

Performance
Evaluation Report

Pakistan: Road Sector Development Program



Performance Evaluation Report
December 2013

Pakistan: Road Sector Development Program

Reference Number: PPE: PAK 2013-17
Project Number: 32058
Loan Numbers: 1892/1893
Independent Evaluation: PE-766

Independent
Evaluation  ADB

Note: In this report, "\$" refers to US dollars.

| | |
|--------------------------|--|
| Director General | V. Thomas, Independent Evaluation Department (IED) |
| Officer-in-Charge | H. Hettige, Independent Evaluation Division 2, IED |
| Team leader | M. J. Dimayuga, Senior Evaluation Officer, IED |
| Team member | J. Mendez-Santos, Senior Evaluation Assistant, IED |

In preparing any evaluation report, or by making any designation of or reference to a particular territory or geographic area in this document, the Independent Evaluation Department does not intend to make any judgment as to the legal or other status of any territory or area.

The guidelines formally adopted by the Independent Evaluation Department (IED) on avoiding conflict of interest in its independent evaluations were observed in the preparation of this report. To the knowledge of the management of IED, there were no conflicts of interest of the persons preparing, reviewing, or approving this report.

Abbreviations

| | | |
|------|---|--|
| ADB | – | Asian Development Bank |
| CWD | – | Communications and Works Department |
| EIRR | – | economic internal rate of return |
| GIS | – | geographic information system |
| HDM | – | highway development and management |
| ICB | – | international competitive bidding |
| IED | – | Independent Evaluation Department |
| IRI | – | international roughness index |
| NCB | – | national competitive bidding |
| NPV | – | net present value |
| OFID | – | OPEC Fund for International Development |
| PCR | – | project completion report |
| PPER | – | project performance evaluation report |
| RAMS | – | road asset management system |
| RAR | – | rural access road |
| RMF | – | road maintenance fund |
| RMU | – | road maintenance unit |
| RRP | – | report and recommendation of the President |
| RSDP | – | Road Sector Development Program |
| SPG | – | Sindh Provincial Government |
| SWR | – | shadow wage rate |
| TA | – | technical assistance |
| VOC | – | vehicle operating cost |
| WSD | – | Works and Services Department |

Currency Equivalents

Currency Unit - Pakistan rupee/s

| At Appraisal | At Project Completion | At Independent Evaluation |
|-------------------|-----------------------|---------------------------|
| (September 2002) | (December 2008) | (December 2012) |
| PR1.00 = \$0.0169 | \$0.01464 | \$0.0104 |
| \$1.00 = PRs56.00 | PRs59.00 | PRs95.94 |

Contents

| | |
|--|-----|
| Acknowledgments | i |
| Basic Data | iii |
| Executive Summary | v |
| Chapter 1: Introduction | |
| A. Evaluation Purpose and Process | 1 |
| B. Expected Results | 2 |
| Chapter 2: Design and Implementation | |
| A. Rationale | 3 |
| B. Formulation | 4 |
| C. Cost, Financing, and Executing Arrangements | 4 |
| D. Procurement, Construction, and Scheduling | 5 |
| E. Design Changes | 6 |
| F. Outputs | 6 |
| G. Consultants and Contractors | 7 |
| H. Loan Covenants | 8 |
| I. Policy Framework | 8 |
| Chapter 3: Performance Assessment | |
| A. Overall Assessment | 10 |
| B. Relevance | 10 |
| C. Effectiveness | 11 |
| D. Efficiency | 11 |
| E. Sustainability | 12 |
| Chapter 4: Other Assessments | |
| A. Impacts | 13 |
| B. Asian Development Bank Performance | 14 |
| C. Borrower Performance | 14 |
| Chapter 5: Issues and Lessons | |
| A. Issues | 15 |
| B. Lessons | 15 |
| APPENDICES | |
| 1. Design and Monitoring Framework | 18 |
| 2. Implementation Schedule | 20 |
| 3. Compliance of Loan Covenants | 21 |
| 4. Economic Evaluation | 24 |

Acknowledgments

A team of staff and consultants from the Independent Evaluation Department prepared this study. The team consisted of Ma. Juana Dimayuga (team leader) and Jenelyn Mendez-Santos. Peter Darjes and Luqman Sarwar were the consultants.

Valuable input and comments at various stages were received from Valerie Reppelin-Hill, Renato Lumain, and Toshiyuki Yokota.

The report benefited from the guidance of Vinod Thomas and Hemamala Hettige.

For their time and opinions, the team would like to thank ADB staff, and officials interviewed in the Islamabad and Sindh provincial governments in Pakistan.

Basic Data

Loans 1892/1893: Road Sector Development Program

| Key Project Data (\$ million) | As per ADB Loan Documents | Actual |
|-------------------------------|------------------------------|---------------|
| | 1892 and 1893 | 1892 and 1893 |
| Total project cost | 236.0 | 195.3 |
| Foreign exchange cost | 104.1 | 96.0 |
| Local currency cost | 131.9 | 99.3 |
| ADB loan amount/utilization | 142.9 | 87.4 |
| ADB loan cancellation | | 55.5 |

ADB = Asian Development Bank.

| Key Dates | Expected | Actual |
|----------------------------------|--------------|-----------------------------------|
| Appraisal | | 10 September– 10 November 2001 |
| Loan negotiations | | 21–22 November 2001 |
| Board approval | | 19 December 2001 |
| Loan agreement | | 1 February 2002 |
| Loan effectiveness | 1 May 2002 | 25 September 2002 |
| First disbursement | | 25 September 2002 |
| Loan closing | 30 June 2007 | 16 July 2010 |
| Years (effectiveness to closing) | 5.2 | 7.8 |

Source: Independent Evaluation Mission.

Borrower Islamic Republic of Pakistan
 Executing agency Communication and Works Department, Sindh Province

Mission Data

| Type of Mission | No. of Missions (1892 and 1893) | No. of Person-Days (1892 and 1893) |
|------------------------|------------------------------------|---------------------------------------|
| Project Administration | | |
| Inception | 1 | 18 |
| Review before midterm | 5 | 38 |
| Midterm review | 1 | 52 |
| Review after midterm | 4 | 41 |
| Pre-project completion | 1 | 14 |
| Project Completion | 1 | 26 |
| Independent Evaluation | 1 | 16 |

Executive Summary

This program performance evaluation report (PPER) presents the findings of an evaluation of the Road Sector Development Program (RSDP) in Pakistan, which was approved on 19 December 2001. The RSDP had two components and was financed with three loans totaling \$200 million. The first component supported road sector policy and institutional reforms at the national level and involved a program loan of \$50 million. The second component (hereinafter referred to as the Sindh component) was funded by two loans (from two sources of financing), totaling \$150 million. It aimed to improve and rehabilitate important sections of the provincial highway and rural access road networks in Sindh Province as well as to introduce provincial institutional and policy reforms. At the request of the government, the Asian Development Bank (ADB) added the program loan component at a later stage of processing the Sindh component. This largely explains why the two components were distinct. The evaluations of the components are therefore presented in two separate PPERs. There were also separate project completion reports (PCRs). This PPER presents the evaluation results of the Sindh component. Another PPER assesses the program loan component.

The RSDP addressed the prevailing constraints of policies and institutions as well as the physical infrastructure. Policy and institutional reforms were deemed necessary to increase the efficiency of the road sector at the national and provincial levels. The RSDP was consistent with the government's transport sector policy framework and its strategic objectives as well as ADB's country assistance plan.

The PPER assessed the Sindh project as *successful*. The physical and institutional subcomponents were *relevant* because they addressed specific needs. The chosen method of achieving outcomes was rated *effective* largely because of the physical subcomponent, which fully met expected results. The component was rated *efficient* as a result of its high economic returns despite the considerable implementation delays. Provincial reforms, which would have contributed to asset preservation and sustainability were not completed, which is why the component was rated *less likely sustainable*. The PCR arrived at an overall rating of *less than successful*, assessing the project as *highly relevant*, *less than effective*, *less efficient*, and *less likely sustainable*. The differences in the ratings of the PCR and PPER are to a large extent explained by the timing of the PCR, which was prepared in 2010 when the Sindh component was not complete. The coverage of the PCR was limited to the implementation activities of the project up to loan closure in 2009, and did not discuss the developments of the subsequent 4 years, during which the project was substantially completed without ADB support.

The following issues have been identified:

The rate of achievement of the institutional development support, capacity development, and institutional reforms subcomponents has been below expectations. The reliance on consultants to produce studies to chart the reform action and inadequate dialogue between ADB and the provincial government have contributed to the issues related to the Sindh project. The government's commitment to the proposed reform agenda was not adequately ascertained. Diagnostics of baseline conditions were

insufficient. In addition, consultants and other sector specialists were inadequately supervised in all capacity development activities.

While it is laudable that the provincial government was able to complete the scope of the investment component substantially as envisaged at appraisal, it needed about 6 extra years to do so, including 2 years of loan extension, which ADB granted. Delays were incurred at all stages of the implementation process. ADB had planned only 14 months for all preconstruction activities, which was unrealistic. In reality, preconstruction activities took more than 3 years. These were delayed because the executing agency had insufficient experience to set up a functioning project implementation unit. ADB could have paid more attention to essential organizational arrangements for project implementation at the design stage of the project. Another cause for delays was the executing agency's insufficient familiarity with contract management principles, as revealed in its dispute with contractors over a price escalation clause; the executing agency thought that such a clause would provide an incentive for delaying construction and expected contractors to absorb the escalation risk. Overall, both ADB and the executing agency overestimated the implementation capacity on the ground. The magnitude of the engineering task could have been assessed more accurately in light of the substantial scope of the work and the capacity available within the executing agency or engineering firms to carry out the task.

Lessons:

The lessons drawn from the project are as follows:

- (i) The time allowed for implementation of the investment and reform programs was inadequate for developing knowledge and understanding, processes, procedures, and the project implementation framework. Unrealistic work schedules, poor procurement planning, insufficient implementation details, and loose monitoring targets prolonged implementation. A well-qualified and experienced project team leader and consultants' familiarity with ADB processes are essential to implement an ADB-financed project.
- (ii) Delayed completion of preconstruction activities and advance action caused delays to all subsequent activities. ADB could have satisfied itself about project readiness in the key areas of detailed design, safeguards, procurement, and establishment of the project implementation unit.
- (iii) The government's commitment and ability to implement the institutional and capacity development (particularly in procurement, loan and contract administration, disbursement processes, monitoring and evaluation mechanisms, periodic reporting, and social and environmental safeguards) could have been carefully reviewed. A flexible approach could have been adopted with adequate supervision support for sector specialists in capacity development activities.

CHAPTER 1

Introduction

1. The following chapter summarizes the purpose of the evaluation, states the results of departmental self-evaluation through a project completion report (PCR), and provides details of the project to be evaluated.

A. Evaluation Purpose and Process

2. The project performance evaluation report (PPER) on the Road Sector Development Program (RSDP) is included in the Independent Evaluation Department's (IED) work program for 2013.¹ The program was evaluated according to the program performance evaluation guidelines of the Asian Development Bank (ADB), based on relevance, effectiveness, efficiency, sustainability, and impact.² The PPER aims to provide lessons and recommendations to a country assistance performance evaluation for Pakistan planned for 2013 and subsequently for the regional department's sector strategy and program under the next country partnership strategy.

3. The RSDP had two components and was financed by three loans. The first component (hereinafter referred to as the policy component) supported road sector policy and institutional reforms at the national level and involved a program loan of \$50 million, to be disbursed in two tranches. The second component (hereinafter referred to as the Sindh component) was funded by two loans totaling \$150 million (from two funding sources). It aimed to improve and rehabilitate important sections of the provincial highway and rural access road (RAR) networks in Sindh Province and to provide measures for institutional development. This PPER deals with the Sindh component.

4. The PCR for the Sindh component was prepared in 2010 and assessed the component as *highly relevant, less than effective, less than efficient, and less likely sustainable*, with an overall rating of *less than successful*.³ It should be noted, however, that the Sindh component was not complete when the PCR was prepared.⁴ The PCR was thus limited to the implementation activities of the project up to loan closure in 2009, and does not discuss the developments of the subsequent 4 years, during which the project was substantially completed without ADB support.

5. An Independent Evaluation Mission reviewed the national reform program in Islamabad and visited Sindh Province in December 2012 to evaluate the provincial

¹ Asian Development Bank (ADB). 2001. *Report and Recommendation of the President on Proposed Loans to the Islamic Republic of Pakistan for the Road Sector Development Program*. Manila.

² Independent Evaluation Department (IED). 2006. *Guidelines for Preparing Performance Evaluation Reports for Public Sector Operations*. Manila: ADB.

³ ADB. 2010. *Completion Report: Road Sector Development Program in Pakistan*. Manila (Loans 1892-PAK and 1893-PAK [SF]; Project No. 32058-2). Manila.

⁴ The loans were closed in 2009, the PCR prepared in 2010, and the last parts of the Sindh component completed in 2013. Prior to the closure of the loans, the closing date had been extended once.

highway and RAR component. The views of relevant ADB departments and offices and those of the government and executing agency have been considered and incorporated, where relevant.

The project was expected to contribute to sustainable economic development and poverty reduction

B. Expected Results

6. The project was expected to contribute to sustainable economic development and poverty reduction. It aimed to increase access of the rural population to markets and social services by (i) improving and rehabilitating parts of the RAR network; (ii) preserving major road assets by rationalizing the road maintenance process—including creating a provincial road maintenance fund; (iii) improving important provincial highways to facilitate trade and create better income and employment opportunities; (iv) improving the efficiency and effectiveness of the reorganized Sindh Works and Services Department (WSD); (v) supporting reforms in the road sector; and (vi) promoting private sector participation in road infrastructure development and maintenance. The updated design and monitoring framework is presented in Appendix 1.

Design and Implementation

7. This chapter summarizes details related to the project's design, including its rationale, the way it was formulated, and its underlying resource assumptions. The chapter assesses how project quality-at-entry was assured. The chapter also compares implementation arrangements as designed and as actually adopted.

A. Rationale

8. The RSDP addressed the prevailing constraints of policies and institutions as well as the physical infrastructure. Policy and institutional reforms were needed to increase the efficiency of the road sector at the national and provincial levels. Such reforms were to address the following broad areas (i) road asset management and funding; (ii) road safety; (iii) truck overloading; (iv) institutional reform of road agencies; (v) adoption of a road sector policy; and (vi) private sector involvement to relieve development funding constraints.

9. The RSDP was consistent with the government's transport sector policy framework and its strategic objectives as defined in the Transport Sector Strategy and the Transport Sector Development Initiative that were developed in collaboration with the World Bank. ADB's country assistance plan focused primarily on the roads subsector. The country assistance plan observed that past sector investment had not kept step with the demands of greater mobility and trading opportunities.⁵ Moreover, resource constraints had led to inadequate road rehabilitation and maintenance, resulting in rapidly deteriorating roads and an ever-increasing maintenance backlog. ADB's strategic priority was the development of the provincial road networks, including rural roads.

10. The road network of Sindh Province was rudimentary and its physical condition was poor. Many parts of the province, notably rural areas, suffered from inadequate connectivity. Connecting towns and villages and rehabilitating and upgrading existing main roads were therefore considered essential to enhance transport and communication between the rural population and market centers as well as to contribute to poverty reduction and employment creation. The interventions under the Sindh component were in line with the strategies of the government and ADB to improve key sections of the provincial highway network, improve and rehabilitate RAR in areas with pervasive poverty, strengthen institutional capacity in the provincial works and services department, and initiate policy reforms to manage roads more effectively.

Policy and institutional reforms were needed to increase the efficiency of the road sector at the national and provincial levels

The road network of Sindh Province was rudimentary and its physical condition was poor

⁵ ADB. 2000. *Country Assistance Plan: Pakistan, 2001–2003*. Manila.

B. Formulation

11. Feasibility studies were carried out for provincial highways in Sindh under an ADB-financed technical assistance project.⁶ Two roads were selected for inclusion in the RSDP, the Thatta–Sujawal road (31 kilometers [km]), and the Nawabshah–Kotlalu–Ranipur road (133 km). These roads are main transport arteries and their selection was based on economic viability, network significance (i.e. missing links), and contribution to economic growth.

12. A sector approach was adopted for the RAR subcomponent. This meant that preparation of subprojects, notably engineering and safeguard studies, would have to be completed after the project’s approval. Implementation was also predicated on the executing agency’s capacity to identify, select, and prepare the subprojects. During loan processing the project was projected to cover a total RAR of 1,200 km. Each road to be selected for inclusion in the project would have to be (i) economically viable and represent the least-cost solution, (ii) comply with ADB’s environmental and involuntary resettlement requirements, (iii) completed within the RSDP period of 5 years, and (iv) excluded from other external financing agencies’ programs. During loan processing, three roads were identified and selected for engineering and safeguard studies, including (i) the Kambar–Warah branch road (13 km); (ii) the Jamrao Head–Fazal Leghari road (15 km); and (iii) the Tangwani town–Bugti village road (20 km).

C. Cost, Financing, and Executing Arrangements

13. At appraisal, the cost of the project was estimated at \$236 million. An ADB loan of \$150 million equivalent was envisaged to contribute to the financing in addition to \$15 million from the OPEC Fund for International Development (OFID). The government was to contribute \$71 million. When the project is completed in mid-2013, the cost will have risen to about \$260 million—10.4% above the cost estimated at appraisal (Table 1).⁷ An increase in the cost of the RAR subcomponent of about 39% largely determined the overall cost increase. As the cost of the provincial road subcomponent turned out to be lower than expected (by 2.6%) and only a fraction of the envisaged institutional development component was completed, the cost increase of the rural roads was to some extent absorbed by the funds freed up by the incomplete components.

The project was executed by the Sindh Works and Services Department under the overall supervision of its secretary

14. The project was executed by the Sindh WSD under the overall supervision of its secretary. The Road Sector Development Directorate (RSDD) within WSD managed the implementation of the component, having specific responsibility for the implementation of the provincial policy and institutional reform subcomponent. The chief engineer, foreign-aided projects, supervised the investment component. The design and supervision consultants provided support to WSD. The chief engineer also acted as the employer’s representative and the construction supervision consultants were the engineers for all civil works contracts. A steering committee, comprising of representatives of relevant agencies and ministries, headed by the chief secretary and additional chief secretary (Sindh) monitored implementation progress. The steering committee was assisted by a citizens’ advisory group to provide feedback. The Association of Road Users of Pakistan acted as secretariat of the advisory group.

⁶ TA 1779-PAK: *Second Highways Project*, for \$1,000,000, approved on 5 November 1992.

⁷ At the time of this writing, the pending work was limited to one section accounting for less than 5% of physical completion of this section.

Table 1: Comparison of Project Scope and Cost Estimates at Appraisal and Completion (2013)

| Contract | Roads | Appraisal | | Project Completion | | Changes | | Unit Cost | |
|--|---|--------------|-------------------|--------------------|-------------------|--------------|---------------|--------------|--------------|
| | | Length (km) | Cost (\$ million) | Length (km) | Cost (\$ million) | Length (%) | Cost (%) | Appr. | Closing |
| P1 | Thatta–Sujawal | 31.0 | 12.7 | 31.0 | 15.5 | 0.0 | 22.1 | 0.409 | 0.499 |
| P2 | Nawabshah–Padedan Road | 67.0 | 27.4 | 67.5 | 26.6 | 0.7 | (2.6) | 0.409 | 0.395 |
| P3 | Padedan–Ranipur Road | 66.0 | 27.0 | 66.4 | 22.9 | | | 0.408 | 0.344 |
| | Land Acquisition and Resettlement | | 1.5 | | 1.7 | | | | |
| | Subtotal | 164.0 | 68.5 | 167.9 | 66.7 | 0.5 | (2.6) | 0.418 | 0.404 |
| RURAL ACCESS ROADS (CORE PROGRAM OF 95 KM AND UNIDENTIFIED ROADS OF 1,005 KM) | | | | | | | | | |
| R1 | Kambar–Warah Branch | 13 | 14.0 | | | | | | |
| R2 | Jamrao Head–Fazal Leghari | 15 | 1.6 | | | | | | |
| R3 | Tangwani Town–Bugti Village | 20 | 2.2 | | | | | | |
| | Unidentified Roads | 1,152 | 124.0 | 1,172 | 179.7 | | | | |
| | Subtotal | 1,200 | 129.2 | 1,172 | 179.7 | (2.4) | 39.1 | 0.108 | 0.153 |
| CAPACITY DEVELOPMENT COMPONENT | | | | | | | | | |
| Institutional Development Component | | | | | | | | | |
| | Provincial Sector Reforms | | 5.0 | | 0.2 | | | | |
| | Consulting Services Institutional Reforms | | 2.8 | | 2.5 | | | | |
| | Equipment | | 0.4 | | 0.3 | | | | |
| | Poverty Reduction Pilot Project | | 0.3 | | 0.1 | | | | |
| | Program Administration | | 0.9 | | 0.4 | | (56.8) | | |
| | Engineering and Construction Supervision | | 6.2 | | 6.7 | | 7.0 | | |
| | Subtotal | | 15.5 | | 9.9 | | (36.0) | | |
| OTHER COST ITEMS | | | | | | | | | |
| | Physical and Price Contingencies | | 15.5 | | 0.0 | | | | |
| | Interest during Construction | | 7.3 | | 4.2 | | (42.7) | | |
| | Subtotal | | 22.8 | | 4.2 | | (81.6) | | |
| | Total | | 236.0 | | 260.5 | | 10.4 | | |

() = negative.

Source: Communication and Works Department, Sindh Province

D. Procurement, Construction, and Scheduling

15. The provincial roads component was divided into four contracts, which were procured on the basis of international competitive bidding (ICB).⁸ The RAR component included 105 contracts, which were procured based on national competitive bidding (NCB) procedures. Major contractual problems were encountered with both; the ICB and NCB contracts were the principal cause for the implementation delays. While there were no safeguard issues, contractors' issues were related to security and construction site-related matters. Another issue was the exclusion of an escalation clause in the contracts. In the opinion of the executing agency, an escalation clause would have constituted a key incentive for contractors to delay work. Overall, limited familiarity with the standard conditions of contracts has been a major factor in delays. The executing agency is of the view that the loan closure in 2009 and the resulting shortfall in project financing also contributed to delays.⁹

⁸ The first contract (P1) was completed prior to the loan closing date, while contracts P2 and P3 are expected to be completed by June 2013. The main reason for the delays in implementing contracts P2 and P3 was that both contractors went for arbitration. While the issues for P2 were resolved amicably, P3 had 16 issues; an out-of-court settlement was eventually reached with the contractor. However, until that happened, P3 had been suspended for 2 years. For P3 new tenders were invited and the package was divided into two contracts (28 km and 38 km, respectively) and awarded to two new contractors.

⁹ It should be noted that the loan closing of 30 June 2009 marked an extension of 2 years over the original closing date (June 2007). The extension had been granted based on the expectation that all civil works would have been completed in 2010.

16. However, delays had already been experienced before the loan closing date and the contractual issues (Appendix 2). Only limited progress had been made in the first 3 years. Project staff had not been recruited on time and the engineering work for the civil works started only in 2005—4 years after loan approval.

The project designs determined at appraisal were largely followed

E. Design Changes

17. The project designs determined at appraisal were largely followed. The preliminary designs envisaged at appraisal were reflected in the detailed designs of the completed projects. The pavement design for provincial roads was an asphalt concrete wearing course and a four-lane carriage way. The rural roads were widened from three to seven meters and received a triple surface treatment consisting of bitumen and aggregates. As to the design of the entire project, only the civil works component was implemented, while the capacity development component was largely disregarded.

F. Outputs

18. **Investment component.** A comparison of planned and actual outputs under the investment subcomponent shows that the key physical targets were achieved, albeit with substantial delays. At project completion, 164.9 km of provincial roads will have been completed. This is in line with the output target set at project appraisal (164 km). For the RARs, the original target of 1,152 km was exceeded by 20 km (see Table 1).

Key physical targets were achieved, albeit with substantial delays

19. **Provincial policy and institutional reforms.** This subcomponent aimed at a major reform of road sector functions in Sindh Province. The reforms mirrored those already completed by the National Highway Authority (NHA) for national highways. However, there was no interaction between NHA and WSD, which could have contributed to a more successful completion of the reforms. The reform program was to be implemented in three phases—a diagnostics (or initiation) phase, an implementation phase, and a consolidation phase. During the final phase, WSD was expected to assume the client role under civil works contracts, while program design and service provision were to become the responsibility of the private sector.

20. During the diagnostics phase, consultants submitted 72 policy papers, recommending a multitude of steps and actions. This included legislative measures; changes in operational procedures; and reorganization, training, and capacity development. However, the chief engineer, WSD, questioned the legal validity of the recommendations. Thus, limited progress was made in most reform areas. The main deliverables are discussed below:

- (i) **Road maintenance fund (RMF).** The fund was not established. The loan agreement had stipulated that a draft of the “Sindh Road Fund Act 2005” was vetted by the Sindh government. The Cabinet discussed the draft and approved the proposal in principle. A subsequent meeting endorsed the creation of a road fund. However, in 2008 the “Sindh Road Fund Act 2008” failed to clear the review of the chief minister and the law department.
- (ii) **Road maintenance unit (RMU).** An RMU was established in 1997 and still exists. The RMU has helped the government prepare a list of feasible Public-Private Partnership (PPP)/build-operate-transfer (BOT) projects. As a follow-on to the RMU, a computerized road asset management system (RAMS) has been developed, which is used for annual planning of maintenance and rehabilitation works. Surveys were

carried out over the course of the project and a 5-year road master plan was prepared. However, the plan was not implemented due to political and administrative problems. One of the problems was that the provincial government accorded the highest priority to construction of new roads, rather than to road maintenance.

- (iii) **Road safety.** A detailed baseline study and traffic safety audits were to be carried out. Traffic safety campaigns have been initiated in a large number of schools in four districts through a nongovernment organization (NGO). A report on a traffic safety audit was prepared, but not implemented. In terms of engineering, progress has been limited to geometric designs prepared by consultants. WSD is still largely unable to incorporate safety features into the geometric design.
- (iv) **Sindh Road Agency.** The provincial government was expected to establish the Sindh Road Agency as an independent institution and provide the required earmarked financial resources. The respective proposal was submitted to the chief minister in 2006. Concrete action is still awaited.

G. Consultants and Contractors

21. Consultants were selected in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time) using quality- and cost-based selection procedures. The selection complied with the provisions of the loan agreement. WSD included relevant sections of ADB's Anticorruption Policy (1998, as amended to date) in all invitations, bidding documents, and contracts.

22. The performance of both international and national consultant firms was partly satisfactory. Consultant inputs often produced limited benefits. WSD noted the following deficiencies in the consultant services: (i) inadequate project management and low standard of service, (ii) poor quality and qualifications of replacements, (iii) delays in decision making and approval, and (iv) inadequate interactions with the client. The consultants faced difficulties in retaining experienced and well-qualified staff as the contract conditions did not allow for wage increases to account for inflation. WSD also identified some serious engineering design issues. Some pavement and bridge structures were over-designed. Insufficient staffing for geographically widespread contracts resulted in inadequate project administration. Overall, WSD rated the performance of consultants poor and substandard.

23. The performance of the civil work contractors is not very satisfactory. Generally, the contractors had insufficient skills in (i) planning and execution of works, (ii) managing working capital, (iii) retaining efficient human resources, (iv) managing a consistent supply of construction materials, (v) maintaining equipment and machinery, and (vi) dealing with security issues (in some areas). Most contractors relied heavily on future loan extensions. After realizing that a further loan extension would not be forthcoming, the contractors stepped up their efforts to make up for lost time. Two out of three ICB contractors failed to complete their contracts within the revised contract period.¹⁰ The performance of the national contractors, with a few exceptions, is rated

The performance of both international and national consultant firms was not up to expectations.

The performance of the civil work contractors is rated partly satisfactory

¹⁰ The overall performance of the contractor on P1 was satisfactory, mainly due to better planning, allocation of adequate resources, availability of working capital, and commitment to complete the job. The overall performance of contractors on P2 and P3 was unsatisfactory because progress was behind schedule. Problems such as financial and materials shortage,

In 2000–2001, when the project was designed, Pakistan experienced severe macroeconomic instability

satisfactory. The contractors were committed to their work programs and rose to challenges such as interference with local people, financial constraints, high inflation, and shortages of materials and labor. However, they had limited capacity in project planning, resource allocation, financial management, and project management.

H. Loan Covenants

24. The provincial government partly complied with loan covenants of (i) hiring the consultants and the contractors, (ii) ensuring availability of land, (iii) timely provision of counterpart funds, (iv) submission of audit reports, and (v) submission of the government's PCR. The covenants related to the project office, consultant staffing, and reporting were partly complied with. All other covenants (environmental, social, financial, and economic) were satisfactory. Appendix 2 provides details on compliance.

I. Policy Framework

25. In 2000–2001, when the project was designed, Pakistan experienced severe macroeconomic instability. Successive years of fiscal and external deficits had resulted in accumulation of large domestic and external debts. In 2000, the country's ratio of foreign exchange obligations to foreign exchange earnings stood at over 300%. The subsequent debt rescheduling reduced this ratio to about 30%. Complementary reforms included a far-reaching macroeconomic stabilization and restructuring initiative. The project was to support this initiative by, among other things, improving the country's trade competitiveness. Improvements of physical infrastructure, notably roads, were expected to contribute to reducing Pakistan's high trade transaction cost. In addition, the government, with the support of donors, embarked on sector programs to address policy issues at the national and provincial levels. Such reforms were at the center of the project.

26. The main policy issues in the transport sector are (i) the continued need for physical works to expand the road network to connect more villages and upgrade existing main roads to support efficient transport operations; (ii) improving road maintenance to preserve the assets and improve road safety; (iii) controlling excessive axle loads, or truck overloading, which causes rapid road deterioration; (iv) reforming road agencies to achieve greater service efficiency, coupled with establishing a road sector policy to help guide future development and overcome fragmentation of responsibility and low coordination within the sector; and (v) increasing private sector involvement to help relieve development funding constraints and further enhance efficiency.

27. Trucks comprise almost 50% of non-urban road traffic, cars and light vehicles 30%, and buses 20%. Trucks are the preferred mode of transport, because there is a single-person responsibility for delivery and payment. Services provided are simple and mostly consist of direct movements between factories and ports. With an estimated 500 road haulers, it is a competitive industry, owing largely to uninhibited access to the industry and small firms and limited market power in relation to their clientele. Ninety-five percent of the industry is said to be in the informal sector. Operators belonging to the informal group are not registered, apparently do not pay taxes, rely on informal and costly financing to buy vehicles, and their drivers are not well trained.

poor safety, security and law and order, heavy rainfall, flooding, and lack of interest added to the inordinate delays and incomplete works.

Improvements of physical infrastructure, notably roads, were expected to contribute to reducing Pakistan's high trade transaction cost

28. The trucking fleet consists of an estimated 200,000 vehicles. The fleet is diverse with respect to its composition by model, type, and age. However, fleet productivity is mirroring the legacy of Pakistan's import substitution policy that, while protecting the local assembly of trucks, has in the past impeded access of road haulers to a more modern and efficient truck technology. As a result, the existing fleet still has a sizeable share of two- and three-axle rigid trucks and tractor-trailer units, contributing substantially to the axle load problem and the premature deterioration of pavement. Photo



1 shows the traditional Bedford two-axle truck that is assembled in Pakistan.

29. The provincial road departments—unlike NHA at the national level—are supply-driven and oriented toward construction rather than a greater service culture. Most work is done by departmental staff, leading to large bureaucracies, and most of the available non-development budget is used for salaries and wages. This limits the range of work that can be done and results in relatively low operational efficiency. Operational systems tend to be manual, rely upon experience-based assessments, and are subject to influence and subjectivity. Ultimately, these institutional constraints, combined with insufficient maintenance funding and instances of political interference, result in inefficient attention to overall road service quality.

30. With ADB assistance, reform of national and provincial institutional arrangements has been initiated. The thrust of reform is to transform the institutions into service departments aimed at marshaling limited funds to produce the best possible conditions for efficient, safe, and comfortable transport, using private sector operators under contract to do much of the work. Improved governance, the development of performance-based maintenance contracts to facilitate maintenance by private contractors in place of departmental work gangs, and efforts to encourage private sector involvement in funding and operating highways are important related targets.

Import substitution policy that has in the past impeded access of road haulers to a more modern and efficient truck technology

With ADB assistance, reform of national and provincial institutional arrangements has been initiated

Performance Assessment

31. The following chapter rates the program's performance based on individual evaluation criteria, as explained below.

A. Overall Assessment

The Sindh project is rated successful

32. The Sindh project is rated *successful*, based on a review of its relevance, effectiveness, efficiency, and sustainability, and on separate assessments of its subcomponents. The total performance rating is a result of four criteria: relevance (25%), effectiveness (25%), efficiency (25%), and sustainability (25%). Individual criterion ratings range from 0 to 3. Table 2 presents the ratings for the project's overall performance assessment.

Table 2: Overall Performance Assessment of the Sindh Project

| Criterion | Rating | Weighted Rating | Rating |
|-------------------------|--------|-----------------|-------------------|
| 1. Relevance (25%) | 2 | 0.50 | Relevant |
| 2. Effectiveness (25%) | 2 | 0.50 | Effective |
| 3. Efficiency (25%) | 2 | 0.50 | Efficient |
| 4. Sustainability (25%) | 1 | 0.25 | Less Likely |
| Total | | 1.75 | Successful |

Overall rating: Highly successful (HS) ≥ 2.7 ; $2.7 < \text{successful (S)} \geq 1.6$; $1.6 < \text{less than successful (LS)} \geq 0.8$; unsuccessful (US) < 0.8 .

Source: Independent Evaluation Mission.

B. Relevance

The project is rated relevant

33. The project is rated *relevant*. The rating considers (i) the relevance to the country's priorities and ADB's country and sector strategies, (ii) the extent to which the project was designed to achieve the intended impact and outcome, and (iii) the ex-ante and current significance of the project with respect to the country's priorities. On the other hand, the rating also takes into account the authorities' limited ownership for the proposed capacity development measures, which prevented the project from receiving a *highly relevant* rating. The Provincial Government has no sufficient understanding of the practical implications of the implementation of the proposed reforms, leading to a lack of buy-in from their side on the proposed measures. While the envisaged reforms reflected good governance in the transport sector, they could have been adapted to what the authorities were willing and able to implement. The physical components were consistent with the government's strategy and program for rehabilitating provincial highways and developing RARs. They were also consistent with ADB's country strategy. The project's regional focus was consistent with ADB's chosen strategy to focus on the provinces, rather than adopting the traditional umbrella approach covering subprojects nationwide.

C. Effectiveness

34. The Sindh component is rated *effective*.¹¹ The main expected outcome was a more efficient and sustainable provincial transport sector.¹² The physical project components contributed to this outcome as both the provincial and RAR targets were fully achieved (para. 18). The rate of achievement of the institutional development support, capacity development, and institutional reform subcomponents has been below expectations (para. 19). The low interaction between NHA and the provincial government, the template approach to reforms, the reliance on consultants to produce studies to chart reform, the inadequate interaction between the consultants and the government, and the low level of dialogue between ADB and the provincial government all contributed to the issues related to this subcomponent.

The Sindh project is rated effective

D. Efficiency

35. The project is rated *efficient*. This assessment is based on the combined rating of the efficiency of the completed civil works and the institutional development component. The ratings are discussed below.

Table 3: Results of Economic Evaluation

| Package | Road Section | Length (km) | Cost (\$ mn) | Appr. | EIRRs PCR | PPER |
|----------------------------|------------------------|-------------|--------------|-------|-----------|------|
| Provincial Highways | | | | | | |
| Package 1 | Thatta–Sujawal Road | 31.0 | 15.5 | 28.3 | 30.5 | 37.5 |
| Package 2 | Nawabshah–Padedan Road | 67.0 | 26.6 | 16.6 | 30.4 | 34.7 |
| Package 3 | Padedan–Ranipur Road | 66.0 | 22.9 | 16.7 | 21.2 | 34.4 |
| | Overall Result | 164.0 | 65.0 | 20.5 | 27.4 | 35.4 |
| Rural Access Roads | | | | | | |
| | Overall Result | 1,172.0 | 179.7 | 21.5 | 15.3 | 26.2 |

The overall project is rated efficient

Appr. = appraisal, EIRR = economic internal rate of return, km = kilometer, mn = million, PCR = project completion report, PPER = project performance evaluation report.

Sources: Independent Evaluation Mission, project completion report, and report and recommendation of the President.

36. The civil works component as completed is rated *highly efficient*. The economic internal rates of return (EIRRs) of the completed provincial and rural road sections, which were re-calculated by the Independent Evaluation Mission, exceeded both the appraisal and project completion estimates (Table 3), despite the cost increases and implementation delays, which tend to negatively influence EIRRs. The recalculated EIRR for the entire provincial road component is 35.4% and for the completed RARs is 26.2%. The differences in EIRRs between the appraisal and PCR stages are mainly attributable to different evaluation assumptions and methods.¹³ This also relates to

¹¹ The PCR rated the project as less than effective because of the low completion progress at the time it was prepared.

¹² As the project still used a project framework (rather than a design and monitoring framework), the outcome is derived from the framework's "goals" and "purposes".

¹³ The basis for the PCR re-evaluation is the fragment project as of 2009, when ADB closed the loan. As the PCR did not present evaluation results, the assumptions and methodology could not be verified. In addition, the assumptions related to the gradual pavement deterioration, which for the PPER are governed by the number of standard axles, were not made explicit in the PCR although roughness indicators are stated.

assumptions made to road accidents.¹⁴ The results are compared in Table 3. Details of the revised economic evaluation are presented in Appendix 4.

37. The institutional development subcomponent is rated *less efficient* as only a few of the reforms envisaged at appraisal were implemented.

E. Sustainability

The sustainability of the project is rated less likely

38. The sustainability of the project is rated *less likely*. An RMF was not created and WSD has yet to develop an asset management system. Needs-based allocations of funds are not assured. An RMU has been operating in the province since 1997; its staff, however, is demoralized as political involvement in spending allocated maintenance funds appears common. Staff fluctuates frequently as the RMU is not considered an attractive assignment. Under the project, detailed condition surveys were carried out to determine the maintenance requirements of the road projects, based on which a 5-year maintenance plan was prepared. The plan, however, was not implemented.

39. Overloading of trucks is a common problem in Pakistan and a major reason for premature road deterioration.

The problem is a sector-wide issue. High import tariffs on high-capacity multi-axle trucks hinders local manufacturers producing low-capacity and low-powered trucks. The environment becomes very competitive, with many truck operators coming into play, but with outdated fleets. The trucks have to be overloaded to stay in the market. Attempts to mitigate the problem at the provincial level by installing weighbridges and penalizing overloading have



not been effective. Most of the existing weighbridges can be bypassed and the level of fines is not a deterrent to drivers. Draft legislation to impound overloaded trucks has not been enacted so far. While the improved design of the project roads can accommodate larger vehicles, the pavements are not strong enough and already show signs of imminent failure. This applies in particular to rural roads, which have not been designed for heavier traffic loads. The triple-surface treatment is meant for light traffic only, but invariably has to carry heavier loads. Photo 2 shows an overloaded trailer carrying sugar cane on an RAR in Sindh Province.

A Road Maintenance Fund was not created and the Works and Services Department has yet to develop an asset management system

¹⁴ The evaluation model used by the Independent Evaluation Mission takes into account roadside frictions and accidents.

Other Assessments

40. The following chapter assesses the project's development impact on institutions and the socioeconomic and natural environment. ADB's and the borrower's performance are subsequently examined.

A. Impacts

41. **Impact on institutions.** The project's impact on institutions is *moderate*. While most of the institutional outcomes were not achieved and a Sindh Road Agency has yet to be created, the interventions have not been without any impact. In a number of areas, the project has marked institutional beginnings, from which WSD's future development may still benefit. The RMU, which was established in 1997, was strengthened under the project. The RMU initiated the use of the geographic information system (GIS) to capture, store, and analyze road data. Such data will be needed for the RAMS that, while having been designed under the project, has yet to be implemented. Under the project, road surveys were carried out, the GIS was updated, and a 5-year road master plan was prepared.

The project's impact on institutions is moderate

42. **Socioeconomic impact.** The project aimed to improve road conditions through rehabilitation and improvement of the existing road infrastructure. No greenfield construction or major realignment of roads was involved. The impacts of land acquisition on the right-of-way, resettlement, and changes in land-use patterns were minimal, as envisaged at appraisal. The civil works have generated about 27,000 person-months of local employment. The improved roads directly benefit five million inhabitants living in the influence areas of the provincial and rural roads.¹⁵ Many of them are poor.

The improved roads directly benefit five million inhabitants living in the influence areas of the provincial and rural roads

43. The design of the project as reflected in the design and monitoring framework did not have specific gender targets, although women form a major group of direct project beneficiaries. While it is difficult to assess the gender impact of the project roads without a socioeconomic baseline survey, benefits that have accrued to women primarily consist of positive impacts resulting from better access to basic economic and social services. Women in Punjab, as elsewhere in Pakistan, are responsible for key family life activities such as education, childcare, health, and nutrition. The transport burden faced by women contributes to poverty as the resultant loss of time is a key constraint on their ability to build their assets and reduce their vulnerability. By reducing the burden of transport, the RARs, in particular, have allowed an increasing number of women to visit markets and can be assumed to have increased women's productivity and income.

44. **Environmental and safety impact.** Environmental management and resettlement plans were prepared and followed. Construction debris was removed according to the environmental management plans. Guidelines and manuals on

¹⁵ This is an Independent Evaluation Mission estimate based on the geographical coverage of the project roads and the number of communities in their direct hinterland.

environmental management for roads and highways have been developed and selected WSD staffs have received training. Accordingly, the plans have been aligned with ADB safeguard requirements, addressing potential adverse impacts to intended beneficiaries. The same applies to guidelines and manuals on resettlement management and planning. A detailed baseline study of traffic safety was carried out, but the department had no capacity to implement it. Traffic safety audits have yet to be conducted. However, whenever the engineering of projects is contracted out to engineering firms, road safety issues are duly considered. Guidelines and manuals on traffic safety have been prepared and are used in WSD; they will also be incorporated into the syllabi of primary and secondary schools. Traffic safety campaigns have already started in a large number of schools in four districts through an NGO.

The performance of ADB was less than satisfactory

B. Asian Development Bank Performance

45. The performance of ADB was *less than satisfactory*. ADB could have carried out a more thorough assessment of the baseline conditions for project implementation. For example, ADB referred to the engineering task as merely an updating of designs, suggesting that engineering had already been carried out. As it turned out, this assumption was not realistic. ADB also underestimated the contract management capabilities of WSD. Overall, the implementation period of 5 years for all preconstruction and construction activities was too short. Project administration was thorough, as reflected in nine review missions and two project completion missions. Changes in ADB project administration staff delayed communications with WSD. ADB allowed a 2-year loan extension, two minor changes in scope, and an increased imprest account ceiling. WSD rated ADB's performance *less than successful*.¹⁶

C. Borrower Performance

46. The performance of the Sindh government and WSD is rated *less than satisfactory*. Slow progress under the investment component and low achievements under the provincial policy and reform components suggest that the provincial government and WSD were ill-equipped to successfully implement the project. The government did not pursue the policy and institutional reform agenda with sufficient enthusiasm and decision making took more time than expected. The difficulties encountered included poor planning, prolonged decision making, inadequate contract management experience, and noncompliance with ADB's requirements. Issues related to environmental mitigation measures also contributed to delays. Important other factors impeding implementation included (i) limited supervision and commitment; (ii) limited guidance, reviews, or inputs by the steering committee; (iii) late realization of project implementation efforts; (iv) delayed activities and an inability to make up for lost time or achieve targets; and (v) inconsistency and discontinuity of project team members.

The performance of the Sindh government and Works and Services Department is rated less than satisfactory

¹⁶ The PCR, in considering ADB's role, responsibilities, and implementation progress, had rated ADB's performance *partly satisfactory*.

CHAPTER 5

Issues and Lessons

47. This chapter elucidates the project's issues and lessons. The PPER does not recommend any follow-up actions.

A. Issues

48. The key issues are related to the substantial implementation delay and the limited progress achieved on provincial institutional and policy reforms. While it is laudable that the provincial government was able to complete the scope of the investment component as envisaged at appraisal, it needed about 6 extra years to do so, including 2 years of loan extension that ADB granted. The issue is complex, as delays were incurred at all stages of the implementation process.

- (i) ADB had arranged advance procurement action to carry out engineering, prepare bid documents, and prequalify contractors. ADB had allowed 14 months for that activity, which was unrealistic. In reality, it took more than 3 years.
- (ii) Preconstruction activities were delayed because the executing agency had insufficient experience to set up a functioning project implementation unit. There is no evidence that ADB paid enough attention to essential organizational matters at the project's design stage.
- (iii) Another cause of delays was the lack of familiarity with contract management principles. This revealed itself in the executing agency's dispute with contractors over a price escalation clause, in which the executing agency took the view that such a clause would provide an incentive for delaying the construction works and expected contractors to absorb the escalation risk.

49. With regard to institutional and policy reforms, ADB could have ensured that thorough diagnostics of the baseline conditions were carried out. The timeline for carrying out the reforms was too short. ADB and the provincial government could have had a dialogue about the numerous studies produced by consultants to initiate a change management process.

50. Overall, both ADB and the executing agency evidently overestimated the implementation capacity on the ground. The magnitude of the engineering task could have been assessed more accurately in light of the work's substantial scope and the capacity available within the executing agency or engineering firms to carry out the task.

B. Lessons

51. The lessons drawn from the project are as follows:

There was limited progress achieved on provincial institutional and policy reforms

Both ADB and the executing agency overestimated the implementation capacity on the ground

- (i) The overall time allowed for implementation of the investment and reform programs was inadequate for developing knowledge and understanding, processes, procedures, and the project implementation framework. Unrealistic work schedules, poor procurement planning, insufficient implementation details, and loose monitoring targets prolonged implementation. A well-qualified and experienced project team leader and consultants' familiarity with ADB processes are essential to implement an ADB-financed project. (paras. 22 and 23)
- (ii) Delayed completion of preconstruction activities and advance action caused delays to all subsequent activities. ADB could have satisfied itself about project readiness in the key areas of detailed design, safeguards, procurement, and establishment of the project implementation unit.
- (iii) The government's commitment and ability to implement the institutional development and capacity development (particularly in procurement, loan and contract administration, disbursement processes, monitoring and evaluation mechanisms, periodic reporting, and social and environmental safeguards) could have been carefully reviewed. A flexible approach could have been adopted with adequate supervision support for sector specialists in capacity development activities. Discussions at the technical level should have led to higher-level discussion as the proposed reforms were far-reaching. (paras. 15, 19 and 20)

Appendixes

APPENDIX 1: DESIGN AND MONITORING FRAMEWORK


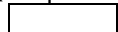
| Design Summary | Performance Targets and Indicators with Baselines | Data Sources and Reporting Mechanisms | Assumptions and Risks |
|---|---|---|--|
| <p>Impact Contribution to sustainable economic development and poverty reduction</p> | <p>By 2015</p> <p>Increased gross regional product (GRP)</p> <p>Improved social indicators</p> | <p>National and local socioeconomic statistics</p> | <p>Assumption Economic growth in the hinterland of the three provincial roads and rural access road (RAR) sections will continue</p> <p>Risk Law-and-order situation in the project area will worsen</p> |
| <p>Outcome Increased transport connectivity and efficiency and improved institutional effectiveness</p> | <p>By 2012</p> <p>On representative provincial roads traffic volume to increase above 4,500</p> <p>On representative rural road sections traffic to grow beyond 2,500</p> <p>Reduced road-user costs to \$0.45/vehicle-km from \$0.68/vehicle-km in 2008</p> <p>Works and Services Department (WSD) routine maintenance allocations increased to \$1,000 per km</p> | <p>National and local statistics from the Punjab Provincial Government (PPG) statistics office</p> <p>Periodic classified traffic counts and accident data system</p> <p>Sindh budget records</p> | <p>Assumptions The availability and quality of transport services improve following the improvement of the project road sections</p> <p>Improved cross-border facilities and procedures at the border</p> <p>Risk Resistance to fiscal reforms</p> |
| <p>Outputs 1. Reform program:</p> <ul style="list-style-type: none"> a. Organization changes at WSD b. Convert WSD into a highway authority or corporation c. Improve road management practices and redesign processes d. Strengthen | <p>By 2008 303 km of provincial roads rehabilitated</p> <p>By 2009 1,020 km of rural roads rehabilitated</p> <p>WSD a highway authority by 2009</p> <p>An advanced road asset management system applied by 2009</p> | <p>WSD and Project Engineering Cell (PEC) progress reports</p> | <p>Assumptions Counterpart resources timely provided</p> <p>Support is forthcoming from local communities</p> <p>The government is committed to further reforming the road sector</p> |

| Design Summary | Performance Targets and Indicators with Baselines | Data Sources and Reporting Mechanisms | Assumptions and Risks |
|--|--|---------------------------------------|-----------------------|
| <p>capacity at WSD and in districts in planning, budgeting, and road maintenance</p> <ul style="list-style-type: none"> e. Strengthen axle-load control f. Improve road safety g. Increase private sector involvement <p>2. Improve 303 km of provincial highways with installation of weigh stations at strategic locations</p> <p>3. Improve 1,020 km of RARs</p> | <p>Weighbridges installed by end 2008</p> <p>New safety system pilot-tested by 2009</p> | | |
| <p>Activities with Milestones</p> <ul style="list-style-type: none"> 2.1 Award of civil works contracts by mid-2006 2.2 Completion of civil works by October 2008 | <p>Inputs</p> <p>ADB: \$150 million Government: \$72.1 million Total: \$122.1 million</p> | | |

APPENDIX 2: IMPLEMENTATION SCHEDULE

| Item | 2001 | | | | 2002 | | | | 2003 | | | | 2004 | | | | 2005 | | | | 2006 | | | | 2007 | | | | 2008 | | | | 2009 | | | | | | | |
|--|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|--|--|--|--|
| | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | | | | |
| A. Advance Procurement Actions | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - Design updates & preparation of Bid Documents for PHs and core RARs. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - Prequalification of Contractors | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - Bidding for PH and core RARs. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - Solicitation and evaluation of supervision consultants' proposals | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B. Consulting Services | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - Appointment and mobilization of supervision consultants | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - Construction supervision of Provincial Highways and core RARs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - Selection and design of RARs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - Construction supervision of RARs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - Appointment and mobilization of Sector Reform Consultants | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - Sector Reforms Implementation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C. Civil Works Implementation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - Tender evaluation and awards of provincial highways and core RARs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - Construction of PH and core RARs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - Bid evaluation and awards of RARs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - Construction of RARs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

PH = provincial highways, Q = quarter, RAR = rural access roads.

 At Appraisal  Actual

APPENDIX 3: COMPLIANCE WITH LOAN COVENANTS

| Covenants | Reference | Status |
|---|---------------------------------------|--|
| <p>The Borrower shall furnish, or cause to be furnished, to the Bank all such reports and information as the Bank shall reasonably request concerning (i) the Loan, and the expenditure of the proceeds and maintenance of the service thereof; (ii) the goods and services and other items of expenditure financed out of the proceeds of the Loan; (iii) the project; (iv) the administration, operations and financial condition of WSD and any other agencies of the Borrower responsible for the carrying out of the project and operation of the project facilities, or any part thereof; (v) financial and economic conditions in the territory of the Borrower and the international balance-of-payments position of the Borrower; and (vi) any other matters relating to the purposes of the Loan.</p> | <p>LA Section 4.04, Article VI</p> | <p>Complied with The executing agency regularly submitted reports to ADB as required, including: monthly progress reports; quarterly progress reports; feasibility studies; inception, design, and complete bid documents; evaluations of bids; project implementation documents; BME; resettlement reports; EIA and EMMP reports.</p> |
| <p>The SPG will establish the RSDD within Sindh. The director general and the section heads will be appointed prior to loan effectiveness.</p> | <p>LA Section 6.01(a), Article VI</p> | <p>Complied with RSDD, headed by the director general and supporting staff, has been established under the Head of Account 6-31100 Administration Works by the Government of Sindh, effective 29 April 2002.</p> |
| <p>International and domestic consultants should be recruited in accordance with ADB's Guidelines on the use of Consultants (2013, as amended from time to time).</p> | <p>LA Schedule 5 para. 2</p> | <p>Complied with International consultants Kampsax (Denmark) were recruited with a consortium of five local consultants, namely, ECIL, REC, OCL, ACC, and ABM in November 2002 in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time).</p> |
| <p>WSD shall be the executing agency of the project.</p> | <p>LA Schedule 5 para. 1</p> | <p>Complied with A chief engineer/project director, as a representative of WSD, the executing agency, was appointed for the project by Services General Administration and Coordination Department, Government of Sindh, on 29 September 2004.</p> |
| <p>POS shall establish RSDD in WSD, headed by a director general and comprising sections that will lead the road sector reform process envisaged under the project.</p> | <p>LA Schedule 6 para. 2</p> | <p>Complied with On 29 April 2002, RSDD, headed by the director general and supporting staff, was established under the Head of Account 6-31100 Administration Works, Government of Sindh.</p> |

| Covenants | Reference | Status |
|---|-----------------------|---|
| Within 6 months of loan effectiveness, SPG will form a steering committee headed by the additional chief secretary. | LA Schedule 6 para. 3 | Complied with The high-level steering committee, headed by the additional chief secretary (Dev), P&D Department was constituted by the Government of Sindh on 27 August 2004. |
| Within 6 months of its establishment, the SPG will form a citizen's advisory group, with the Association of Road Users of Pakistan as the secretariat, to provide a forum for feedback on the progress and direction of the provincial road sector reforms. | LA Schedule 6 para. 4 | Complied with A Citizen Advisor Group was formed by the Government of Sindh on 8 March 2005. |
| WSD shall continuously monitor and evaluate project benefits by compiling and analyzing socioeconomic data and traffic on the project-financed provincial highways and RARs. | LA Schedule 6 para. 5 | Complied with BME report submitted to ADB in September 2005. |
| The SPG shall ensure that people displaced by the PSDP do not incur any losses of income, employment opportunities, or social and cultural well-being. All those displaced will be compensated for loss of lands, housing, and livelihood according to the framework set out in the RP and in conformity with existing laws, regulations, and procedures relating to both legal and acquired rights in Pakistan | LA Schedule 6 para. 6 | Complied with The cost of land acquisition and resettlement has been borne by the Government of Sindh. PRs.71,145,696 has been paid to the land acquisition officer to acquire land for construction of provincial highways. |
| WSD shall ensure that all environmental mitigation measures identified in the IEE are incorporated into the project design and implemented during project construction and O&M, in accordance with the Bank's environmental guidelines and the EMMP agreed with the Bank. | LA Schedule 6 para. 7 | Complied with As per agreement with consultants, all environmental mitigation measures during project construction, operation, and maintenance will be carried out in accordance with ADB guidelines. Fifteen project roads crossed environmentally sensitive areas; EIAs were carried out and approved by SEPA and mitigation measures were included in contracts. Environmental monitoring reports were regularly furnished. |
| WSD shall be responsible for the O&M of the project roads through proper technical supervision and adequate allocation of funds. | LA Schedule 6 para. 8 | Not complied with |
| WSD shall (i) ensure the continued application of a uniform and effective financial and accounting system that meets internationally recognized standards; and (ii) introduce and standardize procurement processes on the basis of transparency, simplicity, and | LA Schedule 6 para. 9 | Complied with The office of chief engineer/project director was established with all required staff for continued application of uniform and effective financial and accounting systems. |

| Covenants | Reference | Status |
|---|------------------------------|---|
| client responsiveness. | | |
| The SPG shall ensure that people displaced by the PSDP do not incur any losses of income, employment opportunities, or social and cultural well-being. All those displaced will be compensated for loss of lands, housing, and livelihood according to the framework set out in the RP and in conformity with existing laws, regulations, and procedures relating to both legal and acquired rights in Pakistan | LA Schedule 6 para. 10 | Complied with The cost of land acquisition and resettlement shall be borne by the Government of Sindh. PRs.71,145,696 has been paid to the land acquisition officer to acquire land for construction of provincial highways. |
| Sindh WSD will ensure that the civil works contractors comply with all applicable labor laws, including elimination of gender differentiated wages, and do not employ child labor in construction activities | LA Schedule 6 para. 11 | Complied with The necessary clause was put in the conditions of contract. (Clause 34.2 Condition of Contract Part-II). Monitoring was carried out by the consultants. |

ACC = Associated Consultancy Centre, ADB = Asian Development Bank, BME = benefit monitoring and evaluation, ECIL = Engineering Consultants International (PVT) Ltd., EIA = environmental impact assessment, EMMP = environmental management and monitoring plan, IEE = initial environmental examination, LA = loan agreement, O&M = operations and maintenance, OCL = Osmani & Company Private Limited, P&D = project and design, PSDP = Provincial Sector Development Project, REC = Republic Engineering Corporation, RP = resettlement plan, RSDD = Road Sector Development Directorate, SEPA = Sindh Environmental Protection Agency, SPG = Sindh Provincial Government, WSD = Works and Services Department.

APPENDIX 4: ECONOMIC EVALUATION

1. The re-evaluation followed the standard approach of cost-benefit analysis, based on the Asian Development Bank's (ADB's) Guidelines for the Economic Analysis of Projects.¹ Accordingly, border prices were used for tradable or non-traded goods and adjusted to reflect the real consumption of domestic resources, the underlying rationale being to measure any gain or loss to the economy in terms of external trade. For that purpose, the project's inputs and outputs were broken down into their traded and non-traded components. The process of converting financial costs and prices to their economic corollaries resulted in a standard conversion factor (SCF) of 0.83, implying that the costs were reduced by about 17% to reflect conditions of economic resource consumption. Table A4.1 shows the calculation of the SCF.

Table A4.1: Standard Conversion Factor

| Materials | Conversion Items | Cost Composition (%) | Adjustment Factor | | |
|----------------------|------------------|----------------------|-------------------|------|--------|
| | Tradable | Exchange rate | 18 | 1.07 | 0.1926 |
| | Non-tradable | | 20 | 0.85 | 0.1700 |
| Equipment (tradable) | | | 20 | 1.07 | 0.2140 |
| Labor | | | 20 | | |
| | Skilled | Skilled SWR | 10 | 0.95 | 0.0950 |
| | Unskilled | Unskilled SWR | 20 | 0.80 | 0.1600 |
| Tax | | | 12 | 0.00 | 0.0000 |
| | | | 100 | | 0.8316 |

SWR = shadow wage rate.

2. The estimation of the economic feasibility of the proposed road sections follows the analytical framework of the highway development and management (HDM) model, which is based on the concept of pavement life-cycle analysis. The key assumption is that road pavements deteriorate as a result of several factors, including traffic loading, climatic conditions, and maintenance regimes. The impacts of road conditions and design standards on road users are measured to predict economic resource consumption reflected in economic costs. Such road-user costs comprise vehicle operating costs (VOC) (fuel, tires, oil, spare parts, depreciation, and capacity utilization); costs of travel time for both passengers and cargo; and costs to the economy of road accidents.

3. Sensitivity analysis studied the impact of variations in key parameters on the feasibility of the proposed road investment project. This analysis indicates which of the parameters examined are likely to have the most significant effect on the project's feasibility. The important variables that are to be considered in this regard are:

- cost of the proposed investment;
- traffic volume, both baseline flows and future forecasted growth rates;
- vehicle use, loading, and utilization; and
- net benefit streams, reflecting variations in transport costs.

4. The economic evaluation is based on comparison of a with-project scenario and a without-project scenario. This comparison generates the standard decision criteria for the investment, notably the net present value (NPV) and the economic internal rate of return (EIRR). The with-project scenario assumes improved road quality and a more systematic and rational maintenance regime. The without-project scenario assumes a status quo in terms of the maintenance regime resulting in increased roughness of the road surface with the expected rise in traffic.

¹ ADB. 1997. *Guidelines for the Economic Analysis of Projects*. Manila.

5. The development of pavement conditions over time, reflecting different maintenance regimes and traffic loads, is expressed in terms of the international roughness index (IRI), which measures pavement performance and riding quality. At appraisal, the pavement on several subsections was in dire condition; the initial IRI was between 9 and 14. The project completion report (PCR) and the Independent Evaluation Mission made this assumption of the pavement's condition.

6. The project's benefits include traffic accruing to normal, generated, and diverted traffic, as a function of a reduction in VOC and time costs. Traffic for the base year 2008 was used in the analysis and in the PCR. The quantities of resources consumed and vehicle speeds were calculated first and then multiplied by unit costs of the resources to obtain total operating costs and travel time costs. The resources consumed and the vehicle operating conditions are a function of traffic volume and the composition of traffic by vehicle type, pavement type, and geometric characteristics of the road as well as the roughness of its surface.

(i) **Vehicle Fleet**

7. The vehicles used in the analysis were selected from among the highway development and management 4 (HDM-4) default fleets and adjusted to current price levels. The vehicles are representative of the vehicle fleet in Pakistan and the consequent determinants of VOC. As it was not possible to simulate the operating costs of every individual vehicle brand or model, representative vehicles for major types operating on the project road were chosen.

(ii) **Vehicle Operating Costs**

8. Road rehabilitation projects lead to a reduction in VOC for the users of the improved road. The corresponding VOC savings are the project's most substantial and direct benefit. The resources consumed are reflected in the major VOC items and include fuel, tires, maintenance parts and labor, lubricants, crew, depreciation, interest, overhead, passenger time, and capital tied up by freight in transit.

9. The economic evaluation is based on VOC relationships under the with- and without-project scenarios. Under the without-project scenario, the road quality is assumed to depreciate at an increasing rate with forecasted traffic volume, increasing from the initial IRI of 9 to an IRI of 16, depending on the road. It is assumed that lower VOC will generate additional traffic. The project benefits are expected to grow in step with economic growth and a normal growth rate of traffic.

10. Time savings were computed with respect to passengers and freight. All passengers were assumed to accrue a monetary benefit from the savings in travel time. With improved road quality under the with-project scenario, the travel time was assumed to be reduced, generating time savings of 1.5 hours per passenger/freight trip.

(iii) **Investment and Maintenance Costs**

11. Consistent with the envisaged 4-year construction period (2008–2011), the project funds were released over 4 years. The costs are net of taxes and duties and reflect the true costs of resource consumption and resource scarcity. Other adjustments were made for the cost of labor and the value of time for passengers. Overall, a conversion factor of 0.83 was used for the financial to economic costs.

12. Maintenance costs include periodic and routine maintenance costs. Periodic maintenance interventions are scheduled at intervals of 6 years. No periodic maintenance was assumed for the without-project scenario. This assumption reflects a rational maintenance regime. As the sub-base and

wearing course of the pavement are beyond repair, periodic maintenance, typically in the form of simple pavement overlays, would not arrest the trend of structural deterioration.

(iv) **Evaluation Results**

13. Tables A4.2 and A4.3 show that all road sections are economically feasible. The provincial road sections together yield an EIRR of 35.2%, while the rural road sections together have an EIRR of 26.2%.

Table A4.2: Sindh Provincial Roads Consolidated Economic Re-evaluation

Highway Development and Management 4

Comparison of Cost Streams (Discounted)

Study Name: Sindh Provincial Roads
 Run Date: 2/8/2013
 Currency: US\$ (million)
 Discount Rate: 12%

| Section | From | To | Cum Trip | Length | %Trip/Length |
|---------|------|-----|----------|--------|--------------|
| KM | 1 | 165 | 79 | 165 | 0.48 |

| Year | ROAD AGENCY COST | | | | ROAD USER COST AND SAVINGS | | | | | | | | | Net Benefits | |
|------|------------------|-----------------|---------|--------|----------------------------|---------|-------|--------------|---------|-------|-------------------|------|-------|--------------|----------------|
| | Capital Works | Recurrent Works | | Total | Normal Traffic | | | Time Savings | | | Generated Traffic | | | | Total Benefits |
| | | With | Without | | With | Without | Net | Pass | Freight | Total | VOC | Time | Total | | |
| 2008 | 0.50 | | 0.36 | 0.86 | 45.07 | 45.07 | 0.00 | | | | 0.00 | 0.00 | 0.00 | | (0.86) |
| 2009 | 9.20 | | 0.24 | 9.44 | 47.73 | 47.73 | 0.00 | | | | 0.00 | 0.00 | 0.00 | | (9.44) |
| 2010 | 12.40 | | 0.25 | 12.65 | 50.59 | 50.59 | 0.00 | | | | 0.00 | 0.00 | 0.00 | | (12.65) |
| 2011 | 17.30 | 0.42900 | 0.26 | 17.13 | 50.46 | 53.65 | 3.20 | 0.29 | 0.09 | 0.38 | 0.42 | 0.00 | 0.42 | 3.99 | (13.14) |
| 2012 | 11.90 | 0.44400 | 0.27 | 11.72 | 43.70 | 56.92 | 13.22 | 0.30 | 0.09 | 0.39 | 1.72 | 0.00 | 1.72 | 15.33 | 3.61 |
| 2013 | 2.70 | 0.45960 | 0.28 | 2.52 | 45.20 | 60.40 | 15.19 | 0.31 | 0.10 | 0.41 | 1.98 | 0.00 | 1.98 | 17.57 | 15.06 |
| 2014 | | 0.47560 | 0.28 | (0.19) | 46.80 | 64.09 | 17.28 | 0.32 | 0.10 | 0.42 | 2.25 | 0.00 | 2.25 | 19.95 | 20.14 |
| 2015 | | 0.49230 | 0.29 | (0.20) | 48.51 | 68.00 | 19.45 | 0.33 | 0.10 | 0.43 | 2.53 | 0.00 | 2.53 | 22.45 | 22.65 |
| 2016 | | 0.50950 | 0.30 | (0.21) | 50.35 | 72.13 | 21.78 | 0.34 | 0.11 | 0.44 | 2.83 | 0.00 | 2.83 | 25.05 | 25.26 |
| 2017 | | 0.52740 | 0.31 | (0.22) | 52.33 | 76.48 | 24.14 | 0.35 | 0.11 | 0.46 | 3.14 | 0.00 | 3.14 | 27.74 | 27.95 |
| 2018 | 7.92 | 0.20592 | 0.32 | 8.03 | 52.22 | 78.77 | 26.55 | 0.36 | 0.11 | 0.47 | 3.45 | 0.00 | 3.45 | 30.47 | 22.44 |
| 2019 | | 0.21310 | 0.33 | 0.12 | 54.05 | 81.13 | 27.08 | 0.37 | 0.12 | 0.48 | 3.52 | 0.00 | 3.52 | 31.09 | 30.97 |
| 2020 | | 0.22060 | 0.34 | 0.12 | 55.99 | 83.57 | 27.58 | 0.38 | 0.12 | 0.50 | 3.59 | 0.00 | 3.59 | 31.66 | 31.55 |
| 2021 | | 0.22830 | 0.35 | 0.12 | 58.07 | 36.08 | 28.01 | 0.39 | 0.12 | 0.51 | 3.64 | 0.00 | 3.64 | 32.16 | 32.04 |
| 2022 | | 0.23630 | 0.36 | 0.12 | 60.31 | 88.66 | 28.35 | 0.40 | 0.13 | 0.53 | 3.69 | 0.00 | 3.69 | 32.57 | 32.45 |
| 2023 | | 0.24460 | 0.37 | 0.13 | 62.74 | 91.32 | 28.58 | 0.41 | 0.13 | 0.54 | 3.72 | 0.00 | 3.72 | 32.85 | 32.72 |
| 2024 | 7.92 | 0.20592 | 0.38 | 8.10 | 62.66 | 94.06 | 31.40 | 0.43 | 0.14 | 0.56 | 4.08 | 0.00 | 4.08 | 35.04 | 27.95 |
| 2025 | | 0.21310 | 0.39 | 0.18 | 64.91 | 96.88 | 31.98 | 0.44 | 0.14 | 0.58 | 4.16 | 0.00 | 4.16 | 35.71 | 36.53 |
| 2026 | | 0.22060 | 0.40 | 0.18 | 67.31 | 99.79 | 32.48 | 0.45 | 0.14 | 0.60 | 4.22 | 0.00 | 4.22 | 37.30 | 37.11 |
| 2027 | | 0.22830 | 0.42 | 0.19 | 69.90 | 102.78 | 32.88 | 0.46 | 0.15 | 0.61 | 4.27 | 0.00 | 4.27 | 37.77 | 37.58 |
| 2028 | | 0.23630 | 0.43 | 0.19 | 72.72 | 105.87 | 33.15 | 0.48 | 0.15 | 0.63 | 4.31 | 0.00 | 4.31 | 38.09 | 37.90 |
| 2029 | | 0.24460 | 0.44 | 0.20 | 75.80 | 109.04 | 33.25 | 0.49 | 0.16 | 0.65 | 4.32 | 0.00 | 4.32 | 38.22 | 38.02 |
| 2030 | 7.92 | 0.20592 | 0.46 | 8.17 | 75.25 | 112.32 | 37.06 | 0.51 | 0.16 | 0.67 | 4.82 | 0.00 | 4.82 | 42.55 | 34.38 |
| 2031 | | 0.21310 | 0.47 | 0.26 | 78.04 | 115.68 | 37.64 | 0.52 | 0.17 | 0.69 | 4.89 | 0.00 | 4.89 | 43.23 | 42.97 |
| | | | | | | | | | | | | | | EIRR | 35.20% |

() = negative, VOC = vehicle operating cost.

Table A4.3: Sindh Rural Access Roads Consolidated Economic Re-evaluation

Comparison of Streams (Discounted)

Study Name: Sindh Rural Access Roads
 Run Date: 08/02/2012
 Currency: US\$ (million)
 Discount Rate: 12%

| Section | From | To | Cum. Trip | Length | % Trip/Length |
|---------|------|-------|-----------|--------|------------------|
| KM | 1 | 1,173 | 457 | 1,172 | 0 |

| Year | ROAD AGENCY COST | | | ROAD USER COSTS AND SAVINGS | | | | | | | | | | Net Benefits | |
|-------------|------------------|-----------------|---------|-----------------------------|----------------|---------|--------|--------------|---------|-------|-------------------|------|-------|--------------|---------------|
| | Capital Works | Recurrent Works | | Total | Normal Traffic | | | Time Savings | | | Generated Traffic | | | | |
| | | With | Without | | With | Without | Net | Pass | Freight | Total | VOC | Time | Total | | |
| 2007 | 1.50 | | 5.27 | 6.77 | 138.41 | 138.41 | 0.00 | | | | 0.00 | | 0.00 | | (6.77) |
| 2008 | 25.40 | | 3069 | 29.09 | 157.56 | 157.56 | 0.00 | | | | 0.00 | | 0.00 | | (29.09) |
| 2009 | 34.40 | | 3.8 | 38.28 | 166.42 | 166.42 | 0.00 | | | | 0.00 | | 0.00 | | (38.28) |
| 2010 | 47.80 | 3.05 | 4.07 | 48.82 | 175.76 | 175.90 | 0.14 | 0.30 | 0.21 | 0.51 | 0.02 | 0.00 | 0.02 | 0.67 | (48.16) |
| 2011 | 11.90 | 3.15 | 4.27 | 13.02 | 148.71 | 186.01 | 37.30 | 0.31 | 0.21 | 0.52 | 4.85 | 0.00 | 4.85 | 42.67 | 29.65 |
| 2012 | 2.70 | 3.26 | 4.49 | 3.92 | 153.64 | 196.77 | 43.13 | 0.32 | 0.22 | 0.54 | 5.61 | 0.00 | 5.61 | 49.27 | 45.35 |
| 2013 | | 3.38 | 4.71 | 1.33 | 158.86 | 208.18 | 49.32 | 0.33 | 0.23 | 0.56 | 6.41 | 0.00 | 6.41 | 56.29 | 54.95 |
| 2014 | | 3.50 | 4.95 | 1.45 | 164.40 | 220.25 | 55.85 | 0.34 | 0.23 | 0.57 | 7.26 | 0.00 | 7.26 | 63.68 | 52.23 |
| 2015 | 117.30 | 3.62 | 5.19 | 118.88 | 170.31 | 232.98 | 62.67 | 0.35 | 0.24 | 0.59 | 8.15 | 0.00 | 8.15 | 71.40 | (47.47) |
| 2016 | | 3.75 | 5.45 | 1.71 | 176.65 | 246.38 | 69.70 | 0.36 | 0.25 | 0.60 | 9.06 | 0.00 | 9.06 | 79.37 | 77.66 |
| 2017 | | 3.05 | 5.73 | 2.68 | 177.66 | 253.78 | 76.12 | 0.37 | 0.26 | 0.62 | 9.89 | 0.00 | 9.89 | 86.63 | 83.95 |
| 2018 | 117.30 | 3.15 | 6.01 | 120.16 | 183.64 | 261.39 | 77.75 | 0.38 | 0.26 | 0.64 | 10.11 | 0.00 | 10.11 | 88.50 | (31.66) |
| 2019 | | 3.26 | 6.31 | 3.05 | 189.95 | 269.39 | 79.44 | 0.39 | 0.27 | 0.66 | 10.33 | 0.00 | 10.33 | 90.43 | 87.38 |
| 2020 | | 3.38 | 6.63 | 3.25 | 195.67 | 277.47 | 80.81 | 0.40 | 0.28 | 0.68 | 10.50 | 0.00 | 10.50 | 91.99 | 88.74 |
| 2021 | 117.30 | 3.50 | 6.96 | 120.76 | 203.86 | 285.80 | 81.94 | 0.41 | 0.29 | 0.70 | 10.65 | 0.00 | 10.65 | 93.29 | (27.47) |
| 2022 | | 3.62 | 7.31 | 3.69 | 211.63 | 294.37 | 82.75 | 0.42 | 30.00 | 0.72 | 10.76 | 0.00 | 10.76 | 94.22 | 90.53 |
| 2023 | | 3.05 | 7.67 | 4.63 | 212.90 | 303.20 | 90.31 | 0.44 | 0.31 | 0.74 | 11.74 | 0.00 | 11.74 | 102.79 | 98.16 |
| 2024 | 117.30 | 3.15 | 8.06 | 122.20 | 220.19 | 312.30 | 92.11 | 0.45 | 0.31 | 0.76 | 11.97 | 0.00 | 11.97 | 104.84 | (17.36) |
| 2025 | | 3.26 | 8.46 | 5.20 | 227.97 | 321.67 | 93.70 | 0.46 | 0.32 | 0.79 | 12.18 | 0.00 | 12.18 | 106.67 | 101.47 |
| 2026 | | 3.38 | 8.88 | 5.51 | 236.30 | 331.32 | 95.02 | 0.48 | 0.33 | 0.81 | 12.35 | 0.00 | 12.35 | 108.18 | 102.68 |
| 2027 | | 3.50 | 9.33 | 123.13 | 245.30 | 341.26 | 95.96 | 0.49 | 0.34 | 0.84 | 12.48 | 0.00 | 12.45 | 109.27 | (13.86) |
| 2028 | 117.30 | 3.62 | 9.8 | 6.18 | 255.08 | 351.50 | 96.41 | 0.51 | 0.35 | 0.86 | 12.53 | 0.00 | 12.53 | 109.81 | 103.63 |
| 2029 | | 3.05 | 10.29 | 7.24 | 255.29 | 362.04 | 106.75 | 0.52 | 0.36 | 0.89 | 13.88 | 0.00 | 13.88 | 121.52 | 114.28 |
| 2030 | | 3.15 | 10.8 | 7.65 | 264.30 | 372.90 | 108.60 | 0.54 | 0.38 | 0.91 | 14.12 | 0.00 | 14.12 | 123.63 | 115.98 |
| EIRR | | | | | | | | | | | | | | | 26.20% |

() = negative, EIRR = economic internal rate of return, NPV = net present value, VOC = vehicle operating cost.