Case Studies of Private Financing in the Road Sector

Tore Hoven, Guillermo Gaviria, Geoffrey Shields and Cesar Queiroz

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Case Studies of Private Financing in the Roads Sector

November 12-13 1998 the Russia Federal Highway Administration organized in Moscow an International Conference on the Financing of Road Investments. The Bank had been asked to help organize the Conference and, in particular, a series of presentations on private financing in the roads sector. The Conference was addressed mainly to the 280 Russian officials and businessmen who attended. But we believe the presentations are of wider interest and reproduce here the slides from four of them:

I. Financing Urban By-Passes by Town Access Charges: The Trondheim Toll Ring System, by Tore Hoven, Department Head, Norwegian Public Roads Administration

II. Long-Term Road Maintenance Contracts Financed by Toll Collections, by Guillermo Gaviria, former General Director, National Road Department of Colombia

III. Bridges and Tunnels by Private Financing - Key Factors for Success, by Geoffrey Shields, Kvaerner, London

IV. Private Construction of Toll Lanes Parallel to an Existing Highway: SR 91 Express Lanes, California, by Cesar Queiroz, Principal Highway Engineer, ECSIN

Other presentations from the conference are reproduced in ECSIN Working Papers No. 2 and 3.
I. Financing Urban By-Passes by Town Access Charges: The Trondheim Toll Ring System

Tore Hoven
Head of Traffic and Road Maintenance Department
Norwegian Public Roads Administration
Trondheim, Norway
What were the traffic problems in Trondheim?

- traffic accidents
- heavy traffic through city centre
- traffic noise and pollution
The solution:

A new complete transportation system

- good and safe main road system
- a new bypass outside city centre
- complete dedicated road network for pedestrians and cyclists
- improved public transport system
  - dedicated bus lanes
  - bus priority system
  - new information system
Financing alternatives

- local annual fee
- local petrol tax
- traditional toll system
- toll ring system
Financial agreement

- Toll revenues 60%
- Extra funding 40% (from central government)
- Total cost 2100 mill NOK (US$ 300 million)
The Toll Ring System
Major toll system goals

- low operating cost
- new technology
- traffic regulation
- a flexible system
Toll ring proposal

- free electronic tag to all car owners in the Trondheim area
- 10 unattended toll plazas, only one attended toll plaza
- operating period
  6 AM - 5 PM, MON - FRI
- higher charges during morning peak (from 6 AM - 10 AM)
Pricing system

Basic price: 10.0 NOK (US$1.50)  
(inbound traffic)

Discount tag users 10 - 50 %  
(based on prepaid amount)

Discount after 10 am 20 %

Max one trip charged per hour

Max 75 trips charged per month
The Trondheim Toll Ring in operation

- System opened 14 October 1991
- A technical success
- Fully electronic from start
- Increasing public acceptance
- Great international interest
Key results

◆ 80 million NOK (US$ 11 million) in toll revenues every year for investment in transport infrastructure
◆ no queues, 95 % use electronic tag system
◆ 110 000 electronic tag users
◆ perfect technical system
◆ 10 % reduction in car traffic crossing the toll ring during tolling period
◆ 7 % increased use of city bus system
New revised system from 1998

- include more users of the road network
- change from one cordon system to a sector pricing system
- time extension, charging period 6 am - 6pm
- basic price 12 NOK (US$1.70)
- max 60 trips charged per month
Expected results

- Expected revenue 1999:
  140 mill NOK (US$ 20 million)
- Operating cost: 10 mill NOK
  (US$ 1.5 million)
- New road and transportation network completed before year 2005
- The main traffic problems already solved
The Trondheim - Airport motorway

- Completed in 1995
- Length 35 km
- Total cost 1,300 mill NOK (US$ 200 million)
- Financing:
  - government funding: 63 %
  - toll revenue: 37 %
  - annual toll revenue: 80 mill NOK
## Comparative characteristics of Norway’s Toll Rings (1998)

<table>
<thead>
<tr>
<th></th>
<th>Bergen</th>
<th>Oslo</th>
<th>Trondheim</th>
</tr>
</thead>
<tbody>
<tr>
<td>City population</td>
<td>220 000</td>
<td>460 000</td>
<td>140 000</td>
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<tr>
<td>Population in</td>
<td>400 000</td>
<td>1 mln</td>
<td>200 000</td>
</tr>
<tr>
<td>influenced area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charging period</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Days</td>
<td>Mon - Fri</td>
<td>All days</td>
<td>Mon - Fri</td>
</tr>
<tr>
<td>Hours</td>
<td>6am - 10pm</td>
<td>All hours</td>
<td>6am - 6pm</td>
</tr>
<tr>
<td>Number of vehicles</td>
<td>70 000</td>
<td>250 000</td>
<td>80 000</td>
</tr>
<tr>
<td>charged per day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of tags</td>
<td>0</td>
<td>250 000</td>
<td>110 000</td>
</tr>
<tr>
<td>Annual gross</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>revenue</td>
<td>60 mln NOK (US$ 9 mln)</td>
<td>720 mln NOK (US$ 100 mln)</td>
<td>130 mln + 80 mln NOK (airport motorway) (US$ 30 mln)</td>
</tr>
<tr>
<td>Operating cost</td>
<td>11 mill NOK</td>
<td>75 mill NOK</td>
<td>10 + 5 mill NOK</td>
</tr>
</tbody>
</table>
II. LONG-TERM ROAD MAINTENANCE CONTRACTS FINANCED BY TOLL COLLECTIONS

Guillermo Gaviria
former General Director
National Road Department (INVIA)S
Colombia
COLOMBIAN EXPERIENCE

■ FOUNDATIONS OF THE CONCESSION PROGRAM

♦ Colombia will expand its infrastructure in a short period of time, with savings compared to current practices.

♦ Private sector is more efficient than public sector.

♦ Participation of private capital in road sector will free public funds to address other social needs.

♦ Government will not take risks which the private sector is in a better condition to handle.
COMPARATIVE ANALYSIS OF ADMINISTRATIVE BUDGET, PUBLIC, AND PRIVATE INVESTMENT IN ROAD SECTOR

US$million

1,200
1,100
1,000
800
600
400
200
0

YEARS


PRIVATE INVESTMENT
PUBLIC INVESTMENT
ADMINISTRATIVE BUDGET
Risk Allocation

SECOND GENERATION

CONCESSIONAIRE
- Design
- Operation and Maintenance
- Non-Tunnel Cost Overruns
- Taxation
- Financing
- Natural Force Majeure
- Revenue/Traffic
- Tunnel Cost Overruns
- Construction Delays
- Currency Inconvertibility
- Peso Devaluation

GOVERNMENT
- Permitting, Licensing
- Establishment and Implementation of Tolls
- Right of Way Acquisition
- Political Force Majeure
COLOMBIAN EXPERIENCE

FIRST GENERATION PROJECTS

- Community
- Land
- Environment
- Design
- Construction
- Financial Aspects
  - Concession Period, Rates, Government Contribution
COLOMBIAN EXPERIENCE

- SECOND GENERATION PROJECTS

- Tobiagrande - Puerto Salgar
- Road Network of Valley Cauca and Cauca
- Others
TOBIAGRANDE - PUERTO SALGAR

SPECIFICATIONS

- 72 km Rehabilitation and Improvement
- 68 km Construction
- 574 km Maintenance.
- 19.4 km Tunnels
- 3.7 km Viaducts
- Approximate value US$400 million*

* without maintenance
TOBIAGRANDE - PUERTO SALGAR

■ PRE-CONSTRUCTION STAGE (7 months):
  ◆ OBLIGATIONS OF THE CONCESSIONAIRE:
    ✦ Performance of the financial closure
    ✦ Establishment of the Trust Fund
  ◆ OBLIGATIONS OF INVIA:
    ✦ Transfer of all Land required for construction
    ✦ Transfer of roads Villete - Honda, El Vino - Tobiagrande and La Dorada - San Alberto, including bridges
    ✦ Establishment of the liquidity mechanism
    ✦ Full disbursement of its initial contribution
TOBIAGRANDE - PUERTO SALGAR

■ CONSTRUCTION STAGE (4 years):

♦ CONSTRUCTION OF THE NEW ROAD
  TOBIAGRANDE- PUERTO SALGAR

♦ REHABILITATION OF EXISTING ROAD
  VILLETA - HONDA

♦ MAINTENANCE OF EXISTING ROADS
  EL VINO - PUERTO SALGAR AND LA
  DORADA - SAN ALBERTO
TOBIAGRANDE - PUERTO SALGAR

MAINTENANCE STAGE

Whichever comes first in 20 years:

- THE CONCESSIONAIRE OBTAINS THE EXPECTED INCOME

- THE CONCESSIONAIRE DOES NOT OBTAIN THE EXPECTED INCOME. THEN INVIAS CAN FOLLOW THE VARIANT:

  - Payment of the remaining amount to reach the expected income.

  - Extension of the concession period each year (up to a maximum of 5 years) until the concessionaire obtains the expected income.
TOBIAGRANDE - PUERTO SALGAR

PROBLEMS SOLVED:

- **LAND**: INVIAS must transfer all land required to start construction before the initiation of works.

- **ENVIRONMENTAL LICENSE**: Must be approved before the bidding process begins, and at the latest before the beginning of the construction stage.

- **CONCESSIONAIRE’S LIQUIDITY**: INVIAS established a liquidity mechanism assuring that the concessionaire will obtain the necessary minimum income during the most critical period ("ramp-up period").
TOBIAGRANDE - PUERTO SALGAR

PROBLEMS SOLVED:

- ENGINEERING STUDIES: Carried up to Level III for higher accuracy of the final appraisal.
- CONSTRUCTION RISKS: The concessionaire assumes cost overruns on bridges and roads.
- GOVERNMENT COMMITMENT: Backed up by irrevocable budget commitments for the future years.
  - BUDGET CONTRIBUTIONS
  - GUARANTEED LIQUIDITY
  - GUARANTEED COVERAGE OF OVERRUNS ON TUNNELS
TOBIAGRANDE - PUERTO SALGAR

GOVERNMENT COMMITMENT TO ASSURE PROJECT ATTRACTIVENESS:

- LIQUIDITY MECHANISM
- LAND ACQUISITION
- ENVIRONMENTAL LICENSE
- CONTRIBUTION TO THE CONCESSION
- MINIMUM EXPECTED INCOME
- COVERED TUNNEL GEOLOGIC RISK OVER 20% (INITIAL 20% IS PAID BY THE CONCESSIONAIRE)
TOBIAGRANDE - PUERTO SALGAR

■ BENEFITS FOR THE GOVERNMENT:
  ◆ TRANSFER TO THE CONCESSIONAIRE OF THE RESPONSIBILITY FOR DESIGN.
  ◆ TRANSFER TO THE CONCESSIONAIRE OF 100% OF COST OVERRUNS ON BRIDGES AND ROADS, AND OF INITIAL 20% OF TUNNEL COST OVERRUNS.
  ◆ CONCESSIONAIRE’S RESPONSIBILITY FOR THE RISK OF HIS OWN INEFICIENCY.
  ◆ BETTER RELATIONSHIP WITH THE CONCESSIONAIRE.
The concession was awarded through a competitive bidding process designed to minimize costs to the government.

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Tunnel construction cost</td>
<td>12 %</td>
</tr>
<tr>
<td>Government contribution</td>
<td>6.9 %</td>
</tr>
<tr>
<td>Minimum revenue</td>
<td>10 %</td>
</tr>
<tr>
<td>Liquidity facility amount</td>
<td>6 %</td>
</tr>
<tr>
<td>Total revenue</td>
<td>3 %</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100 %</strong></td>
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</tbody>
</table>
## PROJECT DETAILS

### AWARDED CONCESSIONS

### GOVERNMENT COMMITMENTS

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>MAXIMUM OFFERED IN BIDDING DOCUMENTS*</th>
<th>WINNING PROPOSAL*</th>
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</thead>
<tbody>
<tr>
<td>TUNNEL CONSTRUCTION COST</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>GOVERNMENT CONTRIBUTION</td>
<td>286</td>
<td>129</td>
</tr>
<tr>
<td>MINIMUM REVENUE</td>
<td>196</td>
<td></td>
</tr>
<tr>
<td>LIQUIDITY FACILITY AMOUNT</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>TOTAL REVENUE</td>
<td></td>
<td>1563</td>
</tr>
</tbody>
</table>

*US $ MILLION
ROAD NETWORK OF VALLEY AND CAUCA

RISK ALLOCATION

- Force Majeure Risk.
  - INVIAS will only assume repair, reconstruction or replacement for damages to the works or equipment by the following force majeure events:
    - Sabotage by terrorists or guerrilla forces
    - Public riots, caused by groups or armed forces breaking the law
    - War, declared or undeclared, civil war, coups, conspiracy and national or regional strikes

- Financial Risk.
  - Associated risks, such as refinancing and interest rates will be covered by the concessionaire.
The concession will be awarded through a competitive bidding process designed to minimize the total revenue and to maximize the complementary works over the basic project.

<table>
<thead>
<tr>
<th>ROAD NETWORK OF THE VALLEY CAUCA</th>
<th>WEIGHT</th>
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</thead>
<tbody>
<tr>
<td>COMPLEMENTARY WORKS</td>
<td>40%</td>
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<tr>
<td>MINIMUM REVENUE</td>
<td>10%</td>
</tr>
<tr>
<td>LIQUIDITY FACILITY AMOUNT</td>
<td>10%</td>
</tr>
<tr>
<td>TOTAL REVENUE</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>
COLOMBIAN EXPERIENCE

CONCLUSIONS

- Each project is a different business.
- Investment in studies and designs is essential to success.
- The need for assessing the real risks taken by the government.
- Users must be taken into consideration, and it is necessary to seek agreement with them.
- Imbalance between public and private sectors.
- The need for institutional strengthening.
III. BRIDGES AND TUNNELS BY PRIVATE FINANCING - KEY FACTORS FOR SUCCESS

GEOFFREY SHIELDS
KVAERNER, LONDON
SCOPE OF THIS TALK

- Kvaerner activity as developer/contractor
- case studies of projects
- key success factors
KVAERNER ROLES

- motivated by the order book
- promoter/developer of civil engineering projects (toll roads and bridges), waste to energy plants, hospitals etc
- financier - provider/arranger
- design and build/turnkey contractor
- potential conflicts of interest
DARTFORD RIVER CROSSING (1)

- first BOT type scheme in UK
- estuarial crossing
- construct a new cable-stayed bridge and operate the existing tunnels
- immediate cash flow from tunnels
- visible traffic flows from users accustomed to paying a meaningful toll
DARTFORD RIVER CROSSING (2)

- completion on time, largely due to efficiencies in the d&b concept
- traffic greater than forecast
- early repayment of debt
- extension of concession to fund further improvements to the tunnels and possibly other parts of the UK road network
0 E 11 Bridge
VASCO DA GAMA BRIDGE, LISBON (1)

- existing bridge at near full capacity
- traffic management problem for city
- $1.3$ billion investment cost
- cable stayed bridge, viaducts, interchanges
- longest over water structure in W Europe
Vasco da Gama Bridge
VASCO DA GAMA BRIDGE, LISBON (2)

- 30 months of preparation and bidding
- three years construction - completed 3 weeks early
- strong public reaction to toll increases
- compensation agreements
- outstanding issues between GoP and concessionaire
- first period traffic above forecast
M1-A1 PROJECT

• first of the UK shadow toll road projects, DBF&O basis
• so far largest and most risky - traffic flow uncertainties
• completion anticipated in 12/98 ahead of schedule
SUCCESS FACTORS OVERVIEW (1)

- coordinated government approach
- cost effective bidding process
- competence and stamina required
- fair concession concept, appropriate risk transfer
- demonstrable project viability
- finance equilibrium
SUCCESS FACTORS (2)

- coordinated government approach
  - planning and other approvals
  - tax
  - networks/competing routes
  - foreign exchange
  - borrowing approvals
  - revenue support, if necessary, from government
  - public/user attitudes
SUCCESS FACTORS (3)

- attract serious bids and be cost effective in the bidding process
  - limit number of bidders
  - clear objective evaluation criteria
  - develop clear project definition and documentation
  - require committed finance only at a late stage in process after provisional award
SUCCESS FACTORS (4)

• competence and stamina required
  – complex, interlocking documentation requires experienced advisors
  – total elapsed time from conception of project to start of construction is likely to exceed 30 months
SUCCESS FACTORS (5)

- fair concession terms
  - site acquisition
  - concession length
  - rates of return/exit for sponsors
  - compensation on breach or termination
  - political risks
  - competing schemes
SUCCESS FACTORS (6)

- commercial risks transferred to private sector
  - limited residual risk in concession company
  - traffic risks
  - interest rate risks may be part transferred
  - construction risks - time and money - but not “leading edge” technology
  - operating and maintenance cost risks
SUCCESS FACTORS (7)

• risks to be retained by government
  – planning approvals, permissions generally
  – site acquisition
  – change in legislation
  – interest rate risks between bid date and financial close
  – maybe FX rate risk for whole project life
  – toll enforcement/collectability
SUCCESS FACTORS (8)

- demonstrable project viability
  - contract - LSTK fixed or firm price
  - traffic ramp-up and growth forecasts validated
  - measured willingness to pay
  - opex forecasts validated or risk mitigation
  - real rates of return to exceed 15% in USD terms in non-investment grade countries
SUCCESS FACTORS (9)

- finance equilibrium
  - promoter and third party equity
  - subordinated debt
  - maximize long term senior debt
  - cover ratios/cash flow cushion to protect lenders
  - sensible covenant package and ICA
  - adequate returns for investors/equity
Cashflows
SUMMARY OF SUCCESS FACTORS

- coordinated government approach
- suitable projects
  - technical feasibility
  - financial viability
- dedicated teams
- mind set in all parties to accept appropriate risk transfer/allocation
IV. Private Construction of Toll Lanes Parallel to an Existing Highway: SR 91 Express Lanes, California

Cesar Queiroz
Principal Highway Engineer
Infrastructure Department
Europe & Central Asia Region
World Bank
SR 91 Express Lanes, CA

- First fully automated toll road, 16-km long, opened on December 27, 1995
- Serves commuters on Riverside Freeway (SR 91), Orange County, south of Los Angeles
- Developer and operator: California Private Transportation Company
- Achieved cash flow break-even in mid-1998 (can pay operating and debt expenses from revenues)
SR 91 Express Toll Lanes, CA
FasTrak toll collection system: overhead antenna and transponder (no tollbooths)
Windshield-mounted Transponder
FasTrak Transponder