



Implementing and Rolling Out Argentina's New Approach to Road Maintenance



IBRD Results

SYNOPSIS

Argentina's road sector remains under significant pressure to deliver high-quality services, with traffic growing at an unprecedented 40 percent since 2003. This growth implies a rate higher than 10 percent per year. Traffic composition changed, increasing the relative importance of trucks that in some segments of the road network account for more than 45 percent of total traffic, accountable to the doubling in growth of agricultural production since 2000.

Challenge

Argentina's recovery from the deep economic crisis of 2001–02 has been impressive. Sparked by increased exports and consumption, GDP has surpassed the pre-crisis level, growing at an average rate of around 9 percent between 2003 and 2007, and reaching 7 percent in 2008 despite the current global economic crisis. With the onset of a worldwide economic slowdown, the Government of Argentina

90 percent of national and provincial paved non-concessioned roads in good condition (maintained with acceptable average roughness)

has come to see an aggressive infrastructure investment program as a key part of a counter-cyclical economic stimulus package.

The road sector, which carries nearly 80 percent of total freight-volume movements and serves the dominant mode of transport

in the country, is front and center in addressing structural weaknesses that hinder transport efficiency and economic competitiveness. In 1990, Argentina had the lowest share of paved roads in good condition among upper-middle-income countries. Over the past 6 years, the Government has given high priority to infrastructure development, both

as a tool to reduce social inequality and as a means to overcome bottlenecks to competitiveness.

Results

Public infrastructure investment levels in Argentina are up from less than 0.5 percent of GDP between 1995 and 2002 to 1.3 percent of GDP in 2007. Probably the most important milestone in the history of road projects financed by the International Bank for Reconstruction and Development (IBRD) in Argentina has been the encouragement and financial support provided by the IBRD to the Government in introducing and implementing the *Contrato de Recuperación y Mantenimiento* (CREMA), Rehabilitation and Maintenance Contracts. The successful implementation of the CREMA system has had a dramatic impact on the condition of the national roads network.

The strategy behind CREMA has helped build-up the required institutional capacity driven by basic principles such as efficiency, accountability, and transparency to best address user needs, as evidenced by:

- Cost-effectiveness of the CREMA compared to other type of contracts,
- Reduction in delays in execution of works,

- Reduction in supervision costs for road agencies,
- Sustainability in flow of funds to pay contractors,
- Increased innovation in programming and sequencing of works based on results and not inputs,
- Improved road safety conditions, as quality standards are linked to safety norms.

Time-series roughness measurements over the last 10 years show the positive outcome of a system that combines both the rehabilitation and subsequent maintenance of the pavements. The CREMA system has managed 14,000 kilometers of the national road network and 1,000 kilometers of the provincial road network since its inception in 1997. Ninety percent of national paved roads and provincial roads in participating provinces that are not under private concession are in good condition; roads in good condition have increased from 65 percent to 91 percent since the inception of CREMAs. These good-conditioned roads

14,000

kilometers of the national roads network managed through CREMA (approximately 55 percent of non-concessioned national network)

are maintained with acceptable average roughness or infrastructure roughness index (IRI) of less than 4. Roads with an IRI greater than 4 have been reduced from 35 percent to 6 percent in

the past 15 years. Roads in poor to bad condition (with an IRI of greater than 5) have been reduced from 11 percent to about 2 percent.

Reduced users' costs. In terms of road user costs, savings on the non-concession network (non-toll roads or roads not under private concession) are estimated at US\$275 million annually. The Argentina national roads network represents a total asset worth US\$7 billion and carries most of the country's long-distance traffic. The annual cost to the users to operate their vehicles on the network is about US\$10 billion.

Good road network conditions have allowed Argentina to take full advantage of high commodity prices. The 2004 exports accounted for 25 percent of GDP (measured in current prices), up from around 9 percent during the 1990s. The long-term, performance-based system is overall

more cost-efficient: the average unit cost of CREMA has been, in comparative terms, 15 percent lower than traditional unit-price systems.

Approach

The CREMA system was designed with the following features in mind:

- Focus on road users' satisfaction and on contractor's performance to achieve a minimum level of service, rather than on inputs (i.e., quantity activity and unit rates compliance);
- Require contractor to set up their own quality control system, eliminating redundant quantities and quality testing and keeping inspection team size and tasks to a minimum;
- Promote lump-sum contracts in order to reduce the risk of cost overruns;
- Require contractor to carry out a detailed engineering design before initiating the works, thus reducing the delays that are due to a lack of stock of prepared sub-projects;
- Deter the Treasury from failing to provide stable funding for road maintenance sector, as the long-term payment obligations under these contracts become legally binding on the Government;
- Reduce risk of unsatisfactory quality in the capital rehabilitation works since the contractor is obliged to maintain the roads over a five-year period; and
- Foster innovation on part of the contractors in the programming and execution of works by making payments tied to end-results and level of service rather than to rigid specifications related to workmanship.

The strategy behind CREMA has been aimed at gradually transferring the execution of road works to private contractors with performance-based contracts and focusing the capacity of the participating road agencies toward more efficient planning and results-oriented organization. Through several projects at the federal and provincial levels in the last 2 decades, World Bank engagement in Argentina's road agenda has contributed to reducing the infrastructure backlog and to strengthening the technical,

managerial, and environmental capacities of the participating road agencies.

At the provincial level, IBRD has supported the design and execution of more efficient road programs, financed works to upgrade and rehabilitate selected segments of the core networks under traditional contracts and, more recently, expanded the CREMA asset management system to the provincial networks. Currently, a long-term results-oriented maintenance strategy is being implemented based on the gradual expansion of CREMA model of highway maintenance.

In the last 15 years, the World Bank has provided continued assistance which has been articulated around a multi-pronged approach that encompasses several critical areas: design and supervision of the CREMA management system, independent technical audits, and a price monitoring mechanism to better assess the evolution of costs and glean the market's response to the various rounds of biddings carried out by road agencies in Argentina.

IBRD Contribution

IBRD has supported Argentina's road transport sector for the past 2 decades through 9 infrastructure investment loans and additional financing operations to scale up ongoing operations, for a total amount of US\$2,346.7 million. The World Bank-supported strategy developed through the CREMA system has led to the development and implementation of strategic road programs that take care of the entire road network, according to traffic and physical conditions of the different segments while prioritizing interventions based on sound economic criteria. This implies designing and implementing investment plans in line with budget constraints, ensuring an efficient allocation of resources between competing needs (capacity expansion, regional integration, rehabilitation, and maintenance), and strengthening the technical capacities in support of the use of appropriate design and maintenance standards.

The Bank's overall strategy focuses on the development of a more comprehensive and efficient road management plan in Argentina that ensures the convergence of road assets toward a steady state-condition, relying on 6 building blocks:



- Supporting adequate road financing strategies within a sound fiscal framework that enables to achieve sustainability of the core network but at the same time breaks up the vicious cycle of postponing interventions in the poorer less-developed parts of the country;
- Building up planning capacity and improving mechanisms to establish investment priorities under network-wide approaches;
- Implementing cost-efficient asset management policies based on target or results-oriented programs to make the most of the available resources;
- Improving governance, driving policy and decision-making with a focus on the degree of institutional rationality, increased transparency, and social accountability;
- Addressing externalities by mainstreaming road safety initiatives and environmental management into the government's policy agendas.

Summary Timeline

1991 → Initial reforms in the Road Sector in Argentina: Concession Program.

1995–1996 → Pilots of performance-based routine maintenance type of contract called the “km-month” in non-concession national paved road network.

1997–2005 → First Phase of CREMA launched. Provincial Roads Project (4093-AR). Fifty-eight contracts were bid and awarded covering a total length of network of about

11,000 kilometers. This first phase came to term in 2002, coinciding with the severe economic downturn that hit the country at the end of 2001.

1998–2005 → National Highways Rehabilitation and Maintenance Project (4295-AR).

2004 → The bidding process was suspended for a period to examine in more detail the reasons for the market's response, one of which was clearly the crisis-generated inflation that started in the second quarter of the year.

2004–2010 → Second Phase of CREMA. National Highways Asset Management Project (7242-AR), IBRD Adaptable Program Loan 1. This phase included about 24 contracts covering a total length of about 5,000 kilometers. This phase came to term in 2009.

2004–2007 → Buenos Aires Infrastructure Sustainable Investment Development Project (7268-AR), IBRD Adaptable Program Loan 1.

2006–2011 → Third phase of CREMA. Argentina Provincial Road Infrastructure (7301-AR) with Subsidiary Loans from federal government to provincial governments. Following the design of an action plan aimed at mitigating

the negative effects of the 2002 economic crisis, and after adjusting the official budget estimate mechanism, the third phase was carried out with some 12 contracts covering a length of about 2,200 kilometers of roads.

2006–2012 → Argentina-Cordoba Road Infrastructure Project (7398-AR). First direct loan to a province that included CREMA contracts.

2006 → Analytic and Advisory Activity (World Bank). Reducing Logistics Costs in Argentina Report (No. 36606).

2007–2012 → Argentina – Santa Fe Road Infrastructure Project (7429-AR).

2007–2011 → Fourth Phase of CREMA. Argentina National Highways Asset Management Project (7473-AR), IBRD Adaptable Program Loan 2. This phase contemplated the bidding and implementation of a larger CREMA program aimed at completing the coverage of the entire 22,000 kilometers-long non-concession paved national network.

2007–2012 → Buenos Aires Infrastructure Sustainable Investment Development Project (7472-AR), IBRD Adaptable Program Loan 2.

IBRD Contribution		US\$ million
1997	AR Provincial Roads Project (4093 AR)	300
1998	AR National Highways Rehabilitation and Maintenance Project	450
2004	AR National Highways Asset Management (7242 AR)	200
2004	AR Buenos Aires Infrastructure Sustainable Investment Development Project APL 1 (7268 AR)	200
2006 + 2010	AR Provincial Road Infrastructure (7301 AR): US\$150 million IBRD loan approved in 2006 + additional financing operation for US\$175 million IBRD loan approved in January 2010	325
2006	Argentina Cordoba Road Infrastructure Project (7398 AR)	75
2007	Argentina – Santa Fe Road Infrastructure Project (7429 AR)	126.7
2007	AR Buenos Aires Infrastructure Sustainable Investment Development Project APL 2 (7472 AR)	270
2007	AR National Highways Asset Management APL 2 (7473 AR)	400
		2,346.7

Good Practices Developed/ Replicated

BOX 1

The **Procurement Plan Execution System** [*Sistema de Ejecución de Planes de Adquisiciones SEPA*] is an innovative Internet platform developed in 2006 by the World Bank to provide public access to contracts executed in the framework of its investment portfolio in the region. SEPA provides public access to basic information on all contracts executed in the framework of projects financed by the World Bank (IBRD) and the Inter-American Development Bank (IDB) in the countries of the region, as well as the procurement and contracting processes planned and their status.

A key innovative aspect of the CREMA system developed with the support of the World Bank in Argentina is the improvement in sector governance, driving policy and decisionmaking with a focus on the degree of institutional rationality, increased transparency, and social accountability. An Action Plan agreed upon by the IBRD and the Government of Argentina will strengthen governance under its recommended actions: (a) closely monitor the evolution of prices in the sector; (b) carry out thorough reviews of technical designs (site measurements on the condition of roads, revise required interventions, etc.) to prepare budget estimates that reflect updated market prices before launching any new bid; (c) monitor and assess the capacity of the construction industry to identify possible issues that may limit competition and to have a clear view of the market characteristics where best to aim bids; (d) design bidding strategies and reformulate the procurement plans to take into consideration analysis results of the construction industry capacity; (e) modify aspects of the bidding documents that will increase the entry of new firms to the market and improve competition; and (f) increase information available to the public with regards to project procurement and implementation. This final point is being implemented through an innovative internet-based tool called SEPA developed by the World Bank team in the Buenos Aires Office.

As part of the focus on improving governance, the IBRD project team has also initiated a **price monitoring** mechanism aimed at better assessing the evolution of costs and at capturing the market's response to the

various rounds of bidding launched by the Road Agencies in Argentina. The system comprises two main components: a database that incorporates the essential features that characterize a bidding event and another database of unit rates for most items on the Bill of Quantities, comparing the official and the best bid estimates. This information is helpful in detecting, at any given time, the degree of competitiveness among bidders, flaws in official budget estimates, or collusive practices between bidders leading to artificially high bid prices, patterns of repartition of awards among bidders, etc. The system covers all the CREMA programs that have been financed since 1997, both at national and provincial levels and also other traditional type of contracts in the provinces. The unit rates database helps to build, over time, a series of fairly representative unit costs for each work activity and to detect suspiciously high or low values in rela-

1,000
kilometers of CREMA-
managed provincial roads
network Map of World
Bank Road Projects in
Argentina

BOX 2

HDM-4 Model

The Highway Design and Maintenance Standards Model (HDM) was developed by the World Bank's Transportation Department to meet the needs of highway authorities, particularly in developing countries, for evaluating policies, standards, and programs of road construction and maintenance. The model simulates total life cycle conditions and costs for one road, a group of roads with similar characteristics, or an entire network of paved or unpaved roads, for a series of road agency construction or maintenance strategies, and provides the economic decision criteria for evaluating the strategies being analyzed. The primary cost set for the life cycle analysis includes the costs of road construction and maintenance and vehicle operating costs, to which travel time costs can be added.

Map of World Bank Road Projects in Argentina



tion to the statistical averages. It can further help identify market response differences between provinces, programs, and highway agencies, and to capture the magnitude of inflation.

The IBRD has also promoted the use of the HDM-4 Model to evaluate the cost effectiveness and cost efficiency of investments in the transport sector, as an important tool to increase the degree of institutional rationality and transparency in the allocation of funds for investments in road infrastructure.

NEXT STEPS

Going forward, the Government proposes to further roll out the CREMA model to more of the national and, especially, provincial networks, with the goal of growing from 880 kilometers to 2,100 kilometers of provincial roads under CREMA by the end of 2012.

Recently approved and under preparation, IBRD-supported operations are aiming to develop a more direct and in-depth policy dialogue with key strategic provinces in Argentina. The approach involves initial “template” operations, executed through the Federal Government, then further extended to provincial governments that are willing to participate in a sector program. The operation finally moves toward stand-alone operations directly with provinces, which allows fostering the generation of a strong strategic partnership between the World Bank and key strategic provinces to deal with more province-specific issues.

The World Bank will continue to support Argentina in continuing to address those structural weaknesses that hinder transport efficiency and economic competitiveness, and continuing to improve the institutional framework and governance of a sector that is experiencing adjustments to the interactions between the public and private transport-sector arena.

LEARN MORE

World Bank in Argentina
www.bancomundial.org.ar

Federal Government – Ministry of Federal Planning, Infrastructure and Services:
<http://www.ucpypfe.gov.ar/pivip1-componentes.html>

Government Officials Interviews/Testimonies in the Press:

Alberto Carcaño, Provincial Road Agency Director, Province of Corrientes, referring to CREMA financed by Loan AR-7301. Date August 25, 2009. <http://www.cardinalcristi.com.ar/?noticia=1500>

This document has been prepared on the basis of information and with excerpts from the following documents:

- AR-Provincial Roads Project Appraisal Document, IBRD Report No. 32019-AR, 2005; Additional Financing Project Paper, IBRD Report No. 50172-AR, 2009.
- AR-Cordoba Provincial Road Infrastructure Project Appraisal Document, IBRD Report No. 36334-AR, 2006.
- AR-National Highway Asset Management Project Appraisal Document APL II, IBRD Report No. 39716-AR, 2007.
- G. Cabana, G. Liautaud and A. Faiz, *Areawide Performance-Based Rehabilitation and Maintenance Contracts for Low-Volume Roads*. 7th International Conference on Low Volume Roads, May 23–27, 1999.
- Maria Marcela Silva and Gerard Liautaud. *Performance-based CREMA Contracts in Argentina, A Review of ten Years of Experience (1997–2007)*. [Upcoming publication]
- Tomas Serebrisky. *Reducing Logistics Costs in Argentina*. IBRD Report No. 36606.

MULTIMEDIA

Testimonies from beneficiaries and public officials regarding the IBRD-financed Santa Fe Road Infrastructure Project (7429-AR): <http://vimeo.com/5065235>