An Independent Evaluation of the World Bank’s Support of Regional Programs

Case Study of Southern Africa Power Market Program

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### Acronyms

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<thead>
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<th>Description</th>
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</thead>
<tbody>
<tr>
<td>AC</td>
<td>Alternating current</td>
</tr>
<tr>
<td>APL</td>
<td>Adjustable program loan</td>
</tr>
<tr>
<td>BCECO</td>
<td>Bureau Central de Coordination (DRC)</td>
</tr>
<tr>
<td>CAS</td>
<td>Country Assistance Strategy (World Bank)</td>
</tr>
<tr>
<td>CC</td>
<td>Coordination Center</td>
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<tr>
<td>CEC</td>
<td>Copperbelt Energy Company</td>
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<tr>
<td>DC</td>
<td>Direct current</td>
</tr>
<tr>
<td>DRC</td>
<td>Democratic Republic of Congo</td>
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<tr>
<td>EC</td>
<td>Executive Committee</td>
</tr>
<tr>
<td>EdM</td>
<td>National power utility of Mozambique</td>
</tr>
<tr>
<td>EOP</td>
<td>End of project</td>
</tr>
<tr>
<td>ESCOM</td>
<td>National electricity utility of Malawi</td>
</tr>
<tr>
<td>IDA</td>
<td>International Development Association</td>
</tr>
<tr>
<td>M&amp;E</td>
<td>Monitoring and evaluation</td>
</tr>
<tr>
<td>NEPAD</td>
<td>New Economic Partnership for Africa’s Development</td>
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<tr>
<td>NORAD</td>
<td>Norwegian Agency for Development</td>
</tr>
<tr>
<td>PAD</td>
<td>Project Appraisal Document (World Bank)</td>
</tr>
<tr>
<td>PHRDD</td>
<td>Policy and Human Resource Development (trust fund)</td>
</tr>
<tr>
<td>PPA</td>
<td>Power Purchase Agreement</td>
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<tr>
<td>SADC</td>
<td>Southern Africa Development Community</td>
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<tr>
<td>SAPM</td>
<td>Southern Africa Power Market</td>
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<tr>
<td>SAPP</td>
<td>Southern Africa Power Pool</td>
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<tr>
<td>SNEL</td>
<td>Societe National d’Electricite (DRC)</td>
</tr>
<tr>
<td>STEM</td>
<td>Short Term Energy Market</td>
</tr>
<tr>
<td>TANESCO</td>
<td>National electricity utility of Tanzania</td>
</tr>
<tr>
<td>TAU</td>
<td>Technical and Administrative Unit</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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Preface

EVALUATION OBJECTIVES AND METHODOLOGY

This review of the Southern Africa Power Market Program (SAPM) is one of 19 reviews undertaken as part of an evaluation by the Independent Evaluation Group (IEG) of the effectiveness of World Bank support for multicountry regional programs over the past 10 years (1995-2004). Twelve of the reviews, including this SAPM assessment, are desk reviews; the other seven reviews are in-depth field studies. All reviews draw on core project documentation, project progress reports, self and/or independent project evaluations, related Bank country assistance strategies (CAS) and sector strategies, and interviews with key Bank staff. See Annexes F and G for a list of people interviewed and references.

There have been limitations in assessing SAPM because the program has been operational only since the third quarter of FY04, and no evaluations were available at the time of this review.

EVALUATION CRITERIA

The 19 reviews use the IEG evaluation criteria of relevance, efficacy, and efficiency. In addition, they assess the Bank’s performance and examine the performance of the regional program’s participating countries. The key evaluative questions addressed under these criteria—designed to deal with the special characteristics of multicountry programs—are as follows.

Relevance

- **Subsidiarity:** To what extent is the program being organized and carried out at the lowest level effective, and how does it complement, substitute for, or compete with Bank country or global programs?
- **Alignment:** To what extent does the program arise out of a regional consensus, formal or informal, concerning the main regional challenges in the sector and the need for collective action? To what extent is it consistent with the strategies and priorities of the region/subregion, countries, and the Bank?
- **Design of the regional program:** To what extent is program design technically sound, and to what extent does it take into account the different levels of development and interests of participating countries, foster the confidence and trust among participants necessary for program implementation, and have clear and monitorable objectives?

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1 All 19 operations reviewed in this evaluation are titled as “programs” by the evaluation, even though 11 are officially designated as “projects” by the Bank, including SAPM. Throughout this report, whenever “SAPM” or an aspect of SAPM is cited, it will therefore be referred to as a “program.” Elsewhere, the term “project” will be used.
Efficacy

- **Achievement of objectives**: To what extent has the program achieved, or is it likely to achieve, its stated objectives, including its intended distribution of benefits and costs among participating countries?
- **Capacity building**: To what extent has the program contributed to building capacities at the regional and/or participating country levels?
- **Risk to outcomes and impacts**: To what extent are the outcomes and impacts of the program likely to be resilient to risk over time? To what extent have the risks to project outcomes been identified and have measures to integrate them been undertaken?
- **Monitoring and Evaluation**: Has the program incorporated adequate monitoring and evaluation processes and addressed available findings?

Efficiency

- **Efficient use of resources**: To what extent has the program realized, or is it expected to realize, benefits by using reasonable levels of time and money?
- **Governance, management, and legitimacy**: To what extent have governance and management arrangements clearly defined key roles and responsibilities; fostered effective exercise of voice by program participants and coordination among donors; contributed to or impeded implementation of the program and achievement of its objectives; and entailed adequate monitoring of program performance and evaluation of results?
- **Financing**: To what extent have financing arrangements affected positively or negatively the strategic direction, outcomes, and sustainability of the program?

World Bank’s Performance

- **Comparative advantage and coordination**: To what extent has the Bank exercised its comparative advantage in relation to other parties in the project and worked to harmonize its support with other donors?
- **Quality of support and oversight**: To what extent has the Bank provided adequate strategic and technical support to the program, established relevant linkages between the program and other Bank country operations, exercised sufficient oversight of its engagement, and developed an appropriate disengagement strategy for the program?
- **Structures and Incentives**: To what extent have Bank policies, processes, and procedures contributed to, or impeded, the success of the program?

Participating Countries’ Performance

- **Commitments and/or capacities of participating countries**: How have the commitments and/or capacities of participating countries contributed to or impeded the success of the program? Have one or more countries exercised a primary leadership role?
- **Program coordination within countries**: To what extent have there been adequate linkages between the regional program’s country-level activities and related national activities?
Executive Summary

Background

1. Sub-Saharan Africa is rich in natural energy resources. Large reserves of low-cost coal are found in South Africa, while important hydroelectricity reserves are present in parts of the Democratic Republic of Congo (DRC), Mozambique, and the border between Zambia and Zimbabwe. Nevertheless, some southern and eastern African countries have few if any indigenous sources of electric power, such as Botswana, Namibia, Tanzania, and Zimbabwe. By the 1990s, power exchange among the Southern African Development Community (SADC) had become a priority due to imbalance of energy supply and demand among countries in the region. In addition, some countries were particularly susceptible to droughts and floods, and high electricity tariffs interfered with competition and development.

2. These developments led to the creation of the Southern African Power Pool (SAPP) in September 1995, and the signing of the SADC Energy Protocol in August 1996. SAPP was initially composed of seven members and currently includes 12 of the 14 SADC members (Madagascar and Mauritius are not members).

3. SAPP established two market mechanisms for power trading: long-term Power Purchase Agreements (PPAs), with contracts typically lasting 10-15 years, and a Short-Term Energy Market (STEM), based primarily on day-ahead short-term contracts for power in hourly periods. In spite of these initiatives, the reliability of the SAPP network has been problematic. Since each member must meet domestic demand, some members have hesitated to rely on the pool for large portions of their domestic load because of reliability problems in the operation of the interconnected transmission system.

Program Summary Description

4. The Southern Africa Power Market Program (SAPM) was intended to rectify SAPP weaknesses. The overall objective of SAPM is to turn SAPP into a reliable, interconnected system, with a competitive pool mechanism and improved balance between the demand for and supply of power among member countries.

5. SAPM’s subobjectives are:
   - Upgrading the facilities at the Pool Coordination Center and increasing its knowledge base;
   - Removing certain transmission system bottlenecks;
   - Converting nonoperating members of the pool to operating members by connecting them to the SAPP.

6. SAPM is structured in three overlapping phases, using horizontal adjustable program loans (APLs): APL1 (November 2003 to December 2007), APL2 (April 2004 to August 2008), and APL3 (January 2006 to December 2009). The objective of APL1 is to expand the power provided by the DRC to SAPP, thereby increasing the competitiveness
of the SAPP power market. APL2 involves constructing a transmission line from Mozambique to Malawi in order to increase Malawi’s access to reliable power, as well as to expand power exports from Mozambique. APL3 includes constructing an additional transmission line from the DRC to Zambia, and investing in other priority transmission bottlenecks and/or constructing connections to another nonoperating member (for example, Tanzania).

7. The overall costs for SAPM will be at least $332 million. The cost of APL1 is estimated at $200 million; APL2, at $87 million; and a partial cost estimate for APL3 is $45 million.

8. Of the total $200.19 million estimated cost for APL1, $178.60 million is to be covered by International Development Association (IDA) credits; $3.36 million, by bilateral grants from Norway and the United States; $8.75 million, by the Zambia Copperbelt Energy Company (CEC), and $8.53 million, in counterpart funds from the borrowing countries. The specific sources of financing have yet to be determined for APL2 and APL3.

Rationale

9. The project is consistent with the subsidiarity principle, and its rationale includes economies of scale. It also is aligned with the development priorities in individual countries: SADC countries have long recognized the need for more reliable electric power in the subregion.

10. Countries have bought into the project through significant contributions at various levels. SAPM has the full support of the ministers of energy of the member countries. It is aligned with the goals and strategies of relevant regional and subregional organizations—namely, SADC and the New Economic Partnership for Africa’s Development (NEPAD). NEPAD identifies infrastructure, including energy, as a priority area for intervention.

Quality of Design and Implementation

11. The project failed to verify the condition of the Inga hydroelectric facility in southwestern DRC. Since the increased efficacy and efficiency of the SAPM network depends on this facility, the lack of attention to its condition constitutes a major design flaw in APL1. The Inga facility was severely deteriorated, resulting in substantial delays.

12. Furthermore, the project performance indicators are deficient in that they do not adequately differentiate between outputs, outcomes, and impacts.

13. Pricing policy issues have received little consideration so far. This represents a potential risk to long-term sustainability, as utility prices in the subregion tend to be much lower than average cost.
14. The designs of APL2 and APL3 are very tentative.

**Program Achievements**

15. Enhanced transmission lines between the Inga hydroelectric facility (in the DRC) and the Luano substation (in Zambia) are currently under construction and probably will be completed by December 2007. Also, the subobjective of strengthening the Coordination Center in Harare, Zimbabwe, with a major capacity-building element, appears to be proceeding according to schedule.

16. But due to the state of the Inga facility, project development objectives and outputs, which require the provision of 500 MW of “firm power” from Inga, are unlikely to be achieved by the planned APL1 completion date of December 31, 2007.

**Effectiveness of World Bank Performance**

17. The Bank played the role of convener and financer for SAPM. It performed these functions satisfactorily. But the Bank failed to identify the level of deterioration of the Inga hydroelectric facility at the design stage, as well as its implications for the efficacy of the SAPM program. And its implementation supervision has been spotty.

18. The Bank also could have played a more forceful role in utility pricing policy. The Bank did not perform prior analytical work that could have helped member countries understand that the benefits from SAPM require efficient power transfer through a competitive market approach, based on prices that cover fixed (investment) and variable costs.
1. Introduction

**CHALLENGES FACING THE SECTOR**

1.1 The New Partnership for Africa’s Development (NEPAD) identified infrastructure, including energy, as a priority area for intervention, and the first adaptable program loan (APL1) of the Southern Africa Power Market Program (SAPM) as its first short-term infrastructure initiative. In August 2003, the heads of state of the member countries of the Southern African Development Community (SADC)\(^2\) approved a Regional Indicative Strategic Development Plan that emphasizes the role of regional infrastructure, and energy in particular, in promoting increased growth and competitiveness in the region.\(^3\)

1.2 While the origins of SAPM can be traced back to the creation of a SADC Technical and Administrative Unit (TAU) in 1980, whose purpose was to coordinate the regional energy sector, the direct predecessor of SAPM, the Southern Africa Power Pool (SAPP), was not established until 1995. During the intervening years, there were a series of incremental institutional steps: the 1980 TAU was followed by the creation of a SADC Electricity Subcommittee in 1990, to serve as a forum for power utilities in the region to plan the improvement of the regional electricity supply.

1.3 By the 1990s, power exchange among SADC countries had become a priority because of the imbalance of energy resource supply and demand among countries in the region. A large reserve of low-cost hydroelectricity existed in the northern part of the region (especially in parts of the DRC, Mozambique, and the border between Zambia and Zimbabwe) and South Africa had large reserves of low-cost coal. But countries such as Botswana, Namibia, and Zimbabwe had no low-cost, indigenous sources of electric power. In addition, some countries were particularly susceptible to drought and floods. And high electricity tariffs interfered with competition, which was a regional energy issue.\(^4\)

1.4 These developments led to the creation of the SAPP in September 1995 and the signing of a SADC Energy Protocol in August 1996. SAPP was initially composed of seven members and currently includes 12 of the 14 SADC members (Madagascar and Mauritius are not members). An Energy Sector Activity Plan (2000-2005) was issued by a SADC Energy Commission. Three of the 12 SAPP members are classified as

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\(^2\) There are currently 14 members of SADC: Angola, Botswana, the Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe.


\(^4\) Ibid.
“nonoperating” because they are not connected to the regional power grid. These countries are Angola, Malawi, and Tanzania.

1.5 SAPP was the first formal international power pool established outside of Europe and North America. This happened because of the strong priority given by the leadership of the SADC countries to establishing an efficient regional electric power network that would facilitate the transfer of power from power-surplus countries to power-short countries.

1.6 The power pool comprises an area of 9 million square kilometers and approximately 150 million people, but the total number of electricity customers of the combined national interconnected systems was only 5.4 million in 2002. The stated objectives of SAPP are to reduce investment costs and operating costs, and enhance supply reliability through providing opportunities to coordinate the installation and operation of generation and transmission facilities. Since its formation in 1995, SAPP has been for the most part a “loose,” or “cooperative,” power pool. Under the SAPP umbrella, individual power suppliers and customers have entered into long-term and short-term contracts. Certain central services, such as data gathering and provision, have been provided by a SAPP Coordination Center (CC) in Harare, Zimbabwe, and SAPP members have established common design and operational standards to ensure system reliability and facilitate trades.

1.7 SAPP established two market mechanisms for power trading: longer-term multiyear Power Purchase Agreements (PPAs), with contracts typically lasting 10-15 years, and a Short-Term Energy Market (STEM), based primarily on day-ahead short-term contracts for power specified in hourly periods. Differences in the features of these two mechanisms, notably their procedures and durations, have inhibited the growth of a fully integrated power network among SAPP members. Moreover, the reliability of the SAPP network has been problematic. Since each member is obligated to meet domestic demand, some members have hesitated to depend on the pool for large portions of their domestic load because of reliability problems in the operation of the interconnected transmission system.

REGIONAL PROGRAM SUMMARY DESCRIPTION

1.8 The Southern Africa Power Market Program (SAPM), the subject of this review, was intended to rectify the SAPP weaknesses, such as poor reliability, nonoperating members without access to the grid, and subsidized prices. The program’s overall objective is to move SAPP to a reliable, interconnected system; that is, from a loose pool to a competitive pool mechanism with a better balance between power supply


6 Confusion reigns between the terms “pool” and “market” and between the corresponding acronyms, “SAPP” and “SAPM.” They tend to be used interchangeably, even in the same document (for example, p. 23 of the PAD and in the 2003 Zambia CAS). A “power market” strives for open access, transparent rules, and full or marginal cost pricing. A “power pool” does not necessarily exclude these features but does not require them. A pool typically does not include full or marginal cost pricing.
and demand among member countries, and with improved conditions for potential investors in generation facilities. Subobjectives aimed at strengthening the operating capability of SAPP are to:

- improve the facilities at the CC and improve its knowledge base;
- remove certain transmission system bottlenecks; and
- convert pool nonoperating members to operating members by connecting them to the pool grid or network.

1.8. Among other things, these improvements would require reforming the pricing policies for PPAs and for contracts in the short-term energy market from their current low levels in order to more closely reflect marginal costs. In the case of PPAs, price increases of two to three times would be required to reach long-run marginal costs. STEM trading does not encourage new investment since it currently does not recover fixed costs.

1.9. SAPM is structured in three overlapping phases, using adjustable program loans (APL): APL1, lasting from November 2003 to December 2007; APL2, lasting from April 2004 to August 2008; and APL3, lasting from January 2006 to December 2009.

1.10. The specific project development objective for APL1 is to increase the competitiveness of the power market and trading of the DRC in SAPP. APL1 involves the following elements: (a) enhancing the capacity of the system, in order to transfer 500 megawatts of reliable power from the Inga hydro-plant in southwest DRC to other SAPP members at the Luano, Zambia, substation (near Kitwe), about 1750 kilometers to the southeast of Inga; (b) upgrading the facilities of the SAPP Coordination Center in Harare, Zimbabwe, that are responsible for providing various technical, training, and advisory services to members; and (c) conducting feasibility and preliminary design studies of a transmission line from Zambia to Tanzania.

1.11. APL2 plans to construct a transmission line from Mozambique to Malawi in order to increase Malawi’s access to reliable power as well as to expand power exports from Mozambique; and APL3 plans to construct an additional transmission line from the DRC to Zambia and invest in other priority transmission bottlenecks and/or construct connections to another nonoperating member.  

1.12. Table 1.1 shows the estimated implementation period and indicative financing plan for each of the phases. The overall cost for SAPM is expected to be at least $332 million. The cost of APL1 is estimated at $200 million; APL2, at $87 million; and a partial cost estimate for APL3 is $45 million. The most costly phase, by far, is APL1. The vast majority of financing for all the phases, and virtually all the Bank share, is likely to be for infrastructure. Cost estimates for the major components of APL1 are given in Section 4; detailed costs estimates for APL2 and APL3 are not yet available.

1.13. Of the total estimated cost for APL1 of $200.19 million, $178.60 million is to be covered by International Development Association (IDA) credits; $3.36 million, by bilateral grants from Norway and the United States; $8.75 million, by the Zambia Copperbelt Energy Company (CEC); and $8.53 million in counterpart from the

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7 For example, Angola. Interview of project team member, Nov. 8, 2005.
borrowing countries. The specific sources of financing have yet to be determined for APL2 and APL3. Since APL2 is only now in the appraisal stage, this case study will focus on APL1.

### Table 1.1 Estimated Implementation Periods and Indicative Financial Plan, Southern Africa Power Market

<table>
<thead>
<tr>
<th>APL</th>
<th>Estimated Implementation Period (Bank FY)</th>
<th>Indicative Financing Plan</th>
<th>Borrower</th>
</tr>
</thead>
<tbody>
<tr>
<td>APL 1 Loan/Credit</td>
<td>Commitment Date</td>
<td>Closing Date</td>
<td>IDA $ million</td>
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<tr>
<td>177.50</td>
<td>1.10</td>
<td>Zambia government</td>
<td></td>
</tr>
<tr>
<td>APL 2 Loan/ Credit</td>
<td>04/28/2004</td>
<td>08/30/2008</td>
<td>62.00</td>
</tr>
<tr>
<td>35.00</td>
<td>27.00</td>
<td>Malawi government</td>
<td></td>
</tr>
<tr>
<td>APL 3 Loan/ Credit</td>
<td>01/30/2006</td>
<td>12/31/2009</td>
<td>209.50</td>
</tr>
<tr>
<td>143.50</td>
<td>10.00</td>
<td>Zambia government</td>
<td></td>
</tr>
<tr>
<td>45.00</td>
<td></td>
<td>DRC government</td>
<td></td>
</tr>
<tr>
<td>Total</td>
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<td>450.10</td>
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</table>
2. Relevance: Rationale, Alignment, and Design

2.1 **Summary:** Overall, with the qualifications noted below, the South Africa Power Market Program is considered to be relevant. The program is consistent with the expressed development priorities in the subregion and in individual countries. Member countries have bought into the program through significant contributions at various levels. But there is a serious deficiency in a key component, the Inga hydroelectric facility in southwestern DRC, which calls into question the relevance of the technical design of SAPM APL1. The program is consistent with the subsidiarity principle, and employs economies of scale as its rationale. SAPM is rooted in the Southern Africa Development Community (SADC), and has the full support of the ministers of energy of the member countries. The Bank country assistance strategies (CASs) of the six countries that are, or will be, involved in SAPM, emphasize electric power issues, and four cite SAPM in particular, with the Malawi and Mozambique CASs giving the most extended treatment. The design of APL1 suffers from a major flaw, as discussed in Box 2.1, in not having taken into account the seriously deteriorated condition of the Inga hydroelectric facility, the main source of power for the program. A serious sustainability problem will arise if pricing policies are not reformed. Given the fact that utility prices in the subregion tend to be considerably below average cost, the longer-term sustainability of the network is at risk. The performance indicators are deficient in that they do not adequately differentiate among outputs, outcomes, and impacts. The designs of APL2 and APL3 are very tentative.

**Subsidiarity Principle**

2.2 Since SAPM’s objective is to improve the Southern Africa Power Pool (SAPP)—which, by definition, involves multiple countries and is subregional in nature—the program is consistent with the subsidiarity principle. Energy efficiencies could be improved separately within each country. However, SAPM aims to provide an efficient market mechanism to facilitate the exchange of electrical energy from power-surplus countries to power-deficit countries in the SADC region. A major rationale for SAPM being a regional program is that regional markets will in turn permit greater economies of scale, consistent with national objectives.

**Alignment with Country, Regional, and Bank Goals and Strategies**

2.3 SAPM is aligned with the goals and strategies of relevant regional and subregional organizations—namely, NEPAD and SADC. NEPAD identifies infrastructure, including energy, as a priority area for intervention. APL1 was one of the first projects identified by NEPAD in its short-term infrastructure plan. SADC, as part of

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8 APL2 would not be affected, since it involves improving the connection between Mozambique and Malawi. APL3, as presently conceived, could be affected by a long delay in APL1, since it envisions further expansion of the transmission system between the DRC and the SAPP network connection in Zambia.

9 The following specific information on NEPAD and SADC comes from the PAD. *Op. cit.*, p. 5.
its overall effort to deepen integration in the region, has issued a 10-year Regional Indicative Strategic Development Plan, approved by SADC heads of state in August 2003. The plan emphasizes the role of regional infrastructure, and energy in particular, in promoting increased growth and improved competitiveness of the region.

2.4 The CASs for all six countries where SAPM-supported activity is to take place cite the importance of electric energy supply, and five—the DRC, Malawi, Mozambique, Zambia, and Zimbabwe—cite in varying degree country and Bank support for enhancing SAPP. Only the Mozambique CAS explicitly envisions additional Bank support for the power sector.

a) Democratic Republic of Congo: The DRC CAS includes rehabilitation of the power grid as a priority and cites the SAPM as a first step. It recognizes the role of SAPM as facilitating integration of regional power networks, including the export of power from the DRC to southern Africa.\(^{10}\) The transport and power sectors are identified as priorities agreed upon by “a broad consensus of stakeholders.” The Bank also continues to invest in power rehabilitation through the DRC Emergency Multisectoral Reconstruction and Rehabilitation Project.

b) Malawi: Malawi’s May 2003 CAS emphasizes the need for structural, policy, and regulatory reforms in the power sector (and other sectors).\(^{11}\) The CAS describes the prevailing situation in the power sector as follows: “Access to electricity has hardly increased as investment in transmission and distribution has lagged; moreover, despite some improvements, the financial viability of ESCOM [the national power utility] is weak” (p.13).

Considerable attention is also given to SAPM and its potential for Malawi. In one entire paragraph devoted to SAPM, the CAS notes that integrating the Malawi grid with SAPM will lessen Malawi’s “dependence on hydroelectric power generated from the erratic and heavily-silted water flow on the Shire River.” The CAS envisions that the “project should help to make the provision of electrical power to Malawian businesses more efficient and less expensive, thereby helping to improve the overall business environment.”\(^{12}\) But the CAS is contradictory as to whether Parliament had approved a new national energy policy (compare p. 11 with p. 13). Parliamentary action also was pending for privatization of power generation and distribution (transmission was to remain a government monopoly). Restructuring of ESCOM was ongoing and seen as necessary for efficiently connecting Malawi with SAPM (via Mozambique in APL2).

c) Mozambique: The 2003 Mozambique CAS recognizes hydroelectric power exports as contributing to the country’s economic growth. It points to current power exports to South Africa and Zimbabwe, and mentions the potential to export to Malawi


and Tanzania with the support of SAPP (SAPM). It sees the development of an efficient subregional power market as reducing electricity prices, fostering regional integration, increasing competitiveness, and creating the conditions for accelerated investment. Under the Mozambique component of APL2, the CAS envisions IDA financing of $48 million, of which $13 million would come from the Mozambique country allocation. The first strategic pillar of the CAS proposes IDA support for private participation in EdM, the national power utility, so as to help extend the grid, reduce connection costs, reduce power losses, and improve reliability. New lending is proposed for the power sector, where “the growth potential remains very high.” But a proposed energy reform APL was delayed to FY04 due to “slow Government and donor agreement to the sector policy, legal, and institutional arrangements for the project.”

d) Tanzania: The 2000 Tanzania CAS notes that the government has given priority to increasing the security of, and access to, electric power. The Tanzania Electric Supply Company (TANESCO) is to be privatized under an IDA-supported Power Sector Restructuring Project. But the CAS contains no reference to SAPP or SAPM. The government’s Tanzania Assistance Strategy, issued in 2002, contains no reference to the power sector or to energy.

e) Zambia: The 2004 Zambia CAS contains several references to Zambian participation in SAPM, at one point referring to Zambia’s “central role in the Southern Africa Power Pool (SAPP).” An IDA-supported 1998 Power Rehabilitation Project is also mentioned.

f) Zimbabwe: The 2004 Zimbabwe country assistance evaluation makes a passing reference to “promoting regional power trade” through the Southern African Power Pool, but the 2005 Interim Strategy Note contains no mention of power or energy.

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REGIONAL CONSENSUS

2.5 SADC countries have long recognized the need for more reliable electric power in the subregion. This led to the formation of the SAPP in 1995 and the pool’s growth over the years from 7 to 12 members. The SADC countries also have shared an expectation that they would mutually benefit from a system with the capacity to reliably and efficiently transfer power from power-surplus countries to power-short countries. But not all member countries have understood that, to reap the gains from such a system, power needs to be transferred efficiently through a competitive market approach based on prices that cover fixed (investment) as well as variable costs.

DESIGN OF THE REGIONAL PROGRAM

2.6 The program comprises four components and three categories of policy and institutional reforms. The four components are designed to:

a) Strengthen the SAPP Coordination Center (CC) by establishing software systems for power analysis, energy management, communications, and short-term trading; conducting training for CC staff and SAPP members; and by preparing guidelines, plans, and technical and policy studies regarding the environment, regulatory matters, fair trading, reliability, and pricing.

b) Increase capacity of the transmission corridor from the Inga hydroelectric plant in southwestern DRC to the Zambian border in the southeast; to mitigate environmental and social impacts; and to conduct environmental studies for future expansion of DRC power sector.

c) Increase the transmission connection capacity between the Zambian-DRC border and the SAPP network at the Luano, Zambia, substation, to be undertaken and financed by Copperbelt Energy Company (CEC) of Zambia, a private company.

4) Conduct a feasibility study and establish a preliminary design of the SAPP connection between Zambia and Tanzania.

2.7 The policy and institutional reforms to be supported by APL1 are divided by the project appraisal document (PAD) into three categories: (a) governance, (b) regulation of the pool, and (c) legal status. The first and last categories are discussed in Section 4. In the middle category, the main regulatory issues are (a) access to SAPM through uniform and enforced anti-trust laws, and (b) taxes on transborder trade. SAPP and the Regional Energy Regulatory Association (RERA) are to submit for Bank review the minimum conditions for open pool access to be applied by national regulators. SAPP will review member taxation policies in order to avoid trans-border trade taxes that distort market conditions. Pricing studies are to be conducted as well. The results of these studies are not yet available.

2.8 Design flaws: There are two major flaws in the design of APL1. First, APL1 failed to give sufficient attention to the seriously deteriorated condition of the Inga hydroelectric facility. During program preparation, the borrower did not inform the Bank about the extent of the Inga facility’s deterioration. The Bank project team did not
indicate the extent of the problem until the second supervision mission in March 2005 (see Box 2.1).

**Box 2.1. The Inga Problem**

The Inga Falls (more accurately, rapids or cataracts) on the DRC’s Congo River about 150 miles southwest of Kinshasa provides a hydroelectric power potential of 39,000 megawatts—one of the greatest in the world, in view of the year-round high volume of water and its velocity. If fully tapped, it is estimated that Inga could supply the entire African continent at current rates of power consumption, with enough capacity to spare to supply part of southern Europe. A previous government tapped a small fraction of this potential by building two hydroelectric plants, Inga 1 and Inga 2 with a total capacity of about 1,750 megawatts. The two plants account for 70 percent of current total installed power capacity in the DRC.

Poor maintenance during civil wars in 1994-2003 left the two dams heavily silted and operating at about 30 percent of capacity. Modest rehabilitation efforts increased available capacity to about 700 megawatts. But pre-existing demands that have to be met before the SAPM program can proceed—notably 700 megawatts to Kinshasa, 100 megawatts to Brazzaville, 200 megawatts to Congo-Bas (Lower Congo) and 200 megawatts to South Africa—already exceed the existing available Inga capacity. As a result, existing needs are not being fully met. For example, Kinshasa, with a need for 700 kilowatts, has typically been supplied with 400 kilowatts.

The project design team reportedly did not look at the utility policy enabling environment in the DRC, which was biased against proper maintenance of the Inga facility. The judgment of at least one project team member is that the SAPM program was not ready to go to the Bank’s Board and that the project preparation team made a flawed assessment that Inga capacity was adequate.

To live up to its potential, SAPMAPL1 must be able to rely on 500 megawatts of “firm power” delivered from Inga, but the deteriorated state of the facility has cast doubt on the timely utilization of the new transmission lines originating there. The APL1 project appraisal document recognized the need to refurbish the generating plant at Inga (as well as power facilities in the Katanga region), and provided for the rehabilitation and expansion of the AC station at Inga at a cost of $3.3 million. In addition, $9.35 million from the Bank-supported DRC Emergency Multisectoral Reconstruction and Rehabilitation Project is being applied to Inga rehabilitation. But this work has lagged and is insufficient to accomplish the needed rehabilitation. By March 2005, the project team became concerned that Inga restoration had slipped substantially behind the estimated completion time for the transmission work, and that the new transmission assets could lie idle for some time. The team therefore recommended that the government urgently seek financing for the rehabilitation of Inga I and II if the objectives of the project are to be achieved. The Bank has responded by agreeing to support an Inga Rehabilitation Project at an approximate cost of $150 million, but this operation is still under preparation at this time.

2.9 The second flaw involves the possibility that pricing policy reform will not be addressed. As noted above, utility prices in the region have typically been far below marginal cost, or even average cost, including fixed or investment cost. Although the PAD calls for the CC to conduct studies of pricing structures, a project team member observed that the CC did not have the “voice” to address utility pricing reform. Such

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21 Interview with a member of the SAPM project team, Nov. 8, 2005.

22 The PAD defines “firm power” as the ability to deliver the required power (500 megawatts) “with a high availability (about 95 percent).” The PAD also describes the SAPP’s more rigorous definition of “firm power,” but argues that owing to the “sparse” nature of the SAPP network, the SAPP definition is not appropriate (PAD, p. 47).
matters are normally country issues, and “in regional projects, the World Bank does not get into country policy issues.” As discussed below, a serious sustainability will arise if pricing policies are not reformed.

**CLARITY AND MONITORABILITY OF OBJECTIVES**

2.10. As shown in Table 2.1, key performance indicators identified in the main text of the PAD do not correspond closely to the more precise indicators shown in Annex 1. All the indicators lack differentiation among output, outcome, impact, end-of-project, and sector indicators, respectively.

<table>
<thead>
<tr>
<th>Hierarchy of Objectives</th>
<th>Key Performance Indicators</th>
<th>Key Performance Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>(PAD, Annex 1)</td>
<td>(PAD, Annex 1)</td>
<td>(PAD, main text, p. 4)</td>
</tr>
<tr>
<td>Sector-related CAS goal: Improved economic growth and environmental conditions in the SAPP region.</td>
<td>Sector Indicators: 1. Share of energy sector in gross domestic product (GDP) for SAPP countries increased by 5 percent by end of project (EOP). 2. Surplus hydroelectric generation utilized by EOP.</td>
<td></td>
</tr>
<tr>
<td>Project purpose: Promote regional integration and cooperation, and facilitate the conditions for accelerated investment in power sector in the southern African region.</td>
<td>End-of-Project Indicators: 1. ESCOM (Malawi) and TANESCO (Tanzania) nonoperating members connected to regional market by 2009. 2. Number of IPPs and large consumers trading directly in SAPP market increased from 9 utilities to 12 by EOP.</td>
<td>Increase export of low-cost environmentally friendly electricity by DRC to SAPP.</td>
</tr>
<tr>
<td>Project development objective: Increase competitiveness of power market and trading of DRC in SAPP.</td>
<td>Outcome/ Impact Indicators: Export of firm electricity from DRC to SAPP to 500 megawatts by EOP.</td>
<td></td>
</tr>
<tr>
<td>Output from each component: 1. Energy management, short term internet market trading, and communication systems designed installed and operational.</td>
<td>Output Indicators: Trade volume in short-term energy market up by at least 15 percent by EOP. Commercial and technical information regularly available online. Tie line flows based on predictive load flows regularly available to pool participants.</td>
<td>1. Improved operations and increased volume of short-term energy market. 2. Equal access to commercial and technical information for all participants in power market. 3. Enhancement of reliability of the interconnected grid.</td>
</tr>
<tr>
<td>2. Pricing and reliability studies conducted.</td>
<td>2.1 Final report available and distributed to SAPP by EOP.</td>
<td></td>
</tr>
<tr>
<td>3. Converter and inverter</td>
<td>3.1 Availability of Inga-Kolwezi</td>
<td>Enhancement of reliability of</td>
</tr>
</tbody>
</table>

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23 Interview with a former project team member, June 22, 2006. The PAD states that “since STEM [Short-Term Energy Market] trading does not cover fixed costs, the pricing is unsustainable and cannot encourage new generation investments when the present surplus is exhausted” (p. 42).
stations on direct current (DC) transmission link and alternating current (AC) network substations upgraded and rehabilitated.

<table>
<thead>
<tr>
<th>4. Transmission line from Karavia to Kasumbelesa operational.</th>
<th>4.1 Integrated infrastructure services to at least seven communities along Katanga transmission route.</th>
<th>Provision of integrated infrastructure services to communities along new transmission line routes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>transmission line to 95 percent by EOP.</td>
<td>3.2 Outages of DRC AC network from Kolwezi to Karavia decreased by 20 percent by EOP.</td>
<td>interconnected grid.</td>
</tr>
</tbody>
</table>

Provision of integrated infrastructure services to communities along new transmission line routes.
3. Efficacy: Outcomes, Impacts, and Sustainability

3.1. **Summary:** Due to the severely deteriorated state of the Inga hydroelectric facility the project development objectives are virtually impossible to achieve by the planned completion date of December 31, 2007. At this point, it is impossible to predict when these objectives will be achieved. Strengthening the CC in Harare, Zimbabwe, with a major capacity-building component, appears to be proceeding according to schedule. One exception, noted in the previous section, is the possibility that pricing policy reform will not be adequately addressed, even if the CC carries out the studies called for by the PAD, and lack of action on the pricing policy front would threaten the long-run sustainability of SAPM. As noted by the PAD, rehabilitation and maintenance of critical infrastructure in the DRC and Zambia are substantial risks.

**Achievement of Objectives**

3.2. **Project development objectives:** The PAD provides two similar, but not identical, formulations of project development objectives (see Table 2.1 above for sources):

   a) To increase competitiveness of the power market and trading of the DRC in SAPP; and
   b) To increase export of low-cost environmentally friendly electricity by DRC to SAPP.

This review assesses SAPM APL1 using the first formulation: to “increase competitiveness of the power market and trading of the DRC in SAPP.” This is the more precise of the two formulations, and it implies the need for pricing policy reform.

3.3. **Program purpose and sector goal:** Higher-level objectives stated in the PAD include:

   - **Program purpose:** to promote regional integration and cooperation; and to facilitate conditions for accelerated power sector investment in southern African region.
   - **Sector-related CAS goal:** to improve economic growth and environmental conditions in the SAPP region.

3.4. **Achievement will be delayed:** It is far too early to predict whether the program purpose and sector goal will be achieved. Enhanced transmission lines between Inga and the Luano, Zambia, substation are currently under construction and will probably be completed by the program closing date of December 31, 2007. But program development objectives and outputs, which require the provision of 500 megawatts of “firm power” from Inga, are not likely to be achieved by the planned APL1 completion date at the end of December 2007.

3.5. **Funding to strengthen the CC:** Grant aid from two bilateral donors, Norway and the United States, has provided for technical assistance and training to expand and strengthen the CC. Implementation of this APL1 component has progressed satisfactorily despite the distressed condition of the political economy of Zimbabwe.
CAPACITY BUILDING

3.6 **Upgrading the CC:** The main capacity-building component of SAPM APL1 is to upgrade the CC, including training for its staff. Grants totaling $3.36 million from NORAD and USAID are providing support to the CC for nine elements delineated in the previous section on program design.

3.7 **Training BCECO staff:** The Bank is providing limited capacity-building assistance by training the procurement staff of the Bureau Central de Coordination (BCECO), the DRC government procurement agency, in Bank procurement procedures. The PAD notes that “the overall capacity of the BCECO to implement IDA-funded procurement is rated fair and the risk assessment is high.”

3.8 **Support for SNEL:** The Société Nationale d’Electricité (SNEL) is responsible for the technical aspects of the work in the DRC, while BCECO is responsible for the commercial aspects. SNEL has received some training support under the ongoing IDA-supported DRC Emergency Multisectoral Rehabilitation and Reconstruction project. APL1 includes support for the formation of a maintenance organization in SNEL, including training. Given the poor condition of Inga, and the mixed procurement record of BCECO and its high risk assessment, it is not clear that the Bank has given enough attention to capacity building in these organizations.

REALIZED DISTRIBUTION OF COSTS AND BENEFITS

3.9 An equitable distribution of costs and benefits was intended among participating countries in SAPM. Surplus-power countries would realize income from the sale of power. Purchasing countries would presumably acquire power at a lower cost and/or with greater reliability than they would have by relying solely on domestic sources (or other imported sources, such as South Africa). The country that stood to gain the most was undoubtedly the DRC, since it would sell power from the Inga plant with its large surplus capacity. But this benefit has not yet been realized. The delay in increased power from Inga will hurt the DRC, and it will delay the benefits that other member countries would derive from an expanded, more reliable supply of power.

RISKS TO OUTCOMES AND IMPACTS

3.10 **Output-to-objective risks:** The PAD identifies a number of risks at the objective and output levels. Several of these are “substantial” or “high.” Management of the substantial and high risks tends to be more problematic.

3.11 **Political interference or country upheaval:** At the project development objective level, the PAD identifies “the possibility of political interference in the

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25 APL2 envisions training of operating staff at both ends of the transmission line to be constructed in Malawi, but no cost estimates or sources of funding are identified in the PAD.
operation of the Pool or the effect of chaotic events in a member country, with a critical geographic location in the Pool” as the highest risks in moving from outputs to objective. The result could be default on settlement of bills and interference in the passage of power through the national grid. The PAD goes on to suggest that “it is possible that the recently formed NEPAD will have enough influence to help mitigate this risk.”26 This suggestion remains untested and is not, in any event, an adequate risk management provision.

3.12 **Failure to reform pricing policies:** Inadequate reform of pricing policies is another output-to-objective risk, but it is not identified as a risk by the PAD (even though pricing policy reform is implied in one of the project development objectives). While some Bank country projects appear to be addressing these issues (Malawi, Mozambique), if they are not effectively addressed in a coordinated way in all SAPM member countries, the risk is high that rehabilitation and maintenance of generation and transmission systems will continue to deteriorate over time, making program sustainability unlikely.

3.13 **Component-to-output risks:** The PAD identifies five component-to-output risks (p. 36).

a) **Rehabilitation of generation and expansion, and rehabilitation of transmission in the DRC, do not finish simultaneously,** resulting in a delay in benefits. The PAD assesses this risk as “modest” and says that “close coordination between task teams” will mitigate this risk. The fact that progress on the rehabilitation of Inga has seriously lagged should make this risk “substantial,” if not “high.” There is a high likelihood of risk to the Bank’s reputation if the transmission assets end up being, as one project team member put it, a “white elephant.” A more careful inspection of the Inga facility during the project appraisal stage, and an urgent rehabilitation effort, would have been required to mitigate this risk. The proposed Inga Rehabilitation Project, described in Box 2.1, will address this risk, but at the cost of a delay of two years or more in program completion.

b) **SNEL fails to maintain the infrastructure.** Mitigation measures include the formation of a maintenance organization in SNEL and a maintenance contract for the DC (direct current) link, “the most critical component of the transmission system.” The PAD adds that “even in the most difficult of circumstances, SNEL’s staff was able to maintain most of the infrastructure in working condition.” The PAD nonetheless rates this risk as “substantial.” In retrospect, this risk should have been assessed as “high,” in view of the significant deterioration of Inga and the delay in its rehabilitation.

c) **SNEL or CEC (Copperbelt Energy Company) fail to complete their parts of the transmission link.** The PAD rates this risk as “substantial,” but does not specify any mitigation measures that will be taken. It suggests that both parties “might consider obtaining insurance to cover potential damages and that the

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license granted by the government of Zambia to CEC should include a clause to allow others to complete the necessary work on CEC’s right of way.

d) **DRC fails to find customers for its electricity.** The PAD assesses this risk as “modest.” Based on an analysis of estimated conditions when the transmission corridor is expected to be ready, the PAD claims that the prices required for profitability by the DRC will be “well within prevailing market prices.” The Bank also offered help to secure negotiators to assist the DRC in obtaining the best possible prices. Assuming the analysis of future market conditions was sound, the risk assessment appears appropriate.

e) **Implementation delays in the Coordination Center component.** This risk is assessed as “modest” because existing CC staff is viewed as competent, some strengthening of CC capacity had already started with other donor support, the SADC Energy Protocol was being followed by the CC, and the Bank was to supervise implementation of this component in cooperation with the bilateral donors. This risk assessment appears to be valid.

3.14 In sum, four of five risks that are substantial or high pose problematic management issues. The other substantial risk and two modest risks appear to be manageable.
4. Efficiency: Governance, Management and Financing

4.1. **Summary:** If implementation proceeds efficiently and if other assumptions—in particular, political and economic stability in the member countries—are maintained, the SAPM program will constitute a very efficient use of resources, with a likely economic rate of return ranging between 22 percent and 26 percent. The program also maintains the well-articulated governance and management structures put in place by SADC and SAPP. But in practice, these structures failed to indicate the severe deterioration of Inga and its not clear that they will adequately address pricing policy issues. The financing structure appears to be sound and donor performance does not appear to pose an issue at this stage of program implementation.²⁷

**Efficient Use of Resources**

4.2. The PAD applied a standard cost-benefit analysis using estimated costs and benefits. It viewed the benefits in terms of the higher power exports attributable to SAPM. The resulting rates of return are well above the standard 10 percent to 12 percent threshold for what is considered economic. The base case yielded a 22 percent rate of return, and a sensitivity analysis of plus and minus 20 percent in investment costs and in operating and maintenance costs (O&M) yielded rates of return ranging between 18 percent and 26 percent. A 20 percent increase in electrical energy prices increased the rate of return to 26 percent, while a 20 percent decline in prices reduced the rate of return to 17 percent. An increase in energy prices is plausible in view of the substantial increase in global petroleum prices over the last few years. The PAD argues further that factors not incorporated in the analysis would push the rate of return up even more. These factors include the gains from additional energy sales to SAPP (resulting from the increased generation and transmission capacity), and the better terms on energy export contracts (due to better quality and reliability).

**Governance, Management, and Legitimacy**

4.3. SAPM is maintaining the governance and management structure of SAPP. This structure is illustrated in Figure 4.1.

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²⁷ Actual efficiency will be reduced because of the Inga problem. But that is a design issue and therefore is not considered in arriving at the efficiency assessment indicated above.
The highest level of SAPM/SAPP governance is the heads of state of the SADC countries. They approved the creation of SAPP in 1995 and the SADC Energy Protocol in 1996. The Council of SADC Energy Ministers meets annually to consider SAPP matters among other issues. The main governance body is the SADC/SAPP Executive Committee on Energy (EC), which consists of the heads of the national power utilities of the SADC countries. The EC meets twice a year and acts as a board of directors, setting overall pool policy. A Management Committee, drawn from the national utilities, meets at the same time as the EC and oversees administration of the pool. Three subcommittees serve under the direction of the Management Committee and are responsible for technical issues. The Planning Subcommittee reviews power-wheeling rates annually (the fees charged by a country through which power is passing) and prepares an indicative SAPP expansion plan every two years. There are also an Environmental Subcommittee and an Operations Subcommittee. The Operations Subcommittee oversees the Coordination Center (CC) in Harare.

CC functions: Important functions of the CC include overseeing pool technical operations; acting as a trading center for electricity flows across the borders of member countries; and conducting analyses of important policy issues, such as pricing and regulatory issues. Working groups comprised of representatives of member utilities are formed on an as-needed basis to address particular issues: for example, telecommunications for the network and power supply quality standards.

EC’s failure to communicate poor condition of Inga facility: These bodies appear to have carried out their responsibilities effectively during the life of SAPP, with the exception of the EC’s failure to inform the Bank of any concerns about the Inga facility’s condition. One stakeholder suggested that the leadership of the DRC electric
utility, SNEL, was not fully on top of the situation at the time. In that case, the EC did not exercise adequate oversight.

4.7. **Unclear if EC will address pricing policy issues:** The EC has not addressed pricing policy issues. The CC has the resources and mandate to carry out pricing studies, but it remains to be seen whether and how SAPM management and governance mechanisms will use the results of those studies.

4.8. **Committee on social development issues to be formed:** A committee comprising key stakeholders—presumably from local communities and civil society—was to be established to provide advice to the implementing agencies on social development objectives and issues. This committee has not yet been established, but it is expected to be formed now that transmission line construction and consequent displacement is to begin this fiscal year.

**FINANCING**

4.9. **Financing of major components:** Table 4.1, below, gives the costs and share of Bank financing for each of the major components of APL1 of SAPM. The first component, strengthening the SAPP CC, is being financed entirely by grants from NORAD and USAID. The second component, expanding and improving the transmission line within the DRC, is being financed primarily by the Bank, with a minor share being provided by country counterpart. The third component, increasing the capacity of the Zambian transmission line that connects the DRC line with the SAPP grid within Zambia, is being financed by the commercial Copperbelt Energy Company. The study and design included in the fourth component is being financed entirely by the Bank.

4.10. **Financing appropriate, assuming adequate funds required to rehabilitate Inga facility:** At the time of program effectiveness, financing did not seem to constitute a problem. Thanks to the grant financing from the two bilateral donors, the mix of financial instruments was appropriate. But to correct the subsequently identified serious problem at Inga, additional resources had to be mobilized. As noted in Box 2.1, the Bank responded by supporting an Inga Rehabilitation Project at a cost of about $150 million. Since this project is still at the preparation stage, it is not possible to give a precise total cost or to indicate other sources of financing.

**Use of horizontal APL:** A distinctive feature of SAPM is its use of a horizontal adjustable program loan (APL). The horizontal APL provides flexibility by enabling each phase of the overall program to include a different set of countries and a different substantive emphasis, linked to overall objectives for the program as a whole. The sequencing of the phases allows for design modification of a given phase, based on changing conditions and the experience of earlier phases. In the case of SAPM, this is most clearly seen in the difference between Phase 1 and Phase 3. The expansion of the DRC-Zambia connection, and establishing a connection to a new, nonoperating country in Phase 3, would depend in part on experience under Phase 1.

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Table 4.1 Costs per Component for APL Phase 1, Southern Africa Power Market

<table>
<thead>
<tr>
<th>Component</th>
<th>Indicative Costs ($ million)</th>
<th>% of Total</th>
<th>Bank-financing ($ million)</th>
<th>% of Bank financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Support to SAPP Coordination Center (CC)</td>
<td>3.36</td>
<td>1.7</td>
<td>0.00</td>
<td>0.0</td>
</tr>
<tr>
<td>2. Increase transmission capacity from DRC to SAPP network</td>
<td>186.11</td>
<td>93.0</td>
<td>177.46</td>
<td>99.4</td>
</tr>
<tr>
<td>3. Increase capacity of transmission from Zambian/DRC border to Luano substation</td>
<td>9.70</td>
<td>4.8</td>
<td>0.00</td>
<td>0.0</td>
</tr>
<tr>
<td>4. Study and preliminary design of transmission connection between Zambia and Tanzania</td>
<td>1.02</td>
<td>0.5</td>
<td>1.02</td>
<td>0.6</td>
</tr>
<tr>
<td>Total Program Costs</td>
<td>200.19</td>
<td>100.0</td>
<td>178.48</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**DONOR PERFORMANCE**

4.11. The bilateral donors funding the CC in Harare—NORAD and USAID—have reportedly provided timely and appropriate technical assistance. According to the PAD, the two donors had already begun assistance to the CC before the IDA assistance became effective. But the PAD also notes that each agency has its own financial management, control systems, reporting, and other procedures. The PAD does not mention any attempt to harmonize these differing procedures. Both donors had established twinning or partnership arrangements between SAPP and relevant institutions in their own countries: NordPool in the case of NORAD, and the US Energy Association and the National Association of Regulatory Utility Commissioners in the case of USAID.

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29 *Op. cit.*, pp. 26 and 45. DFID also financed a study to define the communications system needed for the planned emergency management system (EMS) and the enhanced trading system (p. 45).

5. Monitoring and Evaluation

5.1. **Limited M&E discussion in PAD:** The PAD provides only limited information on the planned monitoring and evaluation (M&E) of the program. For the program as a whole, the PAD notes that the Coordination Center is to be “actively involved in implementation, monitoring, and evaluation of the project,” and that the implementing agencies (SNEL in DRC and CEC in Zambia) are to be responsible for preparing quarterly project management reports and annual progress reports. Yet, very little is said about M&E of the program as a whole. There have been one or two supervision missions and accompanying aide-memoirs a year, but there have not been any evaluations of program implementation.

5.2. **M&E of specific program issues:** The PAD’s discussion of the M&E of the environmental and social aspects of the program is limited to brief descriptions of process; institutional responsibilities; and broad, nonmeasurable aspects to be monitored. For example, monitoring the social development aspects of the program will be the responsibility of each implementing agency—the Project Management Unit in SNEL in the DRC, and the Environmental Officer in the CEC in Zambia. The focus of social development monitoring is to be on the social and economic (for example, compensation) effects of resettling populations displaced by the transmission lines. Moreover, the PAD does not provide any discussion of monitoring and evaluation of technical and physical components of the program, such as the construction of transmission lines.

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6. World Bank Performance

6.1. **Summary:** The Bank has played central convening and financing roles for SAPM. It has performed these roles satisfactorily. Most but not all of the Bank’s country programs are well-integrated with SAPM. But only three deal with related policy reforms and implementation supervision has been spotty, stemming in part from frequent turnover of task managers. The main shortfall in Bank performance has been technical: the Bank did not identify at the design stage the seriously deteriorated condition of the Inga hydroelectric facility and its implications for the efficacy of the SAPM program.

**Comparative Advantage**

6.2. The Bank brought convening power, technical expertise, financing capacity, and experience in the subregion to the program. The SAPP countries asked the Bank to organize assistance for the SAPM program. The Bank has financed power operations in all five of the SAPM countries—the DRC, Malawi, Mozambique, Tanzania, and Zambia.

**The Bank’s Coordinating Role with Other Donors**

6.3. Financing of the program was coordinated by the Bank. For example, it identified NORAD and USAID to provide grant cofinancing for strengthening the SAPP CC. The SAPM program was prepared with a grant of $618,000 from the Bank-administered Japan Policy and Human Resources Development Trust Fund (PHRD).

**Quality of Support and Oversight**

6.4. **Condition of Inga facility:** There have been about two SAPM supervision missions a year. In addition to making site visits to the DRC and Zambia, Bank-led missions normally visit the CC in Harare to discuss progress with NORAD and USAID consultants. Mission reports are fairly comprehensive and some candidly identify the poor state of the Inga hydroelectric facility in the DRC. But such warnings did not emerge at the program preparation and appraisal stages, and it was over a year after effectiveness, in March 2005, that the second supervision mission recommended that financing be sought on an urgent basis to rehabilitate Inga. One reason for the inadequate attention to the condition of Inga was that the Bank thought that the existing support for Inga restoration—$9.35 million from the DRC Emergency Multisectoral Reconstruction and Rehabilitation Project and $3.3 million from SAPM APL1 (for an AC substation at Inga)—would be sufficient. The $150 million currently envisioned for the Inga Rehabilitation Project suggests how far off the original calculations were. Another reason for the delay in addressing Inga’s condition was the fact that SNEL, the DRC electric utility company, gave no indication of the severity of the problem and there was little

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32 Interview with project team member, Nov. 8, 2005.

33 The grant recipient, the government of Zimbabwe, passed the PHRD grant on to the CC.

34 For example, the e-mail from Joel Maweni to S. Vijay Iyer, *op. cit.*
prior analytical work by the Bank which might have uncovered the fact that the support of $9.35 million from the Emergency Multisectoral Project was only for spare parts and did not address the serious problems of siltation and channel blockages. Finally, the skills mix of the Bank’s project team may not have been optimal, as it was weighted toward finance and law rather than hydropower engineering.

6.5. **Utility pricing policy:** Another issue on which the Bank might have played a more forceful role is that of utility pricing policy. The Bank did not undertake prior analytical work that could have helped member countries understand that the benefits to be gained from SAPM require efficient power transfer through a competitive market approach, based on prices that cover fixed (investment) as well as variable costs.

**STRUCTURES AND INCENTIVES**

6.6. The task manager is supported by a staff project team with technical, legal, and environmental backgrounds. The task manager reports to a Sector Manager and to a director for regional integration in the Africa region. Since the effectiveness of the program in early 2004, there have been three task managers, the third having assumed his responsibilities only in mid-2006. This is a rather high turnover rate for a relatively large and complex multicountry operation.

**LINKAGES TO OTHER BANK COUNTRY OPERATIONS**

6.7. The linkage between Bank country financing in the energy sector and the SAPM project varies in the CASs of the five SAPM countries. In the case of the DRC, the Emergency Multisectoral Rehabilitation and Reconstruction Project is contributing directly to SAPM by financing some refurbishment of the Inga power facility. Nonetheless, as noted above, this rehabilitation has not been sufficient to bring Inga’s capacity to 500 megawatts of firm power for the expanded transmission line to Zambia and the SAPP grid. Only the proposed Inga Rehabilitation Project, at a cost of $150 million, will be sufficient to do that job. In two other countries, Malawi and Mozambique, the Bank’s country programs explicitly support utility policy reforms and give significant attention to SAPM, while the programs in the DRC and Zambia refer to SAPM but without attention to policy reform. The country program in Tanzania supports reform but without reference to SAPM.

**DISENGAGEMENT STRATEGY**

6.8. As previously described, SAPM is a three-phase adjustable program loan (APL). Each phase will provide significant benefits that do not require a subsequent phase. Completion of all three-phases does not imply extension of the program, though it is conceivable that SAPM could be expanded in the future to other countries, such as Angola.

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35 Interview with former Bank project team member, July 21, 2006.
7. Country Participation

7.1. **SAPP Executive Committee:** The SAPP Executive Committee has demonstrated its commitment to the SAPM program. It devoted large portions of several meetings to developing the CC and new trading arrangements. These meetings began before the possibility of funding from the World Bank and bilateral donors was raised. Furthermore, all the operating costs, including salaries, for the CC are paid by member contributions. Additional staff for the CC was recruited before SAPM began. The Executive Committee and the CC also prepared a regional plan for the interconnected power systems, supported initial feasibility studies, and identified priority cross-border transmission links, all before the SAPM program became operational.\(^{36}\)

7.2. **Country contributions:** Countries also are making a significant contribution to the total cost of SAPM APL1. The total contribution from countries comes to $17.3 million, which amounts to 8.6 percent of the total cost of $200.2 million. But $8.8 million is in the form of an investment by the Zambia Copperbelt Energy Company (CEC). Not including CEC’s investment, the country contribution is $8.5 million, or 4.2 percent of total APL1 cost.

7.3. **Focus has been on exporting power, not purchasing power:** According to a Bank project team member, all member countries have been interested in SAPM for the potential it holds to export power, implying that they did not appreciate the benefits of purchasing power.\(^{37}\) Expanding this appreciation is a task for governance and management structures of SAPM as well as for the Bank.

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\(^{36}\) PAD, *op. cit.*, p. 21.

\(^{37}\) Interview with Bank project team member, Nov. 8, 2005.
8. Conclusions

**SUMMARY OF FINDINGS**

8.1. **Technical and policy risks not well-managed:** The SAPM program was built on the solid foundations of SADC and the Southern Africa Power Pool (SAPP). The program was well-designed from environmental and social perspectives. But it confronted considerable risks of a technical and policy nature. So far, these risks have not been well-managed.

8.2. **Technical risk (Inga facility):** The poor condition of the Inga hydroelectric facility, which had deteriorated more than was reported or realized at the time of program appraisal, threatens the efficacy of the entire program, since it is supposed to be the main source of power for the enhanced power network. The need to give more attention to the Inga facility should have implied, according to one Bank project team member, that more attention was necessary to increase the efficiency of existing capacity.

8.3. **Policy risk (utility pricing reform):** With prevailing utility prices far below average costs, including fixed costs, there is a need for utility price reforms. Current utility price structures threaten the longer-term sustainability of SAPM. But it is uncertain whether SAPM management and governance structures will take up the results of pricing studies conducted by the Coordination Center (CC) and supported by the program. This uncertainty may stem from member countries’ failure to appreciate the importance of utility pricing reform. The two risks, technical and policy, are related. Had utility prices in the DRC more accurately reflected fixed as well as variable costs, sufficient resources might have been available to maintain and upgrade the Inga facility.

8.4. **Countries’ commitment:** SAPP member countries have shown commitment to the new program through their contributions to its cost as well as through their earlier contributions to creating the CC, paying its staff salaries, and undertaking preparatory studies.

8.5. **Financing:** A horizontal APL is a sensible financing instrument for a program like SAPM, which can be divided into different phases involving different sets of countries. SAPM also represents a good combination of IDA lending for physical infrastructure and bilateral grants for technical assistance.

8.6. **Turnover of task managers:** The relatively frequent turnover of task managers for SAPM could be a cause for concern.
8.7. **Program’s strengths and weaknesses:** MAIN strengths and weaknesses of the SAPM program are summarized in box 8.1.

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAPP was the first formal international power pool outside Europe and North America. This reflected priority given by leadership to a network that enabled power transfer from power-surplus to power-short countries.</td>
<td>The gestation period for SAPM, via SAPP, seems long (20 years), but SAPP started very small and has grown by increments.</td>
</tr>
<tr>
<td>Use of horizontal adjustable program loan (APL) that provides flexibility in each phase with a different set of countries and emphases, linked to overall program objectives.</td>
<td>SAPM emphasizes infrastructure before resolving policy and efficiency issues, based on the assumption that both are needed and they can be approached in parallel.</td>
</tr>
<tr>
<td>At $8.5 million, countries have made significant contributions to APL1 total cost. In addition, $8.8 million is being invested by a Zambia company. Both contributions come to 8.6 percent of total program costs.</td>
<td>There is a policy risk because current utility price structures threaten SAPM sustainability. There is also a serious technical risk owing to the poor condition of the key Inga hydroelectric facility. The two risks are related. Had utility prices in the DRC more accurately reflected fixed as well as variable costs, sufficient resources might have been available to maintain and upgrade the Inga facility.</td>
</tr>
<tr>
<td>There is a clearly articulated governance and management structure for SAPM, with equitable country representation.</td>
<td>Since the SAPP Executive Committee did not indicate any concerns about the condition of the Inga hydroelectric facility at the time of program preparation, the adequacy of the EC’s oversight can be questioned.</td>
</tr>
</tbody>
</table>

**IMPLICATIONS FOR EFFECTIVE SUPPORT**

8.8. **A multicountry regional program should not be initiated until all the key national components are in place.** If a key national component is weak or not in place, a country program to strengthen that component should be implemented before embarking on the regional program. In the case of SAPM, an IDA-DRC project to rehabilitate the Inga hydroelectric facility should have been completed before initiating SAPM.

8.9. **Country policy reforms can be an essential element in the success of regional programs.** Such reforms must be addressed through the regional program or through country programs. Country programs may be the most effective vehicle for addressing policy reforms. But policy reforms in countries participating in the regional program need to be closely coordinated with each other if the regional program involves close economic interaction, such as an electric power network. An important part of addressing policy reforms is analytical work that will explain the need for reforms to policy makers.
8.10.  **Country commitment to a program supports its sustainability.** The extent to which borrowing countries are prepared to finance plans, feasibility studies, and cover recurrent expenses, such as salaries, is a good indicator of program sustainability.

8.11.  **High Bank staff turnover harms regional projects.** Frequent turnover of Bank project leadership results in a lack of continuity that can be particularly problematic for multicountry regional projects that time to achieve their intended objectives.
# Annex A: Background Information on the Regional Program

## Basic Information on the Program

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Program (or project) number</strong></td>
<td><strong>P069258</strong></td>
<td></td>
</tr>
<tr>
<td><strong>2. Program Dates</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>APL 3 (1/30/2006) – (unknown)</td>
<td></td>
</tr>
<tr>
<td>Completion Date (estimated and actual)</td>
<td>APL 1 (12/31/2007) – (unknown)</td>
<td>APL 2 (8/30/2008) – (unknown)</td>
</tr>
<tr>
<td></td>
<td>APL 3 (12/31/2009) – (unknown)</td>
<td></td>
</tr>
<tr>
<td><strong>3. Sectoral or thematic areas</strong></td>
<td>Power (80%), General energy (20%). Regional integration, Infrastructure services for private sector development, Export development and competitiveness</td>
<td></td>
</tr>
<tr>
<td><strong>4. Regional or subregional</strong></td>
<td>Regional</td>
<td></td>
</tr>
<tr>
<td><strong>5. Regional partnership or project</strong></td>
<td>Project</td>
<td></td>
</tr>
<tr>
<td>Does it comprise country projects? If yes, do the country projects:</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>• Conform to a template?</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>• Address the same problem(s)?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>• Regularly interact with each other (for example, through information sharing, research, M&amp;E)?</td>
<td>Executive and Management Committees, Coordination Center</td>
<td></td>
</tr>
<tr>
<td><strong>6. Rationale for the regional program:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Strategic focus: regional commons, transboundary problems, regional integration, or other cooperative actions?</td>
<td>Regional integration and development</td>
<td></td>
</tr>
<tr>
<td>• Intended direct impact (regional/subregional and/or participating countries)</td>
<td>Increase the availability of low-cost power supply to nonconnected members of the pool.</td>
<td></td>
</tr>
</tbody>
</table>
# Annex B: Governance and/or Management Arrangements

## Management Entities for Project Implementation

<table>
<thead>
<tr>
<th>1.</th>
<th>What are the management arrangements for project implementation? List the project implementing and management units and describe roles and responsibilities of:</th>
</tr>
</thead>
</table>
| | Management Committee  
- Planning subcommittee, Operation Subcommittee,  
- Environmental Subcommittee  
- Coordination Center |
| • Task Manager and/or Task Team Leader | Ludmilla Butenko, Joel Maweni, Samuel A. O'Brien-Kumi |
| • Oversight Manager  
  o in the Bank and/or  
  o outside the Bank | Sector manager: Yusufa Crookes  
Country management/director: Marie Francoise Marie-Nelly |

## Regional Governance and/or Coordinating Body(ies)

<table>
<thead>
<tr>
<th>2.</th>
<th>Name, location, and Internet address of the regional governance and/or coordinating body(ies) for the project.</th>
</tr>
</thead>
</table>
| | Council of SADC Energy Ministers and Officials  
SADC Executive Committee |
| | SADC Secretariat: SADC House, Private Bag 0095  
Gaborone, Botswana  
SAPP CC: 17th Fl Southampton Life Centre, PO Box GT 897, Graniteside, Harare, Zimbabwe  
Contact: Lawrence Musaba, SAPP CC manager, lmusaba@sapp.co.zw |
| 3. | For each of these governance and/or coordinating bodies, what is the: |
|---|---|---|
| • Size | 12 | 12 | 8 |
| • Membership/composition | Energy Ministers | Heads of the national power utilities of the SADC countries | Senior officials of the national power utilities of SADC countries |
| • Membership criteria | | | |
| • Functions/responsibilities | Consider SAPP high-level policy and strategy matters, among other issues | Acts as a board of directors, setting overall pool policy | Technical oversight of pool operations, acting as a trading center for electricity flows |
across the borders of member countries, and conducting analyses of important policy issues, such as pricing and regulatory issues.

<table>
<thead>
<tr>
<th>Meeting frequency</th>
<th>Annually</th>
<th>Twice a year</th>
<th>Continuous</th>
</tr>
</thead>
</table>

**Regional and/or Country-level Implementing Agency(ies)**

4. Name, location, and internet address of implementing agency(ies) for the project.

SNEL: 2381 Avenue de la Justice, Kinshasa-Gombe, BP 500, Kinshasa I, DRC.
Contact: Simon Ntambwe, Project Manager, simontambwe@hotmail.com

Coordination Center: 17th Fl Southampton Life Centre, PO Box GT 897, Graniteside, Harare, Zimbabwe
Contact: Lawrence Musaba, SAPP CC manager, lmusaba@sapp.co.zw

Copperbelt Energy Corporation (CEC): PO Box 20819
Plot No. 3614, 23rd Avenue Nkana East, Kitwe Zambia

5. Function of implementing agency(ies)

SNEL: Responsible for technical aspects of DRC work, preparing quarterly project management reports and annual progress reports.
CC: See above
CEC: Responsible for technical aspects of Zambia work, preparing quarterly project management reports and annual progress reports.
## Annex C: Financial Data (estimated)

<table>
<thead>
<tr>
<th></th>
<th>APL1</th>
<th>APL2</th>
<th>APL3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Disbursement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planned</td>
<td>200.2</td>
<td>87.4</td>
<td>220.5</td>
<td>508.09</td>
</tr>
<tr>
<td>Actual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IDA Grant</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planned</td>
<td>178.6</td>
<td>62</td>
<td>209.5</td>
<td>450.10</td>
</tr>
<tr>
<td>Actual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other Sources</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planned</td>
<td>21.59</td>
<td>25.4</td>
<td>11</td>
<td>57.99</td>
</tr>
<tr>
<td>Actual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Program purpose:
To promote regional integration and cooperation, and to facilitate the conditions for accelerated investment in the power sector in the southern African region.

<table>
<thead>
<tr>
<th>Goals/Mission</th>
<th>Program Objectives</th>
<th>Intended Outcomes</th>
<th>Outputs</th>
<th>Inputs/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Increase competitiveness of electricity market and trading of the DRC in the SAPP.</td>
<td>1. Energy management system, communication system, Internet trading system for short-term market designed, installed and operational. 2. Electricity pricing structures and probabilistic measure of reliability studies conducted. 3. Converter and inverter stations of the DC transmission link and the AC network substations upgraded and rehabilitated. 4. Transmission line from Karavia to Kasumbelesa operational.</td>
<td>1. Support to SAPP Coordination Center ($3.36 million total in grants from Norway and the U.S.) 2. Increase capacity of the connection from the DRC to the SAPP ($186.11 million) 3. Feasibility study of the Zambia-Tanzania interconnection ($1.02 million) 4. Zambia transmission line from Kasumbalesa to Luano ($9.70 million)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Components for APL1
1) Strengthen the SAPP Coordination Center (CC) by establishing software systems for power analysis, energy management, communications, and short-term trading; conducting training for CC staff and SAPP members; preparing guidelines, plans, and technical and policy studies regarding the environment, regulatory matters, fair trading, reliability, and pricing.
2) Increase capacity of transmission corridor from the Inga hydroelectric plant in southwestern DRC to the Zambian border in the southeast; conduct mitigation of environmental and social impacts; conduct environmental studies for future expansion of DRC power sector.
3) Increase the transmission connection capacity between the Zambian-DRC border and the SAPP network at Luano, Zambia, substation, to be undertaken and financed by Copperbelt Energy Company (CEC) of Zambia, a private company.
4) Conduct a feasibility study and preliminary design of SAPP connection between Zambia and Tanzania.
Annex F: Persons Consulted

Annex G: References


