

A satellite-style map of southeastern Brazil showing the proposed high-speed rail route. The route is marked with a black line starting from Rio de Janeiro on the left, passing through the bay area, and ending near São Paulo and Campinas on the right. The map shows terrain, water bodies, and city lights. The text 'Ilha Grande' is visible near the bay. The title 'BRAZILIAN HIGH SPEED LINE (RIO DE JANEIRO—SÃO PAULO – CAMPINAS)' is overlaid in large yellow letters.

BRAZILIAN HIGH SPEED LINE (RIO DE JANEIRO—SÃO PAULO – CAMPINAS)

APTA RAIL 2011

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Executive Superintendent - ANTT
Boston (MA), June 13 2011

RIO – SÃO PAULO HIGH SPEED LINE - Background

In recent decades, several studies were developed, sponsored or authorized by the Brazilian Government, with a view of implementing a new railroad between Rio and São Paulo, for passengers and freight.

In 2007, the Government decided to review previous studies and contracted a consortium to prepare a feasibility study for a high speed railway line, with a maximum line speed of 350km/h, over 511 kilometers connecting the cities of Rio de Janeiro, São Paulo and Campinas in Brazil.

The Consortium prepared detailed studies:

- ❖ Demand and Revenue Forecasts;
- ❖ Alignment Studies;
- ❖ Finance and Economics Appraisal and Concession modeling;
- ❖ Rail Operations and Technology;
- ❖ TAV Capital Cost.

The most comprehensive study ever conducted.

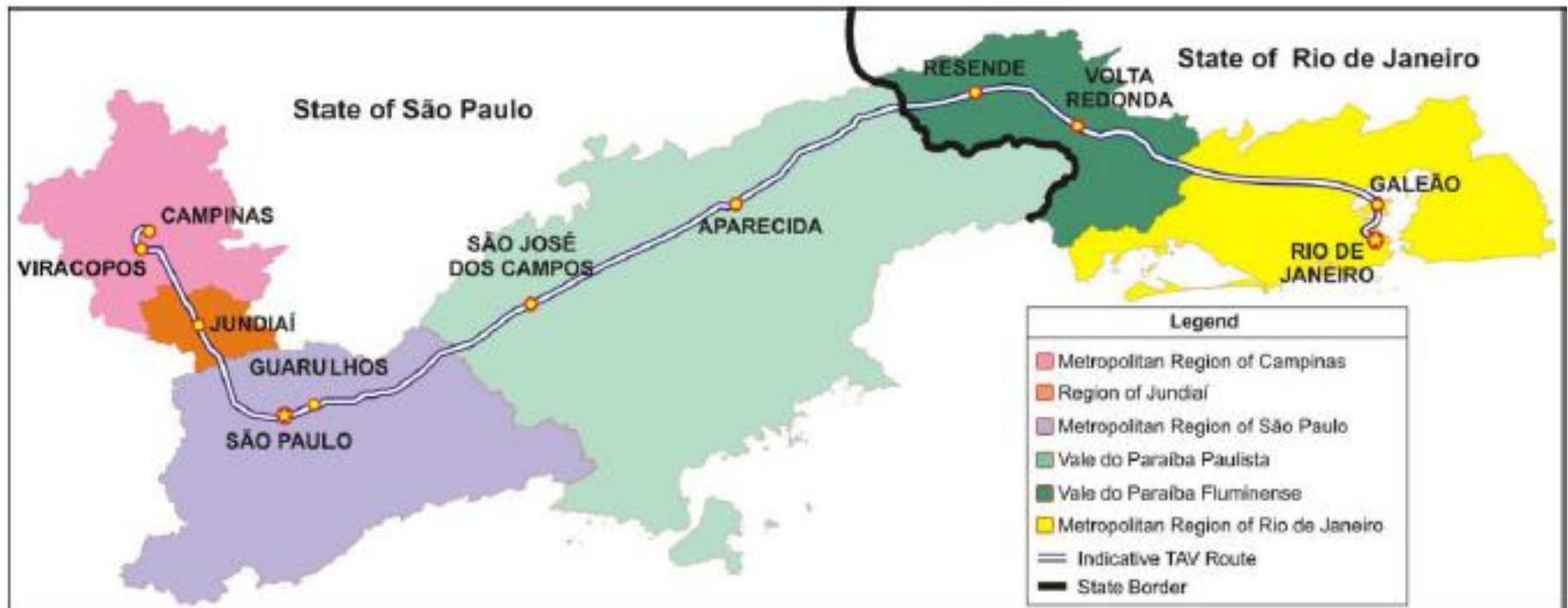
Brazil HSL - TAV Brasil: South America, Brazil, and the states of Rio de Janeiro and São Paulo



Brazil HSL - TAV Brasil - Area of Influence: states of Rio de Janeiro and São Paulo



Brazil HSL - TAV Brasil: Direct Area of Influence - Metropolitan Areas and Regions



Brazil HSL - TAV Brasil: Socio-economic aspects of the regions in the direct area of influence of TAV

The region that includes Rio de Janeiro - Sao Paulo - Campinas is the most important economic region of the country. In the states of Rio de Janeiro and São Paulo live 30% of Brazil population and 45.5% of its GDP.

Metropolitan Region	2007 Population	Area km ²	Pop/ km ²	Main industries	Primary City (2007 est Population)
São Paulo	19,226,426	7,943	2,421	Finance, services, manufacturing	10,886,000
Campinas	2,635,358	3,647	723	High tech, auto, research, education	1,059,000
Jundiaí	580,119	431	1,346	Services, manufacturing	347,000
Vale do Paraíba Paulista	2,156,534	16,179	133	Manufacturing, research, aeronautics	611,000 (São José dos Campos)
Rio de Janeiro	11,157,122	5,645	1,977	Tourism, finance, services, manufacturing	6,136,000
Vale do Paraíba Fluminense	667,405	3,828	174	Manufacturing, steel, agriculture	259,000 (Volta Redonda)

Brazil HSL - TAV Brasil: municipalities in the axis of the high-speed line

The 41 municipalities in the axis of the Rio–São Paulo-Campinas high speed line would correspond to the country's second largest state in terms of population, GDP and higher GDP per Capita of the country.

GEOGRAPHICAL AREA	Population	GDP (In thousand U.S. \$)	GDP per Capita (in U.S. \$)
São Paulo State (26 municipalities)	16.024.394	255,480,865	15.943,25
Rio de Janeiro State (15 municipalities)	9.459.671	113,960,584	12.046,99
Municipalities along the route of TAV (41)	25.484.065	369,441,449	14.496,96
BRAZIL	183.987.291	1,549,635,801	8.422,52
Municipalities along the route of TAV in relation to Brazil	13,9%	23,8%	172,1%

Brazil HSL - TAV Brasil: and the main HS lines in the world

The high speed line Rio - São Paulo - Campinas is comparable to the main HS lines in the world in terms of distance, air traffic and population in key cities.

MAIN HIGH SPEED LINES				
LINE	DISTANCE (km)	POPULATION (millions hab)	AIR TRAFFIC(*) (millions pax/year)	
TOKYO - OSAKA	515	9 - 3	1,7	1964
PARIS - LYON	414	9 - 1	1,0	1981
SEOUL - PUSAN	419	19 - 4	5,2	2003
BEIJING - SHANGAI	1.318	8 - 10	N.D	
MADRID - BARCELONA	620	6 - 5	4,8	2007
RIO - SÃO PAULO	420	11 - 19	5,0	2009

(*) BEFORE THE INTRODUCTION OF HIGH SPEED LINE

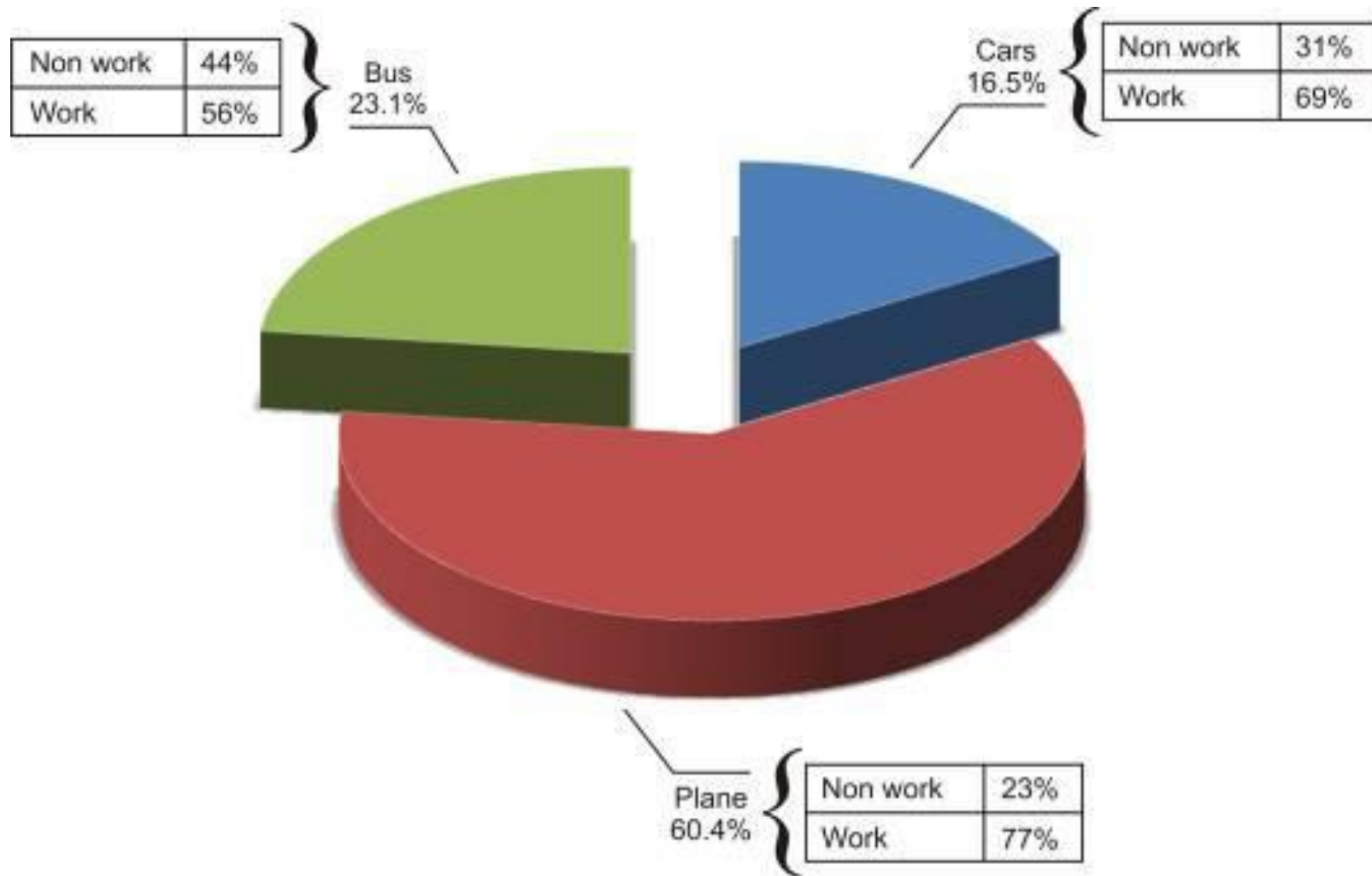
Source:PROF. A. LOPEZ PITA presentation at ANTT in jul 2010.

Brazil HSL - TAV Brasil: Demand for Transport in 2008

Passenger transport matrix- 2008 (thousand passengers/year)				
Modal transport	Rio - São Paulo	Rio - Campinas	Regional	Total
Air	4.414	275	---	4.689
Car	1.207	87	15.771	17.065
Bus	1.687	121	10.040	11.848
Total	7.308	483	25.811	33.602

Passenger transport matrix- 2008 (em %)				
Modal transport	Rio - São Paulo	Rio - Campinas	Regional	Total
Air	60,4	56,9	---	14,0
Car	16,5	18,0	61,1	50,8
Bus	23,1	25,1	38,9	35,3
Total	100	100	100	100

Brazil HSL - TAV Brasil: Demand for Transport - Mode split and reasons for travel



Brazil HSL - TAV Brasil: Fare Parameters

(Reais)

ORIGIN	DESTINATION	Modalidade de Transporte				
		TAV		Air	Car	Bus
		Economy	Executive			
Rio de Janeiro	São Paulo (peak hour)	200,00	325,00	400,00	137,12	67,00
	São Paulo	150,00	250,00	180,00	137,12	67,00
Rio de Janeiro	Campinas	200,00	350,00	400,00	160,80	75,00
Rio de Janeiro	Volta Redonda/Barra Mansa	40,20	-	-	41,46	27,36
	São José dos Campos	102,30	-	-	109,39	51,00
Volta Redonda/Barra Mansa	São José dos Campos	68,40	-	-	73,09	34,00
	São Paulo	97,50	-	-	104,85	46,00
	Campinas	118,50	-	-	126,47	59,00
São José dos Campos	São Paulo	28,80	-	-	31,52	17,30
	Campinas	49,00	-	-	51,91	27,00
São Paulo	Campinas	31,20	-	-	37,38	18,00

Brazil HSL - TAV Brasil: Travel Time Parameters

(minutes)

ORIGIN	DESTINATION	TAV	Transport Mode		
			Air	Car	Bus
Rio de Janeiro	São Paulo	93	110	300	375
Rio de Janeiro	Campinas	128	110	390	450
Rio de Janeiro	Volta Redonda/Barra Mansa	34	-	105	130
	São José dos Campos	77	-	260	300
Volta Redonda/Barra Mansa	São José dos Campos	42	-	175	230
	São Paulo	71	-	240	300
	Campinas	108	-	295	400
São José dos Campos	São Paulo	27	-	70	80
	Campinas	64	-	120	150
São Paulo	Campinas	30	-	75	80

Brazil HSL - TAV Brasil: Demand for Transport with TAV

Passenger transport matrix- 2008

(thousand passengers/year)

Without TAV				
Modal	RIO - SÃO PAULO	RIO - CAMPINAS	REGIONAL	TOTAL
Air	4.414	275	-	4.689
Car	1.207	87	15.770	17.064
Bus	1.687	121	10.039	11.847
Total	7.308	483	25.809	33.600
With TAV				
TAV	3.519	302	14.170	17.991
Air	2.368	101	0	2.469
Car	751	31	8.108	8.890
Bus	670	49	3.531	4.250
Total	7.308	483	25.809	33.600

Brazil HSL - TAV Brasil: Demand Forecast - day

(thousand passengers/day)

ORIGIN	DESTINATION	2014	2024	2034	2044
EXPRESS SERVICE		19.4	30.9	52.9	76.1
Rio de Janeiro	São Paulo	17.6	27.9	47.5	68.4
Rio de Janeiro	Campinas	1.7	3.0	5.4	7.8
REGIONAL SERVICE		70.0	95.3	136.4	196.1
Rio de Janeiro	V.Redonda/B.Mansa	7.2	9.0	11.5	16.6
	S.J.Campos	0.6	0.8	1.2	1.7
V.Redonda/B.Mansa	S.J.Campos	0.7	0.9	1.3	1.8
	São Paulo	0.5	0.6	0.8	1.2
	Campinas	0.1	0.2	0.2	0.3
S.J.Campos	São Paulo	23.4	31.5	44.6	64.2
	Campinas	3.6	5.5	8.5	12.3
São Paulo	Campinas	33.9	46.8	68.2	98.1
TOTAL		89.3	126.2	189.3	272.2

Brazil HSL - TAV Brasil: Demand Forecast - year

(thousand passengers/year)

ORIGIN	DESTINATION	2008	2014	2024	2034	2044
EXPRESS SERVICE		3.822	7.070	11.282	19.323	27.788
Rio de Janeiro	São Paulo	3.520	6.435	10.201	17.348	24.948
Rio de Janeiro	Campinas	302	635	1.081	1.975	2.840
REGIONAL SERVICE		14.170	25.538	34.777	49.774	71.577
Rio de Janeiro	V.Redonda/B.Mansa	1.017	2.619	3.271	4.211	6.055
	S.J.Campos	84	211	294	422	606
V.Redonda/B.Mansa	S.J.Campos	44	254	337	457	657
	São Paulo	88	184	233	308	443
	Campinas	15	40	55	79	113
S.J.Campos	São Paulo	4.959	8.553	11.490	16.282	23.415
	Campinas	598	1.305	2.003	3.110	4.473
São Paulo	Campinas	7.365	12.372	17.094	24.905	35.815
TOTAL		17.992	32.608	46.059	69.097	99.365

Brazil HSL - TAV Brasil: Revenue Forecast

US\$ million

ORIGEM	DESTINO	2014	2024	2034	2044
SERVIÇO EXPRESSO		850.1	1,355.7	2,335.9	3,359.2
Rio de Janeiro	São Paulo	765.0	1,214.4	2,078.1	2,988.5
Rio de Janeiro	Campinas	85.1	141.2	257.7	370.6
SERVIÇO REGIONAL		502.5	684.5	978.8	1,407.5
Rio de Janeiro	V. Redonda/B. Mansa	61.3	76.6	98.6	141.7
	S.J. dos Campos	12.6	17.5	25.1	36.1
V. Redonda/B. Mansa	S.J. dos Campos	10.1	13.4	18.2	26.1
	São Paulo	10.4	13.3	17.5	25.1
	Campinas	2.7	3.8	5.4	7.8
S.J. dos Campos	São Paulo	143.4	192.2	273.0	392.6
	Campinas	37.2	57.2	88.7	127.6
São Paulo	Campinas	224.7	310.5	452.4	650.6
TOTAL		1.352.6	2,040.2	3,314.7	4,766.7

Brazil HSL - TAV Brasil: Engineering and Alignment

Parameters of the railroad:

Gauge:	1,435 mm
Max. Speed Project:	350 km / h
Min. horizontal radius:	7,228 m
Min. Vertical radius:	42,875 m
Slope max:	35 mm / m
Train axle load:	17 t
Platform:	500 m

Brazil HSL - TAV Brasil: Engineering and Alignment

Parameters used in defining the track alignment

- ✓ Technical and operational parameters:
 - ❖ Construction cost considered the geological risks;
 - ❖ Travel time;
 - ❖ Operating Cost
 - ❖ Maintenance cost

- ✓ Social and environmental parameters:
 - ❖ Social Impact (expropriation, resettlement, redevelopment, relocation of roads, etc.);
 - ❖ Environmental impact (compensatory planting, environmental compensation, restricted areas);

Brazil HSL - TAV Brasil: Engineering and Alignment

STRETCH	Extension (km)
Barão de Mauá – Galeão	15.2
Galeão – Barra Mansa/Volta Redonda	102.9
Barra Mansa / Volta Redonda – S. J. Campos	209.6
S. J. Campos – Guarulhos	63.0
Guarulhos – Campo de Marte	21.6
Campo de Marte – Viracopos	76.1
Viracopos – Campinas	22.9
TOTAL EXTENSION	510.8
Tunnel	90.9 (18%)
Viaducts and Brigdes	10.8 (21%)
Surface	312.1 (61%)

Brazil HSL - TAV Brasil: CAPEX and OPEX

CAPEX

US\$ thousand

Item	Total Geral	%
Earthwork	1,238,985.6	6,4
Structures	10,184,187.9	52,8
Buildings and equipment	795,314.5	4,1
Signalling and telecommunications	333,284.5	1,7
Permanent way	1,129,875.0	5,9
Social and environmental works	2,267,151.8	11,8
Electricfication	719,278.6	3,7
Rolling stock	1,447,574.2	7,5
Complementary Services	1,172,732.9	6,1
TOTAL	19,288,384.9	100,0

US\$ 37,7 million /Km

Brazil HSL - TAV Brasil: CAPEX and OPEX

OPEX

ITEM	2014		2024		2034		2044	
	US\$ x 10 ⁶	(%)	US\$ x 10 ⁶	(%)	US\$ x 10 ⁶	(%)	US\$ x 10 ⁶	(%)
PERMANENT WAY	5.9	12,1	77.6	20,4	155,2	30,5	155,2	29,7
STRUCTURES	32.4	15,2	32.5	8,6	43,1	8,5	43,1	8,3
ROLLING STOCK	122.2	57,24	224.9	59,3	252,5	49,7	253,3	48,5
ADMINISTRATIVE EXPENSES	19.9	9,3	24.9	6,6	26,3	5,2	26,3	5,0
MARKETING & SALES	13.4	6,3	19.7	5,2	31,3	6,2	44,2	8,5
TOTAL	213.7	100	379.5	100	508,3	100	522,0	100

Brazil HSL - TAV Brasil: Construction and Concessioneing

- ✓ The object of the concession is the public service by TAV including design, construction, operation, and maintenance of TAV Rio de Janeiro – Campinas according to contract terms;
- ✓ Concession will be remunerated by tariffs on ticket sales, by of economic exploitation of the stations, as well as extraordinary revenues, should they occur

Brazil HSL - TAV Brasil: Construction and Concessioneing

- ✓ Construction and start-up of commercial operations should be in the maximum of six (6) years from preliminary environmental license and conclusion of expropriation;
- ✓ Concession is for a 40 (forty) years period, beginning from the date of issuance of last environmental license after conclusion of constructions and operational tests.

Brazil HSL - TAV Brasil: Public participation

- ✓ Public company who will hold minority stake in the Special Purpose Company - SPE, to whom will be granted the concession;
- ✓ Public participation will be made in the form of:
 - ❖ Capitalization of US\$660 millions to be paid in local currency;
 - ❖ Capitalization of US\$1,3 billion through the payment of assets arising from expropriations necessary for the deployment of infrastructure and operation of public service for the TAV.
- ✓ Public financing, subject to the ceiling of 60.3% of the value of investments, or US\$11,6 billion), whichever is less.
- ✓ Exemption from taxes on ticket sales and and investment.

Brazil HSL - TAV Brasil: Financial Model

- Project IRR: 5,7%
- Share holder IRR: 9,2%

Item	Cost (US\$ million)	%
Equity	5.786,5	30%
Private equity	3.807,0	20,20%
Public equity	1.979,5	9,80%
Debt	13.501,9	70%
Public Financing	11.630,9	60,30%
Eximbank	1.871,0	9,70%
Investment	19.288,4	100%

PUBLIC FINANCING	
Cost	US\$11,6 BN
Paymt. Period	30 years
Grace period	5,5 years to 1st credit
Interest rate	TJLP + 1% per year
Amortization	Price

EXIM	
Cost	US\$1,8 BN
Paymt. Period	20,5 years
Grace period	5,5 years
Interest rate	5,71% per years + ex/rate
Amortization	Constant

Public support	(US\$ BN)
Expropriation	1,3
Equity	0,66

Brazil HSL - TAV Brasil: Bidding Process

➤ Modality: Auction, governed by Law No. 9.491/97, 3 phases

❖ Phase 1

▪ Technical Pre-qualification:

- ✓ Experience in final engineering design project for TAV in operation;
- ✓ Experience in operation of TAV;
- ✓ Expertise in deploying the complete system of TAV;
- ✓ Experience in the manufacture of rolling stock of TAV (technology)

❖ Phase 2

- Auction bidding: R\$ 0,49/km (US\$0,30/km) ceiling rate for the express link Rio de Janeiro - Sao Paulo;

❖ Phase 3

- ✓ Demonstration of legal, economic and financial conditions for the concession;
- ✓ Compliance with minimum requirements of the Technical Proposal and Technology Transfer

Brazil HSL - TAV Brasil: Transfer of Technology

- Bidder shall present a Program for Transfer of Technology in certain areas defined as technological focus.
- ❖ The Technology Transfer shall comprise all technical and scientific knowledge created and transmitted through materials, processes, methods, tools and technical assistance programs and training, whether or not protected by copyright and industrial rights, necessary for the construction, operation and maintenance TAV systems;
- ❖ The technology provider shall ensure, on a non-costly base, to transfer all technology related to the technological focus for the Federal Public Enterprise, or Local Agents indicated by it;
- ❖ To encourage the development of Brazilian industry and market, the Concessionaire shall ensure a minimum percentage of local content of goods and services used in the construction and operation of TAV.

Brazil HSL - TAV Brasil: CHALLENGES

- **ACCESSIBILITY** - Investments to improve users' access to stations by means of mass transportation and high capacity urban roads;
- **QUALIFICATION OF DOMESTIC INDUSTRY** – Implementation of programs for the transfer and absorption of technology, with increased investment in domestic industry to offer, in a competitive way, equipment, systems and services for expansion of high-speed network;
- **QUALIFICATION OF WORK FORCE** - Training of professionals to meet future demand in the industry segment of high-speed transport services;

Brazil HSL - TAV Brasil: CHALLENGES

- **URBAN TRANSFORMATION** - Improving the quality of life in cities serviced by TAV in order to avoid the bottlenecks resulting from the implementation of high-speed lines;
- **ENVIRONMENTAL LICENSING** - Obtaining environmental permits in time and with priority given to preservation of the environment to effectively capture the advantages of high speed transport;

Brazil HSL - TAV Brasil:



EXPANSION OF HIGH SPEED NETWORK IN BRAZIL

Studies included the PAC II

EF-333 National Plan for Railroad

EF-222 Line under bidding process

Brazil HSL - TAV Brasil: HIGHLIGHTS

- ✓ Most populous region (36 million) and more developed economically (45% of GDP) of Brazil;
- ✓ Rio – São Paulo: 420 km in 93 min;
- ✓ Estimated project cost: US\$ 19.3 billion;
- ✓ Public sector participation: equity and financing;
- ✓ Bidding open to all existing technologies;
- ✓ Publication of bidding documents: July 14, 2010
- ✓ Receipt of proposals: July 11, 2011;
- ✓ AUCTION: July, 29 2011

THANKS!

www.tavbrasil.gov.br