Powering Africa Through Interconnection
Executive summary
IDEV conducts different types of evaluations to achieve its strategic objectives.

- Impact Evaluations
- Thematic Evaluations
- Regional Integration Strategy Evaluations
- Corporate Evaluations
- Country Strategy Evaluations
- Sector Evaluations
- Project Performance Evaluation (Public Sector)
- Project Performance Evaluation (Private Sector)
- Evaluation Syntheses
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Executive Summary

Introduction and Evaluation purpose/scope

This report synthesizes the key findings of the evaluations of Power Interconnection (PI) projects, approved and implemented by the African Development Bank Group (AfDB or “the Bank”) during 1999–2013.

The purpose of this cluster evaluation is: (i) to assess the relevance, effectiveness, efficiency, and sustainability of PI projects; and (ii) to identify key lessons on what worked and what did not work.

This evaluation can inform the design and implementation of future power interconnection interventions under the umbrella of the Bank’s New Deal on Energy of Africa together with Regional Integration Policy and Strategy (RiPoS) for 2014–2023.

The AfDB approved 30 PI projects (representing 48 operations and amounting to UA 822 million in net loans and grants) in 1999–2013. These operations comprise 13 investments projects (UA 786 million) and 17 studies (UA 36 million). Six out of the 13 investment projects were purposively selected for this cluster evaluation.

With a total net approval amount of UA 196 million, the selected projects link the following countries: (1) Zambia and Namibia; (2) Morocco, Algeria and Spain; (3) Mali, Mauritania and Senegal; (4) Nigeria, Togo and Benin; (5) Ethiopia and Djibouti; and (6) Ghana, Togo and Benin.

Project Cluster Performance

Development outcomes

Overall performance
All six projects in the cluster (project cluster) were rated satisfactory on development outcomes.

The project cluster was relevant, effective, and efficient with likely sustainable results. However, the project cluster was limited by substantial implementation delays, and inadequate risk assessment.

Relevant project cluster objectives and design, but weak in some risks assessment

The objectives of the project cluster are aligned with the developmental needs and priorities of the thirteen project countries involved. Importing countries faced growing demand for electricity but did not have sufficient generation capacity to respond. Thus, power interconnection projects served to fill this gap and accelerate the regional integration process.

The project cluster’s objectives are aligned with the Bank’s priorities and strategies. They also align with other donors’ sectoral agenda including regional economic cooperation and integration, private sector development and environmental protection.

The project cluster designs have clear objectives with planned outputs that are relevant for PI. These objectives helped support regional integration process within involved countries.

While risks threatening achievement of sustainable outcomes were generally well identified in the planning stage, they were insufficiently analyzed and assumptions tended to be overly optimistic.

Achievement of objectives

The project cluster provided the physical outputs necessary for increasing availability of electric power to countries, either through power generation or through regional power exchange.

All completed projects achieved their outcomes in a satisfactory manner. The project cluster led to increased:
Access to electricity-based services, due to the increased availability of electric power to countries. Cheaper imported electricity expands access for importing countries.

Trading in electrical power on a cross border basis (except for the Morocco-Algeria, where the amount of energy carried by the interconnection is restricted).

Yet, in two cases, the potential power exchange capacity reached their limits shortly after project completion. For instance, four years into the operation, Ethiopia and Djibouti have initiated action to construct a second line between the two countries. In the same vein, additional 700 MW of power interconnection with Spain is under development for Morocco project.

Electric distribution through the expansion of sub-stations that received power from main transmission lines and delivered to consumers. However, the project cluster failed to: (i) increase reliability, quality and affordability of electricity; and (ii) lower electricity tariffs and costs.

Reliability and affordability proved to be a major challenge in project countries. Apart from Morocco and Namibia, reliability goals set for the majority of importing utilities remained unattainable.

The achievement of this goal is dependent on several factors, including: (i) the reliability of both exporting and importing countries’ national grids; (ii) sound operational and technical experience to execute and operate the state-of-the-art 400 kilovolt (kV) high voltage direct current (HVDC) used in PI projects; and (iii) the reliability of other generating facilities in the country.

The goal of lowering electricity tariffs for the average consumer as a result of cheaper power imports over the interconnectors has yet to be achieved. This is attributed to: (i) the increasing demand for electricity services, that is widely covered by more expensive sources of thermal power from fossil fuels; (ii) the inefficiencies in utilities’ domestic operations that are passed on to consumers; and (iii) lack of complementary national policies and programs (Morocco, Manantali Countries and Zambia) to lower electricity tariffs.

Satisfactory project efficiency

Although viable economically and financially (except for Morocco), the projects suffered from substantial implementation delays.

All six projects were characterized by substantial implementation delays leading to inefficiency and cost overruns. The key factors accounting for the project implementation delays include: (i) delays in loan effectiveness; (changes to project design; (iii) delays in counterpart funding; (iv) delays in procurement; and (v) inadequate management skills of project staff.

Likely sustainability of PI project benefits

The projects are rated sustainable on the following grounds: technical, economic, financial, environmental and social, and institutional. The Morocco/Algeria case was not sustainable on political ground.

The key exogenous factors influencing outcomes include: hydrology and demand risks.

Project M&E performance

Limited monitoring and evaluation (M&E) system. M&E systems were incorporated in project designs, but were not effectively operationalized and used. None of the six Project Completion Reports (PCR) was prepared on time. The PCR formats used did not provide comparable rating on effectiveness and development results.
Key Issues & Lessons Learnt

Timeframes

Lesson #1: Projects need to be designed and implemented with realistic timeframes, if they are to efficiently deliver their results.

- The project designs did not establish realistic timeframes based on solid analysis and assessment of potential risks.
- All the completed projects experienced completion delays, largely as a result of delays in loan effectiveness. This led to changes in the project environment and cost escalations.
- In the specific case of Ghana-Benin-Togo where Togo was under sanctions, lack of coordinated planning created a situation where portions of the assets were completed and remain idle.

Mechanisms for upward adjustments

Lesson #2: An inbuilt tariff adjustment mechanism in Power Purchasing Agreements is an incentive for power export.

- The financial viability of Zambia/Namibia project is particularly sensitive to changes in the Power Purchase and Supply Agreements (PPSA) details (energy and tariff) as well as the bulk purchase tariff. In Zambia, the bulk purchase cost to Zesco is likely to triple or quadruple in the near future. This is due to: (i) the generation shortfall in Zambia; and (ii) the higher cost of generation from new capacity under development. This increase will erode some of the benefits of the project and hence the financial return unless recently agreed PPAs take into account expected increases in cost and build-in a mechanism for automatic tariff adjustments going forward.

In the case of Ethiopia Djibouti project, a bilateral PPA was signed. However, in the long term power trade between the countries will be based on a competitive power market in the East African Power Pool (EAPP).

Domestic end-user tariffs

Lesson #3: For power import to reduce meaningfully end-user tariffs in the importing countries, it must be of significant quantities relative to the available electricity.

In all importing countries, reducing domestic end-users tariffs has been a challenge. Prices for electricity supply services continue to be high in all participating countries.

- In Morocco, the government sought to lower electricity prices to be at par with its regional neighbors resulting in a decline in tariffs for all consumers. But from 2006, the tariffs started rising again until when they were stabilized in 2009. Thus, the goal of securing affordable power for the country was largely achieved. But increases in local generation costs as well as imports are likely to render such low tariffs unsustainable.
- As in the Moroccan case, all three OMVS member countries are increasingly resorting to thermal electricity generated from fossil fuels to meet increasing demand, a situation which has continued to put an upward pressure on end-user tariffs notwithstanding the use of the relatively cheap hydro power from the Manantali Power station.

In Djibouti, despite the fall in power imports power cost, and average end-user tariffs, the latter remained high (36.05 US cents/kWh for MV customers and 28.08 US cents/kWh for LV customers). Of concern is the apparent absence of any mechanism for ensuring that the Borrower passes on the
benefit of the project to consumers in the form of lower tariffs.

**Political commitment**

**Lesson #4:** For multinational projects to achieve long-term results, they require sustained political commitment from the participating State-parties.

The viability and sustainability of regional cooperation require very strong political commitments of all the countries involved.

- The project cluster was successfully implemented largely due to the political commitment of the governments involved and the close cooperation between the utilities.

- Partner countries ought to find ways of resolving their differences to achieve the full benefits of projects investments and better cooperation (more specifically for Ethiopia and Djibouti).

In contrast, for political reasons, despite the interconnection capacity to import over 10,000 GWh annually from Algeria, Moroccan power imports from Algeria have been limited to less than five percent of line capacity.

**Regional institutional frameworks**

**Lesson #5:** Successful implementation of multinational operations needs effective and binding regional institutional frameworks.

An adherence by all parties to agreements underlying multinational operations is a major prerequisite for successful project operations. To ensure power interconnection project success and sustainability, participating governments and institutions need to commit to respecting such agreements. Therefore, a set of common development priorities is necessary for forging shared interests and sustainable project outcomes in countries participating in multinational operations.

- The successful conception, implementation and operation of the Manantali project has been attributed partly to a sound regional collaboration framework, well-grounded by international conventions and a clear distribution of costs and benefits among the participating countries.

- There is a need to build-in enforcement mechanisms in agreements underlying power interconnection operations in order to ensure that all stakeholders play by the rules. This task may be delegated to regional institutions, which can be empowered in future multinational power operations to play the role of an independent regional regulator and to enforce rules by applying sanctions. However, the actual situation shows that strong regional institutions are often lacking.

**Complementary government energy policies and programs**

**Lesson #6:** Sustainable PI project benefits require proper alignment of complementary governments’ policies and programs in the energy sector.

In two of the six projects (Morocco, and Ethiopia-Djibouti), the national governments and the public utilities, adopted complementary policies and programs. These policies and programs guarantee the equitable distribution and sustainability of project benefits with the timing of such programs aligned with the timing of project benefits delivery. This in turn, enhanced the likelihood of sustaining the project benefits.

In contrast, the rest of the four projects, lack of complementary policies and programs limits the sustainability the PI project’s outcomes.
Risk assessment

Lesson #7: PI projects need rigorous assessment of risk during the design phase, if they are to deliver sustained results.

The design of all PI projects requires thorough identification and analysis of risks. A lack of this analysis threatens the sustainability of project outcomes. All projects experienced shortcomings in assessing one or more of the six main risks identified within the group.

- Some of the critical exogenous factors such as hydrology and demand risks, gas supply risk and climate change conditions are well-known but under-estimated or not properly mitigated.

- The design was also silent on the inefficiencies and associated risks, due to the lack of proper and coordinated planning for multi-donor–funded projects. This can result in non-delivery of project assets, thus leading to no power transmission and no revenue generation— the case in Ghana, where assets have been idle since December 2014.
About this Evaluation

This report synthesizes the results of a cluster evaluation of six power interconnection projects implemented during the period 1999-2013 and funded by the African Development Bank Group. These projects amounted to UA 196 million and linked the following countries: (1) Zambia and Namibia; (2) Morocco, Algeria and Spain; (3) Mali, Mauritania and Senegal; (4) Nigeria, Togo and Benin; (5) Ethiopia and Djibouti; and (6) Ghana, Togo and Benin. The objective of this cluster evaluation is: (i) to assess the relevance, effectiveness, efficiency, and sustainability of completed PI projects; and (ii) to identify key lessons on what worked and what did not work.

The evaluation used a theory-based approach that not only examined which results were achieved, but also how and why the results were achieved or not.

The evaluation used a common data collection protocol to collect both quantitative and qualitative data on the performance of each of the six projects. The data was generated from multiple data sources and collection methods including: (i) desk review of relevant AfDB documents and literature; (ii) interviews with key stakeholders (both inside and outside the Bank); and (iii) field visits of purposively selected project sites. Descriptive and comparative analysis were undertaken as well as data triangulation.

This project cluster evaluation is a learning product, focusing on findings and lessons. As such, it does not contain recommendations. Rather than AfDB Management preparing a formal Management Response, a knowledge sharing and capitalization workshop was held with the relevant operations departments of the Bank.