

India: Promoting Renewable Energies via IREDA

Ex-post evaluation report

OECD sector	23030 / Electricity generation / renewable energies	
BMZ project ID	1997 65 538	
Project-executing agency	Indian Renewable Energy Development Agency (IREDA)	
Consultant	-	
Year of ex-post evaluation	2009	
	Project appraisal (planned)	Ex-post evaluation (actual)
Start of implementation	3/1998	9/2000
Period of implementation	60 months	45 months
Investment costs	EUR 81.80 million	EUR 92.59 million
Counterpart contribution	EUR 20.45 million	EUR 31.24 million
Financing, of which FC (Financial Cooperation) funds	EUR 61.35 million of which FC: EUR 35.79 million	EUR 61.35 million of which FC: EUR 35.79 million
Other institutions/donors involved	-	-
Performance rating	2	
• Relevance	1	
• Effectiveness	2	
• Efficiency	3	
• Overarching developmental impact	2	
• Sustainability	2	

Brief description, overall objective and project objectives with indicators

The project consisted in the establishment of an environmental credit line at the Indian national development bank IREDA for the refinancing of final loans for investments in electricity generation from renewable energy sources. KfW provided a composite loan to the amount of EUR 61.36 million, consisting of an FC share of EUR 35.79 million and a market share of EUR 25.56 million.

Overall objective of the project was to contribute to diminishing the greenhouse effect by promoting renewable energy sources and thus to support decentralised energy supply. The amount of CO₂ emissions per year that could be avoided owing to the project (at least 247,000 t) was defined as indicator for the achievement of the overall objective.

Project objective was to improve opportunities for the long-term financing of investments in renewable energy sources and to promote the use of technologies for

the commercial exploitation of renewable energy sources. The following indicators for the achievement of the project objective were defined:

	Project objective - indicators	Unit	Target level at project appraisal 1997	Status at ex-post evaluation 2009
1)	For wind stations: - installed capacity - annual capacity utilisation average	in MW in %	>40 >18	93,9 21,6
2)	For bagasse-based cogeneration: - installed capacity - capacity utilisation, during sugar cane harvest (180 days)	in MW in %	>40 >70	53,1 84,0
3)	For photovoltaic (PV) plants: - installed capacity	in MW	>1	0,17
4)	Loan repayment rate - for IREDA overall	in %	>85	85,7

The immediate target group were private investors (no restriction as to the volume) willing to invest in renewable energies (RE) to cover their own or a third party's energy needs. Indirect target group were the energy consumers (private consumers and/or industrial consumers).

Project design / major deviations from the original project planning and their main causes

The project design was implemented as planned. The development bank IREDA was founded by the Indian central government in 1987. Its business purpose is the promotion of environmentally friendly energy generation by granting loans at low interest rates and by using energy in an efficient and economically viable way. The Indian state is still the sole equity holder. IREDA is subject to the administrative control of the Ministry for New and Renewable Energies (MNRE), of which it is the most important implementing organisation. The number of staff has only slightly increased from 103 to 127 employees since the time of project appraisal. IREDA's working methods basically remained unchanged during the course of the project; however, some systemic improvements have been introduced and implemented, especially with regard to risk assessment. Project assessment and appraisal and therefore the technical and developmental aspects are sufficiently verified. Constant pressure by donors and overdue redemption payments of over 20 % of the total loan amount, which burdened results, have forced managers to seriously reconsider credit risks and to carry out corresponding improvements about three years ago. This included a considerably more targeted collection of receivables. At the time of project appraisal, interest rates were more heavily subsidised (approx. 3 to 4 percentage points). Today, the average interest rate roughly corresponds to the market rate based on the Prime Lending Rate, or is approx. half a percentage point lower (currently 11.5 to 12 %). The borrowers' contribution almost always amounts to 30 %. Credit periods vary between 8 and 10 years, and can last up to 15 years for small hydropower plants. By means of the new risk classification, up to one percentage point may be added or deducted, in order to attract more reputable clients and to offer less attractive conditions to less reputable clients, which in the medium-term should positively influence credit risks.

The composite loan was used entirely for the refinancing of altogether 26 final loans for wind energy projects (94 MW), three bagasse-based cogeneration projects (CHP, 53 MW), and five solar photovoltaic plants (169 kWp). The allocation of the funds to individual sectors was open and followed the market trends. The final loan conditions

corresponded to the usual IREDA conditions. At the time the funding commitment was given, interest rates for final loans were at 8.5 to 9.5 % for wind and CHP projects. Credit periods of final loans lasted 8 to 10 years. Loan conditions were thus slightly further below Indian market conditions than is the case today. For reasons of competitiveness, IREDA cannot afford to be more expensive than the market, but IREDA's modest economic profitability does not allow for lower interest rates.

The plants financed with FC funds are in good condition and are properly operated and maintained. For half of the wind power stations financed from the credit line, the final loans of IREDA have already been entirely repaid, so that considerable profits are generated after deduction of the altogether moderate costs for operation and maintenance. With the project's support, wind energy in particular could be established as an attractive investment. Investors in wind parks usually concluded contracts with the suppliers of the plants including the entire responsibility for technical and administrative operations. In this way, the sustainable operation of the plants is guaranteed without any effort on the part of the investors. The internal rate of return and hence the profitability of the investment ranges between 11.9 % and 15.2 %. Also the bagasse-based CHP plants are all profitable. In view of the current low sugar prices, these plants for generating electricity out of bagasse represent a major source of income for the sugar factories. Outside the sugar harvest season, biomass is bought (bagasse of sugar factories that are not equipped with CHP plants, peanut shells, rice chaff and other grain chaff), in order to run the plants almost the whole year over while buying as little of the more expensive coal as possible. This results in higher capacity utilisation rates than originally expected. As long as biomass is burnt, this process must be considered as environmentally friendly. In burning coal, however, no CO₂ emissions are avoided, even if it may be seen as a general contribution towards improving the energy supply.

Key results of the impact analysis and performance rating

By creating target-oriented financing opportunities at IREDA, which at the time was a comparatively small, sector-focused development bank, the market received a crucial incentive to invest in renewable energies for solely commercial purposes. The approach to finance technical innovation in the field of renewable energies by means of loans instead of grants was new to India, and was quickly and positively accepted by the market players. On the basis of this financing offer, private investors have created substantive energy capacities (especially wind energy) in India. Meanwhile other commercial banks have discovered the potential of financing renewable energy plants and have started financing such economically viable wind and CHP projects. The capacity increase in renewable energies and the now receding market share of IREDA show how much the sector and its commercial use and funding have matured in the course of time. In the context of the ongoing discussion on how to limit the global rise in temperature, India is increasingly called upon at an international level to assume its responsibility and to limit its still distinct rise in greenhouse gas emissions. A practicable possibility to do so is the reinforced development of renewable energy sources promoted by the project. Supporting renewable energies is one of the priorities of Indian energy policy as well as of the BMZ (German Federal Ministry for Economic Cooperation and Development) and other international donors in India. Donor alignment was adequate. Especially in view of its innovative character and its successful function as a pilot scheme, we rate the project's relevance as very good (sub-rating 1).

The project and its measures could be implemented as planned. The loan portfolio has quadrupled since the time of project appraisal (balance sheet 03/1996) from EUR 93.8 million to EUR 381 million today (balance sheet 03/2009). Calculated in INR, the total balance has increased 6.7 times. While loan commitments amounted to INR 27 million on average at project appraisal, new commitments have increased to

INR 285 million (EUR 4.2 million). With the exception of the installed photovoltaic capacity, the indicators for the project objective as defined in the project appraisal report have all been reached (albeit with difficulty regarding the loan repayment rate) and sometimes considerably surpassed (created capacities, cogeneration efficiency and CO₂ savings). The capacity utilisation rate of the wind stations was projected at a rather low, but realistic 18 % at project appraisal. The now attained utilisation rate of 21.6 % is still low, but may be explained by the origins of wind energy utilisation in India, the ensuing development and the natural and environmental conditions. The target set for the loan repayment rate has been realistic from a project appraisal point of view. It took IREDA many years to reach this value. In retrospect, 15 % overdue redemption payments seem hardly ambitious, and with regard to the situation in India at the time of project appraisal, 10 % would have been a more acceptable target value. The remaining objectives have been sensibly chosen, also from an ex-post perspective. Since individual projects have been supported depending on demand, and photovoltaics could not establish itself as a commercially viable technology, there has been only little demand for this type of plant. The specific project objectives have mainly been achieved, so the project was effective. The intended target group has been reached successfully and keeps investing in renewable energies even today, when the project has been terminated and tax incentives have been reduced. We therefore rate the project's effectiveness as altogether good (sub-rating 2).

The efficiency of IREDA's working methods can be assessed as good in technical respect, and as mediocre in financial respect. A technical and financial approval procedure set out in detail, and comprehensive internal guidelines on business policy, including the bank's internal control system, ensured a careful loan assessment and a comparatively high quality of the lending policy under the project. Only by means of the comprehensive technical study prescribed by IREDA, the development bank is capable of granting loans for often highly technical investments and of carrying out a competent risk assessment. These measures are costly, but necessary and appropriate in order to achieve the desired environmental effects. The procedures have altogether been improved over the course of the project, and the successful optimisation of the approval procedures is apparent in the gradual decrease of overdue redemption payments also in other business segments of IREDA. However, the work processed per employee and the administrative costs have not improved since the time of project appraisal. IREDA's return on equity is positive in real terms, and satisfactory for a national development bank. IREDA has a high equity ratio, so that international minimum requirements with regard to capital adequacy can be met without any problem. The allocation efficiency with regard to the desired environmental effects can be assessed as satisfactory. Only the combination of tax incentives and adequate financing could trigger investments in renewable energies at a larger scale, even if the less than optimal subsidy scheme meant that achievements remained below the maximum environmental effects that would have theoretically been possible. In purely financial terms, the project's allocation efficiency was good, considering the fact that loan redemption payments under the project were good compared to IREDA's overall loan portfolio. However, restrictions to this rating must be made because of the still relatively high amount of NPL in IREDA's total loan portfolio for the financial year 2008/09, even if the situation has improved over the past three years. Summing up the individual aspects, we rate the project's efficiency as satisfactory (sub-rating 3).

From a current perspective, the overarching developmental impacts of the project are the avoidance of CO₂ emissions and giving momentum to the commercial utilisation of wind energy and bagasse-based cogeneration plants. Owing to the project, 483,000 t of CO₂ emissions were avoided, almost twice as much as originally set out in the indicator for the overall objective (247,000 t). A new financial product was successfully established on the market. IREDA's market share in the area of financing renewable energies has decreased considerably since the project appraisal to only 13.2 % (financial year 2007/08). While IREDA was almost the only lending institution in this

field at the time of project appraisal, many commercial banks now play an active role in the financing of the established forms of renewable energies (mainly wind energy). The decline of the market share to a mere 8.6 % in wind energy and to 13.1 % in small hydropower plants shows that this financial product could establish itself rather independently of IREDA, and that IREDA now has to adapt to the market, instead of modelling the market as it used to do. However, IREDA will need the established sub-sectors also in the future in order to generate income with which to promote less established, higher risk sectors. Both IREDA's balance sheet total and its renown have increased owing to the credit line. We rate the overarching developmental impacts as altogether good (sub-rating 2).

The sustainable operation of the plants is guaranteed because of the investors' business interest. All of the wind and CHP plants are in operation and generate considerable profits. The bagasse-based cogeneration plants make an indispensable contribution to the sugar factories' profit. "Long-term financing of renewable energies" has become an established product in the finance sector. The planned modification of current subsidy schemes that is gradually taking shape (less tax incentives, more attractive feed-in tariffs) is likely to change financing patterns, but not the willingness to invest and therefore the demand for financing opportunities. IREDA as a development institution is profitable, economically sound and recognized in its sector. There do not seem to be major risks threatening its long-term existence. Summing up, we assess the project's sustainability as good (sub-rating 2).

Taking into consideration the above-mentioned individual ratings, we consider an overall rating of 2 (good overall developmental effectiveness) as appropriate, despite the project's merely satisfactory efficiency, i.e. the less than optimal resource allocation on the part of the Indian government.

General conclusions and recommendations

The project is a good example to show how FC can promote the desired developments and bring about economically efficient and sustainable results. By granting long-term loan facilities for wind energy projects to companies, the credit line, combined with national tax incentives, has sparked off a vigorous development, which allowed for FC to be withdrawn, as is generally desirable for subsidiarity reasons. The extraordinary demand for wind energy stations allowed manufacturers in India to build up major production capacities, which have made India an exporter of wind stations by now.

Such a sector-specific credit line could only be successful due to the combined effect of important factors: A positive climate for investment, a fundamentally positive appraisal of the sector, tax incentives granted by the Indian government, and the availability of affordable financing. The manufacturers' offer to take on all aspects of the investment (selection of location, investment, operation and maintenance) and therefore to save the investor any effort deserves particular mention. The investment risk thus became calculable. The investors' profit expectations usually materialised.

However, it should be kept in mind that the tax relief represents a form of subsidy, which entails the risk that the funds are not optimally distributed. In our view, this is acceptable if incentives for investments are given for the first time, as is the case in the present project. In the long term, however, it is necessary to link the amount of subsidies to the achieved or achievable environmental effects, in order to avoid the danger of free-riders taking advantage of the offer.

Notes on the methods used to evaluate project success

Assessment criteria

Projects are evaluated on a six-point scale, the criteria being relevance, effectiveness, overarching developmental impact and sustainability. The ratings are also used to arrive at a final assessment of a project's overall developmental efficacy. The scale is as follows:

Developmentally successful: ratings 1 to 3	
Rating 1	Very good result that clearly exceeds expectations
Rating 2	Good result, fully in line with expectations and without any significant shortcomings
Rating 3	Satisfactory result – project falls short of expectations but the positive results dominate
Developmental failures: ratings 4 to 6	
Rating 4	Unsatisfactory result – significantly below expectations, with negative results dominating despite discernible positive results
Rating 5	Clearly inadequate result - despite some positive partial results, the negative results clearly dominate
Rating 6	The project has no impact or the situation has actually deteriorated

Sustainability is evaluated according to the following four-point scale:

Rating 1	Very good sustainability	The developmental efficacy of the project (positive to date) is very likely to continue undiminished or even increase.
Rating 2	Good sustainability	The developmental efficacy of the project (positive to date) is very likely to decline only minimally but remain positive overall. (This is what can normally be expected.)
Rating 3	Satisfactory sustainability	The developmental efficacy of the project (positive to date) is very likely to decline significantly but remain positive overall. This rating is also assigned if the sustainability of a project is considered inadequate up to the time of the ex post evaluation but is very likely to evolve positively so that the project will ultimately achieve positive developmental efficacy.
Rating 4	Inadequate sustainability	The developmental efficacy of the project is inadequate up to the time of the ex post evaluation and an improvement that would be strong enough to allow the achievement of positive developmental efficacy is very unlikely to occur. This rating is also assigned if the developmental efficacy that has been positively evaluated to date is very likely to deteriorate severely and no longer meet the level 3 criteria.

Criteria for the evaluation of project success

The evaluation of the developmental effectiveness of a project and its classification during the ex-post evaluation into one of the various levels of success described in more detail above focus on the following fundamental questions:

Relevance	Was the development measure applied in accordance with the concept (developmental priority, impact mechanism, coherence, coordination)?
Effectiveness	Is the extent of the achievement of the project objective to date by the development measures – also in accordance with current criteria and state of knowledge – appropriate?
Efficiency	To what extent was the input, measured in terms of the impact achieved, generally justified?
Overarching developmental impact	What outcomes were observed at the time of the ex post evaluation in the political, institutional, socio-economic, socio-cultural and ecological field? What side-effects, which had no direct relation to the achievement of the project objective, can be observed?
Sustainability	To what extent can the positive and negative changes and impacts by the development measure be assessed as durable?