55555	1.75	2.52	28.20	23.40	1.93	44.60	8.4	2.3
Killara	45286	2.20	2.25	38.02	42.07	2.59	27.50	9.4	2.6
Bagdi	57231	1.66	2.25	26.50	19.00	1.51	41.00	22.5	6.2
Deghat	60285	2.20	2.25	22.50	14.80	1.31	36.60	13.7	3.8
Rajonkallur	47250	2.48	3.50	40.10	45.50	2.72	25.60	8.9	2.4
Madkini	59605	1.91	2.25	22.60	15.00	1.20	31.83	60.2	16.5
Neora	52037	2.34	3.15	22.00	14.20	1.31	26.80	9.7	2.8

B. Energy Efficiency and DSM Component

Financial Analysis

6. Financial cashflows over a ten-year project period were developed for sub-projects in the indicative pipeline consisting of 3 ESCO-defined energy efficiency services sub-projects, 12 end-user specified installation of energy efficient devices and systems and 1 utility-based DSM scheme. Financial benefits are derived from savings in fuel and energy payments resulting from the investments. Non-energy savings in operating and maintenance expenses are also anticipated in a number of schemes.

7. Cost streams include investment costs which largely occur within one or two years and incremental operation and maintenance expenses.

Resulting Financial Internal Rates of Return (nominal) for these projects range from 27 % to 158%.

8. Returns to investor's equity were also calculated based on the following assumptions:

- ◊ Debt-equity ratio: 3:1;
- ◊ Financing Terms and Conditions: Interest rate: 17%; Up-front fee: 1.0%
- ◊ Repayment period: 10 years (including 2-year grace); quarterly loan installments
- ◊ Depreciation Rate (Indian Cos. Act, SLM): 4.75% - 10.34%
- ◊ Depreciation Rate (Income Tax, WDV): 25.0% -100%
- ◊ Income Tax Rate: 35%

The post-tax returns to equity range from 34% to over 300%; payback period range from 8 months to 4 years.

Indicative Financial Returns on Energy Efficiency Investments

Schemes	FIRR % real	FIRR % nominal	Post-tax Return on Equity %	Debt Service Coverage	Pay-back Period Years
<i>ESCO-defined Services</i>					
Steel Company	34.3	47.5	84.7	2.71	2.4
Chemical Plant	21.6	32.7	49.5	1.96	3.3
Distillery	21.3	36.0	99.7	2.14	3.1
<i>Energy efficiency devices and systems</i>					
Automotive engineering	88.6	102.1	220.8	5.83	1.1
Paper plant	62.0	72.9	211.5	4.17	1.5
Structural materials	70.0	81.8	169.8	4.66	1.4
Paper Plant	43.7	52.7	97.1	3.02	2.1
Various industrial estates	50.4	60.1	115.5	3.43	1.9
Sugar Company	20.1	26.0	34.1	1.66	4.1
Rayon factory	83.4	96.5	206.6	5.51	1.1
Paper plant	73.9	86.1	180.6	4.9	1.3
Electric utility	47.3	58.7	112.0	3.35	1.9
Textile	64.0	70.1	140.4	3.99	1.6
Chemicals	64.0	70.1	140.4	3.99	1.6
Engineering	136.8	157.7	358.6	9.08	0.7
Sugar	29.0	38.7	63.3	2.28	2.9

Economic Analysis

9. In estimating the economic costs of the indicative energy efficiency schemes, costs and benefits were adjusted for taxes and a standard conversion factor of 0.9 was applied to local costs. Resulting economic rates of return are expected to be higher than what the current estimates suggest. It is expected that IREDA will be able to estimate with greater precision the value of energy savings involved in each scheme based on more detailed information that will be required of applicants on specific fuel and energy supplies affected and their respective border prices.

Resulting indicative economic rates of return range from 26 % to 155%.

POLICY / INCENTIVES FOR SMALL HYDRO SECTOR

ITEMS	MNES GUIDELINES	ANDHRA PRADESH	TAMIL NADU	KARNATAKA	ORISSA	KERALA	UTTAR PRADESH	MADHYA PRADESH	PUNJAB	HIMACHAL PRADESH
RATES/CHARGE										
a) Power Wheeling	2%	• 132 KV - 8% • 33 KV/11KV/LT • upto 50 km - 10% • 51 to 100 km - 12% • beyond 100 km - 15%	15%	• 2% upto 1 MW • 5% upto 3 MW • 10% above 3MW	• 2% upto 3 MW • 8% upto 15 MW	12%	• 2% (Captive) • 2.5% (Third party)	2%	2%	2%
b) Power Banking	One year	Not Allowed	Allowed for captive	To be negotiated	At mutually agreed rate	At mutually agreed rate	Up to 1 year ; To be negotiated	Not Allowed	Not allowed	Allowed with additional charges
c) Buy back by SEB (Per kWh)	Rs.2.25	As per NTPC rate for Ramagundam	At mutually agreed rate	Rate not specified	At mutually agreed rate	At mutually agreed rate	Rs 2.25	Rs.2.25	Rs.2.25	Rs.2.25
d) Third party sale	Mutually agreed rate	Not Allowed	Not Allowed	Allowed	Allowed	—	Allowed	Allowed	Allowed	Allowed
e) Royalty on water	10% of elect. tariff	As per rates fixed by concerned deptt. of govt.	Included in 1(a) above	-	Included in 1(a) above	Included in 1(a) above	10% of electricity generated	-	-	• 1 - 3 MW-10 % • 3 - 15MW-12% Exempt for first 5 year upto 1MW
INCENTIVES										
a) Capital subsidy	—	-Up to 15 lacs per project -Up to 20 lacs in backward area	-10% of cost of equipment -Max.15 lacs	-As extended to other industries-Max. 5 lacs -Additional subsidy: 5% of cost of equipment (Max. 5 lacs) -Exemption for 5 years for captive New industry incentives	-As given to other industries	—	—	—	—	—
b) Elec. Duty Exemption	-Exemption of electricity duty							-Exemption for 5 years	Exemption for 5 years	-Exemption for 5 years
c) Sales tax Exemption	-Exemption from sales tax & other concessions applicable to industry/backward area Upto 30%							-Exemption from sales tax & other concession applicable to new industry	Exemption from sales tax & other concession applicable to industry/backward area	No Sales tax on power generation and transmission eqpt. And building material for power projects
d) Demand charge Exemption								-Upto 30%	-Upto 30%	-Upto 30%
e) Promotional agency		APSEB	TNEB	KREDL	OPGCL	KSEB	UPLJVN/ UPSEB/ NEDA	MPUVN	PSEB/ PEDA	HPSEB/ HIMURJA

Annex 5

Calculation of Incremental Cost

India: Second Renewable Energy Project

INCREMENTAL COSTS AND GLOBAL ENVIRONMENTAL BENEFITS

BROAD DEVELOPMENTAL GOALS

1. It has been estimated that primary energy consumption will need to more than quadruple over the next two-and-a half decades in order for India to achieve an average annual GDP rate of 4.9%. Historically, in India, energy demand has increased somewhat faster than economic growth. Between 1970 and 1987, the energy/GDP ratio increased by 40% - largely caused by substitution of biomass fuels by modern fuels, increased use of oil for transportation and electricity for agriculture, and *poor end-use energy efficiencies achieved in industrial practice*. The unit energy consumption of most production processes in India is much higher than that of the industrialized and rapidly industrializing countries. For example, steel production requires almost twice as much energy per unit of steel output as that in the U.S. or South Korea. Similar differences exist for aluminum, cement and paper as well as household appliances and other end uses. The potential for introducing energy efficiency in the Indian economy is therefore quite substantial.
2. Energy efficiency and DSM have the important advantages of mitigating India's endemic problem of energy and capacity shortages cost-effectively in comparison to increasing supplies. As environmental costs (including the threat from global climate change) weigh heavily against coal-based generation, India will need to accelerate the pace and direction of its energy efficiency efforts, advance fuel substitution (non-coal) and clean-coal initiatives and invest in the development of environmentally sound energy efficient technologies and systems.

BARRIERS

3. While the technical and economic potential for improving energy efficiency and thereby reducing carbon emissions in India is sizable, a host of barriers exist to capturing this potential. GEF-financed activities under this project is designed to precisely address some of the more critical barriers related to institutional development and private sector capacity building to promote the delivery of energy efficiency services in India. Together with Bank-assisted power sector reforms in a few Indian states, the implementation of energy efficiency is likely to achieve considerable momentum. Based on current observations and status of energy efficiency in India, it is believed that the GEF project is in a unique position to address a number of barriers in the policy and private sector arenas. Specifically, the GEF-assisted project will address the following key barriers:

Public policy barriers:

- weak institutional capacity to develop/appraise energy efficiency projects
- inadequate investment planning and integrated resource planning (IRP) skills
- lack of energy efficiency standards; insufficient energy efficiency market data base

Private sector barriers:

- inadequate experience on energy efficiency business transactions
- absence of energy efficiency performance contracting mechanisms
- paucity of energy efficiency service providers

MARKET PROSPECTS

4. Preparatory DSM/energy efficiency studies under the Orissa, U.P., Rajasthan State Power Sector Restructuring Project(s) and the IREDA II: Energy Efficiency Component, provide a preliminary estimate of the potential ESCO market in India. The size of the market thus estimated must be viewed as approximate with a +/- 25% error. The Table below provides an initial estimate of the ESCO project size and is predicated on the availability of a sizable number of ESCOs operating in the country and the acceptance of performance contracting as a mechanism for delivering energy efficiency services to consumers.

Table 5.1
Estimate of All India ESCO Market

Study/Region	Capacity Savings (MW)	Investment (Million US \$)	ESCO Market (Million US \$)
IREDA EE/DSM pipeline	N.A.	30.2	6.7
Orissa SPSR:			
-Electric Motors	63.5	2.75	7.9
-Industrial DSM	120.0	33.50	
Uttar Pradesh SPSR	212	100.00	22.2
-Industrial DSM			
Rajasthan SPSR: Industrial & agric. DSM	N.A.	76.50	17.0
Andhra Pradesh - Agricultural DSM	180, 000 kWh	6.0	1.30
Haryana SPSR	N.A.	90.0	19.8
ESCO market in the reform states ¹			74.9
Total All-India ESCO market ²			425.0

5. The size of the ESCO market that could be directly supported by the project, over the next 5 to 10 years would be less than 5% of the potential. However as a pilot demonstration exercise it would serve the important purpose of opening and testing the market and validating the concept of performance contracting thus serving as the basis on which additional private ESCO efforts and investments are expected to be made.

6. The following table provides an estimate of the potential and status of energy efficiency implementation in key market sectors, including cogeneration and demand side management for the country³.

Table 5.2

DSM Program	NPV of Energy Saved, GWh	NPV of Economic Cost, MN Rs.	Cost of Energy Saved, Rs/kWh	NPV of Peak Reduction, MW	Program Life, Years
<i><u>Industrial Sector</u></i>					
a. Industrial Motor Drives Systems	21,454	14,505	0.68	1,180	10
b. Cogeneration	8,873	8,480	0.96	1,922	10
c. Shifting Discontinuous Loads				6,130	10
<i><u>Agricultural Sector</u></i>					
a. High Eff. Pumpsets	54,800	62,356	1.14		10
b. HDPE pipes	18,459	12,579	0.68		10
<i><u>Domestic/Commercial Sector</u></i>					
a. Fluorescent Lights	648	122	0.19	1,329	10
b. Electronic Chokes	82	272	3.32	101	10
c. CFL	666	1,008	1.51	2,551	10
d. Solar heater	5,045	4,967	0.98	16,751	10

¹ The reforming SEBs in Orissa, Haryana, Andhra Pradesh, Rajasthan and Uttar Pradesh

² Based on extrapolating estimated market in reform states to all India.

³ *Special Study on Demand Side management* (July 1997: by Energy Economy & Environmental Consultants for Environmental Resources Management, London), v.

7. The total estimated savings in electrical energy on account of the IREDA II energy efficiency projects is estimated at 188.2 GWh/year. This accounts for less than 1% of the total achievable economic potential 30,146 GWh and about 2.5% of the industrial potential of 7493 GWh. The project is based upon an arrangement wherein two-thirds of the financing (e.g., US \$ 20 million) will leverage the balance one-third from energy consumers and service providers. The GEF grant is expected to catalyze the necessary arrangements that leverage such private sector energy efficiency investments including formation of ESCOs in the private sector.

BASELINE SCENARIO

8. With a little over two decades of energy conservation experience, the Indian energy conservation program remains largely a captive to the past. Economic, institutional and technical barriers to implementation of cost-effective energy efficiency measures persist despite the growing number of energy efficiency programs undertaken in the country. Despite growth in supply, India's power systems are struggling to overcome chronic power shortages and poor power quality. Power shortages have resulted in voltage reductions, involuntary load shedding and the widespread installation of standby captive capacity by industry, commercial and residential establishments. Standby captive power generating plants are in most instances stationary diesel engines which are costly, inefficient, polluting and a rapidly growing source of greenhouse gas emissions.

9. Growing out of the need to reduce dependence on costly petroleum fuels imports in the early seventies, early conservation efforts were directed at providing diagnostic fuel efficiency audits of consumers and information dissemination through training programs and national educational campaigns. Success in the early years led to an evolution in the methodology and reach of the program to cover major sectors (large and medium industry, road and rail transport) in India's principal cities and industrial locales. In the mid eighties, targeted investment schemes offered by leading Indian development financial institutions catalyzed, with modest success, the entry of a few private sector energy efficiency service providers. In the late eighties, a World Bank proposal to provide a standard line of credit together with a broad-based technical assistance package to promote industrial energy efficiency was withdrawn and justifiably so, following lack of discernible progress on pricing, tariff and institutional reforms to address the specific conservation market barriers. As India transits to a market oriented economy that strives to integrate with the rest of the world, measures to dismantle its trade and investment barriers run counter to its industry's inability to compete with global leaders. The GOI has recognized the key role that energy efficiency could play in terms of its importance to industrial competitiveness and economic growth.

10. Today, the petroleum fuel conservation activities continue to provide subsidized services to consumers with limited impact; financial institutions have all but withdrawn from financing energy efficiency investments; and, project development and financing of energy efficiency services, equipment and systems by the private sector is very nascent. Driven by the need to mitigate power shortages, improve quality of delivered energy and reduce capital needs for capacity expansion, electric utilities are taking the first tentative steps towards introducing demand side management programs. In summary, the pace and direction of conservation efforts in India is fragmented and desultory. The government programs are unable to provide the specificity and implementational features demanded by an increasingly sophisticated consumer. On the other hand, the private sector is unable to capitalize on the expanding market for risk-shared, performance based efficiency services.

Baseline Components:

11. The baseline TA will develop capacity in IREDA to promote, market and finance traditional energy efficiency projects and programs. In the absence of an alternative to Bank/GEF funding, it is assumed that IREDA will follow the standard program design and diagnostic audit approaches that characterized past efforts. The baseline components of the project would include, a) TA program that would be largely focused on providing energy audit services and, b) an energy efficient equipment financing investment component. This would be similar in several respects to past efforts of several Indian development financial institutions⁴ who had mixed success in developing and sustaining energy efficiency portfolios. Without dismantling specific market development barriers that impede energy efficiency solutions, India's energy conservation program would likely be marginalized and continue to decline in size and effectiveness. It is equally unlikely, given the virtual absence of energy efficiency services market delivery mechanisms, for private sector services and investments to step in.

⁴ In the early eighties IDBI launched two industrial energy efficiency schemes: i) the energy audit services scheme, and ii) equipment financing for energy efficiency program. Both these were subsequently withdrawn.

GLOBAL ENVIRONMENTAL BENEFITS

12. The project proposes to enhance and sustain improved end-use energy efficiencies with consequent reduction in carbon dioxide emissions by increasing private sector role and investments in the provision of energy efficiency services and equipment. This is sought to be achieved by fostering capacity in India to promote, catalyze and implement private sector initiatives in energy efficiency services delivery. This enhanced capacity in entrepreneurial development, including formation of ESCOs, will represent a new and critical dimension to energy efficiency project development, financing and implementation in the country.

13. Preliminary targeted savings of a few pilot energy efficiency activities implemented by ESCOs and/or energy end-users (includes three ESCO projects, one utility DSM, and balance 12 industrial energy efficiency projects over a ten year period) are estimated at 0.76 million tonnes (mt) of carbon at a cost of US \$6.6/ton of carbon to the GEF⁵.

GEF-FINANCED ALTERNATIVE

14. The GEF grant for technical assistance (TA) is proposed to strengthen financing institutions' capacity to develop, appraise and finance ESCO and end-user defined energy efficiency investments. The TA will help develop skills and advance knowledge in the country on the risks and benefits of energy efficiency business transactions, formulate and test the validity and application of different energy efficiency project financing and implementational models that deliver performance based services and results. Furthermore, the GEF TA will expand private sector role in financing and delivery of energy efficiency services, and catalyze the development and implementation of utility led DSM programs in the country. Other related benefits that would accrue include energy efficiency awareness building, program promotion and business development.

15. The TA will address the following three areas: *i) preparatory activities, ii) project development and design, iii) institutional development and capacity building*. While i) and ii) are incremental costs to be covered by GEF, item iii) represents the baseline costs of developing traditional EE projects, in a business as usual scenario. The baseline TA program will seek to strengthen IREDA's capability in energy efficiency lending. This component will support, a) creation and strengthening of the energy efficiency lending cell at IREDA; b) establishment of energy efficiency database of services, technologies and projects; c) specialized local and foreign training on energy efficiency project development and financing for IREDA staff, ESCOs and energy audit consultants; d) program of energy audits in enterprises, and e) program of accreditation of ESCOs/consultants and empanelment of efficient equipment manufacturers.

SYSTEM BOUNDARY

16. The analysis consists of the comparison between (a) the baseline cost of implementing EE projects without undertaking the key preparatory activities and without capacity building towards project design and development (see Section 20-21, above), and (b) the cost of implementing these projects including the incremental features associated with the technical assistance program included in the alternative. Participants are essentially the industrial end-user sector, private and public utilities, ESCOs, equipment vendors, government bodies including financial institutions.

COST

17. Total cost of the proposed project without the incremental features included in the Alternative is estimated at \$ 32 million. The incremental costs of developing the capacity to design and implement energy efficiency delivery services is estimated at US \$5.0. The total cost thus, is estimated at US \$ 37 million.

18. The baseline technical assistance cost of US \$ 2.0 million will enable program development and promotion along traditional patterns, viz. advocacy oriented, budget rather than market driven, subsidized energy audit services, etc. These have proved to have obtained limited results and few successes in the past. The role of the private sector energy efficiency service provider has been marginal under such a scenario.

19. The incremental technical assistance cost of US \$ 5.0 million will enable the design of integrated energy management services by energy efficiency service providers/ESCOs and end-users on a performance guarantee basis. The ESCOs will avail of IREDA financing and implement integrated energy efficiency solutions in end-users' facilities under performance-based contracts. The capacity building effort planned through IREDA will assist delivery of complete turnkey package of energy efficiency services including energy auditing, feasibility study preparation, performance contracting, brokering financing, specialized contract documents and marketing.

⁵ See Table 5.4 - Impact of Energy Efficiency Pilot Projects on Carbon Emissions

INCREMENTAL COST MATRIX

20. In summary, the global and domestic environmental benefits, costs and increments of the proposed project compared with the baseline are:

Table 5.3

	Baseline	Alternative	Increment
Country Benefit	<ul style="list-style-type: none"> advances conventional EE practices in sub-project identification, design and execution promotes broad capacity building of key development financial institution disseminates EE information /best practices 	<ul style="list-style-type: none"> permits design and delivery of performance based EE services greatly expands private sector role in financing and delivery of EE services enhances understanding of risks and benefits of EE transactions 	<ul style="list-style-type: none"> fosters market driven EE solutions improved level and delivery of EE services; 188.2 MkwH and 200 Tcal saved in 16 projects
Global Environmental Benefit	<ul style="list-style-type: none"> current level of carbon emissions in selected industrial facilities 	<ul style="list-style-type: none"> introduction of market driven carbon emission reduction strategy private sector carbon emission reduction actions and investments leveraged replication of viable EE systemic solutions in other developing countries 	<ul style="list-style-type: none"> reduced carbon emissions (0.75 million tonnes) in selected pilot facilities catalyzed performance based EE projects additional EE measures applicable to other countries
Costs	US\$ million	US\$ million	US\$ million
On-going EE investments, plus	(*)	(*)	-
ESCO defined EE services	6.0	6.0	-
End-user defined EE devices	24.0	24.0	-
c. Preinvestment activities	-	2.0	2.0
d. Training in EE	-	2.0	2.0
e. Policy based programs	-	1.0	1.0
f. Capacity building programs	2.0	2.0	-
TOTAL	32.0	37.0	5.0
Bank financing	30.0	30.0	-
IREDA/GOI contribution	2.0	2.0	-
GEF Incremental Costs	-	5.0	5.0

AGREEMENT

21 The proposed GEF financed TA project is under consideration by the Department of Economic Affairs (DEA), GOI. The DEA, which is the nodal agency under the Ministry of Finance is responsible for clearance of bilateral and multilateral funding of development projects and would be guided in its decision by the Ministry of Environment and Forests, the agency responsible within GOI for GEF financed project proposals.

22. An inter-ministerial steering committee on Energy Efficiency set up under the Chairmanship of the Ministry of Non Conventional Energy Sources (MNES) has strongly endorsed the project. DEA approval of the project is expected.

Table 5.4

ESTIMATED CARBON IMPACT OF PILOT ENERGY EFFICIENCY PROJECTS				
INDUSTRY	MEASURE	ESTIMATED INVESTMENT (\$ MILLION)	ANNUAL ENERGY SAVINGS POWER (MKwh) HEAT (GCal)	ANNUAL CARBON (C) REDUCTION (Tonnes)
Steel	Arc Furnace Load Management	1.5	Power - 9.5	2976
Chemicals	Co-Generation (Methanation)	1.31	Power - 1.5 Heat - 19,215	2005
Detergents	Co-Generation (Gas Turbine)	3.9	Power - 16.0	5012
Automotive	Gas-fired arc furnaces;	0.50	Power - 7.6	2380
Paper	Refrigeration	0.10	Power - 1.42	438
Engineering	Voltage Stabilizer	0.10	Power - 0.925	285
Paper	Steam drives; Controls; Paper machine upgradation Various	0.4	Power - 1.36 Heat - 2905	595
Industrial Estate	Various	1.400	Power - 13.145	4118
Sugar	Economizers; Steam drives	0.30	Heat - 5550	566
Rayon	Electrical; Thermal	3.2	Power-31.4	14,841
Paper	Electrical; Thermal	5.1	Power-13.6 Heat-33,431	7670
Electric Utility	DSM	10.200	Power - 86.17	26,994
Textile	Motors	0.400	Power - 4.1	1284
Chemicals	Thermal	1.500	Heat - 70,164	5607
Engineering	Thermal	0.100	Heat - 7497	599
Sugar	Electrical	0.300	Power - 1.5	474
TOTAL		30.20	Power - 188.2 Heat - 201396	75,844

Calculation of Incremental \$/ton carbon emission:

- Estimated annual total reduction of carbon emission: 75,844 tonnes
- Estimated carbon emission reduction over project life (10 years): 758,440
- Baseline investment for technical assistance: \$2.0 million
- Total alternative investment for technical assistance: \$ 5.0 million
- Incremental GEF investment for energy efficiency technical assistance: \$5.0 million
- Incremental \$/ton carbon emission reduced: $5,000,000/758,444 = \$6.6/\text{ton carbon}$

Annex 6

Second Renewable Energy Project Financial Summary Indian Renewable Energy Development Agency Limited

Years Ending March 31: 1992 through 1997
(In Millions of Current Rupees)

	HISTORICAL						Average Annual Growth ¹
	1992	1993	1994	1995	1996	1997	
Income Statement Items							
Interest on Loans & Deposits	59.7	81.7	72.3	117.6	296.6	700.1	75%
Other Income	0.6	0.9	11.4	21.0	45.7	49.4	279%
Total Income	60.2	82.6	83.7	138.6	342.3	749.5	74%
Operating Expenses	4.3	7.0	15.1	40.3	81.8	121.1	99%
Interest Expenses	22.7	22.5	22.5	23.7	110.9	423.2	131%
Net Income before Tax	33.3	53.1	46.2	74.6	149.6	205.3	49%
Net Profit after Tax	16.5	49.7	30.9	52.9	75.2	139.8	73%
Funds Statement Items							
Internal Sources	66.2	126.3	146.6	300.8	583.7	1268.9	85%
Borrowings	40.0	0.0	0.0	500.0	1568.9	1950.9	
Grants	91.9	0.0	0.6	438.3	33.7	97.0	
Equity Investments	0.0	80.0	60.0	143.5	240.0	280.0	
Total Sources	<u>198.1</u>	<u>206.3</u>	<u>207.2</u>	<u>1382.6</u>	<u>2426.3</u>	<u>3596.8</u>	<u>139%</u>
Disbursements	101.9	181.7	561.7	1309.1	2386.0	2374.7	100%
Capital Expenditure	0.8	0.8	1.5	31.9	6.7	0.6	404%
Advances	18.7	29.8	2.4	40.5	64.8	47.2	312%
Dividends	0.0	0.0	0.0	2.4	2.6	17.5	
Working Capital Increase (Decrease)	27.4	(74.5)	(393.5)	(39.5)	(184.8)	568.8	
Debt Service	46.7	62.5	34.8	23.7	110.9	448.2	126%
Others	2.6	5.9	0.4	14.6	40.1	140.0	903%
Total Applications	<u>198.1</u>	<u>206.3</u>	<u>207.2</u>	<u>1382.6</u>	<u>2426.3</u>	<u>3596.8</u>	<u>139%</u>
Balance Sheet Items							
Current Assets	401.6	380.3	370.2	614.5	735.4	1276.8	30%
Net Fixed Assets	1.2	1.6	2.2	31.4	54.9	42.8	287%
Other Assets	216.2	341.3	845.6	1896.1	3923.6	6032.3	98%
Total Assets	<u>618.9</u>	<u>723.2</u>	<u>1218.0</u>	<u>2542.1</u>	<u>4713.9</u>	<u>7351.9</u>	<u>67%</u>
Debt	250.0	250.0	250.0	750.0	2318.9	4244.8	98%
Current Liabilities	73.7	48.3	451.6	645.9	917.9	1155.1	182%
Grant Funds	167.9	167.9	168.5	606.9	637.6	723.5	56%
Equity	127.3	257.0	347.9	539.3	839.5	1228.6	59%
Total Liabilities and Equity	<u>618.9</u>	<u>723.2</u>	<u>1218.0</u>	<u>2542.1</u>	<u>4713.9</u>	<u>7351.9</u>	<u>67%</u>

¹ Arithmetic average of annual growth rates

Financial Summary Indian Renewable Energy Development Agency Limited

Years Ending March 31: 1998 through 2002
(In Millions of Current Rupees)

	PROJECTED					Average Annual Growth ¹
	1998	1999	2000	2001	2002	
Income Statement Items						
Interest on Loans & Deposits	1068.1	1526.5	2114.7	2782.6	3634.1	29%
Other Income	60.9	122.4	135.4	145.3	153.9	25%
Total Income	1129.0	1648.9	2250.1	2927.9	3788.0	28%
Operating Expenses	156.8	143.6	185.6	221.1	284.0	14%
Interest Expenses	725.1	1003.6	1372.4	1781.9	2133.5	25%
Net Income before Tax	247.1	501.6	692.1	924.8	1370.6	45%
Net Profit after Tax	214.9	421.3	579.2	783.6	1158.8	43%
Funds Statement Items						
Internal Sources	1745.7	2551.6	3833.0	5172.6	6191.7	30%
Borrowings	2960.0	3350.0	4000.0	4205.1	5075.0	12%
Grants	263.4	275.3	0.0	0.0	0.0	
Equity Investments	415.0	1250.0	480.0	580.0	700.0	36%
Total Sources	<u>5384.1</u>	<u>7426.9</u>	<u>8313.0</u>	<u>9957.7</u>	<u>11966.7</u>	<u>18%</u>
Disbursements	3448.0	4270.0	5200.0	6360.0	8240.0	19%
Capital Expenditure	143.3	4.0	4.0	4.0	4.0	-19%
Advances	32.2	80.3	112.9	141.2	211.8	53%
Dividends	33.8	43.0	84.3	115.9	156.7	39%
Working Capital Increase (Decrease)	435.8	1468.7	724.5	171.0	(725.6)	
Debt Service	1065.6	1458.0	2037.4	2915.7	3729.7	30%
Others	225.4	102.9	150.0	250.0	350.0	24%
Total Applications	<u>5384.1</u>	<u>7426.9</u>	<u>8313.0</u>	<u>9957.7</u>	<u>11966.7</u>	<u>18%</u>
Balance Sheet Items						
Current Assets	2388.8	4210.1	5164.3	5623.5	5276.6	20%
Net Fixed Assets	168.3	149.0	132.4	118.0	105.5	-9%
Others Assets	9156.1	12190.5	15760.9	19843.6	25650.2	24%
Total Assets	<u>11713.2</u>	<u>16549.6</u>	<u>21057.6</u>	<u>25585.0</u>	<u>31032.3</u>	<u>22%</u>
Debt	7604.4	10500.0	13835.1	16906.4	20385.2	23%
Current Liabilities	965.8	1047.0	1159.3	1261.0	1435.0	8%
Grant Funds	1381.3	1753.8	1871.1	2018.5	2186.1	10%
Equity	1761.7	3248.8	4192.2	5399.1	7026.1	34%
Total Liabilities and Equity	<u>11713.2</u>	<u>16549.6</u>	<u>21057.6</u>	<u>25585.0</u>	<u>31032.3</u>	<u>22%</u>

¹ Arithmetic average of annual growth rates

Financial Summary

Indian Renewable Energy Development Agency Limited

Financial Ratios

HISTORICAL

	1992	1993	1994	1995	1996	1997
<i>Financial Ratios</i>						
<i>Interest Income as % of Average Assets</i>	8.9%	12.2%	7.5%	6.3%	8.2%	11.6%
<i>Net Interest Income as % of Average Assets</i>	4.3%	8.8%	5.1%	5.0%	5.1%	5.0%
<i>Operating Expenses as % of Average Assets</i>	1.9%	1.0%	1.6%	2.1%	2.3%	2.0%
<i>Net Profit as % of Average Assets</i>	2.6%	7.4%	3.2%	2.8%	2.1%	2.3%
<i>Interest Income from Loans as % of Average Loan Outstanding</i>	13.1%	10.2%	8.8%	8.9%	10.5%	14.2%
<i>Net Profit on Average Capital Plus Reserves %</i>	13.8%	25.9%	10.2%	11.9%	10.9%	13.5%
<i>Real Net Profit on Average Capital Plus Reserves %*</i>	0.0%	15.8%	1.8%	1.0%	5.2%	6.8%
<i>Personnel and Admin. Expense as % of Loan Outstanding</i>	1.7%	1.5%	1.7%	1.5%	0.9%	0.7%
<i>Operating Income as a % of Revenue</i>	99.1%	98.9%	86.4%	84.8%	86.7%	93.4%
<i>Net Income as a % of Revenue</i>	55.2%	64.3%	55.1%	53.9%	43.7%	27.4%
<i>Return on Average Invested Capital</i>	11.2%	12.4%	9.5%	7.4%	9.2%	12.6%
<i>Debt Service Coverage</i>	2.5	3.4	3.1	4.3	2.4	1.5
<i>Current Ratio</i>	5.5	7.9	0.8	1.0	0.8	1.1
<i>Debt as % of Total Capitalization</i>	45.9%	37.0%	32.6%	39.6%	61.1%	68.5%
<i>Paid-in Capital plus Reserves as % of Total Assets</i>	20.6%	35.5%	28.6%	21.2%	17.8%	16.7%
<i>Revolving Fund as % of Total Assets</i>	47.7%	58.8%	42.4%	45.1%	31.3%	26.6%
<i>Debt: Revolving Fund Ratio</i>	0.9	0.6	0.5	0.7	1.6	2.2

PROJECTED

	1998	1999	2000	2001	2002
<i>Financial Ratios</i>					
<i>Interest Income as % of Average Assets</i>	10.7%	10.8%	11.2%	11.9%	12.8%
<i>Net Interest Income as % of Average Assets</i>	3.6%	3.7%	4.0%	4.3%	5.3%
<i>Operating Expenses as % of Average Assets</i>	1.6%	1.0%	1.0%	1.0%	1.0%
<i>Net Profit as % of Average Assets</i>	2.3%	3.0%	3.1%	3.4%	4.1%
<i>Interest Income from Loans as % of Average Loan Outstanding</i>	14.6%	14.5%	15.3%	15.8%	16.2%
<i>Net Profit on Average Capital Plus Reserves %</i>	14.4%	16.8%	15.6%	16.3%	18.7%
<i>Real Net Profit on Average Capital Plus Reserves %*</i>	7.4%	9.8%	8.6%	9.3%	11.7%
<i>Personnel and Admin. Expense as % of Loan Outstanding</i>	0.6	0.5	0.5	0.4	0.4
<i>Operating Income as a % of Revenue</i>	94.6%	92.6%	94.0%	95.0%	95.9%
<i>Net Income as a % of Revenue</i>	21.9%	30.4%	30.8%	31.6%	36.2%
<i>Return on Average Invested Capital</i>	11.5%	11.5%	11.7%	12.2%	13.0%
<i>Debt Service Coverage</i>	1.4	1.5	1.5	1.5	1.7
<i>Current Ratio</i>	2.5	4.0	4.5	4.5	3.7
<i>Debt as % of Total Capitalization</i>	70.8%	67.7%	69.5%	69.5%	68.9%
<i>Paid-in Capital plus Reserves as % of Total Assets</i>	15.0%	19.6%	19.9%	21.1%	22.6%
<i>Revolving Fund as % of Total Assets</i>	26.8%	30.2%	28.8%	29.0%	29.7%
<i>Debt: Revolving Fund Ratio</i>	2.4	2.1	2.3	2.3	2.2

* Adjusted for Inflation

Annex 7

Second Renewable Energy Project Procurement and Disbursement Arrangements

Proposed Procurement Procedures¹

1. Items or groups of items for private enterprises estimated to cost the equivalent of \$5,000,000 or less per contract, may be procured under contracts awarded on the basis of evaluation and comparison of quotations obtained from at least three qualified suppliers from at least two different countries eligible under the Guidelines in accordance with the procedures acceptable to the Bank.
2. Items or groups of items for public sector enterprises estimated to cost the equivalent of \$200,000 or less per contract, may be procured under contracts awarded on the basis of competitive bidding, advertised locally, in accordance with procedures satisfactory to the Bank.
3. Specialized equipment (office equipment, computer hardware and software, and instruments for monitoring and testing), with individual contract value not exceeding \$50,000, up to an aggregate amount equivalent to \$5,000,000 may be procured under contracts awarded on the basis of comparison of price quotations obtained from at least three suppliers, in accordance with procedures acceptable to the Bank.
4. Items or groups of items for private enterprises estimated to cost the equivalent of \$50,000 or less per contract up to an aggregate amount equivalent to \$30,000,000 may be procured on the basis of established commercial practices for such items. For purposes of this paragraph, "established commercial practices" includes direct contracting.
5. Contracts for civil works for private enterprises estimated to cost the equivalent of \$10,000,000 or less per contract may be procured on the basis of competitive bidding advertised locally in accordance with procedures satisfactory to the Bank.
6. Contracts for civil works for private enterprises estimated to cost the equivalent of \$5,000,000 or less per contract may be procured on the basis of established commercial practices acceptable to the Bank. For the purposes of this Paragraph, the term "established commercial practices" shall inter alia, include (i) some form of competition, and evidence to this effect shall be presented to the Bank, and (ii) in case of direct contracting, or when no documentary evidence is available to demonstrate competition, IREDA shall furnish to the Bank confirmation by independent engineers employed by IREDA that the contract amounts are reasonable.
7. Contracts for civil works for public sector enterprises estimated to cost the equivalent of \$10,000,000 or less per contract may be procured on the basis of competitive bidding advertised locally in accordance with procedures satisfactory to the Bank.
8. Contracts for civil works for public sector enterprises estimated to cost the equivalent of \$50,000 or less per contract, up to an aggregate amount equivalent of \$2,000,000, may be procured through force account procedures, or direct contracting, or under contracts awarded on the basis of comparison of price quotations obtained from at least three qualified contractors, all in accordance with procedures satisfactory to the Bank.

¹ Paragraphs 1 to 8 are in accordance with agreed procurement procedures under India: Renewable Resources Development Project, as per Schedule 1 of Project Agreement for Cr2449-IN dated March 5, 1993, as amended on February 8, 1995 and October 31, 1996, respectively, and as clarified by side letters to the amendments. Paragraphs 9 to 11 refer to performance contracting arrangements expected to emerge under the Project's energy efficiency component. These procurement procedures fall under para 3.13 of the Procurement Guidelines.

9. Performance service contracts offered by Energy Service Companies involving energy efficiency investments equivalent to over \$1 million would be procured on the basis of international competitive bidding.
10. Performance contracts involving energy efficiency investments larger than the equivalent of US \$50,000 up to US \$1 million may be awarded on the basis of limited international bidding (LIB).
11. Performance contracts involving energy efficiency investments valued at the equivalent of US \$50,000 or less during the contract period, up to an aggregate ceiling of \$ 5 million may be procured on the basis of established commercial practices, including direct contracting.

Disbursement Arrangements

Allocation of loan proceeds is presented in Table 7.C.

A Special Account will be established at time of loan and credit effectiveness, equivalent to \$4.0 million from the IDA Credit, \$3.0 million from IBRD, and \$0.5 from GEF Trust Fund. For this purpose, the Government and IREDA will open a Special Deposit Accounts for proceeds from IDA, IBRD and GET, respectively, with the State Bank of India, or with any other national bank acceptable to the Bank. All sub-loan disbursements and applications for Bank loan withdrawals would be handled by IREDA's finance group, and in the case of IDA disbursements through appropriate DEA channels. Whenever appropriate, direct disbursements by the Bank to suppliers and contractors will be allowed. PDAT will interface with IREDA regarding the requirements for disbursement monitoring and processing.

Statement of Expenses (SOE): Disbursements for expenditures under contracts falling below the prior review threshold listed in Table 7b will be on the basis of SOEs. Specifically, disbursements for contracts for goods, works and energy efficiency services based on performance contracts, valued at US\$ 5 million and below will be processed on the basis of SOEs; except that in the case of goods procured by public sector enterprises, disbursements for contracts valued at US \$200,000 and below will be disbursed against SOEs.

Table 7A: Project Costs by Procurement Arrangements
(In US\$ million equivalent)

Small Hydro Component							
Expenditure Category		Procurement Method					Total Cost ² (Including Contingencies)
		ICB	RFQ ³	NCB	ECP ⁴	Others		NBF^{5}
1	Works	-	-	25.0 (25.0)	65.0 (29.0)	10.0 (1.0)	10.0 (55.0)
2	Goods	40.0 (40.0)	50.0 (44.0)	-	20.0 (5.0)	10.0 (1.0)	10.0 (90.0)
3	Engg., Erection & Consultancy Services	2.0 (2.0)	2.0 (1.0)	-	2.0 (1.0)	3.0 (1.0)	1.0 (5.0)
<u>Total</u>		42.0 (42.0)	52.0 (45.0)	25.0 (25.0)	82.0 (35.0)	23.0 (3.0)	250.0 (150.0)

Figures in parenthesis are the amounts to be financed from the proceeds of the IBRD/IDA assistance.

² Excludes taxes and duties and cost of land

³ Request for Quotations

⁴ Established Commercial Practice

⁵ Not Bank-Financed.

Energy Efficiency and Technical Assistance Component

Expenditure Category	Procurement Method						Total Cost (Including Contingencies)
	ICB	LIB	RFQ	ECP	NCB	NBF	
1. Goods	6.0 (6.0)		5.0 (4.0)	7.0 (3.0)		2.0	20.0 (13.0)
2. Engg., Erection, Performance Contracting Services		4.0 (4.0)	2.0 (2.0)	3.0 (1.0)		1.0	10.0 (7.0)
3. Consultants		3 (3)			2	2	7.0 (5.0)
Total	6.0 (6.0)	4.0 (4.0)	7.0 (6.0)	10.0 (4.0)		3.0	30.0 (20.0)

Table 7B: Thresholds for Procurement Methods and Prior Review

Expenditure Category	Contract Value (Threshold)	Procurement Method	Contracts Subject to Prior Review
1. Civil Works			
	a. Above \$10 million	a. ICB	a. Above \$5 million
Private Sector	b. Above \$5 million and up to \$10 million	b. NCB	b. Above \$5 million
	c. \$5 million and below	c. ECP	c. None
Government Sector	d. Above \$ 50,000 up to \$10 million	d. NCB	d. Above \$5 million
	e. \$50,000 and below, up to an aggregate amount of \$2 million	e. Force account, or direct contracting, or price comparisons	e. None
2. Goods			
Private Sector	a. Above \$5 million	a. ICB	a. Above \$5 million
	b. Above \$50,000 up to \$5 million	b. quotations from at least 3 qualified suppliers from at least 2 eligible countries	b. None
Government Sector	c. Above \$200,000	c. ICB	c. Above \$200,000
	d. \$200,000 and below	d. NCB	d. None
Specialized equipment	e. Up to an aggregate of \$5 million	e. quotations from at least 3 suppliers	e. None
3. Services			
Performance Contracting	a. With energy investments involving over \$1 million	a. ICB	a. All
	b. With energy efficiency investments of more than \$50,000 up to \$1 million	b. LIB	b. None
	c. With energy efficiency investments valued at \$50,000 and below up to an aggregate of \$5 million	c. ECP including direct contracting	c. None

Table 7C: Allocation of Loan proceeds
In US \$ Million Equivalent

Expenditure Category	IBRD	IDA	GEF Trust Fund	Financing Percentage
1. Equipment & Materials	30	20	1	100% of foreign expenditures, 100% of local expenditures (ex-factory cost); and 80% of local expenditures for other items procured locally
2. Civil Works	70	20		90% of the contract amount
3. Engineering Services; Energy Efficiency Services	5	5		100% of supervision, erection, testing & commissioning charges; 100% of energy efficiency performance contract
4. Consultants			2	100%
5. Training			1	100%
6. Unallocated	15	5	1	
TOTAL	120	50	5	

NOTE:

a) The term "Foreign Expenditures" means expenditure incurred in the currency of any country other than that of Borrower for goods or services supplied from the territory of any country other than that of the borrower. The term "Local Expenditures" means expenditures in the currency of the borrower or for goods or services supplied from the territory of the Borrower.

Annex 8 Second Renewable Energy Project

GUIDELINES FOR ENVIRONMENTAL ANALYSIS OF SMALL-HYDRO PROJECTS*

These guidelines identify points that would be reviewed in the environmental screening of small-hydro projects, including related works on civil, mechanical and electrical engineering to provide water diversion dams, powerhouses, water intake structures, water conveyance structures, electrical systems, grid interconnection, etc.

SCOPE OF WORK FOR ENVIRONMENTAL ANALYSIS

Project Plan

1. Provides a general project plan and its schedule and provide two maps drawn on scale, one of the general area and one for the project area.

Climate

2. Describe climate type, and meteorological data for temperature, rainfall (seasonal), wind (direction, speed, seasonal).

Geology

3. Describe land morphology, topography and geologic structure. Is project located in an earthquake zone, if so, provide quantitative data for the frequency and intensity of earthquakes.

Hydrology

4. Provide river stream flow rates (monthly maxima and minima from historical records).
5. Provide data area describing water availability in all seasons and if available, give surface and groundwater quality data during all seasons. Indicate surface and groundwater recharge areas, all uses of water (including irrigation, industrial and other uses), sources of water for drinking, bathing, clothes washing.
6. If the water availability for the different uses is impaired by the project, describe the impact and propose mitigation measures to provide this water at the same quality.
7. Describe river flow disruption during the dry season caused by the project. Describe high sedimentation during construction and immediately after construction and measures proposed to mitigate the situation. Describe the impacts on aquatic organisms during construction (with high sedimentation) and after implementation of the project.
8. A minimum flow of 100 liters/second should be maintained in the bypassed river section during normal plant operation.

Land and Soil

9. Describe land stability, adaptability, layout and use, land allotment, protected lands and soil types, structures and texture.
10. Does the project has an impact on the land stability? If so, describe measures to stabilize the land.

Flora and Fauna

11. Describe types of flora and fauna (land and water), and types of protected flora and fauna.
12. Describe impact of projects on wildlife.
13. Are surveys available describing endangered biological species that might be threatened by the proposed small-hydro power plant (SHPP) ?

Health

14. What are local health facilities and are there surveys of communicable diseases in the local communities that could be affected especially during the construction phase of the project.

* These Guidelines are issued by IREDA to its clients

15. Will imported labor force be checked on communicable diseases?
16. What will be the impact of the project on water-borne diseases and parasites. Especially for those sections of the rivers that will fall dry during construction periods, or that the project will fully use available river water.

Construction

17. Provide a list of project activities, including construction, land clearing, land excavation, access road construction, transmission line installation, etc..
18. Provide an estimate of the size of the area used for the project activities, including the main structures, road, transmission lines, and penstocks. Indicate what percentage of the area, allocated for the project, will be restored to conditions prevailing prior to commencement of construction activities. Restored land should not be fenced and/or considered the project developer's property.
19. List the heavy equipment to be used in the project construction activities.
20. Describe the impact of this equipment on existing roads and measures to be taken to repair any damage.
21. Describe in a general way the various building materials, mainly construction aggregates, to be used (type, quantity or volume), where these materials are to be found and how collected, their means of being transported to the site and their storage and the final disposal system for any wastes generated.
22. Describe the environmental impacts on the sites where these materials are collected, or quarried.
23. Describe how the hydro- power plant will be operated, including any special environmental management controls.
24. Describe the types of equipment used in operating the generating systems, including giving the plant's capacity rating.
25. Describe fully the environmental impact of the construction activities.
26. Describe the number of construction workers and the education and expertise required, whether or not these workers can be hired locally, where they will reside during construction and their ages and sex.
27. Describe any training that will be given to workers.
28. Describe the number of operating employees and the education and expertise required, and whether some people can be hired locally.
29. Describe any training that will be given to operators.
30. Describe noise intensity around the power house, how much it is over ambient noise levels and what measures will be taken to mitigate a noise problem.
31. Describe any existing activities adjacent or near the project that could have a positive or negative effect on the project.
32. Do project plans provide for an adequate buffer between project (construction and operation) and any conflicting adjacent land uses? What mitigation is planned for such cases (vegetative screening)?

Cultural-socio-economic-aesthetic impacts

33. Describe population profiles (age, sex, education, religion, income, health), attitude and perception of the community toward development, condition of the socio-culture heritage and other relevant information.
34. Are there surveys for the area's archaeological, aesthetic and cultural resources that might be threatened by the hydro-power plant?
35. Describe cultural impacts (including on local religion, on local archeological treasures and loss of riparian vegetation used for artisan or medicinal purposes).

Note

It should be noted that not all the impacts mentioned above will prevail in all the small hydro power projects under consideration. Even so, the Environmental Review should state that the impact does not exist. Some other impacts could also be quite positive and should be mentioned as such.

Annex 9 Second Renewable Energy Project

GUIDELINES FOR THE SOCIAL IMPACT ASSESSMENT OF SMALL - HYDRO PROJECTS*

These guidelines identify points that would be reviewed in the social impact screening of small-hydro projects, including related works on civil, mechanical and electrical engineering to provide water diversion dams, powerhouses, water intake structures, water conveyance structures, electrical systems, grid interconnection, buildings and structures to house related offices and maintenance staff, and access roads to these structures.

Key Words: SIA: Social Impact Assessment
IPDP: Indigenous People Development Plan
PAP: Project Affected Persons
RAP: Resettlement Action Plan

Project Plan and Location

1. Provide the general project plan and its schedule and provide two maps drawn on scale, one of the general area and one for the project area.
2. Give details of the proposed location of the project. State/District/Village, etc.

Land Details

3. Give the total area of the land required for the physical components of the project.
4. Describe the type of land (e.g., agricultural, residential), the crops, vegetation, etc.
5. Ownership of land (Government, Private), traditional population, encumbrance details, etc.
6. Current land use in the proposed area and surroundings.
7. Possible land use change expected after project implementation.
8. Proposed strategy for procurement of land - Government lease, direct purchase, negotiated settlement or compulsory acquisition, etc. Give detailed description of the area falling under each category.

People Affected

9. Number of people and families affected (*give details as necessary*)
 - a) including those losing homes, land, or livelihood;
 - b) those deriving benefits (employment, electricity, etc.) from the sub-project; and
 - c) those who may be adversely affected by the imposition of an external population or local cultures (e.g., women, tribals).
10. Describe the nature of impacts expected (positive and negative)
11. Identify and describe cultural impacts, if any, in the population due to the land acquisition and the proposed project.

Rehabilitation and Resettlement Plans

12. Establish the need for rehabilitation and resettlement based on the above descriptions and any other issues.
13. Explain the actions taken and proposed for the above so as to ensure restoration/improvement of living standards. (*Please see World Bank Operational Directive OD: 4.30 in the Annexure.*)
14. Describe the National and State legal framework existing quoting the relevant provisions and applicability for the specific case as identified above. (*Ref: LAA 1984 amendment. 1984*)
15. Give a flow chart of actions for the entire RAP along with the time frame and identified responsibilities of each player such as the developer, Government agency, etc.

* These Guidelines are issued by IREDA to its clients

16. Provide the Entitlement calculations for payment of compensation for various losses at replacement value. (See *Social Impact Assessment Framework, Annexure A, for entitlement guidelines.*)

Peoples' Participation

17. Existing and proposed mechanisms/efforts for public consultation and disclosure of information. Statutory requirements, if any, for the above may also be explained.
18. Explain how public participation is ensured during the entire project cycle.
19. Mention the requirement of RAP and where appropriate IPDP.

Grievance Mechanism

20. Describe the grievance redress mechanism legally available as well as socially acceptable.
21. Remedies available through Lok Adalt, Village Panchayats, NGOs, etc.

Institutional Arrangements

22. Institutional arrangements made for monitoring and implementation of RAP.
23. Manpower, system and costing for the above activities.
24. Please mention whether the estimated costs have been incorporated in the project cost with sufficient contingency.

Conclusion

25. Conclude with the overall view with respect to Social Impacts and Action Taken covering the following points:
 - a) Register all people to be affected by land acquisition
 - b) Inform and consult the affected population, and organize appropriate grievance mechanisms.
 - c) Monitor the formal process of land acquisition and payment of compensation, and provide relevant assistance, if needed.
 - d) Implement resettlement and rehabilitation of affected people as per approved plans.
 - e) Establish collaboration with local NGOs which represent the developer's employees and their families and other local interest group.

Note

The "Social Impact Assessment Framework", enclosed as Annexure-A, should be read carefully before preparing the response to the above guidelines. It should be noted that not all the impacts mentioned above will prevail in all the small hydro power projects under consideration. Even so, the Social Impact Screening should state that the impact does not exist. Some other impacts could also be quite positive and should be mentioned as such.

Annex 10 Second Renewable Energy Project

Eligibility Criteria for Beneficiaries and Sub-Projects

Beneficiaries	
General:	In compliance with IREDA's Operational Policy Statement (OPS) and Financing Guidelines
Financial criteria	Sub-borrower has no accumulated losses and must have posted profits during last year of operations. Audit and financial management practices are satisfactory. Projected corporate financial performance reflect adequate earnings capacity and debt service coverage
Security package	Sub-loans must be secured by either one or combination of: bank guarantee, equitable mortgage, hypothecation of moveable assets, state government guarantee, corporate guarantee and/or other financial instruments or marketable securities acceptable in the Indian commercial market.
Legal character	Sub-borrowers from the private sector: individual and partnership concerns, companies registered under the Company's Act, registered NGOs and Trusts, societies registered under Indian Societies Registration Act. On a case-to-case basis, state-owned enterprises registered under the Company's Act can be beneficiaries.
Loan ceiling amount	Based on OPS credit matrix, maximum per client exposure is set at no more than 20% of IREDA's network. Following RBI Guidelines, per client exposure limit is 15% of IREDA's network, and exposure limit to group companies is 25% of IREDA's network
Sub-Projects	
Priority Areas	Private sector investments in small hydro and energy efficiency schemes
Minimum equity contribution	20 to 25 percent of the project cost
Technical	Scheme is technically sound and the solution proposed is least cost. Selected power plant technical design should follow value engineering principles espoused in ESMAP pre-investment study on small hydros.
Financial and Economic	At least 12 percent FRR and ERR; Competitive return on investor equity; project cash flow covers debt service requirement
Environmental and Social Impact	Sub-project should comply with IREDA guidelines on environmental and social (R&R) standards (which reflect GOI, State and Bank environmental guidelines)
Clearances and contractual arrangements	Schemes must have secured appropriate clearances from State and Center; and contractual arrangements for energy sales and delivery in place.
Bank prior review	Schemes involving project costs of US\$5 million and above, as well as the first two initial energy efficiency schemes, will be subject to Bank's prior review.

IREDA'S FINANCING NORMS AT A GLANCE

A. PROJECT FINANCING

S. No. (1)	Sector (2)	Int. Rate (excl of Int. Tax) % p.a.* (3)	Repayment including Moratorium (Max yrs) (4)	Moratorium (Maximum Years) (5)	Minimum promoter's Contribution (%) (6)	Term Loan/Lending Norms of IREDA (7)	Remarks (8)
1.	Small Hydro (a) Intl Funds (b) IREDA Funds	16.50 17.00	10 10	3 3	25 25	100% of eligible equipt cost under World Bank norms limited to a maximum of 75% of project cost.	-
2.	Wind Farms (a) Intl Funds (b) IREDA Funds (above IMW capacity)	15.50 16.00	10 10	1 1	25 25	100% of eligible equipt cost limited to a maximum of 75% of project cost	-
3.	Biomass Co-Generation (including Sugar Ind.) (a) Intl Funds (b) IREDA Funds	16.50 17.00	10 10	3 3	25 25	Upto 75% of total project cost Upto 75% of total project cost	-
4.	Biomass Power Generation	16.00	10	3	25	Upto 75% of total project cost	-
5.	Biomass Gasifier for Power Generation (Above 500 KW)	15.50	5	2	25	Upto 75% of total project cost	-
6.	Bio-methanation from Industrial Effluents (a) Intl Funds (b) IREDA Funds	16.50 17.00	8 8	2 2	25 25	Upto 75% of total project cost - do -	- -
7.	Biomass Briquetting	9.50	10	2	25	Upto 75% of total project cost	-
8.	Recovery of Energy from urban and Municipal Wastes to produce electricity, solid fuels and gas	7.50	10	2	25	Upto 75% of total project cost	Subject to signing of MoU with MNES for receipt of subsidy @10%
9.	Solar Thermal Systems** - Users (Direct) - Inst. (non-profit making i.e. not claiming 100% Depreciation) - Industrial & Inst. (Profit making and claiming 100% Depreciation) - INTERMEDIARIES - Intermediaries (Domestic)\$\$ - Intermediaries (Other than domestic) \$\$\$	5.00 8.30 2.50 8.30	10 10 5 10	2 2 1 2	25 25 25 25	Upto 75% of total project cost Upto 75% of total project cost Upto 75% of total project cost Upto 75% of total project cost	- - - -
10.	Solar Cooker Market Devt Programme - Bulk users (Corporate bodies and co-operative societies -Intermediaries (State Renewable Energy Agencies & non-profit Institutions) -Manufacturers	Nil Nil 10.30	2 2 7	6 mos. 6 mos. 2 yrs.	10 10 25	Upto 90% of total project cost (net of any State subsidy) Upto 90% of total project cost (net of any State subsidy) Upto 75% of total project cost (net of any State subsidy)	-

S. No. (1)	Sector (2)	Int. Rate (excl of Int. Tax) % p.a.* (3)	Repayment including Moratorium (Max yrs) (4)	Moratorium (Maximum Years) (5)	Minimum promoter's Contribution (%) (6)	Term Loan/Lending Norms of IREDA (7)	Remarks (8)
11.	Biogas plants based on: i. Animal dung/Agro residues/Other wastes (or) combination of these wastes ii. Human Excreta/Night Soil (20-100 cum/day)\$ - Financial Intermediary*** a) For category (i) above b) For category (ii) above -Direct Users a) For category (i) above b) For category (ii) above	10.50 4.00 10.50 4.00	8 8 8 8	2 2 2 2	20 20 20 20	Upto 80% of total project cost Upto 80% of total project cost Upto 80% of total project cost Upto 80% of total project cost	- - - -

B. MANUFACTURING OF EQUIPMENT RELATING TO:

1.	Bio-mass Briquetting	16.00	7	2	25	Upto 75% of total project cost	-
2.	Bio-mass Gasifiers	16.00	7	2	25	Upto 75% of total project cost	-
3.	High Efficiency Wood burning Stoves	16.00	7	2	25	Upto 75% of total project cost	-
4.	Battery Powered Vehicles and Special Batteries for Battery Powered Vehicles/SPV and Electric Vehicles	16.00	7	2	25	Upto 75% of total project cost	-
5.	Devices related to Energy conservation/systems/ Equipment using/ operating through Renewable Energy	16.00	7	2	25	Upto 75% of total project cost	-
6.	Solar Thermal Systems	16.00	7	2	25	Upto 75% of total project cost	-
7.	Solar Photovoltaics	16.00	7	2	25	Upto 75% of total project cost	-
8.	Wind Energy Equipment	16.00	7	2	25	Upto 75% of total project cost	-
9.	Micro Hydel Sets	16.00	7	2	25	Upto 75% of total project cost	-

C. EQUIPMENT FINANCING:

1.	Micro Hydel Sets (upto 100KW capacity)	16.00	6	1	20	Upto 80% of the cost of eligible equipment(s)	-
2.	Wind Energy Equipment (upto 1 MW per party per financial year)	17.00	10	1	25	Upto 75% of the cost of eligible equipment(s) (Eligible Equipment comprise WEG, Tower, Control Panel and Transformer)	-
3.	Gasifiers (upto 500KW)	15.50	4	1	20	Upto 80% of the Cost of eligible equipment(s)	-
4.	Battery Powered Vehicles and Special Batteries for Battery Powered Vehicles /PV and Electric Vehicles	16.00	5	1	20	Upto 80% of the Cost of eligible equipment(s)	-
5.	High Efficiency energy saving/conservation systems through renewable systems/fuels	16.00	5	1	20	Upto 80% of the Cost of eligible equipment(s)	-

S. No. (1)	Sector (2)	Int. Rate (excl of Int. Tax) % p.a.* (3)	Repayment including Moratorium (Max yrs) (4)	Moratorium (Maximum Years) (5)	Minimum promoter's Contribution (%) (6)	Term Loan/Lending Norms of IREDA (7)	Remarks (8)
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D. SPV FUNDING UNDER WORLD BANK PROGRAMME

Domestic and Farm Stand Alone Systems of all Categories except Pumping and Power Generation Systems							
1.	Rural applications	2.5	10	1	15	Upto 85% of the project cost	-
2.	Other than rural applications	5.0	10	1	15	Upto 85% of the project cost	-
Pumping Systems							
1.	All applications	2.5	10	1	15	Upto 85% of the project cost	-
Power Generation Systems of all categories							
1.	Main grid interactive/inter-tied systems primarily for export of power to grid	5.0	10	2	15	Upto 85% of the project cost	-
2.	Main grid interactive systems for captive consumption and Localized grid interactive systems	2.5	10	2	15	Upto 85% of the project cost	-

E. HYBRID SYSTEMS FUNDING:

1. SPV with Fossil Fuel(s)							
a)	Rural Applications	2.50	10	1	15	Upto 85% of the project cost	(i)Applicable to stand alone mode only
b)	Others	5.00	10	1	15	Upto 85% of the project cost	(ii) Combination of sources in the range of 40% to 60%
2. Wind with Fossil Fuel(s)							
a)	Rural Applications	5.00	10	1	15	Upto 85% of the project cost	(i)Applicable to stand alone mode only
b)	Others	7.50	10	1	15	Upto 85% of the project cost	(ii) Combination of sources in the range of 40% to 80%
3. SPV, Wind and Fossil Fuel(s)							
a)	Rural Applications	6.00	10	1	15	Upto 85% of the project cost	(i)Applicable to stand alone mode only
b)	Others	8.50	10	1	15	Upto 85% of the project cost	(ii) Combination of sources in the range of 60% to 80%
4. Wind with SPV							
a)	Rural applications	2.50	10	1	15	Upto 85% of the project cost	(i)Applicable to stand alone mode only
b)	Others	5.00	10	1	15	Upto 85% of the project cost	(ii) Combination of sources in the range of 60% to 80%

Notes:

- * Rate of interest would be reduced by 0.50% in the event of borrower furnishing security of Bank Guarantee
- ** Rebate of 0.50% in interest rate is given to the beneficiaries who use ISI marked collectors for Solar Thermal Heating Systems.
- *** The financial intermediaries will have to lend @14.50% p.a. for Biogas Plants based on Animal dung [category (i)] and @8.00% p.a. (maximum) for Biogas plants based on Human excreta/night soil [category (ii)]. The requirement of margin/spread of 4% would have no application where financial intermediaries give equipment on lease basis. The lease period should be co-terminus with IREDA loan repayment.
- \$ Projects costing upto Rs.50 lakhs could only be considered for IREDA's financing.
- \$\$ Are eligible for spread upto maximum of 2.5%
- \$\$\$ Are eligible for a spread of 4%

Note: benefit of interest Subsidy from MNES, wherever available, will be passed on to the borrower.

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Annex 11
Second Renewable Energy Project
Project Processing Budget and Schedule

A. Project Budget (US\$000)	<u>Planned</u> (At final PCD stage) US\$150,000	<u>Actual</u> as of 03/02/98: US\$41,400 (incl. \$14,000 for GEF processing)
B. Project Schedule	<u>Planned</u> (At final PCD stage)	<u>Revised</u>
Time taken to prepare the project (months)	9	18
First Bank mission (identification)	<u>11/04/1996</u>	<u>11/04/1996A</u>
Appraisal mission departure	<u>04/15/1997</u>	<u>07/14/1997A</u>
Negotiations	<u>06/16/1997</u>	<u>04/01/1998</u>
Board Approval	<u>08/14/1997</u>	<u>05/26/98</u>
Planned Date of Effectiveness	<u>12/01/1997</u>	<u>09/01/1998</u>

Prepared by: Indian Renewable Energy Development Agency Limited (IREDA)

Preparation assistance: Japan Trust Fund Energy Efficiency (TF022621)

Bank staff who worked on the project included: Mmes. M. Manzo, V. Ziff (SASEG); and Messrs. A. Ceyhan, K. Hattori (SASEG); S. Padmanabhan (ASTAE); Y. Ziv (ASTEN); A. Dani (SASSD); W. Smith (Consultant)

Annex 12

Second Renewable Energy Project Documents in the Project File*

A. Project Implementation Plan

- IREDA Project Document for Second Line of Credit for Small Hydro Power and Energy Efficiency Projects prepared by IREDA, September 1997
- IREDA Proposal for Technical Assistance under GEF, Energy Efficiency Market Development Programme, October 1997
- Small Hydro Development in India under the World Bank line of credit
- Appraisal of Small Hydro projects under World Bank Programme, IREDA Small Hydro unit
- Procurement Modalities for Small Hydro projects under World Bank Funding
- IREDA Financing Guidelines; Operational Policy Statement
- IREDA organization, financial policies and lending conditions, corporate plan (summary)

B. Bank Staff Assessments

- Descriptions of energy efficiency project proposals, February 1997
- Financial analysis of energy efficiency projects, February & July 1997
- Evaluation of Small Hydro Program of IREDA, October 1995
- India: Small Hydro Power Projects, February 1997
- Energy Efficiency Project Document Submitted to GEF Council, December 1997
- Review of IREDA operations, December 1997

C. Others

- Scenario of Small Hydro in India by Dr. B.S.K. Naidu
- Challenges in Implementation of Small Hydro Schemes on Hilly Streams, by Dr. Y.K. Murthy and Dr. B.S.K. Naidu
- Business Meet on Small Hydro Power, January 20, 1997, organized by IREDA
- Proceedings of Workshop on Energy Efficiency Project Development and Financing, February 1997, New Delhi, organized by IREDA and sponsored by IBRD and USAID.

* Including electronic files.

Annex 13
Status of Bank Group Operations in India
IBRD Loans and IDA Credits in the Operations Portfolio
(As of December 31, 1997)

Project ID	Loan or Credit No.	Fiscal Year	Purpose	Original Amount in US\$ Millions				Difference Between expected and actual disbursements a/	
				IBRD	IDA	Cancel-lations	Undis-bursed	Original (SAR)	Form. Revised
Number of Closed Loans/credits: 373									
<u>Active Loans</u>									
IN-PE-35169	IDA30180	1998	U.P. FORESTRY	0.00	52.94	0.00	52.85	0.00	N/A
IN-PE-38021	IDA30120	1998	DPEP III (BIHAR)	0.00	152.00	0.00	151.51	0.00	N/A
IN-PE-50638	IDA30130	1998	UP BASIC ED II	0.00	59.40	0.00	59.22	0.00	N/A
IN-PE-9979	IBRD42260	1998	COAL SECTOR REHAB	530.00	0.00	0.00	530.00	0.00	N/A
IN-PE-9979	IDA29860	1998	COAL SECTOR REHAB	0.00	2.00	0.00	2.03	0.00	N/A
IN-PE-10473	IDA29360	1997	TUBERCULOSIS CONTROL	0.00	142.40	0.00	128.48	12.12	N/A
IN-PE-10511	IDA29640	1997	MALARIA CONTROL	0.00	164.80	0.00	156.60	1.02	N/A
IN-PE-10531	IDAN0180	1997	REPRODUCTIVE HEALTHI	0.00	248.30	0.00	236.24	3.08	N/A
IN-PE-35158	IBRD41660	1997	AP IRRIGATION III	175.00	0.00	0.00	175.00	-18.70	N/A
IN-PE-35158	IDA29520	1997	AP IRRIGATION III	0.00	150.00	0.00	96.71		N/A
IN-PE-36062	IDA29160	1997	ECODEVELOPMENT	0.00	28.00	0.00	24.43	-.66	N/A
IN-PE-43728	IDA29300	1997	ENV CAPACITY BLDG TA	0.00	50.00	0.00	44.09	-.11	N/A
IN-PE-44449	IDA29420	1997	RURAL WOMEN'S DEV	0.00	19.50	0.00	18.29	2.85	N/A
IN-PE-45600	IBRD41140	1997	TA ST'S RD INFRA DEV	51.50	0.00	0.00	45.85	10.35	N/A
IN-PE-49301	IBRD41560	1997	A.P. EMERG. CYCLONE	50.00	0.00	0.00	50.00	6.33	N/A
IN-PE-49301	IDA29500	1997	A.P. EMERG. CYCLONE	0.00	100.00	0.00	89.77		N/A
IN-PE-9995	IBRD41920	1997	STATE HIGHWAYS I(AP)	350.00	0.00	0.00	337.65	-8.35	N/A
IN-PE-10480	IBRD39230	1996	B SEWAGE DISPOSAL	167.00	0.00	0.00	145.40	45.23	N/A
IN-PE-10484	IBRD40560	1996	UP RURAL WATER	59.60	0.00	0.00	56.49	1.59	N/A
IN-PE-10485	IDA27740	1996	HYDROLOGY PROJECT	0.00	142.00	0.00	114.72	25.61	N/A
IN-PE-10529	IDA28010	1996	ORISSA WRCP	0.00	290.90	0.00	212.08	-7.69	N/A
IN-PE-35170	IBRD40140	1996	ORISSA POWER SECTOR	350.00	0.00	0.00	334.57	14.58	N/A
IN-PE-35821	IDA28760	1996	DISTRICT PRIM EDUC 2	0.00	425.20	0.00	385.30	24.67	N/A
IN-PE-35825	IDA28330	1996	STATE HEALTH SYS II	0.00	350.00	0.00	305.38	34.68	N/A
IN-PE-39935	IBRD39920	1996	ILFS-INFRAS FINANCE	200.00	0.00	0.00	175.00	17.50	N/A
IN-PE-39935	IDA28380	1996	ILFS-INFRAS FINANCE	0.00	5.00	0.00	4.61		N/A
IN-PE-43310	IDA28620	1996	COAL ENV&SOCIAL MIT.	0.00	63.00	0.00	54.92	.19	N/A
IN-PE-10461	IBRD39076	1995	MADRAS WATER SUP II	269.80	0.00	189.30	75.37	82.18	N/A
IN-PE-10463	IBRD37790	1995	INDUS POLLUTION PREV	93.00	0.00	0.00	85.93	45.69	N/A
IN-PE-10463	IBRD37806	1995	INDUS POLLUTION PREV	50.00	0.00	0.00	44.87		N/A
IN-PE-10463	IDA26450	1995	INDUS POLLUTION PREV	0.00	25.00	0.00	23.75		N/A
IN-PE-10464	IDA26610	1995	DISTRICT PRIMARY ED	0.00	260.30	0.00	169.78	17.98	N/A
IN-PE-10476	IDA27450	1995	TAMIL NADU WRCP	0.00	282.90	0.00	232.40	64.41	N/A
IN-PE-10489	IDA26630	1995	AP 1ST REF. HEALTH S	0.00	133.00	0.00	106.34	22.87	N/A
IN-PE-10503	IDA26990	1995	AGRIC HUMAN RES DEVT	0.00	59.50	0.00	46.00	26.25	N/A
IN-PE-10506	IDA27000	1995	MP FORESTRY	0.00	58.00	0.00	38.06	4.54	N/A
IN-PE-10522	IDA27330	1995	ASSAM RURAL INFRA	0.00	126.00	0.00	104.77	23.77	N/A
IN-PE-10563	IBRD38560	1995	FINANCIAL SECTOR DEV	350.00	0.00	0.00	200.00	-159.74	N/A
IN-PE-10563	IBRD38576	1995	FINANCIAL SECTOR DEV	144.00	0.00	0.00	140.26		N/A
IN-PE-10448	IDA25720	1994	FORESTRY RESEARCH ED.N	0.00	47.00	0.00	31.20	20.61	N/A
IN-PE-10449	IDA25730	1994	ANDHRA PRADESH FORESTRY	0.00	77.40	0.00	47.10	14.61	N/A
IN-PE-10455	IDA26110	1994	BLINDNESS CONTROL	0.00	117.80	0.00	92.23	23.64	N/A
IN-PE-10457	IDA26300	1994	POPULATION IX	0.00	88.60	0.00	69.31	16.58	N/A
IN-PE-34162	IDA25940	1994	MAHARASHTRA EARTHQUA	0.00	246.00	29.19	32.07	57.40	6.99
IN-PE-9870	IBRD37530	1994	CONTAINER TRANSPORT	94.00	0.00	0.00	82.42	64.43	N/A
N-PE-9964	IDA25920	1994	WATER RES CONSOL HARYANA	0.00	258.00	0.00	174.27	55.17	N/A
IN-PE-10407	IDA24330	1993	ADP - RAJASTHAN	0.00	106.00	0.00	42.46	24.18	N/A
IN-PE-10408	IDA24390	1993	BIHAR PLATEAU	0.00	117.00	0.00	76.77	66.02	N/A
IN-PE-10410	IDA24490	1993	RENEWABLE RESOURCES	0.00	115.00	0.00	85.36	76.36	N/A
IN-PE-10416	IBRD35770	1993	PGC POWER SYSTEM	350.00	0.00	0.00	164.52	126.51	N/A

IN-PE-10418	IDA24830	1993	KARNATAKA WS & ENV/SANN	0.00	92.00	0.00	64.72	48.88	N/A
IN-PE-10423	IBRD36320	1993	NTPC POWER GENERATION	400.00	0.00	0.00	213.68	213.69	N/A
IN-PE-10424	IDA25280	1993	NATL LEPROSY ELIMIN.	0.00	85.00	9.07	40.35	34.69	N/A
IN-PE-9955	IDA25090	1993	UTTAR PRADESH BASIC ED	0.00	165.00	0.00	62.99	5.52	-101.06
IN-PE-9959	IDA24090	1993	RUBBER	0.00	92.00	36.58	35.10	52.22	.84
IN-PE-9961	IDA25100	1993	UP SODIC LANDS RECLAM	0.00	54.70	0.00	29.10	12.51	N/A
IN-PE-9977	IDA24700	1993	ICDS II (BIHAR & MP)	0.00	194.00	0.00	158.46	82.86	79.27
IN-PE-10390	IDA23280	1992	MAHARASHTRA FORESTRY	0.00	124.00	16.18	54.34	50.00	34.94
IN-PE-10393	IDA23500	1992	AIDS PREVENTION AND	0.00	84.00	0.00	31.23	31.49	N/A
IN-PE-10400	IBRD34980	1992	MAHARASHTRA POWER II	350.00	0.00	0.00	237.75	234.14	N/A
IN-PE-9888	IBRD34360	1992	POWER UTIL EFFIC IMP	265.00	0.00	25.00	65.72	90.74	65.74
IN-PE-9921	IDA23290	1992	SHRIMP & FISH CULTUR	0.00	85.00	48.51	24.12	64.51	10.92
IN-PE-9946	IBRD34700	1992	NAT. HIGHWAYS II	153.00	0.00	0.00	153.00	71.23	N/A
IN-PE-9946	IDA23650	1992	NAT. HIGHWAYS II	0.00	153.00	0.00	61.17		N/A
IN-PE-9963	IDA23940	1992	POPULATION VIII	0.00	79.00	0.00	67.41	49.62	N/A
IN-PE-10369	IDA22340	1991	MAHARASHTRA RURAL WS	0.00	109.90	0.00	36.68	39.96	N/A
IN-PE-9877	IDA22410	1991	DAM SAFETY	0.00	130.00	27.03	63.57	112.03	73.36
IN-PE-9885	IBRD32590	1991	PETROCHEMICALS	233.00	0.00	70.30	26.65	97.63	27.33
IN-PE-9906	IBRD33340	1991	IND POLLUTION CONTRO	124.00	0.00	0.00	14.77	9.84	N/A
IN-PE-9906	IDA22520	1991	IND POLLUTION CONTRO	0.00	31.60	0.00	14.30		N/A
IN-PE-9958	IBRD33000	1991	AGR.DEV.I (TN)	20.00	0.00	0.00	20.00	16.58	N/A
IN-PE-9958	IDA22150	1991	AGR.DEV.I (TN)	0.00	92.80	0.00	8.92		N/A
IN-PE-9988	IDA22230	1991	TECH EDUC II	0.00	307.10	51.37	117.04	143.94	33.53
IN-PE-9860	IDA21310	1990	WTRSHED PLAINS	0.00	55.00	0.00	14.29	12.09	4.04
IN-PE-9882	IDA21000	1990	WTRSHED HILLS	0.00	75.00	0.00	27.92	36.28	23.28
IN-PE-9890	IDA21150	1990	HYDERABAD W/S	0.00	79.90	0.00	17.28	18.10	6.30
IN-PE-9940	IDA21330	1990	POP. TRG (VII)	0.00	86.70	22.74	4.52	29.79	-5.03
IN-PE-9965	IDA20760	1990	PUNJAB IRR & DRAINAG	0.00	150.00	4.72	26.87	28.85	10.13
IN-PE-9982	IBRD32370	1990	NOR REG TRANSM	485.00	0.00	0.00	230.92	230.91	N/A
IN-PE-9989	IDA21300	1990	TECH EDUC I	0.00	235.00	24.26	43.85	78.63	29.37
IN-PE-9869	IBRD30240	1989	NATHPA JHAKRI HYDRO	485.00	0.00	0.00	188.89	188.89	N/A
IN-PE-9941	IBRD30960	1989	MAHARASHTRA POWER	400.00	0.00	62.67	59.93	122.61	-5.76
IN-PE-9973	IBRD29940	1989	STATE ROADS I	170.00	0.00	61.41	6.99	63.11	.70
IN-PE-9990	IDA20080	1989	VOCATIONAL TRAINING	0.00	250.00	103.33	36.12	163.97	19.97
Total				6,368.90	7,373.64	781.66	8,411.08		

	Active Loans	Closed Loans	Total
Total Disbursed (IBRD and IDA):	4,373.32	30,587.78	34,961.10
of which has been repaid:	196.92	9,096.77	9,293.69
Total now held by IBRD and IDA:	12,763.92	20,924.04	33,687.96
Amount sold :	0.00	133.77	133.77
Of which repaid :	0.00	133.77	133.77
Total Undisbursed :	8,411.08	97.37	8,508.45

- a. Intended disbursements to date as projected at appraisal minus actual disbursements to date or, if disbursement projections have been formally revised, then formally revised disbursement projections to date minus actual disbursements to date.

India at a glance

11/7/97

POVERTY and SOCIAL

	India	South Asia	Low-income
Population mid-1996 (millions)	943.2	1,264	3,229
GNP per capita 1996 (US\$)	380	380	500
GNP 1996 (billions US\$)	358.4	481	1,601

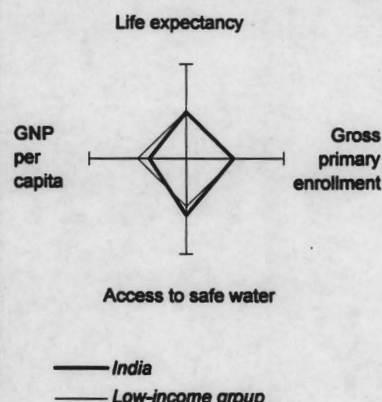
Average annual growth, 1990-96

Population (%)	1.7	1.9	1.7
Labor force (%)	2.0	2.1	1.7

Most recent estimate (latest year available since 1989)

Poverty: headcount index (% of population)	35	..	..
Urban population (% of total population)	27	26	29
Life expectancy at birth (years)	62	61	63
Infant mortality (per 1,000 live births)	68	75	69
Child malnutrition (% of children under 5)	63	..	..
Access to safe water (% of population)	63	63	53
Illiteracy (% of population age 15+)	48	50	34
Gross primary enrollment (% of school-age population)	102	98	105
Male	113	110	112
Female	91	87	98

Development diamond*

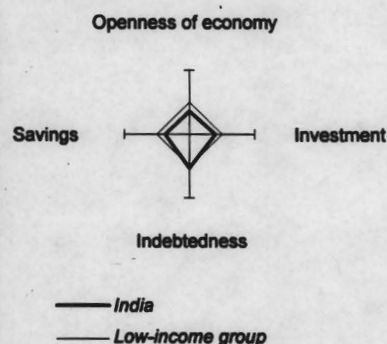


KEY ECONOMIC RATIOS and LONG-TERM TRENDS

	1975	1985	1995	1996
GDP (billions US\$)	91.0	214.3	328.3	355.8
Gross domestic investment/GDP	20.8	24.2	26.2	26.5
Exports of goods and services/GDP	6.2	6.0	12.1	12.0
Gross domestic savings/GDP	20.4	21.1	22.7	23.1
Gross national savings/GDP	20.6	21.6	24.2	25.3
Current account balance/GDP	0.0	-2.8	-2.1	-1.2
Interest payments/GDP	0.3	0.6	1.4	1.3
Total debt/GDP	15.1	19.1	28.9	25.2
Total debt service/exports	13.1	22.7	26.9	22.6
Present value of debt/GDP	..	..	22.8	..
Present value of debt/exports	..	..	161.4	..

	1975-85	1986-96	1995	1996	1997-05
(average annual growth)					
GDP	4.2	5.8	7.3	7.5	6.5
GNP per capita	1.9	3.5	5.4	5.2	..
Exports of goods and services	3.9	11.5	31.6	7.5	10.3

Economic ratios*

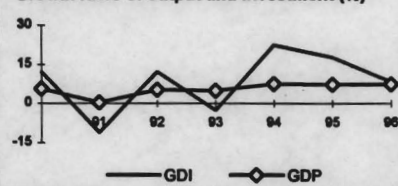


STRUCTURE of the ECONOMY

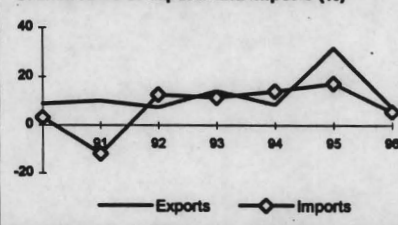
	1975	1985	1995	1996
(% of GDP)				
Agriculture	40.5	33.0	27.9	27.8
Industry	23.7	28.1	30.1	29.2
Manufacturing	16.7	17.9	19.7	20.1
Services	35.8	38.8	42.1	43.0
Private consumption	70.2	67.8	66.8	66.4
General government consumption	9.4	11.1	10.5	10.5
Imports of goods and services	6.6	9.1	15.6	15.3

	1975-85	1986-96	1995	1996
(average annual growth)				
Agriculture	2.5	3.6	-0.1	5.7
Industry	5.3	6.6	11.6	7.0
Manufacturing	5.5	6.7	13.6	8.1
Services	5.1	6.7	8.8	7.4
Private consumption	4.5	4.8	2.6	6.8
General government consumption	6.5	3.9	5.1	7.2
Gross domestic investment	4.1	7.1	17.9	8.5
Imports of goods and services	9.1	6.0	17.3	5.7
Gross national product	4.1	5.4	7.2	6.7

Growth rates of output and investment (%)



Growth rates of exports and imports (%)



Note: 1996 data are preliminary estimates. All GDP data other than sectoral value-added are in market prices.

* The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

PRICES and GOVERNMENT FINANCE

	1975	1985	1995	1996
Domestic prices				
(% change)				
Consumer prices	..	5.6	10.2	7.0
Implicit GDP deflator	-1.5	7.5	7.3	7.0
Government finance				
(% of GDP)				
Current revenue	..	23.8	24.7	25.2
Current budget balance	..	2.2	1.0	1.3
Overall surplus/deficit	..	-11.0	-10.1	-10.4

TRADE

	1975	1985	1995	1996
(millions US\$)				
Total exports (fob)	..	8,793	32,311	33,638
Tea	..	512	352	290
Iron	..	473	515	484
Manufactures	..	5,840	24,540	24,749
Total imports (cif)	..	15,957	43,670	46,121
Food	..	1,321	1,293	1,359
Fuel and energy	..	4,054	7,526	9,679
Capital goods	..	3,502	4,560	4,513
Export price index (1980=100)	..	98	104	103
Import price index (1980=100)	..	84	115	116
Terms of trade (1987=100)	..	118	90	89

BALANCE of PAYMENTS

	1975	1985	1995	1996
(millions US\$)				
Exports of goods and services	5,650	12,773	39,668	42,556
Imports of goods and services	5,990	19,422	51,213	54,431
Resource balance	-340	-6,649	-11,545	-11,875
Net income	-150	-1,552	-3,735	-4,118
Net current transfers	470	2,207	8,506	11,888
Current account balance, before official capital transfers	-20	-5,994	-6,774	-4,105
Financing items (net)	20	6,542	3,050	10,095
Changes in net reserves	0	-548	3,724	-5,990
Memo:				
Reserves including gold (mill. US\$)	2,065	9,493	21,246	26,160
Conversion rate (local/US\$)	8.7	12.2	33.5	35.5

EXTERNAL DEBT and RESOURCE FLOWS

	1975	1985	1995	1996
(millions US\$)				
Total debt outstanding and disbursed	13,708	40,960	94,858	89,827
IBRD	436	2,396	9,849	8,768
IDA	2,809	9,750	17,499	17,616
Total debt service	822	3,532	13,346	12,667
IBRD	89	313	1,713	1,514
IDA	24	124	357	364
Composition of net resource flows				
Official grants	511	450	345	408
Official creditors	1,260	1,424	-1,048	-163
Private creditors	83	2,277	589	-1,102
Foreign direct investment	85	106	2,133	2,359
Portfolio equity	0	0	2,471	2,775
World Bank program				
Commitments	917	2,882	1,697	1,725
Disbursements	531	1,375	1,318	1,628
Principal repayments	63	157	1,169	1,074
Net flows	467	1,218	149	554
Interest payments	50	280	901	804
Net transfers	417	938	-752	-250

