Haiti – Small Hydropower Plants

Final follow-up/Ex-post evaluation

OECD sector	23065/Hydroelectric power plants	
BMZ project ID	a) 1982 65 258 – Jacmel Electricity Supply b) 1982 65 290 – Caracol Small Hydropower Plant c) 1986 65 945 - Délugé-Lanzac **I** d) 1989 66 020 - Délugé-Lanzac **II**	
Project-executing agency	Électricité d'Haïti (EDH)	
Consultant	DECON/Hydroplan	
Year of ex-post evaluation	**2006**	
	Project appraisal (planned)	**Ex post evaluation (actual)**
Start of implementation	a) 03/1983 b) Beginning of 1983 c) 04/1987 d) Beginning of 1990	a) 03/1983 b) 10/1983 c) 04/1987 d) Mid-1990
Period of implementation	(a) 15 months (b) 24 months (1) 20 months (1) 12 months	(a) 30 months (b) 31 months (1) 47 months (1) 89 months
Investment costs	(a) EUR 2.53 million (b) EUR 2.97 million c) EUR 3.83 million d) EUR 3.08 million	a) EUR 2.71 million b) EUR 4.43 million c) EUR 4.09 million d) EUR 3.68 million
Counterpart contribution	a) EUR 0.67 million b) EUR 0.11 million c) EUR 0.25 million d) EUR 0.52 million	a) EUR 0.85 million b) EUR 1.57 million c) EUR 0.51 million d) EUR 0.36 million
Financing, of which Financial Cooperation (FC) funds	a) EUR 1.86 million b) EUR 2.86 million c) EUR 3.58 million d) EUR 2.56 million	a) EUR 1.86 million b) EUR 2.86 million c) EUR 3.58 million d) EUR 3.32 million
Other institutions/Donors involved	None	None
Performance rating	a) 4 b) 5 c) 5 d) 5	
• Significance/Relevance	a-d) 5	
• Effectiveness	a) 4 b-d) 5	
• Efficiency	a) 4 b-d) 5	

Brief description, overall objectives and project objectives with indicators

All four projects centred on the construction of small hydropower stations and their connection to existing medium-high voltage or distribution grids. The project, Jacmel Electricity Supply, comprised the construction of the Gaillard hydropower station with an installed capacity of 520 kW, the erection of a new 23 kV overhead cable to the diesel station in the provincial town of Jacmel in the southeast of the country, the replacement of switchgear at the diesel station and the overhaul of the local Jacmel grid. The project, Caracol Small Hydropower Plant consisted of the construction of a 850 kW hydropower station at the river Caracol equipped with 1-day water storage, the erection of a 23 kV overhead cable to the medium voltage grid of the provincial capital Cap Haitien in the northeast of the country as well as various supplementary measures. The project, Délugé-Lanzac I, consisted of constructing an 800 kW run-of-water power station at the rivers Délugé and Lanzac, the erection of a 22.8 km long 23 kV overhead cable to connect the station to the local grids of St. Marc and Gonvaives in Artibonite Province and advisory measures on the operational management of the power station. The project, Délugé-Lanzac II, contained a package of measures to extend Délugé-Lanzac I with a 300 kW block, train power station operatives and overhaul St. Marc's municipal grid. All projects entailed engineering services in project planning and building supervision. The investment costs for the projects totalled EUR 14.91 million (see Annex 6), EUR 11.62 million of which was financed from FC funds. The key programme data is appended in Annex 1. The sites of the four projects are described in Annex 3.

No objectives or indicators were set for the earlier projects, Jacmel Electricity Supply and Caracol Small Hydropower Plant. In terms of rationale and the intended impacts, however, they resemble the subsequent projects in Artibonite Province, for which objectives were set. A feature that all projects shared in common was their concentration on regions with poor infrastructure facilities and an insufficient supply of public services and their intention to improve electric power supply (macroeconomically efficient electric power supply) as an indirect contribution to remedying development constraints. The principal target group of all projects were productive power consumers in agriculture and trades as well as high-income private households. The projects were not expected to benefit the poorest sections of the population directly.

The overall objective of the projects Délugé-Lanzac I+II was to promote agricultural and small-scale business development in the provincial towns St. Marc and Gonaives and the rural surroundings by securing and expanding power supply. In hindsight, we can impute to the projects, Jacmel Electricity Supply and Caracol Small Hydropower Station, the overall objective of supporting agricultural and trades activities in and around the provincial towns Jacmel and Cap Haitien through improved power supply.

The project objectives of Délugé-Lanzac I+II consisted in generating electric power: (i) about 4.7 GWh for the Délugé-Lanzac I hydropower station in the normal hydrologic year with a capacity of 800 kW during the four-month rainy season and about 400 kW during the remainder of the year; (ii) about 1.5 GWh for the Délugé-Lanzac II hydropower station in the normal hydrologic year with a capacity of 300 kW during the four-month rainy season and about 120 kW during the remainder of the year. The indicator targets were: (a) increase in productive electricity consumption from about 6.7 GWh/year before the hydropower station began operation to about 8.0 GWh in 1991 (Délugé-Lanzac I) or in the year of project completion (Délugé-Lanzac I); (b) elimination or reduction of generational power cuts for Délugé-Lanzac I and reduction of grid power cuts in St. Marc as well as reduction of total losses in the distribution grid from 35% in 1989 to about 20% as of the second operating year for Délugé-Lanzac II; (c) provision of 4.7 GWh in additional power in the normal hydrologic year for Délugé-Lanzac I and about 1.5 GWh in the normal hydrologic year as of the second operating year for Délugé-Lanzac II.

We can infer the following project objectives for Jacmel Electricity Supply and Caracol Small Hydropower Station: production of electric power under normal hydrologic year conditions of 3.8 GWh/year for the Gaillard hydropower station (Jacmel) and 4.0 GWh/year for the Caracol hydropower station.

Programme design/Major deviations from original programme planning and main causes

Executing agency and sectoral analysis

The project-executing agency was the state-owned enterprise, Electricité d'Haïti (EDH) founded in 1971, which is responsible for the generation, transmission and distribution of electric power in Haiti. The enterprise, whose finances were still relatively sound in the eighties, has been making losses since 1989 and places a permanent burden on Haiti's national budget. Efforts by international donors to instigate the rehabilitation of the company with technical and financial help have failed so far, as have attempts at adopting a policy of opening the market and involving the private sector. The role of private enterprises in the power sector is confined to the parallel provision and operation of relatively expensive emergency generating sets (diesel) to offset chronic supply bottlenecks.

The ruinous financial predicament of the EDH is a result of the distortions that have long hampered the Haitian power sector and prevented significant progress in power supply. Per capita consumption of electric power, 32 kWh/year at present, is stagnating at the level it stood at in the eighties. Although the percentage of mains connections has doubled over the last 25 years to approximately 30%, an extremely low figure anyway, the bulk of more than 80% of electricity consumption is accounted for by the 200,000 electricity subscribers in the capital Port-au-Prince. Power outside the capital is supplied via separate grids and reaches little more than 10% of the population living there. Nor has the supply infrastructure improved significantly to meet growing demand. EDH's installed generating capacity, which amounted to about 240 MW in 2003, and gross power generation, which came to 535 GWh in the same year, has increased by only 1.9% on annual average since 1980, roughly equivalent to population growth. Due to the dramatic rise in system losses (electricity theft, unmetered consumption, grid losses and self-consumption) of 244 GWh, EDH was hardly able to sell more current in 2003 than in 1981. The time availability of the thermal power stations has deteriorated to less than 60% due to the poor condition of the plants and chronic fuel shortage. The system losses, which amounted to 27% at the beginning of the eighties, increased to 40% by 1989, crossed the 50% threshold in 1995 and even rose again to 54% in 2003. The share of commercial (non-technical) losses is estimated at more than 50% and collection efficiency measured by billed receivables from customers is 60%. At currently 40%, the fraction of consumer electricity has declined slightly compared with the eighties, but as the stagnating current sales indicate, there has been no notable increase in consumption amongst productive clients, either. In response to supply bottlenecks, though, many consumers have obtained relatively costly emergency generating sets to secure against power failures. Total installed capacity of these emergency power systems is estimated at 70 MW at least and we can assume that a considerable part of the emergency power supply is used for production.

Annex 5 shows the deterioration of the situation as measured by operational appraisal criteria. The reasons for the ongoing crisis of Haiti's power sector do not only lie in the operational and systemic deficits but in considerable measure also in the adverse political and social framework. Mismanagement, corruption and political influence on management have undermined EDH's earnings and investment capacity as much as the high technical losses and low collection efficiency. Though of secondary importance, another obstacle is that electricity tariffs are not aligned with costs. Since the last tariff adjustment in December 2005, the consumption-tied operational prices range between 9.45 EUR cents/kWh and 10.50 EUR cents/kWh; but this is still not enough to break even. Apart from the grave poverty due to ongoing political tensions and conflict, another problem that EDH faces is that it must operate in a social milieu where legal uncertainty, hostilities amongst interest groups, delinquent behaviour and vandalism are widespread.

The history of nationwide electricity generation provides an instructive picture of the political and social distortions in Haiti since the mid-eighties (see Annex 4). After the end of the 30-year rule of the Duvalier family in 1986, electric power generation increased temporarily up to the election of President Aristide in 1990. The military putsch soon afterwards and the ensuing trade embargo and termination of international aid heralded a period of economic and social decline that lasted until the return of President Aristide in 1994. In the course of this economic contraction, power generation declined below the 1980 level. A donor-financed reconstruction

programme initiated a short period of economic recovery following the election of the new President Préval in 1995. In a short time, electric power generation returned to the 1990 level. Owing to renewed political tensions as of 1997, however, the commitment of international donors and investors flagged. Economic growth and indirectly electric power generation was maintained by massive private remittances from Haitian expats. The dissolution of parliament and the controversial re-election of Aristide in 2000, however, plunged the country into another crisis with social unrest, armed rebellion and a marked decline in power generation. The situation did not calm down until the resignation of Aristide and the appointment of a transitional government in 2004, though this did not make for durable political stability.

Altogether, the problems and deficits that the four FC-funded hydropower stations were intended to help remedy have now worsened considerably. Neither the security nor outreach of power supply have improved. The insufficient electric power supply and the lack of other infrastructure services still place a major constraint on development, which is also a reason why approximately 76% of the population live below the poverty line, the distribution of income is extremely inequitable (Gini coefficient) and Haiti occupies position 153 among the 177 countries measured by the UN Development Index.

Project measures and their results

The project, Jacmel Electricity Supply, comprised the reconstruction of the more than 50 year-old Gaillard hydropower station (reservoir, sloping canal, grit collector, pressure pipeline, electric powerhouse with turbine and generator) with an installed capacity of 520 kW, the construction of a 18.3 km-long 23 kV overhead cable to the switchgear of the Jacmel diesel power station and the overhaul of the Jacmel municipal grid. Diverging from the original plan, it proved necessary to replace the whole local grid in Jacmel instead of simply adjusting frequency and distribution voltage. In addition, the EDH decided to set up a new 23 kV transmission line at its own expense instead of overhauling the existing 8 kV line as originally intended. Since the new transmission line did not affect the project budget, most of the additional costs incurred from rehabilitating the local grid could be offset so that total costs exceeded estimates at project appraisal by only 7%. All construction work was carried out by a municipal enterprise under the responsibility of the EDH with support from consulting engineers and involving the local population. The equipment was delivered and assembled by German companies after an international call to tender with two lots. At 30 months, the execution period was twice as long as estimated in project planning. The delays arose through customs clearance problems, difficulties in procuring construction steel and cement and the destruction of the grit collector after completion by unidentified persons. Altogether, we can say that the project was planned and implemented properly and resulted in a technically adequate and economically viable improvement in power supply to the town of Jacmel.

The project, Caracol Small Hydropower Station, comprised the construction of a hydropower station with a nominal capacity of 850 kW (weir, intake conduit, grit collector, pressure pipeline and electric powerhouse with turbine and generator), the erection of a 17.5 km-long overhead cabling connecting the power station with the medium voltage grid at Cap Haitien and some supplementary measures such as the construction of a 65 m-long pedestrian bridge over the Grande Riviére du Nord. Except for some amendments (longer overhead cable line, longer intake conduit, relocation of the electric powerhouse and grit collector), the technical layout of the project was executed as planned. It was conducted by a municipal enterprise under the responsibility of the project executing agency with support from consulting engineers. The equipment was delivered and assembled after an international call to tender with two lots. While the works commenced as planned, commissioning was delayed by 7 months as compared with the original plan. The delays were caused by prolonged contractual negotiations with the suppliers, bottlenecks in procuring building materials and high water on the construction site. The political upheavals and social unrest in 1986 also hampered building site operations. The difficulties during the implementation of the project incurred higher costs of almost 50% (EUR 1.5 million). These additional costs spread out evenly over plant and electromechanical equipment. At EUR 3,274/kW (without overhead cable), the specific investment costs of the Caracol hydropower station thus distinctly exceeded those of the Gaillard hydropower station (EUR 2,567/kW without overhead cable). However, the overall project finance was not in jeopardy at any time. Except for the sloping canal, the building works complied with international norms. The project outcome was an operational hydropower station geared to local conditions

able in the long term to operate at base load under proper maintenance.

The project, Délugé-Lanzac I, comprised the construction of a run-of-water power station with a nominal capacity of 800 kW at river courses with the same name fed from two karst sources near the village of Montrous, the connection of the facility to the municipal grid of St. Marc via a 22.8 km-long 23 kV line and an operations training programme for power station operatives. The construction measures included water catchments at the karst sources, a pressure line to the electric powerhouse, the electric powerhouse itself with turbine, generator and control centre, a residential building for operatives and an access road. As the intake of part of the spring water for power generation deprived local families in the project region of utility water, the project provided for compensatory measures to at least maintain or if possible improve the conditions of life and work for the families affected. This included a compulsory water charge to the irrigation systems which was more in line with needs but not with legal water provisions, the repair of existing irrigation channels, agricultural extension services and power supply to two villages. As with comparable earlier projects, the project was implemented by a municipal enterprise under the responsibility of the EDH with support from consulting engineers. While the construction work commenced on schedule in April 1987, election campaigns, political unrest and strikes caused considerable disruption later on. Due to ill-defined competencies in the EDH, there were also delays in awarding the supply contracts for electromechanical components for the plant (after limited tendering in Germany). As a result, the implementation period of the project extended over more than almost 4 years, more than twice as long as estimated at project appraisal. Despite considerable cost increases for services invoiced in local currency, the total costs of the project as compared with the estimates at project appraisal only rose by almost 7% as savings were made on foreign currency costs and ample contingency reserves had been provided for. The remaining FC funds amounting to EUR 0.20 million were channelled into financing the sequel project Délugé-Lanzac II. With specific investment costs of EUR 4,383/kW (without overhead cable), the power station must nevertheless rate as a comparatively expensive facility.

A major deficiency in project implementation was the project executing agency's inconsistent conduct of the compensatory measures agreed in favour of the farmers living in the project area. Many farmers remained disgruntled at the water intake by the power station. Only a few days after the official commissioning of Délugé-Lanzac I in March 1991 incidents and service interruptions occurred as a result of the dispute over water rights. After farmers from the surroundings had destroyed one of the crosschannels, additional damage was caused to water catchments and pipelines. The protests culminated in a part of the population forcibly entering the powerhouse, where a caretaker was killed. Following this, further surveys were agreed with the project executing agency in June 1991 on agricultural irrigation needs, but the measurements were not carried out due to the military putsch in September 1991. It is doubtful whether the measure, which was not carried out ex post, either, would have made a decisive contribution to settling the conflict. At all events, the station was only operated at partial load to cater for the competing water use by farmers and also for fear of escalating conflicts, particularly during the dry season, so that the actual energy yield as a rule remained well below the target of 4.7 GWh/year. Apart from this, it turned out that the water available from the springs and hence the maximum amount of current generated had been overestimated at project appraisal. The upshot is that a power station was built that cannot produce the output it was designed for even when it is operational.

The project, Délugé-Lanzac II, consisted of two major components: The expansion of the power station under construction, Délugé-Lanzac I, with a 300 kW unit for generating an average annual output of 1.5 GWh (turbine, generator, switchgear, water catchment, grit collector, intake conduit, etc.) and the rehabilitation of the St. Marc municipal grid (overhead cables, transformers, street lights, household connections). As a complementary measure, the ongoing programme for operatives was prolonged. Since the incline of the additional power station unit contained no offtake points for irrigation and service water, there did not seem to be an immediate danger of a conflict of interest with other water users, unlike the project Délugé-Lanzac I. The plans provided for the construction work to be carried out by a municipal enterprise under the responsibility of the EDH, awarding an additional contract for the delivery and assembly of the electromechanical equipment for the power station block to the suppliers of Délugé-Lanzac I and issuing a public call to tender for the rehabilitation of the St. Marc municipal grid. Despite the social unrest and the impediments it caused for the project executing

agency, the construction work could begin after a six-month delay in mid-1990. While the supply and assembly of the turbine and generator could already be awarded as a follow-up contract in October 1990, a new call to tender had to be issued for the electrotechnical lot due to excessive pricing. This is why the contract for the supply and assembly of the electrotechnical equipment was not executed until June 1991. The contract for the rehabilitation of the St. Marc municipal grid was not placed until August 1991, either, to a company based in Haiti after a lengthy tendering procedure. The coup and take-over by the armed forces in September 1991, however, thwarted the continuation of the project. In response to these events, the German Federal Ministry for Economic Cooperation and Development decided on 2 October 1991 to suspend Financial Cooperation with Haiti. The payments stoppage prevented downpayment for the electrotechnical equipment and its manufacture, but also for the rehabilitation works on the municipal grid in St. Marc. The project executing agency was able to resume the hydraulic engineering works in January 1992 with its own funds, but the activities had to be finally broken off in mid-1992 pending delivery and assembly of the electromechanical equipment.

Not until resumption of development cooperation with Haiti in August 1995 and the increase in FC funds by EUR 0.77 million in July 1996 could the project be brought to completion. The rehabilitation of the local network in St. Marc was completed at the end of 1997. Délugé-Lanzac II was also temporarily commissioned in December 1997 but technical problems with the turbine generator set forced the project executing agency to take the facility off line in April 1998. The cause of the malfunction were construction faults, which the supplier agreed to remedy after lengthy negotiations. The supplier bore the costs for replacing the system parts, while the indirect costs incurred through lost revenue from electricity sales had to be borne by the project executing agency. The facility finally started operation in October 1999. As a result of the project delays, particularly the ensuing demands by the suppliers, total project costs exceeded the original estimates by almost 20%. The hydropower components proved to be extremely costly, with specific investment costs of about EUR 7,000/kW. Contrary to the expectations at project appraisal, the operation of Délugé-Lanzac II was also impaired by ongoing conflicts over the use of the restricted water supply so that the power station was not able to run at nominal load.

Key findings of impact analysis and performance rating

Assessment of objectives achievement

As all projects managed to create additional operational power generating capacities, they also made a temporary contribution to achieving the overall objective, the promotion of agricultural and small-scale business development in the project areas. However, at no location has power supply been secured in the long term, let alone development constraints remedied. The uptrend in national electrification in which the projects Jacmel Electricity Supply and Caracol Hydropower Station played a part, came to an end in 1990. Average supply has deteriorated since then. The projects cannot be blamed for this setback, but the project executing agency must bear some responsibility, although the main causes lay in social and political tensions. At the overall objective level, we can therefore state in all that major development constraints in and outside the power supply sector have not yet been removed. Rather, the situation has deteriorated, as partly evidenced by per capita income, which has declined continuously in Haiti since the mid-eighties.

The projects also failed to meet their objectives for the most part. None of the four hydropower projects came near to attaining the long-term power generation for which they were designed. Where operational at all, the power stations were run at 50% of nominal capacity. Due to deficient maintenance, financial bottlenecks and damage, all the facilities were periodically out of operation. Recently rehabilitated by the Canadian power provider Hydro Quebec with funding from the Canadian International Development Agency, only the Jacmel hydropower station is currently available. Thanks to this support, Jacmel is presently the only locality in Haiti with a secure power supply. Moreover, the Jacmel hydropower station stands out for having generated up to 1.9 GWh a year in the critical period from 1991 to 1995, while the Caracol hydropower station was out of operation. Due to operational reasons and overscaling, the Délugé-Lanzac I+II hydropower stations were also never able to reach the indicator targets for power generation. The projects Délugé-Lanzac I+II also failed to meet the other indicator targets. The consumers in the local grids of St Marc and Gonvaives have to put up with frequent power cuts.

Total losses in the nineties ranged between 50% and 60%, at least half non-technical. It was not possible to raise productive electric power consumption to the indicator figure of 8 GWh/year; for this, total consumption in St. Marc and Gonaives would have had to increase to over 15 GWh/year but maximum actual total consumption amounted to only 10.5 GWh/year and the minimum to 7.1 GWh/year during the nineties.

Due to the unreasonable current tariffs compared with the relatively excessive technical and non-technical losses, the projects were uneconomic for the project executing agency. The project appraisals for the first two projects at Jacmel and Caracol already anticipated that they would not recover business costs. The expectation for all projects was that they would be worthwhile in macroeconomic terms. In hindsight, however, there is also reason to doubt their macroeconomic viability. Based on the assumptions at project appraisal (8% discount for an operational life of 25 years; 80% capacity utilization rate), the actual investment costs for the FC-financed hydropower stations make for prime power costs of between EUR 68.5/MWh (Gaillard/Jacmel) and EUR 374/MWh (Délugé-Lanzac II). Based on average capacity utilization so far of only 50%, the prime costs range between EUR 94/MWh (Gaillard/Jacmel) and EUR 555/MWh (Délugé-Lanzac II). Even if one computed fuel costs for an alternative electric power generation with a diesel power station at the present, comparatively high, world market prices, the macroeconomic advantage of hydropower would only be assured for the Gaillard/Jacmel project.

There was no reasonable technical alternative to the rehabilitation measures for the local grids in Jacmel and St Marc, particularly as the costs remained within an acceptable margin. As to the socio-economic impacts of the projects, the labour-intensive construction work had temporary, direct, beneficial employment effects; long-term indirect income and employment effects are hard to quantify but due to the adverse climate for economic development they are irrelevant anyway. Nevertheless, all the projects were geared to general poverty reduction at macro and sectoral level. Environmental protection and resource conservation did not figure in the objectives; nor have the projects had any notable environmental impacts. The project objectives had no bearing on gender equality or participatory development/good governance.

The audit of the use of funds gave rise to no objections for any of the four projects. The project, Jacmel Electricity Supply, has residual funds amounting to EUR 511.29. We suggest that BMZ deduct the residual funds from the original FC finance of EUR 1,857,089.60 to close disbursals at EUR 1,856,578.31. As the disbursement period has elapsed, there is no need for approval by the Republic of Haiti.

Altogether, the German FC priority attached to power supply in rural areas and the concentration on environmentally safer and prospectively cost-effective hydropower conformed with the declared goals of Haitian development planning and the goals and basic guidelines of German development cooperation. No decisive progress could, however, be made in the implementation of these objectives.

Summary evaluation and KfW assessment

Considerable risks were forecast for the projects as to the amount of water available for the power stations. The danger of political and social tensions were also foreseeable at the end of the eighties. These risks were correctly identified during the project appraisals. The risk forecasts turned out to be correct and this has substantially impaired the developmental success of the projects.

The projects **Caracol**, Délugé-Lanzac **I and II** have clearly failed to achieve their objectives. Even when the hydropower stations were operational, the power they generated partly remained well below the target level. Nor were the project objective indicators met for productive electric power consumption, supply security and system losses in the local grids of St Marc and Gonvaives. Altogether, we therefore assess the effectiveness of these three projects as clearly insufficient (Subrating 5).

Objectives achievement in the project, Jacmel Electricity Supply, tends to be a little better than that of the three other projects. For example, despite falling short of the indicator target, the power station made a substantial contribution to power supply for the town in the crisis years 1991-1995 and thanks to a donor-financed rehabilitation programme it is the only one of the four FC-financed power stations that is still in operation today. We accordingly rate the effectiveness

of the project, Jacmel Electricity Supply, as slightly insufficient (Subrating 4).

The projects have not made any progress towards the overall objective of promoting agricultural and small business activities in the project regions through securing and expanding power supply. The supply situation in the project areas has not improved compared with the eighties. Electric power consumption even declined in the nineties and has only now regained the level it was at 15 years ago. There was no significant sustainable indirect contribution to remedying development constraints. Nor has the capacity of the power sector and the project executing agency improved. On the contrary, the electricity sector has been in dire financial and organizational straits for over 10 years, with no discernible signs of any basic reforms or sustained recovery. Altogether, we therefore assess the relevance/significance of all four projects as clearly insufficient (Subrating 5).

As a result of the specific investment costs, particularly for the two later hydropower projects (Délugé-Lanzac I and II), the frequent and lengthy downtimes due to disruptive incidents and damage and the resultant insufficient average capacity utilization of the facilities, the dynamic prime power costs of the hydropower projects exceed the anticipated level by a considerable margin. It is therefore doubtful whether the last two projects have even brought a macroeconomic benefit. Added to this are the high technical and non-technical losses, which make for unnecessary power supply costs and stand in the way of improving business cost-effectiveness. In view of the poor allocation and production efficiency, we gauge the efficiency of the projects **Caracol**, Délugé-Lanzac **I and II** as clearly insufficient (Subrating 5).

The efficiency of the project, Jacmel Electricity Supply, tends be somewhat better: Besides the above-mentioned limitations, this project has at least broken even in macroeconomic terms. We therefore assess the efficiency of the project, Jacmel Electricity Supply, as slightly insufficient (Subrating 4).

Accounting for the above-mentioned subcriteria, we rate the developmental efficacy of the projects **Caracol**, Délugé-Lanzac **I and II** as **clearly insufficient (Rating 5)**.

Considering the above-mentioned subcriteria, we gauge the developmental efficacy of the project, Jacmel Electricity Supply, as **slightly insufficient (Rating 4).** A decisive factor here was the course adopted of maintaining the substance of the Gaillard hydropower station and the Jacmel local grid through rehabilitation measures as part of institutional reforms, which averted further economic harm to the country.

General conclusions and recommendations

In an inimical sectoral environment, even well designed projects cannot have the anticipated beneficial developmental impacts.

Legend

Developmentally successful: Ratings 1 to 3	
Rating 1	**Very high or high degree of developmental effectiveness**
Rating 2	**Satisfactory developmental effectiveness**
Rating 3	**Overall sufficient degree of developmental effectiveness**
Developmental failures: Ratings 4 to 6	
Rating 4	**Overall slightly insufficient degree of developmental effectiveness**
Rating 5	**Clearly insufficient degree of developmental effectiveness**
Rating 6	**The project is a total failure**

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 below concentrate on the following fundamental questions:

Are the **project objectives** reached to a sufficient degree (aspect of project **effectiveness**)?
Does the project generate sufficient **significant developmental effects** (project **relevance** and **significance** measured by the achievement of the overall development-policy objective defined beforehand and its effects in political, institutional, socio-economic and socio-cultural as well as ecological terms)?
Are the **funds/expenses** that were and are being employed/incurred to reach the objectives **appropriate** and how can the project's microeconomic and macroeconomic impact be measured (aspect of **efficiency** of the project conception)?
To the extent that undesired **(side) effects** occur, are these tolerable?

We do not treat **sustainability**, a key aspect to consider for project evaluation, as a separate category of evaluation but instead as a cross-cutting element of all four fundamental questions on project success. A project is sustainable if the project-executing agency and/or the target group are able to continue to use the project facilities that have been built for a period of time that is, overall, adequate in economic terms, or to carry on with the project activities on their own and generate positive results after the financial, organisational and/or technical support has come to an end.