

## SANTA CATARINA STATE HIGHWAY PROGRAM, PHASE 4

(BR-0355)

### EXECUTIVE SUMMARY

<b>Borrower:</b>	Government of the State of Santa Catarina	
<b>Guarantor:</b>	Federative Republic of Brazil	
<b>Executing agency:</b>	Santa Catarina State Highway Department	
<b>Amount and source:</b>	IDB (OC):	US\$150 million
	Local:	US\$150 million
	Total:	US\$300 million
<b>Financial terms and conditions:</b>	Amortization period:	20 years
	Grace period:	5 years
	Disbursement period:	5 years
	Physical initiation of works:	4 years
	Interest rate:	variable
	Inspection and supervision:	1%
	Credit fee:	0.75%
	Currency:	Currency pool
<b>Objectives:</b>	<p>The general objective of the program is to improve economic integration and efficiency of the different regions and productive sectors in Santa Catarina state, decreasing transportation costs and travel times thanks to improved traffic conditions and greater traffic safety. The specific objectives of the program are to: (i) reduce transportation costs; (ii) improve access to county seats; and (iii) increase safety in passenger and freight transportation.</p>	
<b>Description:</b>	<p>The program consists of upgrading and rehabilitating highways that belong to the state highway system, implementing major highway safety measures and institutional strengthening activities. The road works will consist of paving 450 km of highways with relatively high traffic that are currently dirt or gravel and rehabilitating 700 km of already paved roads that are reaching or have outlived their useful life. The purpose of the highway safety component is to strengthen the capacity of the Santa Catarina Highway Patrol (<i>Polícia Rodoviária</i>) (PR/SC) to enforce traffic laws and substantially increase its capacity</p>	

to prevent and address accidents. Highway upgrades and rehabilitation will include the construction of sidewalks, bicycle paths, access ramps for the handicapped, and pedestrian protection systems for roads that go through urban areas. The activities for institutional strengthening and the environment include improving planning capacity, which is already quite well developed, assessing the environmental liabilities of the roads, and preparing and implementing a plan for highway transportation of hazardous materials.

**The Bank's  
country and  
sector strategy:**

The strategy focuses on the following main areas: (i) promote and deepen public sector reform and modernization on the federal and state levels; (ii) support efforts to improve competitiveness and market access for Brazilian products; (iii) support efforts to reduce social inequities and poverty; and (iv) address the problems of environmental and natural resource management, with emphasis on protecting vulnerable ecosystems. The proposed program will support the area of strengthening competitiveness and market access by reducing transportation costs (paragraph 2.19 of the country paper dated 7 July 2000).

**Environmental  
and social  
review:**

The Santa Catarina Environment Foundation (FATMA), the state environmental protection agency authorized to grant environmental permits for the projects to be carried out under the proposed program, decided that the rehabilitation works would not require environmental and social impact assessments and may be executed with the respective Environmental Permit. The upgrading works were reviewed on a case-by-case basis to determine the basic environmental studies and permits necessary. For the projects in the representative sample, FATMA did not require any environmental impact studies. To comply with Bank policy, DER/SC prepared an environmental assessment report (EAR), based on the simplified environmental assessments conducted for each sample project. The EAR concluded that: (i) program implementation will lead to an improvement in current social and environmental conditions in the area of influence of the projects; (ii) the potential adverse impact of the projects is minor and foreseeable, and can be mitigated through measures that have already been incorporated into the designs; (iii) the program will properly address (a) the impact of the works, (b) indemnification or resettlement of affected residents, (c) environmental compensation and critical environmental liabilities, (d) protection of springs, and (e) transportation of hazardous materials; and (iv) the program will provide instruments to strengthen the environmental management capacity of the DER/SC. The DER/SC has carried out outreach activities with the affected communities and other stakeholders and will continue to do so during preparation of the designs for the new highway segments to be added to the program. The environment report was forwarded to the Public

Information Center (PIC) on 16 July 2001 and approved by the Committee on Environment and Social Impact (CESI) on 3 October 2001 (paragraph 3.43).

**Benefits:** The expected benefits will be to: (i) reduce transportation costs; (ii) improve access to municipalities in the state for the transportation of passengers and agricultural and industrial production; (iii) improve safety in passenger and freight transportation, reducing the risk of accidents, decreasing travel time, and optimizing itineraries; and (iv) lower the cost of highway maintenance and repair. The program will benefit all the residents of the state, especially those living in the interior. To a lesser degree, it will also benefit the residents of neighboring states who are involved in trade in goods, inputs, and services with individuals and firms located in Santa Catarina or use its ports for exports.

**Risks:** The program does not involve any special risks, except for limited institutional exposure, given that the DER/SC is a competent executing agency with experience implementing projects financed by multilateral institutions and an appropriate organizational structure, and will be supported by a management firm. However, there is a risk that professionals and other skilled staff will decline due to attrition. This risk will be minimized through a plan to hire young professionals that will be supported by the program through training and staff development. The program has no political, technical, financial, or environmental risks (paragraph 4.29).

**Special contractual clauses:** Prior to approval of the first contract for the execution of civil works, the management firm must have been hired and be in a position to provide the necessary support to the DER/SC (paragraphs 3.7 and 3.53).

Prior to issuing the call for bids for each construction contract, the DER/SC must: (i) obtain an environmental permit; and (ii) arrange for a resettlement plan for the low-income population (paragraph 4.24a).

Prior to approval of each construction contract, the DER/SC must hire the firm that will be in charge of technical and environmental supervision (paragraph 4.24b).

Prior to initiating each construction project, the DER/SC must: (i) be in possession of the environmental paperwork required; (ii) give the respective technical units and regional inspector of the DER/SC, the works supervisor, and the contractor a general and specific environmental briefing; (iii) implement the resettlement plan for the low-income population; and (iv) take the necessary measures to ensure that the public utilities affected cooperate in the project (paragraph 4.24c).

Other conditions: the DER/SC must: (i) within 18 months after signing of the loan contract, hire consulting services to prepare the *highway transportation master plan* (paragraph 2.14a), the *hazardous materials master plan* (paragraph 4.24e), and the *environmental liabilities survey* (paragraph 4.24f), and, within 24 months, the *guidelines for municipal land management* (paragraph 4.24f); (ii) within 30 months, initiate procurement under the *emergency action plan* (paragraph 4.24e); (iii) within 36 months, complete the *course on handling accidents involving hazardous materials* (paragraph 4.24e); and (iv) within 24 months, complete the *review of environmental regulations for highways* (paragraph 4.24g).

As a condition precedent to the first disbursement for the activities to support the PR/SC, a new agreement between the DER/SC and the PR/SC must be signed (paragraph 3.10). In addition, prior to outfitting a new Highway Patrol station, the DER/SC must demonstrate that the PR/SC has the necessary staff to assign to it (paragraph 3.11).

Other conditions: the DER/SC agrees to: (i) compile data for any future socioeconomic evaluation (paragraph 3.52); and (ii) prepare the other program projects not included in the representative sample according to the same procedures as those used for the sample, or better ones (paragraph 2.7).

**Poverty-targeting and social sector classification:**

This operation does not qualify as a social equity enhancing project, as described in the key objectives of for Bank activity set forth in the Report on the Eighth General Increase in Resources (document AB-1704). Furthermore, this operation does not qualify as a poverty-targeted investment (PTI). The borrowing country will not be using the 10 percentage points in additional financing (paragraph 4.25).

**Exceptions to Bank policy:**

None.

**Procurement:**

International competitive bidding will be required for construction contracts in excess of US\$5 million and the procurement of equipment in amounts greater than US\$350,000 (paragraph 3.55). An open call for proposals will be requirement for consulting contracts above US\$200,000 (paragraph 3.56).

**Recognition of previous expenditures:**

Up to US\$9.5 million in expenses incurred will be recognized as eligible for retroactive financing, up to US\$3.5 million of which will be financed by the Bank and up to US\$6 million as part of the local counterpart contribution (paragraph 3.47).

## **I. FRAME OF REFERENCE**

### **A. Socioeconomic framework**

- 1.1 The economy of Santa Catarina state is based on a well-balanced regional distribution of resources. Its productive structure focuses on agriculture, manufacturing, mining, tourism, and services, which together offset any adverse cycles. The state posts above average macroeconomic indicators for the southern part of the country. From 1990 to 2000, GDP grew at a cumulative annual rate of 3.8%. This healthy rate is reflected in the state accounts, which have posted a fiscal surplus systematically from 1998 to 2000.
- 1.2 Santa Catarina state, located in southeastern Brazil, accounts for 1.1% of the surface area of the country, 3.1% of the population, and 3.6% of GDP. With 4.4% of industrial GDP, 6% of grain production, and 5.1% of exports, it contributed to the balance of trade with a surplus of US\$15 billion in the 1990s. Since it does not have any large urban centers (none of its cities is home to more than 10% of the state population), the social situation in Santa Catarina does not have the common problems found in other states. In the absence of latifundios, the main socioeconomic challenge is to ensure the viability and sustainability of small rural farms. Although it is one of the states with the least arable land, Santa Catarina has the best land distribution index in the country. This structure was not imposed, but stems from the consolidation of the state's economic development and its particular demographic structure, which is based on immigrants of various origins.

### **B. Transportation system**

- 1.3 The national transportation system consists of automotive, railroad, river, maritime, and air transportation. The Ministry of Transportation ensures harmonious, integrated development of all of these means. For automotive transportation, priority has been assigned to maintenance and operation of the existing road system, with gradual transfer to the states of responsibility for their administration. The national road system consists of the federal, state, and municipal systems. The federal government is responsible for the construction, upgrading, and maintenance of the major highway corridors; the state governments, for integration of productive regions into the corridors and urban centers; and municipal governments, for ensuring proper access for units of production.
- 1.4 The Santa Catarina state road system, which absorbs practically all passenger traffic and the overwhelming majority of freight traffic, is made up of: (i) 2,270 km of federal highways, overseen by the National Highway Department (DNER), of which 2,138 km are paved; (ii) 6,448 km of highways that belong to the secondary road system overseen by the DER/SC, of which 3,708 are paved; and (iii) 53,867 km of municipal roads, of which only 890 km are paved.

- 1.5 The state has a railroad built in the late 19<sup>th</sup> and early 20<sup>th</sup> century that is 1,120 km long and divided into two systems. The largest one, 945 km long, is part of the national railroad system and plays a minor role in the transportation of state freight. The other one, 175 km long, is mainly used to transport coal for electric power generation and is privately operated.
- 1.6 The port system consists of the ports of São Francisco do Sul, Itajaí, and Imbituba. In 2000, the main port, São Francisco, which was opened in 1955, moved 14.2 million metric tons of cargo, mainly bulk liquids; Itajaí, 2.3 million metric tons, almost all of which general cargo; and Imbituba, 1.2 million metric tons, almost all of which solid bulk. The airport system consists of 21 public airports and seven private ones, of which 16 have paved runways. Three of them are major airports (Joinville, Navegantes, and Florianópolis) and four are significant regional airports (Blumenau, Lagos, Chapecó, and Forquilha).

### C. State infrastructure and its operation

- 1.7 The road system is essential for the state inhabitants to carry out their economic and social activities. It is the dominant means of transportation for merchandise and productive inputs, especially for those with higher value added. From a social standpoint, it is also important to ensure that the population has access to social and public services.
- 1.8 Santa Catarina state currently faces the challenge of maintaining its road system, ensuring serviceability, safety, and preservation of state assets, while continuing to expand the paved system. During the period from 1995 to 2000, the following objectives were achieved:

<b>Length of road section (in km ), according to condition</b>							
<i>Road system</i>	<i>Year</i>	<i>Excellent</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<i>Very Poor</i>	<i>Total</i>
Paved	1995	1,126	678	705	496	107	3,112
	2000	1,094	1,099	820	426	94	3,533
Unpaved	1995	133	413	1,261	503	120	2,430
	2000	237	636	985	505	78	2,441

- 1.9 The paved road system in excellent and good condition represents 62% of the total system, while that in poor or very poor condition accounts for 15%; for the unpaved system, the percentages are 36% and 24%, respectively. As the system is rehabilitated, the roads should have appropriate designs for small cities located close together, thereby improving safety conditions for pedestrians and cyclists.

#### **D. Road maintenance**

- 1.10 During the 1980s, after having achieved a strong expansion of the state road system, the DER/SC faced the need to ensure its proper maintenance or lose a major public good, generating additional vehicle operation costs, an increase in accidents, damage to cargo, adverse environmental impact, and so on. To

**State Road System (km)**

<b>Year</b>	<b>Total</b>	<b>Maintenance</b>
1996	6,362	5,734
1997	6,362	5,866
1998	6,439	5,794
1999	6,448	6,023
2000	6,573	5,973

address this challenge, the DER/SC devised a structure under which the Operations Office oversees road maintenance, with support from the Road Maintenance, Traffic Engineering, and Road Safety Offices and the 22 districts directly responsible for maintenance activities. The DER/CS maintains the entire system under its jurisdiction. The difference between the entire system and the system being maintained is due to the urban encroachment of state highways and the addition of new stretches in the State Road Plan to allow for project execution and to roads under construction.

- 1.11 The DER/SC maintains the state road system through a diversified management approach: (i) on force account, with staffing and equipment overseen by the Regional Offices; (ii) under unit price-based maintenance contracts; and (iii) under quality level-based maintenance contracts. The guidelines applied by the DER/SC maximize the use of its own technical resources (staff and equipment) and allow for outsourcing of maintenance services that it cannot provide itself. Given the gradual cutback in staff, outsourcing has become increasingly important, but the degree of outsourcing varies depending on the district and its resources. Thus, the same services can be rendered in the future by force account and by contract, which are normally complementary activities. It should be mentioned that two districts, as part of a pilot project launched in 1998, have implemented project outcome-based maintenance services, and will be expanded insofar as the pilot project proves to be beneficial, but the nature of the contract requires a higher initial technical standard for the roads being maintained.
- 1.12 Road maintenance is subject to a strict planning system, owing to the implementation of a Maintenance Management System (MMS), which keeps a detailed inventory of the road system, uses standard techniques for maintenance services, prepares work programs and budget proposals, and monitors the resulting activities.
- 1.13 The budget allocated to road maintenance is sufficient. The average cost for routine maintenance in 2000 was US\$3,250/kilometer. Shown below are the expenditures for routine and scheduled maintenance for the 1996-2000 period (executed), and budgeted expenditures for 2001 (amounts in thousands of dollars at current prices):

Item	1996	1997	1998	1999	2000	2001
By force account	11,459	10,082	9,531	10,387	10,977	9,998
By contract	5,403	5,602	6,921	6,837	8,437	11,700
Total routine maintenance	16,862	15,685	16,452	17,224	19,414	21,698
Unit cost (US\$/km)	2,910	2,675	2,840	2,860	3,250	3,630
Scheduled maintenance	7,853	7,480	4,053	2,409	152	9,339
Total	24,715	23,165	20,504	19,633	19,566	31,037

## E. Road safety

- 1.14 The operation of the state highways is entrusted to the *Polícia Rodoviária* (Highway Patrol) of the State of Santa Catarina (PR/SC), whose mission is to oversee, coordinate and direct traffic, preventing and suppressing acts that impair safety. The goal of the PR/SC is to ensure the free movement of traffic and minimize accident risk. Due to staffing, equipment and budget restrictions, coverage by the PR/SC is limited to 2,600 kilometers of the state road system, and it therefore seeks to gradually extend the existing geographical coverage. The proposed project may also expand the duties of highway education currently undertaken by the PR/SC.
- 1.15 Many accidents can be avoided by the use of traffic engineering, especially with proper signaling and other traffic control devices, and by adequate geometric design. The Bank has published a manual<sup>1</sup> recommending the concepts, practices and procedures for inclusion in the projects it finances. In the proposed program, not only do the designs for the roadways subject to rehabilitation and improvement, particularly those sections in populated areas, provide for these road safety factors, but they include a specific component for upgrading the signaling system of other state highways, reducing road safety problems at critical points, installing electronic speed reduction devices in urban areas and developing a master plan for transporting hazardous materials.
- 1.16 The DER/SC hired a traffic safety expert who has been monitoring accident risk-related projects. This has greatly improved traffic safety and introduced a valuable learning process. A study of these controls to be made on the highways in the sample indicates that geometric and intersection corrections, and providing for pedestrian and similar crossings, will reduce serious accident and mortality rates. Other government actions to improve safety include: (i) accident assessment (using photography and witnesses); (ii) monitoring of the condition of accident victims for up to 30 days; (iii) mapping and computerized identification of critical accident points; (iv) better accident reporting; (v) procurement of equipment for the PR/SC, including mobile and stationary radar equipment; (vi) implementation of scales

<sup>1</sup> Philip A. Gold (1998), *Traffic Safety: Using Engineering to Reduce Accidents*. Washington, D.C.: IDB (xi + 196).

with photographic registers for trucks that do not pass over them; and (vii) highway education activities.

**F. Vehicle weight and measuring controls**

1.17 Vehicle size and weight are regulated in accordance with the Brazilian Traffic Code and the resolutions of the State Traffic Council. The Office of Traffic Engineering, an agency of the DER/SC's Office of Operations, has the authority to control and regulate the size and weight of vehicles traveling over state highways. The PR/SC has responsibility for oversight of the highways within the jurisdiction of the DER/SC.

1.18 This oversight was strengthened in 1995 with the "Program for Regulating Vehicle Weight by Axis on the Santa Catarina State Highway System" (Scales Program), using seven portable scales operated by the PR/SC, distributed among six districts of the DER/SC, which monitors the activities; the PR/SC is assisted by four regionally assigned squads covering 70% of the most heavily traveled state highways.

1.19 The effectiveness of weight regulation is satisfactory, even though the scales are not used frequently, because they have shown wide variability and must be upgraded. Of the regulated vehicles, 17% are fined, while the excess weight identified is relatively moderate (in the year 2000, less than 2 tons for each truck). To improve oversight, the DER/SC: (i) resumed its planning and supervision of this activity; (ii) increased the use of existing scales; and (iii) will purchase new scales to expand geographic coverage.

Year	Weighing Operations		
	Number of Vehicles		
	Regulated	Fined	%
1996	13,879	3,563	25.7
1997	32,537	5,348	16.4
1998	2,265	364	16.1
1999	16,745	1,866	11.1
2000	7,678	1,396	18.2
2001	10,996	2,390	21.7

2001: January-October.

**G. Road concessions**

1.20 The majority of state highways, and all of those covered in this program, have low to medium traffic levels, and therefore do not justify the use of the highway management concession system, either economically or operationally. However, the private sector plays an increasingly important role in road maintenance, due to projects executed by contract, which, together with works executed on force account, help keep the state road system in good condition.

1.21 The State of Santa Catarina has engaged in various highway concession-related projects, under state laws nos. 9.163 and 10.934. Under this system, the State awarded concessions covering the state highways accessed north of the island of Santa Catarina, permitting the partial overlap of roads covered in the concession;

however, the concession holder's failure to perform, and government delays, together with citizen protests, led the courts to prohibit the collection of tolls until the concession holder fully complied with his contractual obligations. The DER/SC, by court order, retook control of the highway, operating and maintaining it until the legal situation was resolved.

- 1.22 Other projects involved highways in the "Santa Catarina Road System" group, comprising three road systems, two based on federal highways transferred by agreements. These were the North Highway System (BR-280), 345 km long, the RR470 Highway System, 481 km long and the Brusque Highway System, 127 km. All three were the subject of a tender, and contracts were awarded for the two latter road systems. The State Auditing Office (TC/SC) ruled that the terms and conditions of the bidding procedure were unlawful and revoked the signed concession contracts. The DER/SC proceeded to return the portions of the federal highways to the DNER.
- 1.23 This project, together with the road system features (road density, numerous alternative routes between various starting and destination points, proximity to population, low traffic volume, ingress and egress problems, etc.), has caused the State to forego the highway concession system as an option for developing their road system in the medium term.

#### **H. Institutional framework**

- 1.24 The DER/SC has a strong institutional framework. In recent years it has deepened its technical capacity as a result of sound practices. It has a technical and professional team with tenure, proven planning ability and the institutional desire to improve and implement its methods. As part of this institutional strengthening, the DER/SC recognizes shortcomings in areas such as professional staff turnover, integration of diverse systems used in project planning and scheduling, implementation at the state level of relatively innovative elements (hazardous materials transport, extending load regulation coverage, upgrading traffic safety systems, expanding road maintenance through outcome-based contracts) and the review of environmental specifications requiring assurance of sustainability.

#### **I. Bank strategy**

- 1.25 The key elements of the Bank's strategy are: (i) promote and deepen public sector reform and modernization on the state and federal levels; (ii) support efforts to increase competitiveness and access to Brazilian productive markets; (iii) support efforts to reduce social inequities and poverty; and (iv) address the problems of environmental and natural resource management, particularly with respect to the protection of at-risk ecosystems. The proposed operation falls within the area of increasing competitiveness and access to productive markets, by reducing transportation costs.

## **J. Experiences of the Bank and other financial institutions**

- 1.26 The Bank has had extensive experience assisting Santa Catarina and its highway system. This support began with the approval of the “Program for Feeder Roads for Santa Catarina” (380/OC-BR and 624/SF-BR, US\$54.9 million; 1980), which allowed for the paving of 824 km of roads and a substantial reduction in vehicle operating costs and travel times. The “Second Program for Feeder Roads for Santa Catarina” (770/SF-BR and 157/IC-BR, US\$86.7 million; 1985), which ended in 1992, helped pave 451 km of roads, construct bridges and procure equipment to strengthen the capacity of the DER/SC. The “Program for Corridor Roads for Santa Catarina” (719/OC-BR, US\$102.5 million; 1992), concluded in 2000, improved 541 km of highways, representing 67% of paved segments during the life of the loan<sup>2</sup>.
- 1.27 The State also had the support of the World Bank. In 1992, with Loan 3547-BR (US\$50 million), it participated in the “National Program for State Highway Maintenance”, which, for six years, allowed for the rehabilitation of 526 km and scheduled maintenance of 532 km of roads, as well as routine maintenance, procurement of equipment, and technical assistance and training.
- 1.28 Lastly, the State had the support of the National Bank for Economic and Social Development (BNDES), through the “Program for Highway Sector Investment”, consisting of multiple projects for embankments, paving, bridges, access and detour routes for cities. With US\$15.7 million, it was able to develop 174 km of highways.

## **K. Lessons Learned**

- 1.29 The lessons learned in the three highway sector projects for the State of Santa Catarina helped identify the following: (i) **Financial and fiscal framework**: the projects should be carried out only if the executing unit is financially sound, to permit the timely contribution of counterpart funds and guarantee its ability to borrow; (ii) **Institutional and operational framework**: the projects should support the adoption of an adequate institutional framework where the institution can “learn by doing”, thus bringing about the desired changes; (iii) **technical aspects**: a project should have firm technical guidelines from the start; establishing such guidelines in the project execution stage becomes difficult, during which the Bank may not be in a position to implement them; (iv) **global vision**: the projects must have a broad vision of the target sector; partial or limited projects generally hinder the need to address difficult issues, which take longer to resolve; and (v) **stakeholder involvement**: this involvement is a high-yield investment, since it assures that the

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<sup>2</sup> The project completion report (PCR) for this operation, dated September 4, 2001, emphasizes that execution delays were due mainly to the lack of counterpart resources, since the government authorities did not give the program the necessary priority. The current administration, which took office in 1999, has ensured the necessary resources to complete the project. The PCR also mentions that the development goals were attained.

stakeholders understand the nature of the project and what it demands from and offers to the community; (vi) **road concessions**: even in states that are technically and institutionally ready, road concessions can break down if the terms of the concession are not adequate or there is a lack of properly qualified concession holders; and (vii) **road maintenance**: When the state has an adequate road maintenance system, with the full and growing participation of the private sector, reforming that system can be accomplished as a work in progress, without imposing qualitative changes.

- 1.30 Benefiting from these lessons, this program possesses: (i) a clear commitment for appropriation of local resources, based on a sound financial position; (ii) a strong institutional framework, with an evolving executing agency sustained by a medium and long-term vision; (iii) recent amendments to state technical guidelines, with strict standards; (iv) inclusion of program activities within the state's medium-term transportation plan; and (v) community outreach activities for gaining consensus on the selected projects and proposed solutions.
- 1.31 Similarly, the lessons learned on projects with the federal and state governments have allowed for the inclusion of stricter and more uniform procedures for readiness, benefiting from experience-sharing and making loan management more effective. The federal government loans are more problematic; the reasons are diverse, but are based on financial and institutional factors. These factors have been specifically accommodated in this program<sup>3</sup>.

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<sup>3</sup> The project alert system (PAIS) identifies three "at risk" projects for the transportation sector, two of which have the DNER as the executing agency (904/OC-BR and 1046/OC-BR) and the third, the State of Bahía (1191/OC-BR).

## **II. THE PROGRAM**

### **A. Objectives and Description**

- 2.1 The general objective of the program is to improve economic integration and efficiency of the different regions and productive sectors in Santa Catarina state, decreasing transportation costs and travel times as a result of improved traffic conditions and greater traffic safety.
- 2.2 2.2 The specific objectives of the program are to: (i) reduce transportation costs; (ii) improve access to county seats; and (iii) improve safety in passenger and freight transportation.

### **B. Program Strategy**

#### **1. Highway Strategy for the State of Santa Catarina**

- 2.3 The population and production structure of the State of Santa Catarina, with its balance of a large urban and rural population, requires a dense road system capable of providing the necessary transportation services. Such conditions of population and production distribution define a road system with intermediate demand, which needs to be well designed and in good condition, but does not require the capacity of heavy traffic highways. The State is meeting this challenge by expanding the road system under its jurisdiction, giving it the technical features geared to the operation and use of the roads, the characteristics of the land and its occupants, and progressively paving the roads that are more heavily traveled; special attention is given to road safety and to services for pedestrians and non-motorized transportation.

#### **2. Type of operation and investment categories**

- 2.4 This operation has been conceived as a comprehensive multiple-project program, with the following main investment categories: (i) technical and environmental works project studies; (ii) civil works to improve and rehabilitate roads in the state road system and their supervision; (iii) highway safety improvement and accident prevention; and (iv) strengthening of planning capacity and highway management.

#### **3. Project selection criteria**

- 2.5 With varying frequency, depending on the type of technical assessment, the DER/SC inspects the road system under its jurisdiction and updates the applicable inventory. The scheduled reviews include, among other tasks, a visual inspection of the overall network and evaluation of the condition of the roads ("Falling Weight

Deflectometer” procedure (FWD)); these activities supplement the regular inspections carried out by the regional authorities.

- 2.6 Based on this overall inspection, the project selection criteria for the program are: (i) road segments whose cost effectiveness exceeds 12% are identified, using the Highway Design and Maintenance Model (HDM IV); (ii) only segments whose annual average daily traffic rate for the year the road is opened exceeds 300 vehicles are considered; (iii) the segment should be part of the road system under the DER/SC's jurisdiction; and (iv) the segment should be connected to the paved road system at least at one end.

#### **4. Representative sample**

- 2.7 The representative sample of the highways to be rehabilitated under the program is 421 km , out of a total of 700 km (60%); the sample of highways to be improved consists of 229 km , out of a total of 450 km (51%). The estimated cost is approximately 55% of the total value of the highway projects in the program. These projects have the technical, financial and environmental documentation, as well as the respective bidding terms and conditions, to enable them to be executed in the first year of the program. The DER/SC contracted the preparation of the sample under complete terms of reference, in accordance with the Bank's criteria, including outreach activities and a resettlement policy. The same or better procedures will be used to prepare the rest of the projects in the program. With the Bank's authorization, and the no objection from the project team to the engineering designs of the representative sample, the DER/SC has already begun the bidding process.

#### **5. Road safety**

- 2.8 Although road safety conditions are not among the most dangerous in the country, there has been a marked increase in accidents in recent years (3,335 in 1994; 5,414 in 2000, of which 1,982 had casualties), with 209 deaths and 2,975 injured in 2000. In this regard, the State has placed a great deal of importance on supporting accident prevention, driver education, reducing traffic accident rates and improving service, encouraging the PR/SC to have a greater presence, by expanding its geographic coverage to include the entire paved and partially paved state road system, and providing it with modern efficient equipment. The DER/SC has also been successful in effectively lowering accident rates in urban areas with the installation of automatic speed reduction devices; the proposed program will allow for wider distribution of these devices and implementation of other infrastructure improvements.
- 2.9 The State's strategy is aimed at simultaneously dealing with three fronts: (i) improving infrastructure quality, solving critical points and raising the design standard to respond to the needs of users, pedestrians and non-motorized transportation; (ii) traffic operation and control, by training and equipping the

PR/SC and expanding its geographic coverage; and (iii) planning, owing to the preparation of road safety plans that integrate the various elements with the responsible parties by initiating intermediate measures (the reports that the DER/SC will submit to the Bank will include the road safety-related tasks and goals; paragraphs 3.60 and 2.15a).

## **6. Environmental aspects**

- 2.10 The DER/SC possesses the environmental guidelines for the various project phases. The environmental studies of the representative sample were based on these guidelines and supplemental instructions for complying with the Bank's requirements, which include: (i) identification and targeting of environmental liabilities; (ii) identification and location of protected areas; (iii) location of public water supply; (iv) surveying of conditions where roads go through urban areas; (v) surveying of the socioeconomic profile of the residents directly affected by the works; and (vi) conducting outreach activities. Based on the environmental studies of the projects in the sample: (i) an environmental assessment of the program was done; (ii) measures for environment-related institutional strengthening are provided for, with the training of employees in all departments of the DER/SC and regional offices; and (iii) vegetation unavoidably removed will be compensated for.

### **C. Components**

- 2.11 The program contains four components, as described below, and also involves associated expenditures and finance charges.
- 2.12 **Engineering and management** (US\$12,282,000): This component will finance the economic feasibility, technical and environmental studies for the program and other road system-related projects under the DER/SC's jurisdiction, and are among the high-traffic roads of interest to the DER/SC. For these studies, the DER/SC will utilize the technical guidelines called "Service Instructions" (paragraph 3.15a), which have a high technical standard and produce high-quality engineering projects. One specific study, involving the environmental liabilities of the state road system not covered in this program, seeks to identify and quantify the environmental liabilities created by prior activities of the DER/SC and to propose solutions. This component will also cover the program's management expenditures, chief among them being the cost of the management firm.
- 2.13 **Civil works** (US\$226,251,000): This includes the rehabilitation of 700 km of paved highways, whose existing pavement is in poor or normal condition and at the end of its useful life, as well as the improvement of 450 km of unpaved roads of relatively high traffic. The works include the construction of berms, improvement and expansion of the drainage system, road widening or platform modifications and replacement of works of art; of particular importance are road safety elements, such as works involving intersections and urban access routes, protection of pedestrian

and bicycle paths, etc., and the mitigation of environmental impact by the new works. Lastly, it will include supervision of the program projects.

- 2.14 **Road safety** (US\$21,881,000): This component will cover various activities for improving road safety conditions. Some of them, such as handling critical points, signal upgrade and the procurement of automatic speed reduction devices or electronic barricades, are intended to improve the quality of the existing infrastructure. Other activities aimed at supporting the PR/SC, such as the construction of 10 new patrol stations and the procurement of patrol and rescue vehicles, seek to expand the patrol's geographic and operational coverage and strengthen the capacity to prevent and handle accidents; lastly, through road education-related activities, the component seeks to act preventively with respect to users of public roads.
- 2.15 **Institutional strengthening** (US\$4,315,000): These activities relate to the strengthening of capacity for planning and management of the transportation of hazardous materials. This component is divided into four subcomponents.
- a. **Road Planning** (US\$2,027,000): The principal activity of this subcomponent is the Master Plan for Highway Transportation (PDTV)<sup>4</sup>. This plan will allow for updating, coordinating and integrating the management tools used by the DER/SC over the past few years. Thus, the maintenance management system (SAM) database, the paving management system (SGP), the traffic count system (SCT), and the traffic accident statistics system (SEAT), would be compatible with each other. It will also include the planning and monitoring of the weight regulation system (SCP), and study the integration of the database with a geographic information system (GIS). The PDTV will substantially improve the preparation and evaluation of the maintenance, rehabilitation and paving projects. This subcomponent will also finance the development of a new module, which will measure and compare project effectiveness, in terms of both maintenance and investment, by measuring contractor performance, the efficiency of the districts and the outcomes achieved with the various contracting methods and technologies used. In particular, it will help generate an information and evaluation system to improve maintenance services, either by quantity-based or outcome-based contract, or on force account, resulting in a more effective management system. Lastly, it will include a road safety plan that combines the activities of the DER/SC and the PR/SC, offering a comprehensive and medium-term perspective, and will evaluate the results attained under the project.
- b. **Computerization plan** (US\$512,000): This subcomponent will allow for the procurement of software and computer equipment to supplement and upgrade the DER/SC's existing equipment, so that the technical and administrative functions performed either at headquarters or the regional offices conform to

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<sup>4</sup> The PDTV will have to be commissioned within 18 months of the signing of the loan contract.

work-specific technical principles ("*reglas del arte*"). The command center and the 10 patrol stations of the PR/SC will also be provided with computer equipment;

- c. **Education and training** (US\$650,000): The expected loss of professional staff due to attrition, as well as the shift in duties (channeled toward contract planning and management concerning the direct execution of road activities), has caused the DER/SC to undertake a program of hiring young professionals to address such needs. The training and development of these professionals is essential to produce the changeover and quickly integrate these employees into the culture of quality and performance that exists in the institution. This subcomponent will partially address these needs; and
- d. **Master plan for highway transportation of hazardous materials** (US\$1,126,000): Although most hazardous materials are transported on federal highways, the DER/SC, jointly with the PR/SC, go into action when these materials bypass those roads and use the state road system to their final destination. Identification of these materials, as well as procedures for carrier licensing, shippers' liability and the training and equipping of the institutions responsible for oversight, control and accident-handling are some of the aspects covered by this task. This plan will contain an Emergency Action Plan, the implementation of training courses and equipment procurement.

**D. Associated expenditures**

- 2.16 **Acquisition of rights of way** (US\$3,095,000): This covers the costs of discharging the rights of way acquired from expropriations due to potential widening or correction of sections of road, and expropriations for quarries or borrow pit areas. By having the works executed on the rights of way of existing rural roads, no major impact on the surrounding population is expected.
- 2.17 **Environmental compensation** (US\$1,871,000): Includes measures aimed at: (i) offsetting unavoidable environmental impacts, such as the removal of vegetation or disturbance of protected areas, as mandated by law; (ii) indemnifying the residents that may be affected and helping to resettle low income residents; and (iii) comply with municipal land management regulations.

**E. Financing expenditures**

- 2.18 These expenditures include interest, credit fees and inspection and supervision costs applicable to the proposed loan under the program, totaling US\$30,305,000.

**F. Targets and indicators**

- 2.19 The logical framework (Annex I) contains the targets and indicators to be used for monitoring the program activities. These targets will be diverse: (i) physical, which

include project execution; (ii) institutional, covering such elements as the integration and training of professionals, strengthening capacity for highway sector planning and assessment, and transportation oversight by the DER/SC, as well as the expansion of geographic and operational coverage of the PR/SC; and (iii) operational, such as reduction of transportation costs and time.

**G. Cost and financing**

2.20 The program's estimated costs and financing would be (figures in thousands of US\$):

<b>Component</b>	<b>Total</b>	<b>IDB</b>	<b>Local</b>
<b>1. Engineering and management</b>	<b>12,282</b>	<b>5,963</b>	<b>6,319</b>
Studies and projects	5,762	444	5,318
Program management	6,520	5,519	1,001
<b>2. Direct costs</b>			
<b>Civil works</b>	<b>226,251</b>	<b>123,898</b>	<b>102,353</b>
Improvement (450 km )	110,381	58,027	52,354
Rehabilitation (700 km )	102,653	53,974	48,679
Works supervision	13,217	11,897	1,320
<b>Road safety</b>	<b>21,881</b>	<b>14,541</b>	<b>7,340</b>
Treatment of critical points	3,105	311	2,794
Road signals and electronic barricades	11,364	9,091	2,273
PR/SC support	7,412	5,139	2,273
<b>Institutional strengthening</b>	<b>4,315</b>	<b>3,217</b>	<b>1,098</b>
Highway planning	2,027	1,780	247
Computerization plan	512	409	103
Training and development	650	100	550
Master plan for highway transportation of hazardous materials	1,126	928	198
<b>3. Associated Expenditures</b>	<b>4,966</b>	<b>881</b>	<b>4,085</b>
Acquisition of rights of way	3,095		3,095
Environmental compensation and resettlements	1,871	881	990
<b>4. Finance charges</b>	<b>30,305</b>	<b>1,500</b>	<b>28,805</b>
Interest	26,370		26,370
Credit fees	2,435		2,435
Inspection and supervision	1,500	1,500	
<b>Total</b>	<b>300,000</b>	<b>150,000</b>	<b>150,000</b>

### **III. THE PROGRAM**

#### **A. Borrower, guarantor and executing agency**

- 3.1 The borrower will be the State of Santa Catarina, and the guarantor, the Federative Republic of Brazil. The executing agency will be the Highway Department of the State of Santa Catarina (DER/SC), an autonomous agency of the Secretary of Transportation and Public Works.
- 3.2 The State of Santa Catarina will be responsible for contributing the local counterpart funds. The Federative Republic of Brazil will guarantee the repayment of the loan from the Bank (amortization, interest and fees), but not the obligations of the borrower and executing agency which, by law, they are not required to assume.

#### **B. Executing agency**

- 3.3 The DER/SC is an autonomous agency created by Decree-Law No. 217 of 1946, as a public legal entity, with a separate administration and its own operations, finances and capital. The organizational structure and responsibilities of the DER/SC are defined in its internal regulations, which were approved by Decree-Law No. 1.164 of 1996. The principal goals of the institution are: (i) execute the state highway transportation policy; (ii) prepare works studies and projects, and their specifications and budgets; (iii) undertake, either directly or indirectly, management of the State Road Plan, including bridges and related works, their construction, maintenance, restoration, reconstruction and improvement; (iv) conduct studies for the preparation, organization and periodic review of the State Road Plan; (v) administer, on the regional and local level, state road infrastructure-related services; (vi) regulate and oversee the placement of facilities, construction of access roads and the utilization of subterranean or aerial rights of way along state highways; (vii) execute, either directly or indirectly, traffic control and other highway-related activities; and (viii) collaborate with other municipalities in the development of their road systems.

#### **C. Institutional structure**

- 3.4 The DER/SC is governed by a General Director and has authority over the Departments of Special Programs, Studies and Projects, Works, Operations, Administration and Finance, and 22 regional offices, each in charge of one district. The General Director's Office has a cabinet consisting of the Office of Bids and the Office of Internal Audits, plus a legal department. The directors, cabinet chief and legal advisor constitute the institution's administrative board, a decision-making body and advisor to the General Director.

- 3.5 The various departments are structured as follows: (i) The Department of Special Programs has four program offices (IDB, IBRD, concessions, microwatersheds) and a planning office; (ii) The Department of Studies and Projects has three offices: highway, paving and environment projects; (iii) The Works Department has two offices: contracts and project engineering; (iv) The Operations Department has three offices: highway maintenance, traffic engineering and highway safety, and (v) The Department of Administration and Finance has five offices: human resources, financial and capital management, general services, statistics and information technology, and accounting administration. The regional offices, in turn, are responsible for oversight of the works and services, maintenance and operation of the highways in their jurisdiction and certain monitoring and data-gathering activities involving the condition of the road system.
- 3.6 The project team's assessment, the performance of the DER/SC itself during the project preparation phase and its continued fulfillment of responsibilities, have shown that the DER/SC's technical and administrative structure is adequate for the tasks demanded by the program.
- 3.7 Similarly with previous loans, the program will be implemented by the DER/SC's technical and administrative organization, which has demonstrated that it is an efficient and professionally competent implementer. The Office of Special Programs will be in charge of coordination, although the various technical tasks will be under the direct responsibility and supervision of the respective offices. The DER/SC will be supported by a management firm, whose terms of reference have been prepared by the DER/SC and have received the Bank's no objection. A condition precedent to the contracting of the first project will be the hiring of this firm and confirmation of its staff. The management firm will be responsible for, among other things, providing environmental briefings for the legal advisor, works supervisor and contractor.

**D. Highway Patrol (Polícia Rodoviária)**

- 3.8 The Highway Patrol of the State of Santa Catarina (PR/SC) is not a co-executing unit of the program, but a beneficiary; its performance is essential to the attainment of the program's objectives. The PR/SC was conceived by an agreement between the Secretary of Citizen Security (SESP) and the Secretary of Transportation and Public Works (STO) to control traffic on state highways. Under this agreement, signed in 1976, and ratified by Decree No. 1.832, the SESP assigned the Military Police (Polícia Militar) and the STO to the DER/SC as the agencies responsible for enforcing the agreement. In 1977 (Decree No. 2.599), the PR/SC was created, and given the duty of overseeing traffic on the highways under the DER/SC's jurisdiction. The PR/SC currently has 18 stations, organized in four squads, distributed throughout the state, each headed by a commander.

- 3.9 The PR/SC's mission is to "oversee, coordinate and direct traffic, preventing and suppressing acts that impair public safety, providing aid and comfort to highway users, assuring free traffic movement and preventing accidents." Its area of activity includes 2,786 km of the 6,573 km of the state highway network. The PR/SC is supported by a total of 488 persons, 29 of whom have had higher education. The PR/SC also has 101 support vehicles, among which are 74 patrol cars and 19 ambulances.
- 3.10 The PR/SC supervises and controls traffic, handles accidents and emergencies, oversees highway use and highway education. Under the agreement, the PR/SC provides specially trained staff for the Military Police, while the DER/SC, in addition to equipment and facilities, provides the PR/SC with the necessary resources for its operations, with the sole exception of staffing costs, which the Military Police must bear. The agreement covers these items and is adequate for the mutual exchange of services; however, the signers realize that the agreement must be revised in view of the magnitude of the work<sup>5</sup>. This revision should take place during the first year of the program, and is a condition precedent for disbursement of the subcomponent funds.
- 3.11 The DER/SC will construct facilities and procure goods to be transferred in gratuitous bailment to the PR/SC under that agreement. Under the program, the PR/SC will expand its geographic coverage to cover the entire paved highway network (3,532 km ) and partially cover the unpaved network; it will also improve the quality of traffic oversight and accident handling, thanks to the new equipment and proximity of patrol stations. The program will only disburse funds for this subcomponent to the extent that the DER/SC demonstrates that the PR/SC has recruited trained personnel to handle the equipment and staff the patrol stations.

**E. Human resources**

- 3.12 The active staff of the DER/SC has been cut as the result of a policy decision not to replace most of the vacancies caused by attrition and to outsource the services previously rendered by those employees. Through December 2000, the DER/SC had 1,439 employees, which implied a reduction of 215 employees with respect to those employed in December 1996. The staff currently consists of 105 engineers and another 10 professionals of various educational and skill levels, 63 administrative employees, 359 intermediate-level technicians, 144 machine operators, 191 drivers and 567 workers.

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<sup>5</sup> The program will allow for the construction of the PR/SC's command headquarters and ten new stations, which will require more than 200 additional patrol personnel; in addition, the complexity of the new equipment imposes new obligations that will be more adequately covered by an agreement that clearly sets forth the duties and obligations of the parties.

- 3.13 The ER/SC has cut its staff at the rate of 3% a year during the 1996-2000 period and expects to continue reductions at a 2.5% rate during the term of this program. This reduction will not affect its capacity to implement the program, since the duties carried out by most of the personnel that have left will be covered by private firms under routine maintenance contracts, and, with respect to the professional staff, the DER/SC has a plan to recruit at least 40 professionals during that same period.

**F. Staff training**

- 3.14 The DER/SC staff will be trained by the applicable section of the Administration Department. Under the current program, the DER/SC will upgrade the paving management and traffic statistics management systems, fine-tune its environmental management system and strengthen the highway engineering area. A specific training program will be utilized when each of these systems is implemented.

**G. Technical capacity**

- 3.15 The technical sustainability of these activities is based on:
- a. **Applied technical guidelines:** The DER/SC updated all the rules and procedures called "Service Instructions"<sup>6</sup> in 1998, applicable to the conducting of basic studies, economic evaluation, design and preparation of project plans for new construction and for highway improvement, rehabilitation and restoration. The Service Instructions are based on the rules of the State Highway Department and German guidelines of highway design. The definitive designs<sup>7</sup> of the sample under the program were drawn up in accordance with these guidelines and plans prepared with highway geometric design software; and
  - b. **Adequate road maintenance:** The highway system in good or excellent condition has continually improved due to the DER/SC's institutional and budget efforts. The institution includes the Offices of Highway Management, Traffic Engineering and Highway Safety, units of the Department of Operations, plus 22 districts. 76% of its staff (1,098 employees) work in that Department. In 2000, 13% of the DER/SC budget was earmarked for maintenance services on force account, 14% by contracts and 12% for scheduled maintenance.

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<sup>6</sup> IS-01 Preparation of Highway Projects; IS-02 Traffic Study; IS-03 Topographic Study; IS-04 Geological Study; IS-05 Environmental Study and Project; IS-06 Water Study; IS-07 Geotechnical Study; IS-08 Geometric Design; IS-09 Earth Moving Project; IS-10 Geotechnical Design; IS-11 Drainage Design; IS-12 Paving Design; IS-13 Special Works of Art; IS-14 Supplemental Works Design; IS-15 Expropriation Project; IS-16 Execution Plan; IS-17 Economic Assessment; IS-18 Presentation of Reports and Designs.

<sup>7</sup> Prior loan experiences on the subject of obsolescence and technical design inconsistencies, with the resulting overcosts and prolonged construction periods, prompted the DER/SC to update the technical guidelines and to contract works solely when they had final, complete and updated designs.

#### **H. Financial management and budget preparation and oversight**

- 3.16 The DER/SC's financial resources and budget are managed and overseen by its Financial Management Office. Its administration is part of the financial system of the Secretary of the Treasury, within the "single account" mechanism. This institution oversees state agency accounts and makes the respective payments. All such activities are adequately regulated and carried out.
- 3.17 The DER/SC budget begins with proposals from each department or division of the institution, which are consolidated by the Department of Accounting and Finance. Once the consolidated proposal is approved by the General Directorate and the Secretary of Transportation, the budget is sent to the Secretary of Planning. The State Legislative Assembly is responsible for final approval.

#### **I. Internal and external oversight of the DER/SC**

- 3.18 The State of Santa Catarina has implemented a system of internal and external oversight of the operations of the DER/SC. The state's auditing activities include the following: (i) internal audit by the Office of Internal Audits under the General Directorate; and (ii) external audit by the State Auditing Department (TC/SC), an agency of the State Legislative Assembly. Each unit acts within its respective field and jurisdiction, and its performance has been deemed to be satisfactory.
- 3.19 The DER/SC will be responsible to the Bank for the following: (i) opening separate and specific bank accounts for managing the funds from the loan and local counterpart; (ii) have an adequate system of (a) internal oversight and of accounting and financial records of program fund sources and uses, as provided in General Clause 7.01 of the loan contracts, and (b) filing of support documentation of eligible expenditures for verification by the Bank and the external auditors; (iii) prepare and submit (a) revolving fund reports every six months, and (b) disbursement requests and the respective expenditure vouchers; and (iv) prepare any other reports required by the Bank.
- 3.20 The program's annual financial statements will be submitted to the Bank within 12 days of fiscal year end, audited by the Auditing Office of the State of Santa Catarina.

#### **J. Financial assessment of the DER/SC**

- 3.21 The resources of the DER/SC available for financing the state highway project are relatively solid. During the 1996-2001 period, the state-allocated funds ranged between a minimum of US\$54.6 million in 1999 and a maximum of US\$87.5 million in 1997, with an average of US\$73.5 million. The principal source of revenue is the State Treasury, although the revenue from the collection of traffic fines has been growing (US\$20.7 million in 2001 and a mean of US\$13.4 millions). These funds include proceeds from external loans; excluding those funds, the local

funds handled by the DER/SC totaled US\$60.8 million a year. With those financial resources, the DER/SC paid its operating expenses, and made investments and counterpart contributions to loans it obtained. To these funds should be added recent transfers from the federal government by the Caixa Econômica Federal (CEF) for specific state-related works requiring future counterpart contributions (70% CEF, 30% DER/SC).

- 3.22 The State does not have tollways, and therefore the collection of tolls is not a factor in financing the highway sector. The DER/SC does not have the ability to assume debt independently. Furthermore, the DER/SC has received US\$92.5 million through arrangements with the DNER for works to be executed by the DER/SC on federal highways, without committing the DER/SC's own financial resources; these funds possess extreme volatility. The DER/SC resources are set out below by source:

Year	1996	1997	1998	1999	2000	2001	media
<b>Source 00</b>	70.6	105.0	66.4	41.0	62.6	52.3	66.3
<b>Source 40</b>	9.0	11.6	11.8	11.4	15.6	20.7	13.4
<b>CEF Transfers</b>	3.3	0.7		0.5	4.8		1.6
<b>Adjustment</b>	5.5	(29.3)	2.2	2.2	(3.2)		(3.9)
<b>Total resources (1)</b>	<b>88.4</b>	<b>88.0</b>	<b>80.4</b>	<b>55.1</b>	<b>79.8</b>	<b>73.0</b>	<b>77.4</b>
<b>IDB III</b>	13.4	12.1	19.7	4.0	7.9		9.5
<b>IBRD</b>	6.9	6.1	3.6	2.6			3.2
<b>Total loans (2)</b>	20.3	18.2	23.3	6.6	7.9		12.7
<b>Total own resources (1-2)</b>	<b>68.1</b>	<b>69.8</b>	<b>57.1</b>	<b>48.5</b>	<b>71.9</b>	<b>73.0</b>	<b>64.7</b>

Amounts in millions of constant US\$ at June 2001. 1996-2000 period, executed budget; year 2001: executed through October and proposed for November and December. Source 00: State Treasury transfers (includes loans); Source 40: DER/SC revenue from traffic fines. Financial adjustment: differences in executed budget in proportion to payment of debt with government instruments.

- 3.23 The major expenditure categories are management, maintenance and construction of highways and road safety. During the period in question, government services were quite stable (US\$30.6 million in 2001): (i) active staff, gradually being cut back (US\$9.6 million); (ii) retired staff, relatively stable (US\$5.0 million); (iii) third-party services, increasing dramatically (US\$11.2 million); (iv) inputs (US\$2.8 million); (v) PR/SC expenditures (US\$1.5 million); and (vi) miscellaneous (US\$300,000). Expenditures of active and retired staff are approximately 31.3% and 16.3% of current expenditures, respectively.
- 3.24 Maintenance expenditures for the 1996-2001 period have increased from US\$18.3 million to US\$20.2 million; its composition has changed since the DER/SC reduced expenditures for work on force account from US\$12.4 million to US\$11.4 million,

and increased maintenance contracts from US\$4.6 million to US\$11.2 million, at a cumulative annual rate of 19.5%.

- 3.25 The State has invested an average of US\$47.2 million on highway rehabilitation and paving, as well as scheduled maintenance, trending downward with respect to scheduled maintenance, due to the conclusion of external loans. The investments made with state funds and loans vary widely, with a minimum of US\$28.1 million in 1999, and a maximum of US\$60.4 million in 1996. This variation is due to loans from multilateral institutions.
- 3.26 Road safety expenditures, although relatively small (US\$5.8 million for the 1997-2001 period), are qualitatively significant and rising<sup>8</sup>. Such expenditures finance the PR/SC activities of providing motorist protection and assistance. These activities are expected to expand, to the extent that the PR/SC expands its geographic coverage of service. It should be noted that this is a strictly operational expense, since the investment categories, such as the PR/SC equipment and facilities, fall within other budget items of the DER/SC. In 2000, the DER/SC invested US\$800,000 to support the PR/SC. The cost of salaries for the police assigned to highway safety duties are included in the Military Police budget.
- 3.27 The program will involve financial measures by the DER/SC. In the five-year period between 1996 and 2001, total annual revenue was US\$75.1 million, while the budget estimates for 2002-2006 indicate total annual revenue of US\$107 million, an increase of 42%; for the 1996-2001 period, the investment was US\$47.2 million, while for the 2002-2006 period, it is expected to approach US\$74 million, an increase of 57%. The sources and uses of the DER/SC funds, according to estimates from the DER/SC and the Secretary of the Treasury, are shown as follows (in millions of constant US\$ for June 2001):

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<sup>8</sup> Expenditures for 2000 and 2001 were US\$1.5 million, 20% higher than the average for the preceding three-year period.

Year	2002	2003	2004	2005	2006	mean
<b>Sources</b>						
State treasury	57.1	54.0	45.5	48.1	41.6	49.3
Traffic fines	21.0	21.5	22.0	22.6	23.1	22.0
External loans (IDB 4)	38.9	39.9	29.9	23.2	16.6	29.7
Agreements (CEF, Embratur)	15.7	6.1	6.1			5.6
<b>Total sources</b>	<b>132.7</b>	<b>121.5</b>	<b>103.5</b>	<b>93.9</b>	<b>81.3</b>	<b>106.6</b>
<b>Uses</b>						
Staff	14.6	14.5	14.4	14.3	14.2	14.4
Maintenance contracts	11.6	12.0	12.4	12.9	13.4	12.5
Other expenditures	3.3	3.3	3.3	3.3	3.3	3.3
PR/SC	1.6	1.8	2.2	2.3	2.5	2.1
<b>Total current expenditures</b>	<b>31.1</b>	<b>31.6</b>	<b>32.3</b>	<b>32.8</b>	<b>33.4</b>	<b>32.2</b>
IDB 4 investment	69.2	72.1	53.1	42.9	29.5	53.4
Other investments	32.4	17.8	18.1	18.2	18.4	21.0
<b>Total investments</b>	<b>101.6</b>	<b>89.9</b>	<b>71.2</b>	<b>61.1</b>	<b>47.9</b>	<b>74.3</b>
<b>Total uses</b>	<b>132.7</b>	<b>121.5</b>	<b>106.5</b>	<b>93.9</b>	<b>81.3</b>	<b>106.6</b>

## K. Financial assessment of the State of Santa Catarina

- 3.28 In 1994, the *Plan Real* sought to eliminate hyperinflation and lay the groundwork for economic growth, but it had the collateral effect of aggravating fiscal problems on all government levels. The higher effective rates of interest on public debt and the new rights granted to government officials by the Constitution of 1988 raised current expenditures, made public finance management difficult and wakened the capacity to invest in economic and social infrastructure. In addition, funds from state banks were mishandled. All of these problems existed in Santa Catarina prior to 1994.
- 3.29 Starting in 1994, the National Congress established limits on staffing expenditures, pursuant to Supplemental Law No. 82 of March 27, 1995 (the "Camata Law"). The total active and inactive staff expenditures on force account or by contract, including foundations, government enterprises and partially government-owned companies, currently covered by tax receipts, would not exceed 60% of the current fiscal year net revenues. This law applies to the federal government, states, municipalities and federal district. Law No. 9.496 of September 11, 1997, established the criteria for consolidating State and Federal District debt, authorizing the federal government to assume and refinance such debt under more favorable terms, subject to compliance with fiscal adjustment programs.

- 3.30 In 1998, the federal government inaugurated the Fiscal Stability Program (PEF) to restore financial stability to the public sector, which included: (i) short-term measures for realizing a tax surplus in the next three years and stabilizing the GDP/debt ratio by the end of the three-year period; and (ii) institutional reform measures to help foster long-term fiscal adjustment (Institutional Reform, Social Insurance Reform, National Denationalization Program and Tax Reform). The fiscal adjustment measures have been successful, although not all long-term measures have been implemented. 25 states and 180 municipalities have restructured their federal debt, representing almost the entire subnational debt, extending debt repayment periods and lowering interest rates.
- 3.31 In 1998, the Federal Senate adopted Resolution No. 78 (R78/98), which subjected internal and external loan transactions of subnational governments, including guarantees, and authorization limits and terms, to the following parameters: (i) real net revenue/debt ratio<sup>9</sup> (RNR) not exceeding 2.0; (ii) annual expenditure with loan repayments, interest and other obligations not exceeding 13% of the RNR; (iii) total debt not exceeding double the RNR in 1998 (reducing that ratio through 2008); and (iv) primary positive performance. To ensure strict oversight of fiscal adjustment, the Law of Fiscal Responsibility, Supplemental Law No. 101 of May 2000, established the guidelines of government funding for the federal units. This law kept staff expenditures at 60% of the RNR, and lowered the federal limit to 50%.
- 3.32 These guidelines led to the signing of Fiscal Adjustment Agreements (AAF), which are reviewed and whose targets are updated periodically, by evaluation of the economic-financial condition of each subnational unit by the Secretary of the National Treasury. In that context, the federal government and the State signed a Fiscal Adjustment Agreement (AAF/SC) on January 31, 2000; the internal debt was renegotiated and targets were established for the State. The State became a positive example of fiscal adjustment. The last restructuring agreement was signed on April 30, 2001 and constitutes the focus of the program's financial feasibility assessment.
- 3.33 Due to the rigidity of the initial targets of R78/98, on August 3, 2000, the federal government proposed a resolution to the Federal Senate to modify those parameters. For example, under R78/98, new loan operations in one fiscal year must not exceed 18% of the RNR, or 16% in the proposed resolution. The annual amount of interest, amortizations and other loan obligations must not exceed 13% of the RNR, under R78/98, or 11%, according to the proposed resolution. The legal guidelines are generally compatible, except in the case of the ratio pattern between the amount of debt and the RNR. The documents establish this ratio to be between

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<sup>9</sup> Resolution R78/98 utilizes two basic concepts: real net revenues, defined as state revenue, from which loan income, sales of goods, transfers and grants received and mandatory transfers to municipalities must be deducted. The RNR is used as a parameter for all AAF/SC targets, with the exception of staff expenditures, which utilizes current cash revenues (ILC). The ILC, at the RNR value, deducts employee contributions to the social assistance and retirement fund and adds transfers received by the state for various uses.

2.0 and 3.0 and progressively reduce it to 1.0, according to law; the specific amounts and terms, however, are different:

<b>Limits between debt amount and real net receipts</b>			
<b>Parameter</b>	<b>Resolution 78/98</b>	<b>Fiscal Adjustment Agreement</b>	<b>Proposed Resolution</b>
<b>Critical ratio</b>	2.00	2.75	3.00
<b>Target</b>	1.00	1.00	1.00
<b>Term to attain target</b>	10 years	24 years	30 years
<b>Intermediate ratio (IR)</b>	1.50	2.01	2.00
<b>Term to attain IR</b>	5 years	12 years	15 years

- 3.34 If adopted, the proposed resolution will revoke R78/98, considered unrealistic, since the original values have not kept pace with those posted for many of the subnational units; the proposal provides that the loan operations under the AAF, until approved, not be limited by the debt/RNR and debt/RNR service ratios, thus facilitating the approval of such operations, which is the program's goal.
- 3.35 Since the AAF/SC is based on the recently renegotiated contract pursuant to Law No. 9.496, its parameters are utilized in assessing the State's fiscal situation. The value specified in the AAF/SC for the debt/revenue ratio is 2.75 in 2000 and 1.00 for 2024.
- 3.36 Prior to the AAF/SC, debt service was paid at internal market rates within a three-month period; with the AAF/SC, the term became 30 years with an effective annual interest rate of 6% on 77% of total debt. Debt reduction represented a fundamental improvement for State finances, due to both the AAF/SC and extraordinary amortizations made with the sale of state assets and debt transfers from privatized state enterprises to the new owners. The debt is primarily internal (92%).
- 3.37 As a result of these measures, the State: (i) has posted a primary surplus, owing to the positive performance of its tax collections, and indicates a trend toward financial recovery, transferring prior-year deficits to the period in question; (ii) has recovered its savings capacity, making the fiscal adjustment viable; and (iii) has adequate fiscal indicators, such as current and positive primary performance, prior to debt obligations.
- 3.38 The various parameters applicable to the six fiscal targets during the 1996-2000 period, as well as the values established by the AAF/SC for the 2001-2003 period, are as follows (values in millions of constant US\$):

[illegible]

- 3.39 The State easily attained Targets 1 to 4. Projections for tax receipts and debt are positive; the operation is included within the limits agreed with the federal government for external loan operations. The annual counterpart requirement under the proposed program is approximately US\$30 million, the maximum being estimated at US\$37.4 million in 2003; this figure is equivalent to 1.6% of the state's own tax receipts in 2000. Therefore, the State is deemed to be in a position to obtain financing and provide the counterpart funds for the program, through an increase of its own revenues, and reduction of expenditures. The DER/SC's own resources contribute to the program's sustainability.

**L. State of readiness and program execution**

**1. Works**

- 3.40 The DER/SC has the technical, economic and environmental feasibility, and the final designs, for 15 rehabilitation projects, covering 421 km of highways, and nine improvement projects, for a total of 229 km, which were evaluated as satisfactory and which conformed to the representative sample. The DER/SC has begun contracting for additional studies and designs, which will assure an adequate pipeline of projects to be tendered in the second year.

**2. Road Safety**

- 3.41 The road system's critical points were selected on the basis of the traffic accident statistics system (Traffic Accident Reports), weighting the seriousness of such accidents between 1997 and 2000 on all highways patrolled by the PR/SC. There are completed technical studies for these critical points, which identify the activities for improving highway safety and, if necessary, the location of electronic speed reduction devices; similarly, by means of the road inventory, sections have been identified that require signaling. The experience indicates that these improvements, for the treated critical points, result in a reduction of the total number of accidents by about 30%.
- 3.42 The subcomponent for the PR/SC includes the construction of 10 patrol stations along the route, as well as the procurement of equipment for those stations and for others that are needed to improve the efficiency of traffic control and driver management (helicopters, radar systems, ambulances, mobile classrooms). The program's financial plan includes the investment to be made by the DER/SC. Equipment operating expenditures and expenditures for the additional staff necessary to operate such equipment are not part of the operation, but they have been provided for in the future budgets of the DER/SC.

**3. Environmental issues**

- 3.43 The DER/SC has prepared environmental management plans for the program projects; it has also met the requirements of environmental permits for

improvement projects as a condition for FATMA to grant the environmental permit to implement the paving work (LI). Rehabilitation projects do not require an LI. The DER/SC also has available the PEAR (Program Environmental Assessment Report), which contains the above-mentioned management plans and the procedures for utilizing them in preparing the projects not included in the sample. All these documents were made available to the public on July 16, 2001, in compliance with the Bank's public information policy. The Environmental Report was forwarded to the Public Information Center (PIC) on July 15, 2001 and approved by the CESI at its meeting on October 3, 2001. Chapter 6 of that report describes the mitigating measures in detail and recommended environmental control programs.

#### **4. Institutional strengthening**

- 3.44 The institutional strengthening components have already been identified, which cover, among other things, a training program, paving management system, and systems for traffic statistics, projects engineering, environmental management, road safety and hazardous materials handling. The terms of reference for these studies will be prepared by the management firm and sent in due course to the Bank for its no objection. The steady pace at which civil works are contracted will permit the DER/SC to assign the necessary priority to this task.

#### **5. Competitive Bidding**

- 3.45 The DER/SC has published, with the Bank's no objection, the General Procurement Notice in the United Nations journal "Development Business," and a specific notice of tender for the 15 road segments to be rehabilitated and the 9 segments to be improved. The proposed bidding terms and conditions were approved for international competitive bids for the works under the proposed operation. The bids for works will be grouped geographically; this will help achieve economies of scale in construction and supervision, and permit a single enterprise to make bids for several lots, making the projects attractive to international bidders.
- 3.46 To accelerate the program's activities, and demonstrating its technical and institutional capacity, the DER/SC has already initiated the bidding process for works in the representative sample, for its supervision of such works and for the management firm. The respective terms of reference (TOR) have the Bank's no objection. These are international competitive bidding procedures, in compliance with the Bank's policies. The anticipated dates are as follows:

Activities	Phases	Dates
Management firm for the program	Opening of bids	November 14, 2001
	Contract signing	January 2, 2002
	Start of activities	January 7, 2002
Supervision of works in the representative sample	Opening of bids	November 8 and 9, 2001
	Contract signing	January 2, 2002
	Start of activities	January 7, 2002
Contracting for works in the representative sample	Opening of bids	November 7, 2001
	Contract signing	January 15, 2002
	Start of activities	February 1, 2002

## 6. Recognition of expenditures

- 3.47 The DER/SC has incurred expenses during program preparation; with the project team's authorization, and following Bank procedures, it has begun the bidding process for projects in the representative sample. These activities involve an expense by the executing agency that can be recognized as a counterpart expenditure. Therefore, expenses incurred on eligible activities, such as expenditures for contracting studies (designs, environmental impact, economic evaluation, management firm during preparation) and payments to works contractors and supervisory firms, incurred after approval of the loan request by COFIEX, and until approval of the operation, are recognized up to a maximum of US\$9.5 million. Of this amount, the Bank may finance retroactively up to US\$3.5 million and recognize up to US\$6 million as a counterpart contribution.

## 7. Revolving fund

- 3.48 The program's revolving fund, in accordance with current practices, will be 5% of the loan amount, i.e., US\$7.5 million.

## 8. Right of way

- 3.49 The program's projects are expected to be executed with the right of way exercised by the DER/SC, which covers at least 30 meters on either side of the corridor of roads to be improved or rehabilitated (with the sole exception of roads crossing urban areas) and is unpopulated. The DER/SC has discharged the right of way for all paved roads under its jurisdiction, as well as the right of way for roads to be paved in the representative sample. The DER/SC plans to continue discharging the right of way for the unpaved road system in its jurisdiction to the extent it is improved.

- 3.50 If the rights of way are extended, the borrower must show proof that it has agreed, with the owners of the affected areas, to pay or compensate such owners for the affected property, or that it has obtained the assignment of such properties, before the Bank will authorize the corresponding bidding procedure. If it is necessary to relocate low-income population, this will be in accordance with the Bank's rules (Policy OP-610 Involuntary Resettlement). If pertinent and, in accordance with the cadastral survey of the lands and buildings affected by the new right of way, the DER/SC will negotiate with the owners for the appropriate compensation and acquire the right to occupy such lands. The proof that the DER/SC possesses this right will be a condition precedent to the authorization to begin the works.

#### **9. Use of the right of way**

- 3.51 Before the works are executed, and where public utilities are affected by the works, the DER/SC must obtain the commitment of the respective utility companies that they will cooperate as necessary to carry out such works.

#### **10. Ex post evaluation**

- 3.52 In accordance with Bank policies, the borrower was consulted and it was decided not to make an ex post evaluation; the project team also believes that it is not necessary to make an independent evaluation, since the DER/SC maintains information systems and procedures for monitoring the use and condition of the roads in its jurisdiction, which allows for an assessment, if necessary. Thus, the DER/SC undertakes to maintain the paving management and traffic statistics systems, with classified vehicle counts, evaluation of the number, nature and seriousness of accidents, and project environmental conditions.

#### **M. Procurement of goods and services**

- 3.53 The works will be executed by private construction firms; works supervision and the technical assistance services and studies will be done by independent expert consulting firms. The contracting of works, goods and consulting services with Bank funds will be in accordance with the Bank guidelines. A condition precedent to the start of each road project is the hiring of the technical supervisory firm and the provision, by the management firm, of environmental briefings for the supervisor of the regional office where the project is located, the project supervisor and the contractor. These briefings will cover both general concepts of environmental protection and project-specific concepts, which are part of the environmental permit. In addition, the management firm will provide environmental support to the DER/SC and its environment office.
- 3.54 The DER/SC will assume the responsibility of managing these contracts and overseeing the services of the consulting firms. Its capacity and experience, and the management firm's support, will be adequate to fulfill this duty. A substantial

portion of the procurement will require international competitive bidding procedures. The procurement schedule is shown in Annex 2.

- 3.55 An international competitive bid (ICB) will be called, insofar as the value of the individual works or lots exceed US\$5 million. Below this amount, the procedures set forth by local legislation will be observed. The procurement of goods and services, financed in whole or in part with Bank funds, the amount of which is equal to or greater than US\$350,000, will also be subject to the ICB procedure. Bids for a lower amount will be subject to the procedures set forth in local legislation.
- 3.56 The contracting of consulting services, for amounts equal to or greater than US\$200,000 will be by international competitive bid. Contracts for lower amounts will follow the procedures set forth in local legislation.

**N. Execution period and disbursement schedule**

- 3.57 The execution period and disbursement schedule are for five years. The term for the physical implementation of the works is four years.

**O. Monitoring and evaluation**

- 3.58 The monitoring of this operation will be entrusted to the country office, with the assistance, if necessary, of the project team. This monitoring will be carried out as follows: (i) by annual examinations of the program outcomes, using the key monitoring indicators shown in the logical framework; (ii) by six-month reports covering: (a) the progress made in relation to the execution indicators and the disbursement schedule; (b) execution and disbursement schedules updated in relation to the remainder of the project; (c) compliance with the terms of the loan contract; and (d) works schedule and detailed activity program for the next two six-month periods; and (iii) by customary procedures for obtaining the applicable no objection to the bidding for works, services and procurement of goods.

**P. Maintenance**

- 3.59 Given the importance of maintaining the works to be carried out to ensure that the expected benefits are obtained, the borrower will undertake the maintenance of all the works and equipment under the program. This maintenance will be in accordance with generally accepted technical guidelines. Similarly, it will undertake to submit to the Bank, starting in the second year of the program and up to a year after the final disbursement of funds, an annual maintenance report of works carried out and equipment procured.
- 3.60 This report will contain general information concerning the DER/SC and the institutional structure and manner in which the maintenance is being carried out, the state road system inventory and the condition of that system, an evaluation of the

maintenance carried out during the preceding year and the current plan for the current year, traffic accident information, findings with respect to load and size controls and, if traffic counts are made on the roads, the results of those counts and comparison with projected figures.

- 3.61 If, as a result of inspections, the Bank verifies that the maintenance carried out is inferior to technically acceptable levels, the borrower will adopt the measures necessary to correct any deficiencies.

#### **IV. FEASIBILITY AND RISKS**

- 4.1 With the program, the State of Santa Catarina intends to attain several goals: (i) reduce transportation costs and increase reliable vehicle access to expand the markets of agricultural products and other goods; (ii) integrate the currently limited access areas with regional economic centers; and (iii) improve transportation conditions, reducing travel times and accidents. In addition, this program is consistent with the Bank's strategy in the highway sector, which seeks to reduce transportation costs, increase mobility and accessibility and facilitate road maintenance, as a means of achieving greater economic efficiency.

##### **A. Institutional feasibility**

- 4.2 The program will be implemented by the DER/SC, which has ample experience in program execution with multilateral credit institutions, particularly the IDB. Although prior loans had execution problems, they were not due to institutional shortcomings, such as restrictions in counterpart contributions. The financial assessments conducted, as well as the DER/SC's decision to limit borrowing, foresees that these problems are not repeated.
- 4.3 To guarantee the cooperation of the agencies involved in the program and the adequate oversight of their activities, the DER/SC relies on the Office of Special Projects, and is in the process of hiring an experienced firm to advise highway-related institutions on programs of this type. The background of the PR/SC indicates that this agency has the capacity to assume the responsibilities and carry out the duties under this program. The existing institutional framework meets the Bank's requirements for program execution.

##### **B. Technical feasibility**

- 4.4 The technical studies for the projects in this program were developed pursuant to the criteria and modern methods of evaluation, calculation and sizing, and have utilized internationally accepted engineering standards, applying methodologies developed by the DER/SC itself; this agency has a reliable and modern traffic-related database containing features and conditions of the existing roads, which was utilized to adopt the principal design parameters of the proposed works. The unit prices used to determine the cost of the projects in the sample were obtained through its pricing system, which is regularly updated.
- 4.5 The works in the representative sample have no construction-related complications, and therefore have no technical feasibility problems. For the remaining projects in the program, and, as was done with the works in the sample, special care will be taken to execute works in urban areas, doing audits on traffic safety, providing for

traffic detours, utilizing safety measures to avoid accidents, and environmental measures to avoid excessive disruption to travelers and surrounding residents.

**C. Economic feasibility**

- 4.6 **Sample size:** A sample of US\$117.9 million has been evaluated out of an anticipated total of US\$213 million in highway project investments, which represents 55% of the program's actual investment. The breakdown by category indicates the same ratio. For rehabilitation projects, the sample covered 61%, while for improvements, the figure was 51%.
- 4.7 **Costs:** The timely rehabilitation of highways, whose paving has reached the end of its useful life, reduces both maintenance expenditures for such highways and the cost of vehicle operation. The improvement of highways, whose traffic level justifies paving, achieves a similar goal. The proposed program, in addition to realizing these benefits, will help prolong the highway's useful life by incorporating substantial upgrades to drainage systems, while reducing accident risk, thanks to high quality highway safety designs.
- 4.8 All costs for each sample project were calculated to include, as applicable, the cost of foundation work, construction of embankments, removal and recycling of paving rubble, paving material, pedestrian bridges, sidewalks and bicycle paths, improvements in road geometry, traffic control and safety devices, and environmental upgrades and compensation.
- 4.9 **Benefits:** The benefits consist basically of reductions in three cost categories: (i) vehicle operation, responsible for 81.1% of total benefits; (ii) travel times of car and bus passengers (13.8%); and (iii) accidents (5.1%). The cost of accidents avoided on the highways in the sample was US\$52.9 million, equivalent to 45% of the total cost of the works in the sample.
- 4.10 Traffic growth rates were calculated by road section and vehicle category. The total number of vehicles, on average, increased 4.4% a year for rehabilitated sections in the sample and 20.0% in the improved sections, during the three years between the existing condition and the reopening of the road. These percentages dropped to 4.1% and 3.4% between the year of opening and the 10<sup>th</sup> year of operation, respectively.
- 4.11 **Economic assessment results:** For this assessment, the HDM-IV model was used. The chart summarizes the economic assessment of the sample by road section. The internal rates of return (IRR) rose, ranging from 28.5% to 148.4% for rehabilitation works, and from 17.2% to 73.6% for improvement projects. These results were not substantially affected by changes in the assessment's key values. For example, an increase of 10% in costs, in combination with a 10% reduction in benefits, lowers the IRR of the lower-return rehabilitated section from 28.5% to 23.0%; the IRR for

a similar section of improved road would go from 17.2% to 11.3%. The presumption that costs would increase 25% was verified in only two projects with an IRR of approximately 10%.

Economic assessment results of highway projects, by road section							
Highway-lot		Km	TMD (1)	Investment (2)	VPN (3)	IRR (4)	IRR (5)
<b>Rehabilitation</b>							
SC-283	BR158-Caibí-Mondai	20.3	1,394/ 912	2,345	2,560	46.9	38.5
SC-465	Lindóia do Sul-SC283	25.4	785/ 1,178	3,175	1,427	28.5	23.0
SC-283	BR153-Concórdia-SC465	20.2	5,954/ 3,957	3,039	18,203	93.9	80.5
SC-451	BR153-Taquara Verde-Cacador	61.5	2,109/ 3,570	7,220	52,852	108.4	72.5
SC-302	Cacador-Lebon Régis	38.7	1,927	6,096	10,083	51.7	43.8
SC-302	Lebon Régis-BR116	26.7	2,094	3,868	20,152	99.7	84.8
SC-303	Cacador-Rio das Antas-Videira	36.4	1,982/ 2,175	4,438	13,659	75.6	64.5
SC-425	BR470-Otacílio Costa-BR282	55.2	2,173/ 2,350	8,515	33,505	71.8	62.1
SC-301	Alto da S. Francisca-S. Bento do Sul	42.2	2,700/ 7,063	8,576	21,491	62.4	53.2
SC-301	BR101-Pé de Serra Dona Francisca	8.0	3,896	1,714	4,892	64.3	54.6
SC-418	Pomerode-BR470	17.4	7,390	2,097	23,847	148.4	129.5
SC-450	Praia Grande-Sao Joao do Sul-BR101	21.9	1,585/ 1,826	3,008	1,731	34.1	28.0
SC-431	Gravatal-Armazem-Sao Martinho	23.0	990/ 2,633	3,321	5,854	50.3	42.8
SC-448	Meleiro-Forquilha	18.0	2,656	2,454	10,068	73.4	63.2
SC-485	Sombrio-Balneário Gaivota	7.3	4,337	957	4,986	80.5	70.5
<b>Improvement</b>							
SC-302	Cacador-Calmon-Matos Costa	48.9	694/ 969	9,700	52,010	51.2	44.1
SC-302	Matos Costa-Porto Uniao	32.3	634	7,264	52,010	51.2	44.1
SC-426	Trombudo Central-Braco do Trombudo	15.5	694	4,806	4,092	26.2	17.2
SC-458	Anita Garibaldi-Lajeado dos Portoes	23.1	510	6,199	4,887	20.2	13.4
SC-458	Lajeado dos Portoes-Campo Belo do Sul	26.2	510	6,440	4,887	20.2	13.4
SC-474	Sao Joao do Itaperiú-Massaranduba	19.5	1,533	6,030	18,086	48.5	34.4
SC-483	Morro Grande-Meleiro	13.7	496	3,007	2,638	26.6	22.3
SC-431	Sao Bonifácio-BR282	33.1	318	7,240	1,796	17.2	11.3
SC-427	Rio Rufino-Canoas-BR282	17.2	381	4,758	1,370	17.7	10.3

(1) Average daily traffic for the opening year; (2) and (3) in thousands of US\$; (4) as a percentage; (4) with +10% of costs and -10% in benefits as a percentage.

**D. Financial feasibility**

- 4.12 The local counterpart contribution under the program, to be paid by the resources of the State of Santa Catarina, is US\$150,000,000. The State's own budget revenues totaled US\$1,619,000, US\$1,724,000 and US\$2,310,000 for the years 1998, 1999 and 2000, respectively; if this revenue level is maintained, conservatively, the state's contribution to the program for the year requiring the most counterpart funds (US\$37.4 million, 2003) would be less than 2% of the average revenues for the three-year period.
- 4.13 An assessment of the finances of the State and the DER/SC shows that Santa Catarina has the financial capacity to fulfill its obligations and to make the financial resources available, when appropriate, to cover the commitments it will assume in this program.

**E. Social and environmental feasibility and recommendations**

- 4.14 From the socio-environmental standpoint, the program is expected to improve existing conditions in the areas of influence of both the road sections to be rehabilitated and the sections to be improved, since, among other benefits: (i) it will provide local residents with access to goods and services; (ii) it will reduce travel costs and times; (iii) it will ensure better traffic safety conditions and reduce accidents; (iv) it will support the remediation of environmental liabilities; (v) it will compensate for vegetation in permanently protected areas (areas along water courses); (vi) it will protect water sources located below the highways; and (vii) it will alleviate the risk of transporting hazardous materials.
- 4.15 The environmental impact caused by the highway rehabilitation works under the program is less significant than the impact caused by the current condition of the roads and their environmental liabilities, which wreak damage on the natural and socio-economic environment, such as erosion, instability and deposit of solids into drainage systems, pollution of springs and risks to user safety and the surrounding population. The contemplated measures, aimed at correcting negative impacts identified with respect to the road and the right-of-way, when submitted to a broader evaluation, take on a positive aspect.
- 4.16 The improvement projects are prepared in accordance with the environmental specifications, rules and guidelines of the DER/SC, with preliminary environmental feasibility studies and route design alternatives submitted to FATMA upon application for the permit. The designs conform to the original plan of the existing unpaved highways, with some variations to enhance the geometric and operational features. The environmental assessment, based on traffic studies, concluded that the highway connections utilized do not seek to attract existing traffic flows on other

roads<sup>10</sup>; in addition, no substantial attraction of population or economic activities is expected, that could have negative effects on the landholdings system in rural areas.

- 4.17 Any negative impact from the works will be insignificant, as described in the environmental report; such effects will be mitigated by adequate environmental measures, implementation of temporary safety, traffic control and signaling devices or will be compensated for, pursuant to environmental laws. The DER/SC possesses effective regulatory instruments to enable the environmental control procedures in the engineering designs to specify the environmental protection and reclamation measures to be implemented for each section of road. These instruments will be supplemented by project specifications, contractual provisions and adequate works supervision and oversight.
- 4.18 The program provides the necessary procedures for resettlement of low-income families and for compensation to those residents affected by the works; these procedures are completely consistent with the Bank's policy. The distribution of affected persons on the sections of road comprising the representative sample is as follows: (i) on the rehabilitated sections, one family will be resettled and two families indemnified, with financing for the construction of their houses; and (ii) on improvement projects, 11 families will be indemnified, six families will be resettled on the same land and one family will be resettled on land specially acquired for that purpose.
- 4.19 The program provides the institutional mechanisms to implement the environmental mitigation measures and calls for sufficient environmental management for the highway sector. The environmental assessment concludes that the effect on protected areas is not significant; this opinion is shared by FATMA which, in granting the pertinent environmental permits, will determine the compensatory measures pursuant to law. FATMA is responsible, among other things, for forest protection.
- 4.20 The socio-environmental measures were properly detailed and budgeted, the financial resources to execute those measures were included in the program's budget, and the timetable is consistent with the works schedule. All supplemental studies and services have terms of reference that have been reviewed and approved by the project team.
- 4.21 The measures for supporting the DER/SC's environmental management capacity, as well as the review, description and inclusion of the environmental aspects in the technical specifications for the highway projects, will allow for the adequate and continuous treatment of environmental issues in the various phases of the highway projects under its jurisdiction.

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<sup>10</sup> The projects will not attract long distance-based demand. The impact on local traffic will, however, be substantial, estimating major detours reflected in the high initial rates of traffic growth.

- 4.22 The program provides for environmental control and evaluation to ensure compliance with the Bank's guidelines on eligibility, design preparation and construction of the road sections not covered in the sample.
- 4.23 Prior loans were evaluated, with the following conclusions: (i) the most significant aspect was urban occupation and encroachment along the route, notwithstanding right of way restrictions and safety standards for access areas, demonstrating the need for land management by the municipalities through which the roads pass<sup>11</sup>; (ii) some works have resulted in environmental liabilities, and therefor correcting these liabilities is one of the requirements included in the projects of this program; (iii) inadequate maintenance has resulted in drainage devices being obstructed or destroyed; (iv) environmental measures were guaranteed by contracts with the Bank; they will more likely be complied with if they are included in the bidding terms and conditions for the works; (v) land occupation elements have remained stable, a result of the State's own qualities, emphasizing the predominance of small properties; and (vi) the rules for use of rights-of-way must be strengthened.
- 4.24 Recommendation: To ensure the adequate implementation of the above-mentioned environmental measures, the loan agreement should include the following provisions:
- a. Prior to the call for bids for the works, the DER/SC must submit evidence of the following: (i) it has obtained the environmental permits for the works, including the Environmental Pre-Permit and the Environmental Permit for Installation, or exemption; (ii) if resettlement of residents becomes necessary, it has the appropriate plan, prepared in accordance with Bank Policy OP-710; and (iii) it has legal possession, the easements and other rights pertaining to the real properties where the works will be constructed;
  - b. As a condition precedent to the no objection to the works contract, the DER/SC must submit evidence that it has contracted for technical supervisory and environmental services;
  - c. Prior to commencing a new project, the DER/SC must: (i) obtain all administrative licenses and permits necessary for the environmental regularization of the works; (ii) with the assistance of the management firm, offer environmental briefings, both general and work-specific, for the technical areas involved, the regional supervisor of the DER/SC, the works supervisor and the contractor; (iii) if necessary, execute the resettlement plan; and (iv) adopt the

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<sup>11</sup> Among the compensatory measures, the program provides the municipalities affected by the works with assistance in adapting or preparing their land management plans to help deal with the demands of urban encroachment toward the highway. The program provides mechanisms for coordination between the DER/SC and the municipalities; this coordination begins with the temporary transfer to the state of the urban section of the highway to be rehabilitated, so that the DER/SC can act legally with respect to that section, and then return it to the jurisdiction of the municipality once the work is completed.

measures necessary for the affected public utility companies to cooperate with the execution of the project;

- d. Project preparation procedures: the project designs for roads not included in the representative sample will be prepared in accordance with the technical, economic and environmental procedures utilized for the sample, which were detailed in the program environmental assessment report (PEAR). New projects will have their respective environmental assessment report (EAR);
- e. For the hazardous materials transportation component, and upon signing of the loan agreement, the DER/SC must: (i) within 18 months, contract for the Master Plan for Transportation of Hazardous Materials, which will include an Emergency Action Plan; (ii) within 30 months, begin the procurement of vehicles and equipment provided in the Emergency Action Plan; and (iii) within 36 months, conclude the emergency training course for transporting hazardous materials;
- f. For environmental control, the DER/SC must, upon signing the loan agreement: (i) within 18 months, contract for the assessment and proposal to correct the environmental liability of the paved highway system not included in this program; and (ii) within 24 months, have available the municipal land management regulations as established in the PEAR;
- g. The DER/SC, with the assistance of the management firm, and within 24 months of the signing of the loan agreement, will have to submit the revised highway environmental guidelines; and
- h. The DER/SC must submit six-month reports describing the environmental measures adopted and the outcomes achieved, any problems that existed and the measures to resolve them. Within 36 months of the signing of the loan agreement, it must submit a report containing the conclusions of monitoring the positive effects of the program.

**F. Social equity and poverty**

- 4.25 The nature of the program for rehabilitation and improvement of major roads in the state highway system, as well as the relatively high income level of the inhabitants of the State, does not qualify this operation as a social equity enhancing project, as described in the Report on the Eighth General Increase in Resources (document AB-1704). Similarly, this operation does not qualify as a poverty-targeted investment (PTI). The borrowing country will not be using the 10 percentage points in additional financing.

## **G. Benefits**

- 4.26 The principal benefits under the proposed program are expected to be: (i) reduce transportation costs; (ii) improve access for the transportation of passengers and agricultural and industrial production; (iii) improve safety in passenger and freight transportation, reducing the risk of accidents; and (iv) lower the cost of highway maintenance and repair, in the medium and long term, with the execution of integral projects on a timely basis.
- 4.27 4.27 The State highway system is an essential element to enable its 5,350,000 inhabitants to carry out their economic and social activities; it is the predominant means of transportation for merchandise and productive inputs, especially those of higher added value. From a social standpoint, the highway system is equally important. The program will benefit all the residents of the state, especially those living in the interior.
- 4.28 The State government recognizes that, to achieve this goal, a modern user-focused highway management system is required. This system covers project conception and execution, as well as the improvement of highway operations and traffic safety.

## **H. Risks**

- 4.29 The program presents no special risks: (i) **Institutional**: the DER/SC is a competent executing agency experienced in implementing projects financed by multilateral institutions and with an appropriate organizational structure<sup>12</sup>, and will be supported by a management firm. However, there is a risk that professionals and other skilled staff will decline due to attrition. The DER/SC will minimize this risk through a plan to hire young professionals to be supported by the program through training and staff development, which is part of the institutional strengthening plan; (ii) **technical**: rehabilitation and improvement projects are simple, and the DER/SC has been executing such projects regularly for more than two decades; there is a broad market of trained construction firms; (iii) **Technical and operational sustainability**: The DER/SC has given priority to the maintenance of the highway system in its care by making generous budget allocations and having adequate management systems in place; (iv) **Financial**: Santa Catarina possesses a solid financial framework, having renegotiated its debt with the federal government, and with the COFIEEX authorization to that effect; (v) **Environmental**: the works have no major indirect impact; any direct impacts are construction-related and are adequately addressed in the works and supervision contracts; and (vi) **highway safety**: the program gives priority to this issue, in particular, with respect to the aspects of education, prevention, oversight and control, to reduce the number of accidents and mortalities.

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<sup>12</sup> The trouble-free implementation of the competitive bidding procedure for the works in the representative sample and the supervision thereof, attest to this fact.

## BRAZIL

### SANTA CATARINA STATE HIGHWAY PROGRAM. PHASE IV (BR-0355)

#### LOGICAL FRAMEWORK

Goal	Indicators	Verification methods	Assumptions
Integration of the State of Santa Catarina with productive activities	<ul style="list-style-type: none"> <li>Regional GDP statistics of the State of Santa Catarina</li> </ul>	<ul style="list-style-type: none"> <li>Reports from the Secretary of Planning of the State of Santa Catarina</li> </ul>	<ul style="list-style-type: none"> <li>Current economic growth level of Santa Catarina are maintained</li> </ul>
For the users of the State of Santa Catarina more efficient operating (travel costs and safety and better access to county seats	<p>At the end of the program (within 5 years), the following targets will have been attained:</p> <ul style="list-style-type: none"> <li>Vehicle operating costs are reduced 10% for rehabilitated roads and 50% for paved roads</li> <li>Travel time is reduced on paved roads by 40% of current travel time</li> <li>Private and commercial vehicle traffic increases by 3.5% and 5.0%, respectively</li> <li>8 county seats have improved access to the state highway system</li> <li>The annual weighted accident index by vehicle-kilometer on state roads patrolled by the PR/SC falls by 10%</li> <li>The cumulative number of accidents at treated critical points is reduced by 30%</li> <li>The PR/SC's geographic coverage is expanded to 80% of the paved state highway system</li> </ul>	<ul style="list-style-type: none"> <li>DER/SC technical studies, based on the HDM IV</li> <li>Traffic estimates of the CVT management system of the DER/SC</li> <li>Statistics from the DER/SC and PR/SC traffic accident management system</li> <li>Transportation user and operator surveys</li> <li>Program activity reports</li> </ul>	<ul style="list-style-type: none"> <li>Satisfactory development of market and transportation market conditions</li> <li>DER/SC continues to offer adequate maintenance to the highway system in its jurisdiction</li> <li>DER/SC continues to offer support for traffic safety</li> </ul>
Highway safety due to improved infrastructure	<p>1.1 A total of 450 km of state highways are paved and 700 km of highways are rehabilitated during the 5 years of the program.</p> <p>1.2 Environmental liabilities of the paved state highway system have been identified and the remedial action plan has been prepared 3 years into the program</p>	<p>1.1 Highway inventory and information system for the program</p> <p>1.2 Certification of works by the DER/SC and opening of road sections to the public</p> <p>1.3 DER/SC activity reports</p> <p>1.4 DER/SC periodic reports incorporate the new scope of information</p> <p>1.5 Remedial action plan for environmental liabilities approved by the DER/SC</p>	<p>1.1 The program has the continued support of the State</p> <p>1.2 State remains interested in eliminating environmental liabilities</p>

Goal	Indicators	Verification methods	Assumptions
Capacity to manage highway system is	2.1 DER/SC has a Highway System Plan Director 3 years into the program 2.2 GIS system implemented and integrated into other DER/SC management applications 3 years into the program 2.3 Computer equipment procured and installed 3 years into the program 2.4 40 professionals have been incorporated and trained 3 years into the program	2.1 Certification of procurement of equipment and services by the DER/SC 2.2 DER/SC activity reports	2.1 The program has the continued support of the State 2.2 The State remains interested in highway management
Highway safety due to highway infrastructure	Upon conclusion of the program (within 5 years), the following targets will have been attained: 3.1 20 intersections, 50 km of streets in urban areas, and 500 km of roads in rural areas of critical points have been treated 3.2 50 traffic circles have been illuminated 3.3 7,800 km of highways are surface marked and two pieces of pavement marking equipment procured 3.4 36,500 vertical signs 3.5 100 automatic speed reduction devices are installed 3.6 30,000 meters of safety barricades are installed 3.7 Two helicopters procured and on patrol 4 years into the program, the following targets will have been attained: 3.8 20 rescue vehicles and 10 school vehicles have been acquired and are in use 3.9 40 satellite telephones and 20 mobile radar systems are procured and in use at 18 control stations and at the PR/SC command headquarters 3.10 10 new PR/SC control stations have been constructed and equipped 3 years into the program, the following targets will have been attained: 3.11 Master plan for the transportation of hazardous materials has been implemented	3.1 Highway system and information system for the program 3.2 Certification of works by the DER/SC and opening of sections to traffic 3.3 DER/SC activity reports 3.4 DER/SC and PR/SC periodic reports incorporate the new scope of information 3.5 Regularization of current transportation of hazardous materials	3.1 The program has the continued support of the State 3.2 State remains interested in highway management 3.3 Highway safety continues to improve

**BRAZIL: SANTA CATARINA STATE HIGHWAY PROGRAM. PHASE FOUR (BR-0355)**

Expenditure category	Financing (%)			method	prequalification YES/NO	Publication		
	TOTAL	IDB	local contributi			AGA	AEA	
						prior YES/NO	semi- annual/ann	II
station (Group I)	61,710	32,446	29,264	ICB	YES	YES	02/01	Y
station (Group II)	14,700	7,729	6,971	ICB	YES	YES	02/02	Y
station (Group III)	14,700	7,729	6,971	ICB	YES	YES	02/03	Y
station (Group IV)	11,543	6,069	5,474	ICB	YES	YES	01/04	Y
ement (Group I)	56,171	29,529	26,642	ICB	YES	YES	02/01	Y
ement (Group II)	22,000	11,565	10,435	ICB	YES	YES	02/02	Y
ement (Group III)	22,000	11,564	10,436	ICB	YES	YES	02/03	Y
ement (Group IV)	10,210	5,367	4,843	ICB	YES	YES	01/04	Y
critical points	3,105	311	2,794	LCB	YES	YES	02/02	Y
and electronic barricades	11,364	9,091	2,273	ICB	YES	YES	02/02	Y
orks	1,129	113	1,016	LCB	YES	YES	02/02	Y
ment	431	378	53	ICB	YES	YES	01/04	Y
aterials equipment	850	683	167	ICB	YES	YES	01/04	Y
ment	6,283	5,026	1,257	ICB	YES	YES	02/02	Y
ter equipment	512	409	103	ICB	YES	YES	02/02	Y
Services			-					
rojects	5,607	304	5,303	LCB/ICB	YES	YES	01/01	Y
ronmental liabilities	155	140	15	LCB	YES	YES	01/03	Y
vision	13,217	11,897	1,320	ICB	YES	YES	02/01	Y
agement	6,132	5,519	613	ICB	YES	YES	02/01	Y
plan	150	132	18	LCB	YES	YES	01/03	Y
g	1,446	1,270	176	ICB	YES	YES	01/03	Y
ads study	276	248	28	ICB	YES	YES	01/03	Y
ditures	36,309	2,481	33,828	n/a	n/a	n/a	n/a	r
TOTAL	300,000	150,000	150,000					

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PROPOSED RESOLUTION

BRAZIL. LOAN \_\_\_\_/OC-BR TO THE STATE OF SANTA CATARINA  
(Highway Program for the State of Santa Catarina - Fourth Stage)

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such contract or contracts as may be necessary with the State of Santa Catarina, as Borrower, and the República Federativa do Brasil, as Guarantor, for the purpose of granting the former a financing to cooperate in the execution of Highway Program for the State of Santa Catarina. Such financing will be for the amount of up to one hundred and fifty million dollars of the United States of America (US\$150,000,000), or its equivalent in other currencies, except that of Brazil, which are part of the Ordinary Capital resources of the Bank, and will be subject to the "Special Contractual Conditions" and the "Terms and Financial Conditions" of the Executive Summary of the Loan Proposal.